RSX-11M

System Generation
and Management Guide

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RSX-11M Version 3.2

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PREFACE

MANUAL OBJECTIVES

The RSX-11M System Generation and Management Guide is for use in generating the RSX-11M operating system. This guide provides information on how to generate an RSX-11M system tailored to a particular installation's hardware configuration and application requirements.

INTENDED AUDIENCE

System generation is a fairly complicated process. To fully understand what is taking place, readers should be familiar with RSX-11M and its component tasks. This guide is directed toward system managers (those responsible for tailoring and maintaining installation specific RSX-11M systems.

STRUCTURE OF THIS DOCUMENT

First, read Chapters 1, 2, and part of 3. Then follow the specific instructions in Chapter 3. For complete details on the Phases of system generation, read Chapters 5, 7, and 9.

Chapter 1 contains an overview of the system generation process. It acquaints you with the various phases involved in producing a tailored system.

Chapter 2 describes the distribution kits and supplies methods for copying the media.

Chapter 3 provides information on preparing the host system and on initiating system generation.

Chapter 4 provides a summary of the Phase I questions.

Chapter 5 provides complete details for the Phase I questions.

Chapter 6 provides a summary of the Phase II questions.

Chapter 7 provides complete details for the Phase II questions.

Chapter 8 describes the commands and operation of the Virtual Monitor Console Routine (VMR), which initializes the target system in the final stage of system generation.

Chapter 9 describes the optional phase of system generation, Phase III.

Chapter 10 describes the means of confirming that the system generation process was a success.

Chapter 11 supplies an interpretation of the system generation error messages.

Note that Chapters 5 and 7 conclude with details of an actual system generation (Chapter 5 contains Phase I, Chapter 7 contains Phase II).

Appendix A defines the symbols of a saved answer file.

Appendix B describes the system display task RMDEMO.

Appendix C describes the Console Output Task (COT) and defines COT commands.

Appendix D describes the queue manager.

Appendix E describes the I/O Exerciser (IOX) and defines the IOX commands.

Appendix F describes RSX-11M system conventions.

Appendix G is a listing that describes the means of building a 4K FCS resident library.

Appendix H describes how to use support for DEC supplied Help files.

Appendix I details hardware bootstrap ROMs.

ASSOCIATED DOCUMENTS

The RSX-11M Documentation Directory briefly describes all the manuals in the RSX-11M documentation set and provides a brief synopsis of each manual's contents. The following lists the manuals most closely allied to the purposes of this guide:

> RSX-11M/M-PLUS Executive Reference Manual
> RSX-11M/M-PLUS MCR Operations Manual
> RSX-11M/M-PLUS I/O Drivers Reference Manual
> RSX-11M/M-PLUS Task Builder Manual

CHAPTER 1

INTRODUCTION

The system generation process, SYSGEN, defines a user RSX-11M operating system tailored to meet a specific PDP-11 configuration. SYSGEN provides the flexibility to generate an RSX-11M system that fits the many variations of the hardware configuration as well as the software elements.

This chapter provides an introduction that helps you tailor RSX-11M to meet your hardware and software needs.

1.1 OVERVIEW OF SYSTEM GENERATION

The system generation process consists of logical steps that ultimately produce an RSX-11M system. Figure 1-1 summarizes these steps from preparation and planning, invoking the SYSGEN command files, creating the tailored system, and placing the system on a target media.

1.1.1 Preparing for SYSGEN

First, backup your RSX-11M distribution kit and become familiar with the baseline system. The backup copy insures against destruction of the data on the kit and provides a base for updates to the operating system that you may receive in the future. The baseline system controls the system resources during system generation.

Chapter 2 provides information about the distribution kits and how to copy the kits to a backup volume. Chapter 2 also describes the RSX-11M baseline system.

1.1.2 The System Generation Command Files

RSX-11M indirect command files control system generation. These command files are collectively known as SYSGEN. The SYSGEN command files:

- Permit you to define the features to be included in (or excluded from) your system

- Perform MACRO-11 and Task Builder processing to produce an executable image of the system

- Define the system memory requirements
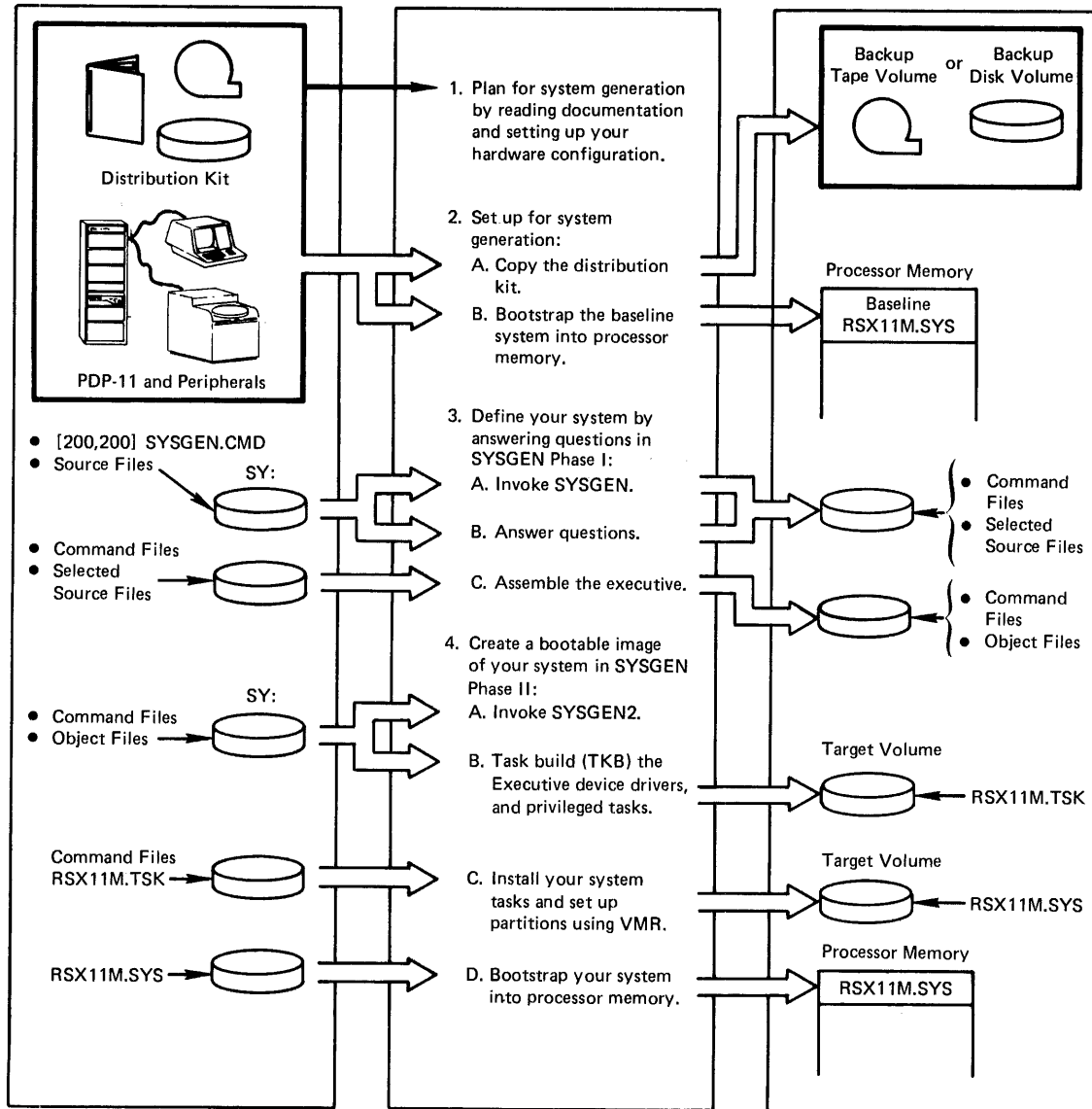
Figure 1-1   SYSGEN Steps
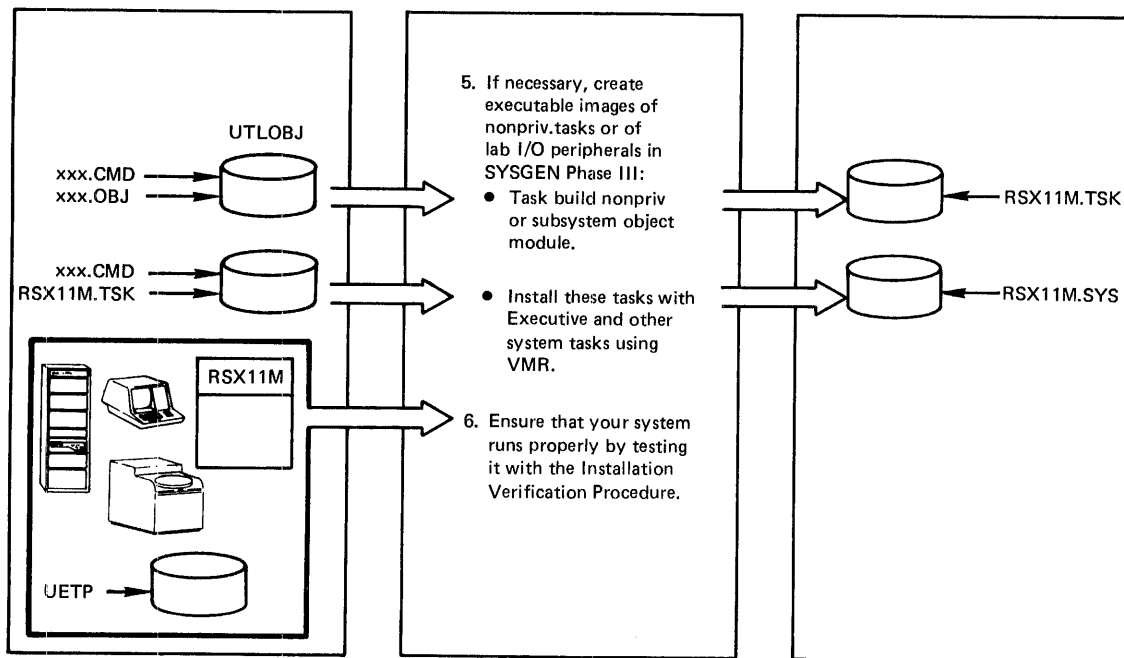
Figure 1-1 (Cont.)   SYSGEN Steps

SYSGEN executes in three phases or parts. In Phase I, you define the
target configuration and assemble the Executive and device drivers.
In Phase II, you task build the Executive, device drivers, and
privileged system tasks.   In Phase III, you optionally task build
nonprivileged tasks.

When SYSGEN completes processing of Phase I, it has produced object
and command files to be used as input to SYSGEN Phase II. Upon
completing Phase II, SYSGEN has produced a system image, complete with
loadable drivers and privileged tasks. You can then, if necessary,
continue with Phase III and build (or rebuild) nonprivileged tasks.

1.2 SYSTEM GENERATION FEATURES

The system generation dialogue is divided into phases, each phase
designed to generate a separate section of the system:

Phase I   -- Ask SYSGEN dialogue questions and assemble source files
               for the Executive, device drivers, and, if requested,
               laboratory and industrial I/O subsystems.

Phase II   -- Task Build the Executive, device drivers, and all
               privileged tasks, define partitions for the system image,
               load device drivers, and install tasks.

Phase III -- Optionally, Task Build unprivileged utilities.

SYSGEN Phase I is divided into sections. The sections either define
logical parts of an RSX-11M system or provide control information for
SYSGEN. The following list shows the sections in SYSGEN Phase I along
with a description of the function performed in each section.

SYSGEN Section	Function
Setup	Defines for SYSGEN how to use saved answers (described below) and, in general, allows you to specify the way SYSGEN executes.
Target	Defines for SYSGEN the hardware characteristics of your target system.
Host	Specifies whether you are running SYSGEN standalone (on the baseline system) or online (on a previously generated RSX-11M system) and also allows you to specify how you want SYSGEN to handle listings and maps.
Executive	Defines the Executive features you want to include in your RSX-11M target system.
Terminal Driver	Defines the type of terminal driver you want in your target system and the software features supported by the driver.
Peripherals	Describes control information for the peripherals included in your target system, such as Control Status Register (CSR) address and vector addresses for the peripherals.
Assembly	Provides you the opportunity to edit executive build files or laboratory and I/O build files before assembly of Executive and laboratory subsystem source files.

SYSGEN provides the means to inhibit execution of MCR command lines during SYSGEN Phase I. This feature allows you to perform a SYSGEN without actually executing the commands that create, delete, assemble, or build task images.

MCR command inhibition permits you to follow a logical path through SYSGEN without altering existing files. More importantly it provides an excellent opportunity for a user to become familiar with SYSGEN before actually performing a full or "live" SYSGEN.

SYSGEN provides the means to save answers to questions asked during SYSGEN Phase I and Phase II. These answers are saved in a file called SYSSAVED.DAT. You can use this feature to select options and features for multiple target configurations or to vary the options and features generated for operating systems to be used on the same processor. When used in conjunction with MCR command inhibition, you can trace the logical flow of SYSGEN and then use the saved answers to generate an actual system.

Three features permit you to execute SYSGEN Phase I without interruption. When used with saved answers, these features allow you to generate an RSX-11M operating system unattended.

These three features are:

- End-of-Section Breakpoints

- End-of-Execution Breakpoints

- End-of-Disk Breakpoints

1.3 FORMAT OF SYSGEN QUESTIONS

SYSGEN questions provide a simple means for selecting the features you want in your system. Based on your responses, SYSGEN generates various command files that control the assembly and task building of your system.

The following question is an example that shows the form of most SYSGEN questions:

    * 2. Have you made a copy of the distribution kit? [Y/N]:

Each SYSGEN question is preceded by an asterisk and a number. In SYSGEN Phase I, there are seven sections; the questions in each section are numbered beginning with question number 1. The number is followed by the text of the question. The text of the question is followed by a prompt generated by the RSX-11M indirect command file processor, in this case [Y/N]:.

When SYSGEN asks a question that requires a number as a response, the indirect command file processor generates a prompt that specifies the defaults and appropriate ranges or options, for example:

    * 35. Number of preallocated QIO packets [D R:0.-15. D:5]:

The character D following the bracket indicates that the following numbers are decimal. R: specifies the range of numbers you can enter, in this case from 0 through 15. D: following the range specifies the default value SYSGEN uses when you enter only a carriage return.

SYSGEN also asks questions that require ASCII strings as responses:

    * 50. Memory dump device (ddu:) [D: NL:][S]:

In this case, the character D following the open bracket indicates the default. [S]: specifies that an ASCII string response is required.

Where there are exceptions to these general rules, SYSGEN displays prompts to explain how to answer questions.

When you answer a question with an incorrect value, SYSGEN displays a message that describes the error and suggests a procedure to correct the problem.

Error messages are listed alphabetically in Chapter 11.

1.4 LOGICAL FLOW OF SYSGEN QUESTIONS

As described above, questions in SYSGEN sections are numbered. However, SYSGEN never asks all questions; the questions asked are based on the response to previous questions.

SYSGEN includes some features automatically when you select certain options and prints a message to inform you of their inclusion. More importantly, when you select an option that requires an option that you excluded, SYSGEN automatically includes the excluded option and informs you.

If you request DBMS support in Executive question 1, SYSGEN automatically includes Files-11 support (which would ordinarily be asked for in Exective question 2) and displays a message specifying that Files-11 support is being included:

```
* 1. Will DBMS-11 be used [Y/N]:Y
     Files-11 ACP support will be included
```

If you had not selected DBMS, SYSGEN would have asked Executive question 2:

```
* 1. Will DBMS-11 be used [Y/N]:N
* 2. FILES-11 ACP [Y/N]:Y
```

1.5 INVOKING THE SYSGEN COMMAND FILES

As described above, system generation is controlled by command files known, collectively, as SYSGEN. There is one command file to control each phase of SYSGEN:

```
SYSGEN.CMD    Controls execution of SYSGEN Phase I
SYSGEN2.CMD   Controls execution of SYSGEN Phase II
SYSGEN3.CMD   Controls execution of SYSGEN Phase III
```

You invoke each of these as you would invoke any RSX-11M indirect command file:

```
@filename
```

where @ invokes the RSX-11M indirect command file processor and filename specifies the filename of the command file. You need not specify the filetype .CMD when you execute these files.

When each indirect command file completes execution, it generates the prompt:

```
@<EOF>
```

This prompt indicates that a SYSGEN phase has completed execution. If you want to execute the next Phase, you must invoke it explicitly.

As explained above, each of the three main SYSGEN command files must be explicitly invoked. However, SYSGEN.CMD (the control file for Phase I) invokes secondary control files, as shown in Figure 1-2.

SYSGEN invokes other command files depending on the type of requests you make during the SYSGEN dialogue. These secondary command files all have the prefix SGN in their filenames rather than the SYS prefix used in the major command files.

SGNEXEC and SGNPER are invoked when you specify that you want to answer executive and peripherals questions. SGNICIS or SGNIP is called when you specify that you have laboratory or I/O subsystem peripherals in your configuration. SGNTT is invoked when you are answering questions that define terminal driver characteristics.
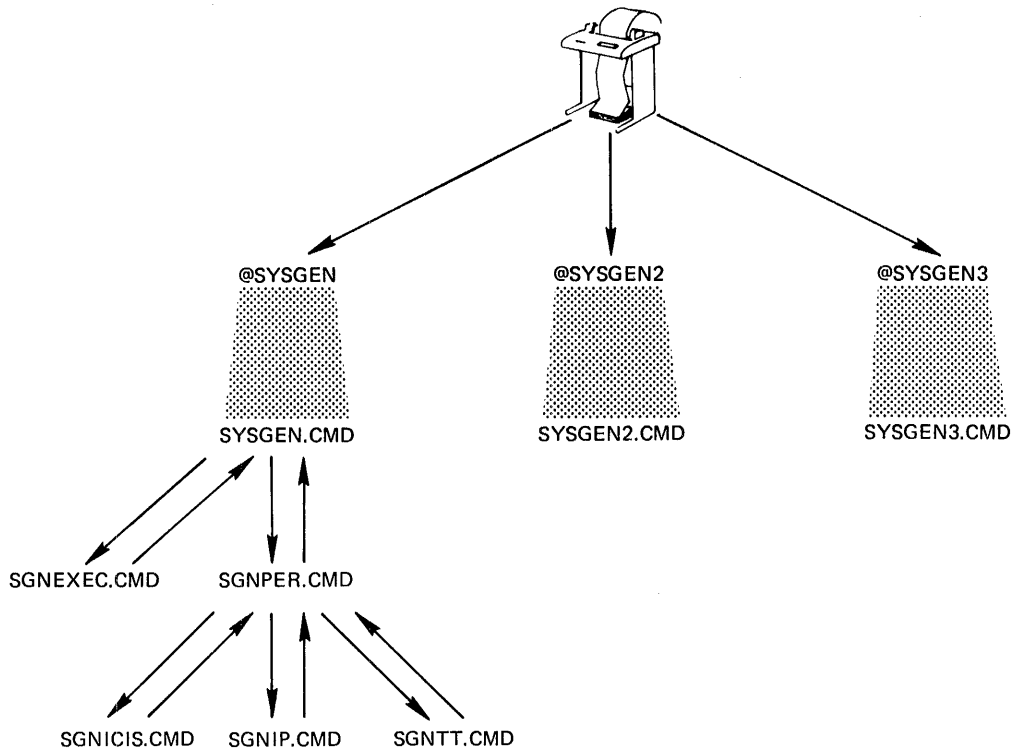
Figure 1-2   SYSGEN Command Files and How They Interrelate
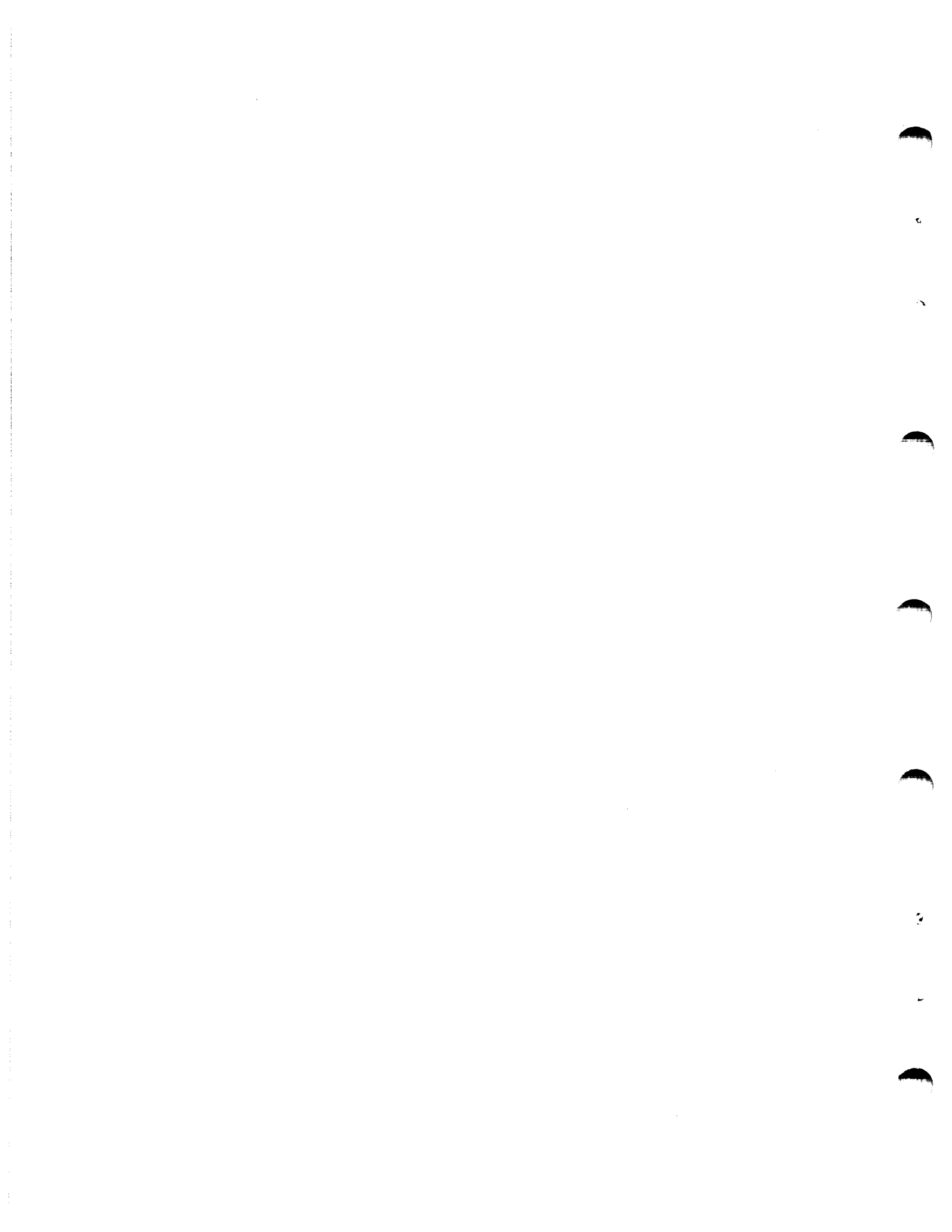
CHAPTER 2

SETTING UP FOR SYSTEM GENERATION

This chapter provides information on the following topics:

- System generation environments

- Bootstrapping programs into processor memory

- RSX-11M distribution kit and baseline system

- Backing up the distribution kit and bootstrapping the baseline system

- Startup Display Sequence

2.1 SYSTEM GENERATION ENVIRONMENTS

When you generate RSX-11M, an operating system controls the processor. In an online environment, you are generating RSX-11M under control of an operating system that has already been tailored to your hardware/software environment. When you must generate RSX-11M without such an operating system, you must use the RSX-11M baseline system.

In general, if you are generating RSX-11M in an online environment, you need not go through many of the setup procedures described below.

If you are generating a new system online, you should protect existing files and data; SYSGEN creates and deletes files and uses many UICs during its execution. You can protect existing files and data by isolating devices used by SYSGEN from system devices. For example, if your system device is normally DB0: and you have another unit available, run SYSGEN using DB1: (for example, ASN DB1:=SY:).

If you are generating RSX-11M on the baseline system, you must follow the procedures described in this chapter.

2.2 BOOTSTRAPPING PROGRAMS INTO PROCESSOR MEMORY

Your PDP-11 processor must have a control program resident in its memory before you can use the hardware resources. For the RSX-11M system generation, two systems are used to control system resources: the Disk Save and Compress (DSC) standalone system and the RSX-11M baseline system. DSC is discussed briefly later in this chapter and in detail in the RSX-11 Utilities Manual. The following sections discuss the RSX-11M baseline system.

These systems are loaded into memory using hardware bootstrap routines in PDP-11 Read-Only Memory (ROM). Ensure that you know which of the bootstrap ROMs is in your processor.

The keys on the console panel of your processor provide control functions you can use to bootstrap control programs into processor memory. These console functions are controlled by switches which vary in appearance on different processors. Refer to the Processor Handbook for your processor for explanations of these functions.

2.3 THE RSX-11M SYSTEM GENERATION DISTRIBUTION KIT

RSX-11M distribution kits are the tape or disk media that contain the source, object, task, and command files you need to build your RSX-11M system.

Regardless of whether your kit is a disk kit or a tape kit, RSX-11M system generation is always done using disks; if you receive a tape distribution kit, the tape(s) contains images for a particular type of disk kit.

There are three types of kits: the dual RK05 kit, the RL01 kit, and the big disk kit. The term "big disk kit" refers to the type of kit on which the entire distribution kit can be stored on a single disk volume. Big disk media can be one of the following:

      RK06/RK07
      RM02/RM03
      RP02/RP03
      RP04/RP05/RP06

This section describes the types of RSX-11M distribution kits, the contents of each kit, and how to backup a kit.

2.3.1 Types Of Distribution Kits

RSX-11M is distributed on either disk or tape. Whether your kit is on disk or tape, create a backup copy on disk before you try to generate your system.

The backup of the distribution kit provides a base against which you can update your system when you receive patches from DEC. Also, the backup provides you with a spare volume with which to retry SYSGEN in case you destroy important files or otherwise make your system unusable.

2.3.1.1 Disk Distribution Kits - Disk kits are distributed on three types of disk media. The following list shows the disk type and the number of disks in the kit:

Type of Kit	Number of Disks
RK05	6
RL01	4
Big Disk Kit (the RK06 or RK07 only)	1

For big disk kits, only RK06 or RK07 disks are physically distributed, other big disk kits are furnished on magtape.

2.3.1.2 **Tape Distribution Kits** - RSX-11M is distributed on 6 types of tape kits. Each tape must be copied to disk using DSC before performing the SYSGEN; each tape contains DSC images for the appropriate type of disk. After you copy the tape to disk, the disk can be booted. All tapes are 9-track tapes. The following list shows the type of disk to which the tape must be copied, the number of tapes in the kit, the tape length, and the tape density before generating your system.

Type of Disk	Number of Tapes	Tape Length (feet)	Tape Density (bpi)
RK05	6	600	800
RL01/RL02	2	2400	800
RK06/RK07	4	600	800
RM02/RM03	1	2400	800
RM02/RM03	1	2400	1600
RP02/03	1	2400	800
RP04/05/06	1	2400	800
RP04/05/06	1	2400	1600

2.3.2 Contents of the RSX-11M Release Kit

There may be several disks used during SYSGEN, depending on which kit you have. Each disk has a volume label that describes the contents of the disk. The following sections describe the contents of all three types of kits in terms of the contents of the volume in the RK05 kit.

2.3.2.1 **Volumes on the RK05 Distribution Kit** - The following list shows the volume name of each of the disks in the RK05 distribution kit, along with a brief description of the files on the volume.

RSXM26   This disk contains the files that comprise the baseline system; this disk also contains various standalone systems used during system generation, for example, DSCS8, DSCS16, and PRESRV.

EXCSRC   This disk contains the source files for the RSX-11M Executive; this disk also contains other files used by SYSGEN, including MAC and BIGMAC. Also included on this volume are standalone versions of DSC: DSCS8 and DSCS16. This volume contains the Backup and Restore utility (BRU) files and the files to produce Help text files. For information on the help text files, see Appendix H.

DRVSRC   This volume contains the source files for the drivers. This volume also contains the K-series routines.

MCRSRC   This disk contains the source files for MCR, the shuffler, broadcast (BRO), console output task (COT), and the account file maintenance program (ACNT).

PRVOBJ   This disk contains the object files for RSX-11M privileged tasks, as well as .ODL and .OLB files.

UTLOBJ   This disk contains the object files for the RSX-11M utilities and nonprivileged tasks.

2.3.2.2 **Volumes on the RL01 Distribution Kit** – The following list shows the volume name of each of the disks in the distribution kit, along with a brief description of the contents of the volume.

RSXM26   This disk contains the files that comprise the baseline system

MAPSRC   Contains all the files required to build mapped systems. The files in this volume correspond to the following volumes in the RK05 kit:

                              EXCSRC
                              DRVSRC
                              PRVOBJ

                              All task files are in UIC [1,54] for mapped systems.

UNMSRC   Contains all the files required to build unmapped systems. The files in this volume correspond to the same volumes as in MAPSRC, above. However, task files for unmapped systems reside in UIC [1,50].

RLUTIL   Contains files corresponding to the files in the following volumes on the RK05 kit:

                              UTLOBJ
                              MCRSRC

                              This disk also contains the Backup and Restore utility (BRU) files and the files to produce Help text files. For information on the help text files, see Appendix H.

2.3.2.3 **Volume on Big Disk Kits** – The volume name of the disk for large disk kits is RSXM26. This volume contains all the source, object and other files required for system generation.

2.3.3 **Standalone DSC**

All distribution kits include standalone versions of the Disk Save and Compress (DSC) Utility. DSC is used to create backup copies of the distribution kit.

There are two versions of the standalone DSC utility, DSCS8 and DSCS16. DSCS8 is used with 800 BPI (and 1600 BPI) tape devices and DSCS16 is used with 1600 BPI tape devices only.

Disk kits include copies of both versions in UIC [1,51].

Included in each tape kit is a 600-foot, 9-track 800 BPI magnetic tape that contains a hardware bootable, standalone version of the Disk Save and Compress Utility (DSCS8). Use the DSC tape to copy tape kits to disk.

2.3.4 The RSX-11M Baseline System

If you do not have an RSX-11M operating system for your host computer (your host computer is the computer on which you are performing the system generation), you need an operating system to control the host's resources while you generate an RSX-11M operating system. DEC provides the RSX-11M baseline system for this purpose.

During SYSGEN, many files are created, installed and removed, then deleted. Also, these files are contained in many UICs in order to separate one type of file from another. Among other reasons, the tasks on the baseline system are used to make these types of file manipulation functions possible.

Execution of baseline system tasks is controlled by MCR (the RSX-11M Monitor Console Routine).

The baseline system is an RSX-11M operating system that comprises only those software tools you need to generate a more complex system tailored to your specific configuration.

2.4 BACKING UP YOUR DISTRIBUTION KIT AND BOOTSTRAPPING THE BASELINE SYSTEM

When you receive the RSX-11M distribution kit, you should make a backup copy of the kit to ensure against accidents to the files and data on the kit and to provide a base for system updates.

This section describes the procedures for backing up tape and disk distribution media.

2.4.1 Backing Up Tape Distribution Media

When you receive tape distribution media, use the hardware bootable DSC tape to copy the tape media to disk because the system generation program requires disk volumes for its processing. Once you copy the distribution media from tape, the tape is your backup copy of the kit.

The procedure for copying from tape to disk and bootstrapping the baseline system is shown in Figure 2-1.

Step 1 in Figure 2-1 is bootstrapping the standalone version of the Disk Save and Compress Utility (DSC) into processor memory. DSC provides the functions required to copy the RSX-11M distribution media. (For a complete description of DSC functions, refer to the RSX-11 Utilities Manual.)

To bootstrap DSC, mount the DSC tape you receive with the distribution kit and the disk to which you are writing, and follow the hardware bootstrap procedures for your particular bootstrap ROM. The PDP-11 hardware bootstrap routine bootstraps the standalone version of DSC into processor memory and gives DSC control of the system. DSC displays the following line when it is ready:

    RSX11S V2.2 BL26 DISK SAVE AND COMPRESS UTILITY V3.0
    DSCS8>

You can then enter the DSC command lines to create disk copies of the distribution media.
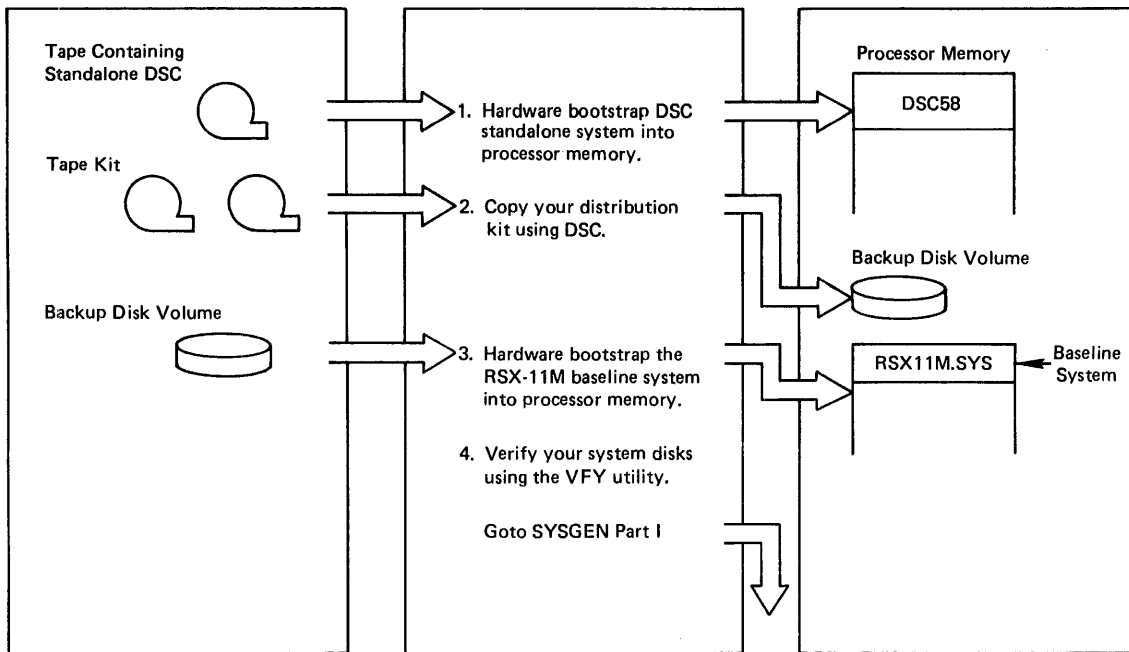
Figure 2-1 Copying Tape Distribution Kits

Step 2 in Figure 2-1 is copying the tape distribution media to disk using DSC. The following is the general format for entering DSC command lines to copy from tape to disk:

        DSC>outdevice:=indevice:

where DSC> is the DSC prompt, outdevice: specifies the disk device to which DSC is copying data, and indevice: is the tape input device with the tape distribution media mounted.

When the tape media is copied to disk, you can hardware bootstrap the baseline system and invoke SYSGEN.

Step 3 in Figure 2-1 is to hardware bootstrap the RSX-11M baseline system into processor memory to control the system resources while SYSGEN is executing.

To bootstrap the baseline system, mount the disk on which the baseline system resides, and follow the hardware bootstrap procedures for your particular bootstrap ROM. The PDP-11 hardware bootstrap routine bootstraps the baseline system into processor memory, giving control of the system to the baseline system. Section 2.5 describes the startup display sequence.

Step 4 in Figure 2-1 is to verify the integrity of the disks you are using for system generation. Use the File Structure Verification Utility (VFY) to ensure the integrity of these disks. (The RSX-11 Utilities Manual provides details of all the functions performed by VFY.)

Use the following command lines to ensure the integrity of a disk:

        >RUN $VFY
        VFY>/RC

/RC is the Read Check switch. This switch reads from the disk ensuring that each block on the disk that is allocated to a file can be read. If VFY reports that it cannot read a block, call your local DIGITAL Software Support Specialist for assistance.

When you complete this procedure, you can invoke the SYSGEN procedure, as described in Chapter 3.

2.4.2 Backing Up Disk Distribution Media

You can back up disk distribution media to either disk or tape backup volumes. Figure 2-2 outlines the procedure for creating a backup copy of disk distribution media.
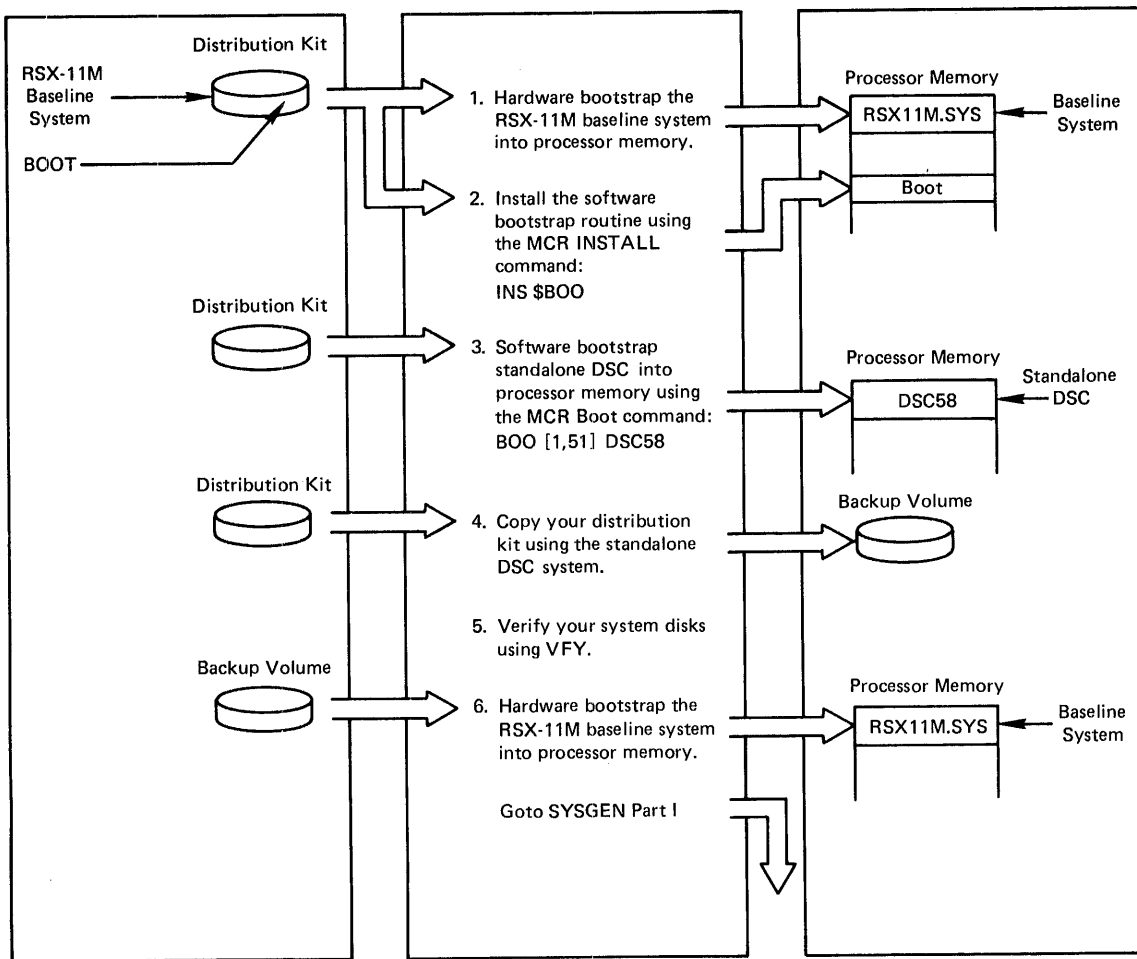
Figure 2-2 Copying Disk Distribution Kits

Step 1 in Figure 2-2 is to hardware bootstrap the RSX-11M baseline system into processor memory to control the system resources while SYSGEN is executing.

To bootstrap the baseline system, mount the disk on which the baseline system resides, and follow the hardware bootstrap procedures for your particular bootstrap ROM. The PDP-11 hardware bootstrap routine bootstraps the baseline system into processor memory, giving control of the system to the baseline system. Section 2.5 describes the startup display sequence.

Step 2 in Figure 2-2 is to install the MCR BOOT command (the software bootstrap routine) into memory. Using the BOOT command, you can bootstrap the standalone version of DSC into processor memory. You then use DSC to copy the kit. To install BOOT, enter the command line:

>INSTALL $BOO

The software bootstrap routine has the same effect as the hardware bootstrap routine, that is, it bootstraps DSC into processor memory and gives DSC control of the system.

Step 3 in Figure 2-2 is bootstrapping the standalone version of the Disk Save and Compress Utility (DSC) into processor memory. DSC provides the functions required to back up and restore data on the RSX-11M distribution media. (For a complete description of DSC functions, refer to the RSX-11 Utilities Manual.)

To bootstrap DSC, using the software Boot task, enter the command BOO [1,51]DSCS8. The software bootstrap routine bootstraps the standalone version of DSC into processor memory and gives DSC control of the system. DSC displays the following line when it is ready:

RSX11S V2.2 BL26 DISK SAVE AND COMPRESS UTILITY V3.0
DSCS8>

You can then enter the command lines to create copies of the distribution media.

Step 4 in Figure 2-2 is copying the disk distribution media to disk using DSC. The following is the general format for entering DSC command lines to copy from disk to disk:

DSC>outdevice:=indevice:

where DSC> is the DSC prompt, outdevice: specifies the device to which DSC is copying data, and indevice: is the input device with the distribution media mounted.

When the media is copied, you can use the disk copy of the media to bootstrap the baseline system and invoke SYSGEN.

Step 5 in Figure 2-2 is to verify the integrity of the disks you are using for system generation. Use the File Structure Verification Utility (VFY) to ensure the integrity of these disks. (The RSX-11 Utilities Manual provides details of all the functions performed by VFY.)

Use the following command line to ensure the integrity of a disk:

>RUN $VFY
VFY> /RC

/RC is the Read Check switch. This switch reads from the disk ensuring that each block on the disk that is allocated to a file can be read. If VFY reports that it cannot read a block, call your local DIGITAL Software Support Specialist for assistance.

Step 6 in Figure 2-2 is to hardware bootstrap the RSX-11M baseline system into processor memory to control the system resources while SYSGEN is executing.

To bootstrap the baseline system, mount the disk on which the baseline system resides, and follow the hardware bootstrap procedure for your particular bootstrap ROM. The PDP-11 hardware bootstrap routine bootstraps the baseline system into processor memory, giving control of the system to the baseline system. Section 2.5 describes the startup display sequence.

When you complete this procedure, you can invoke the SYSGEN procedure, as described in Chapter 3.

2.5 START-UP DISPLAY SEQUENCE

If the RSX-11M system being bootstrapped was built with a different device configuration than the current host, a series of display lines appears on the console in the form:

    Device ddnn: NOT IN CONFIGURATION*

    Where:

        dd=device NAME.
        nn=unit NUMBER.

(Devices not in the configuration are declared OFFLINE and the display OFFLINE is appended to these devices as part of the output of the MCR Devices command).

Then the system displays:

    RSX-11M <vers-num><base-level><mem-siz>[mapped]
    >RED DDNN:=SY0:
    >RED ddnn:=LB0:
    >MOU ddnn:volname
    >@[1,2]STARTUP

    Where:

        <vers-num>   - The release version number (for example,
                              release 3.2 of RSX-11M is V3.2).

        <base-level>   - The software development group at DIGITAL
                              periodically brings together new versions
                              of the software under development.
                              Internal groups may use this software to
                              ensure correct operation and to build new
                              software. These development milestones
                              are called base levels. For example,
                              release 3.2 of RSX-11M is base level
                              BL26.

<mem-siz>   – The memory size (in the form of nnnk) of the machine on which the system was bootstrapped.

[mapped]   – Mapped is displayed for systems built to use the Memory Management Unit.

ddnn: – Device name and unit number of the boot device.

volname   – The name of the volume that contains the booted system.

[1,2]STARTUP   – The file specifier for the indirect command file, which is invoked automatically at bootstrap time and which contains user commands for initializing the bootstrapped system.

The system is now ready for operation. The RED and MOU displays are internally generated Redirect and Mount commands. The Redirect command establishes the load device as the system and library devices SY: and LB:, and the Mount command mounts the load device as a Files-11 volume.

CHAPTER 3

GETTING STARTED

This chapter describes the pre-processing steps which prepare the host
system for the system generation procedure.

Each type of distribution kit is described in a separate section.
Read the section that pertains to your kit as follows:

- Big disk distribution kits, Section 3.1

- Dual RK05 distribution kits, Section 3.2

- RL01 distribution kits, Section 3.3

To perform a SYSGEN, you must be privileged. Privileged status
insures that the command files can access as well as create and delete
files in various UFDs.

To perform a PREPGEN, privileged status is not required; a PREPGEN
does not create or delete files (if requested, a PREPGEN creates the
file SYSSAVED.DAT). Also, a PREPGEN uses the UFD that corresponds to
the default UIC of the terminal to find command files and create
SYSSAVED.DAT.

NOTE

If you wish to direct listings or maps
to a device other than SY:, LB:, or TI:,
you should load the driver and then
mount the device before you begin the
system generation process.

3.1 BIG DISK DISTRIBUTION KITS

If you have a previously generated RSX-11M version 3.2 system, read
Section 3.1.1.

If you do not have a running RSX-11M version 3.2 system available,
read Section 3.1.2.

3.1.1 Online SYSGENs and PREPGENs

The following lists the pre-processing steps to perform an online
SYSGEN or PREPGEN:

1. Mount the baseline system disk. For example:

    ```
    >MOU DB2:RSXM26
    ```

2. Assign the baseline system disk to the pseudo device SY:.
    For example:

    ```
    >ASN DB2:=SY:
    ```

3. The system generation command files require an indirect
    command file processor with extended symbol table space. For
    mapped systems, this is a 12K-word version (BIGIND). For
    unmapped systems, this is a 14K-word version (BIGIND). If
    the running system contains the 8K-word indirect (without
    symbol table space extensions), remove the task AT. and
    install BIGIND specifying a priority of 10(10). For example:

    ```
    >REM ...AT.
    >INS $BIGIND/PRI=10.
    ```

4. If performing a SYSGEN, set the UIC to [200,200]. For
    example:

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

    This is not required to perform a PREPGEN.

5. Initiate SYSGEN Phase I. For example:

    ```
    >@SYSGEN
    ```

6. For a summary of the Phase I questions, read Chapter 4. For
    a detailed description of Phase I questions, read Chapter 5.

3.1.2 Standalone SYSGENs and PREPGENs

The following lists the pre-processing steps to perform a SYSGEN or
PREPGEN using the baseline system.

1. Hardware bootstrap the system using the device that contains
    the baseline system disk (RSXM26) as the boot device. This
    will bring up the unmapped baseline system. If the host
    system includes the memory management unit and you are
    generating a mapped system, software boot the mapped baseline
    system. For example:

    ```
    >INS $BOO
    >BOO [1,54]RSX11M
    ```

2. The system generation command files require an indirect
    command file processor with extended symbol table space. For
    mapped systems, this is a 12K-word version (BIGIND). For
    unmapped systems, this is a 14K-word version (BIGIND). The
    baseline system contains the 8K-word version, which lacks
    sufficient symbol table space. Remove the task AT. and
    install BIGIND specifying a priority of 10(10). For example:

    ```
    >REM ...AT.
    >INS $BIGIND/PRI=10.
    ```

3. Initiate SYSGEN Phase I. For example:

   >@SYSGEN

4. For a summary of the Phase I questions, read Chapter 4. For a detailed description of Phase I questions, read Chapter 5.

3.2 DUAL RK05 DISTRIBUTION KITS

The dual RK05 distribution kit requires two RK05 drives. When SYSGEN completes processing of the Executive source disk (EXCSRC), you must replace the disk with the driver source disk (DRVSRC) so that SYSGEN can access the driver source files. This is known as an end-of-disk breakpoint (EOD). Note that if your host configuration includes more than two RK05 drives, you can override these breakpoints. See Chapter 5 for details.

3.2.1 Online SYSGENs and PREPGENs

The following lists the pre-processing steps to perform an online SYSGEN or PREPGEN:

1. Mount the baseline system disk. For example:

   >MOU DK:RSXM26

2. Assign the baseline system disk to the pseudo device SY:. For example:

   >ASN DK:=SY:

3. The system generation command files require an indirect command file processor with extended symbol table space. For mapped systems, this is a 12K-word version (BIGIND). For unmapped systems, this is a 14K-word version (BIGIND). If the running system contains the 8K-word version (without symbol table space extensions), remove the task AT. and install BIGIND specifying a priority of 10(10). For example:

   >REM ...AT.
   >INS $BIGIND/PRI=10.

4. If performing a SYSGEN, set the UIC to [200,200]. For example:

   >SET /UIC=[200,200]

   This is not required to perform a PREPGEN.

5. If performing a PREPGEN, mount the Executive source disk and assign this device to the pseudo device LB:. For example:

   >MOU DK1:EXCSRC
   >ASN DK1:=LB:

   This is not required to perform a SYSGEN; a SYSGEN automatically issues Mount and Assign commands for the device that contains the Executive source files.

6. Initiate SYSGEN Phase I. For example:

        >@SYSGEN

7. For a summary of the Phase I questions, read Chapter 4. For
    a detailed description of Phase I questions, read Chapter 5.

3.2.2 Standalone SYSGENs and PREPGENs

The following lists the pre-processing steps to perform a SYSGEN or
PREPGEN using the baseline system:

1. Hardware bootstrap the system using the device that contains
    the baseline system disk (RSXM26) as the boot device. This
    will bring up the unmapped baseline system.   If the host
    system includes the memory management unit and you are
    generating a mapped system, software boot the mapped baseline
    system. For example:

        >INS $BOO
        >BOO [1,54]RSX11M

2. The system generation command files require an indirect
    command file processor with extended symbol table space. For
    mapped systems, this is a 12K-word version (BIGIND).   For
    unmapped systems, this is a 14K-word version (BIGIND). The
    baseline system contains the 8K-word version, which lacks
    sufficient symbol table space.   Remove the task AT. and
    install BIGIND specifying a priority of 10(10). For example:

        >REM ...AT.
        >INS $BIGIND/PRI=10.

3. If performing a PREPGEN, mount the Executive source disk and
    assign this device to the pseudo device LB:. For example:

        >MOU DK1:EXCSRC
        >ASN DK1:=LB:

    This is not required to perform a SYSGEN;   a   SYSGEN
    automatically issues Mount and Assign commands for the device
    that contains the Executive source files.

4. Initiate SYSGEN Phase I. For example:

        >@SYSGEN

5. For a summary of the Phase I questions, read Chapter 4. For
    a detailed description of Phase I questions, read Chapter 5.

3.3 RL01 DISTRIBUTION KITS

The RL01 distribution kit requires two RL01 drives to perform a SYSGEN
or a PREPGEN.   However, you can perform a SYSGEN or PREPGEN using a
single RL01 provided that you have a secondary storage device.   The
secondary storage device can be a magtape unit or a disk drive of a
different type.

To generate a system using two RL01 drives, you simply load the baseline system disk (RSXM26) and either the mapped source disk (MAPSRC) to generate a mapped system or the unmapped source disk (UNMSRC) to generate an unmapped system.

To generate a system using a single RL01 drive, you must copy the contents of [11,10] from the mapped or unmapped source disk (MAPSRC for mapped target systems, UNMSRC for unmapped target systems) to secondary storage. Later, during SYSGEN Phase II, you will copy these files from secondary storage onto the baseline disk under [1,24]. Note that both the mapped and unmapped source disks contain a bootable copy of RSX-11M. Thus, if you are running standalone, you must boot the proper disk (MAPSRC for mapped target systems, UNMSRC for unmapped target systems), copy [11,10] to secondary storage, and then reboot using the baseline system disk.

If your secondary storage device is a disk drive of a different type and the driver is loadable, you can specify this drive as the device that contains the Executive sources (obviously, you must first copy the mapped or unmapped sources to this drive).

3.3.1 Online SYSGENs and PREPGENs

The following lists the pre-processing steps to perform an online SYSGEN or PREPGEN:

    1. Mount the baseline system disk. For example:

        >MOU DL:RSXM26

       If you are using a single RL01 drive, you must first copy the contents of [11,10] from the mapped or unmapped source disk to secondary storage.

       To generate a mapped system, mount the mapped source disk (MAPSRC) and copy the contents of [11,10] to secondary storage. For example:

        >MOU DL:MAPSRC
        >FLX MM:/ZE
        >FLX MM:/DO=DL:[11,10]*.*/RS

       To generate an unmapped system, mount the unmapped source disk (UNMSRC) and copy the contents of [11,10] to secondary storage. For example:

        >MOU DL:UNMSRC
        >FLX MM:/ZE
        >FLX MM:DO=DL:[11,10]*.*/RS

       When the copy completes, dismount and unload the mapped or unmapped source disk and mount the baseline system disk. For example:

        >MOU DL:RSXM26

    2. Assign the baseline system disk to the pseudo device SY:. For example:

        >ASN DL:=SY:

3.   The system generation command files require an indirect command file processor with extended symbol table space. For mapped systems, this is a 12K-word version (BIGIND). For unmapped systems, this is a 14K-word version (BIGIND). If the running system contains the 8K-word indirect (without symbol table space extensions), remove the task AT. and install BIGIND specifying a priority of 10(10). For example:

```
>REM ...AT.
>INS $BIGIND/PRI=10.
```

4.   If performing a SYSGEN, set the UIC to [200,200] For example:

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

     This is not required to perform a PREPGEN.

5.   Initiate SYSGEN Phase I. For example:

```
>@SYSGEN
```

6.   For a summary of the Phase I questions, read Chapter 4.   For a detailed description of Phase I questions, read Chapter 5.

3.3.2   Standalone SYSGENs and PREPGENs

The following lists the pre-processing steps to perform a SYSGEN or PREPGEN using the baseline system:

1.   Hardware bootstrap the system using the device that contains the baseline system disk (RSXM26) as the boot device. This will bring up the unmapped baseline system. If the host system includes the memory management unit and you are generating a mapped system, software boot the mapped baseline system. For example:

```
>INS $BOO
>BOO [1,54]RSX11M
```

     If you are using a single RL01 drive, you must first hardware bootstrap the mapped or unmapped source disk. Then copy the contents of [11,10] to secondary storage.

     To generate a mapped system, hardware bootstrap the system using the device that contains the mapped source disk (MAPSRC) as the boot device. Then copy the contents of [11,10] to secondary storage. For example:

```
>FLX MM:/ZE
>FLX MM:/DO=DL:[11,10]*.*/RS
```

     To generate an unmapped system, hardware bootstrap the system using the device that contains the unmapped source disk (UNMSRC) as the boot device. Then copy the contents of [11,10] to secondary storage. For example:

```
>FLX MM:/ZE
>FLX MM:/DO=DL:[11,10]*.*/RS
```

When the copy operation completes, halt the system and remove the mapped or unmapped source disk from the drive. Then, reboot using the baseline system disk.

2. The system generation command files require an indirect command file processor with extended symbol table space. For mapped systems, this is a 12K-word version (BIGIND). For unmapped systems, this is a 14K-word version (BIGIND). The baseline system contains the 8K-word version, which lacks sufficient symbol table space. Remove the task AT. and install BIGIND specifying a priority of 10(10). For example:

   >REM ...AT.
   >INS $BIGIND/PRI=10.

3. Initiate SYSGEN Phase I. For example:

   >@SYSGEN

4. For a summary of the Phase I questions, read Chapter 4. For a detailed description of Phase I questions, read Chapter 5.

CHAPTER 4

SUMMARY OF SYSGEN PHASE I QUESTIONS

This chapter provides summary information for SYSGEN Phase I. The chapter is meant to help familiarize you with the SYSGEN questions and as reference for when you become familiar with SYSGEN.

4.1 SUMMARY OF SYSGEN PHASE I SETUP QUESTIONS

The following list comprises the possible setup questions for SYSGEN Phase I.

Not all of the questions are pertinent; the order of the questions depend upon the distribution kit you are using as well as the responses to the questions. For complete details and the implications of your responses, see Chapter 5.

1. Inhibit MCR command lines (Type <ESC> for explanation)

   An affirmative response permits you to follow the logical flow of a specific SYSGEN, without actually executing commands that assemble, build, or delete files. The manual refers to this as a PREPGEN.

   A negative response indicates that you wish to perform a "live" SYSGEN.

2. Have you made a copy of the distribution kit

   If you are performing a SYSGEN, this question insures that you have copied the distribution kit. Following a negative reply, SYSGEN exits to allow you to do so.

3. Use saved or canned answer files for input responses

   This question permits you to use a saved answer file as responses to SYSGEN questions.

4. Undefined answer wakeup

   If you are using a saved answer file, an affirmative response to this question instructs SYSGEN to precede necessary questions (either a question you did not answer or a question for which a saved response does not exist) with a CTRL/G (bell). Thus, SYSGEN alerts you when a response is required.

5. Use saved host configuration

   If you are using a saved answer file, an affirmative response indicates that SYSGEN can use your previous host responses. For example, you are performing SYSGEN on the same host configuration.

6. Use saved peripheral configuration

   If you are using a saved answer file, an affirmative response
   indicates that you do not wish to change the peripheral
   configuration.

7. Skip end of section (EOS) breakpoints

   If you are using saved answer files, an affirmative response
   permits SYSGEN to continue after each section of Phase I.

8. Skip end of execution (EOX) breakpoints

   If you are using a saved answer file, an affirmative response
   instructs SYSGEN to continue after assembly or task build
   operations complete. For example, you are certain that all
   device drivers will assemble correctly.

9. Skip end of disk (EOD) breakpoints

   Dual RK05 kits only. An affirmative response indicates that you
   do not have to change RK05 disks. For example, you have more
   than two RK05 drives available (one for the baseline system, one
   for the Executive source files, and one for the device driver
   source files).

10. Save responses (i.e.: create SYSSAVED.DAT)

    An affirmative response instructs SYSGEN to create the file
    SYSSAVED.DAT, which can later be used as input to SYSGEN. See
    Chapter 5.

11. UIC for SYSSAVED files if not [current UIC]

    If you are using a saved answer file, SYSGEN assumes that the
    file is in the UFD corresponding to the current UIC. Enter a UIC
    to override this default. Also, if you are creating the file
    SYSSAVED.DAT (a Yes response to question 10), SYSGEN will create
    the file in the UFD corresponding to the current UIC. Again,
    enter a UIC to override this default.

12. UIC for SYSGEN command files if not [current UIC]

    SYSGEN assumes the command files are in [200,200] for SYSGENs.
    If you have moved them, enter a UIC.

    If you are performing a PREPGEN (a Yes reply to question 1),
    SYSGEN assumes the command files are in the UFD corresponding to
    the current UIC. If they are not, enter a UIC.

13. Clean up files from previous GENs

    If you are performing a SYSGEN, disk space becomes critical. An
    affirmative response instructs SYSGEN to delete old and
    unnecessary files created during previous SYSGENs (for example,
    RSXBLD.CMD and RSXASM.CMD).

14. Device, when ready, for Executive sources (ddu:) [D: SY:]

NOTE

If you are using the RL01 or the dual RK05 distribution
kit, there is no default response to this question; you
must enter the device that contains the Executive source
files.

For big disk kits, SYSGEN assumes that the Executive source files
are on SY:. Enter a device specification if not.

15. Driver source files device (ddu:)

Dual RK05 kits only. Enter the device that contains the device
driver source files.

>ASN SY:=LB:
>PIP /FR

Following the free block display, SYSGEN changes the UIC to [11,10].

>SET /UIC=[11,10]

4.2 SUMMARY OF TARGET AND HOST QUESTIONS

The SYSGEN Phase I target and host questions ask you to define the
target and host configurations. Target questions define hardware
features in your configuration as well as the attached peripheral
devices. Host questions determine, primarily, how you want to handle
listings.

The following list comprises the possible target and host questions
for SYSGEN Phase I.

Target

1. Processor (e.g.: 11/34, LSI-11)

   Enter the target processor type.

2. Does processor have a switch register

   Enter Yes if the target processor has a switch register.

3. Generating RSX-11S

   Enter Yes if you wish to generate an RSX-11S system.

4. Memory size (in K-word blocks)

   Enter the number of K-word blocks of memory for the target
   processor. Note that memory blocks must be a multiple of 4K.

5. Mapped

   Enter Yes if you are generating a mapped system. Note that a
   mapped system requires a minimum of 24K-words of memory.

6. Any K-series laboratory devices

   Enter Yes if the target configuration includes the K-series
   laboratory peripheral options.

7. Extended arithmetic element (KE11-A/B EAE) present

    Enter Yes if the target processor contains the PDP-11 EAE option.

8. Floating point processor (FP-11) present

    Enter Yes if the target processor includes the floating point option.

9. Floating instruction set (FIS) present

    Enter Yes if the target configuraton includes the floating instruction set processor.

10. If using KW11-P as system clock: number of intrps./sec.

    If you are using the KW11-P programmable clock as the system clock, enter the number of interrupts per second. Note that the number of interrupts must evenly divide into 10,000.

11. Line frequency: A-60Hz B-50Hz [D: "A"]

    Enter the line frequency. The default is 60Hz.

12. KW11-Y Watchdog timer support

    Enter Yes if the target configuration includes the KW11-Y.

13. Memory parity support

    Enter Yes if the target configuration contains parity memory.

14. Cache memory

    In conjunction with memory parity support, cache memory speeds main memory operations. Enter Yes if your system includes it.

15. Highest interrupt vector (If 0 will be computed)

    SYSGEN automatically computes the highest interrupt vector address. Enter a value greater than 400 if you require vector space for devices not specified during SYSGEN.

16. Devices

    Enter the device mnemonic for all pseudo and peripheral devices to be included in the target configuration.

    Enter an asterisk (*) for a list of devices and mnemonics.

    For a device-type with multiple controllers, enter the device-type, an equal sign (=), and the number of controllers. For example, DK=2. Note that SYSGEN assumes one controller for the device-type if you omit the equal sign.

    SYSGEN prompts for a device mnemonic until you terminate the entry (or the question) with a period (.).

Host

1. Are you running SYSGEN standalone (on the baseline system)

    Enter Yes if you are not running SYSGEN on a previously generated
    RSX-11M system.

2. Is a line printer available

    Enter Yes if the host configuration includes a line printer.
    (The printer can be used for listing and map files.)

3. Spool assembly listing and Executive and driver maps

    Enter Yes if you want these files spooled to the line printer.
    Enter No if you want to save the files, but not print them.

4. Does the listing/map device have at least 120 columns

    Enter Yes if the printer has at least 120 columns. Otherwise,
    SYSGEN forces narrow listings.

5. Assembly listings device (ddu:) [D: NL:]

    Usually, assembly listing files are not required. If you desire
    or require these files, enter a device specification.

6. Map device for Executive and device drivers (ddu:) [D: SY:]

    For unmapped systems, maps are required. Enter a device
    specification if you do not want to use SY:.

    For mapped systems, the maps may prove helpful. Enter a device
    specification if you do not want to use SY:.

    Be advised that you should not enter NL:.

EOS * Do you want to: <CR>-continue R-repeat section E-exit P-pause

A response of carriage return begins Executive option generation.

4.3 SUMMARY OF EXECUTIVE QUESTIONS

The following list comprises the possible Executive questions for
SYSGEN Phase I. Not all of the questions appear during an actual run
of SYSGEN. For example, some options require Executive support of
other options; SYSGEN automatically includes Executive support if it
is required in your system. For complete details on the Executive
options and their implications, refer to Chapter 5.

Unless otherwise noted, a Yes response includes Executive support for
the option.

1. Will DBMS-11 be used

    Enter Yes to include Data Base Management System support. For
    details on DBMS, see the DBMS-11 documentation.

2.   FILES-11 ACP

     Enter Yes to include the services described in the IAS/RSX-11 I/O
     Operations Reference Manual.

3.   RMS record locking and placement control

     Enter Yes to include support for the Record Management System.
     See the RMS documentation for details.

4.   Non-resident tasks (task loader)

     Enter Yes to include support for the task loader.   The task
     loader: reads a task into memory; performs a checkpoint write
     of a task image from memory to disk; or performs a checkpoint
     read of a task image from disk into memory.

5.   Loadable task loader

     Enter Yes to include support for the loadable task loader.   The
     loadable task loader reduces the amount of address space required
     for the Executive.

6.   Memory managment (PLAS) directives

     Enter Yes to include support for the memory   management
     directives.   These directives allow tasks greater span of
     physical memory.

7.   Send/Receive by reference directives

     Enter Yes to include support for the send/receive by reference
     directives.

8.   Get mapping context directive

     Enter Yes to include support for this directive.

9.   Address checking

     Enter Yes to include Executive support for address checking.
     This option provides boundary and alignment checks on addresses
     passed by users in Executive directives.

10. I/O rundown

     Enter Yes to include Executive support for I/O rundown.   This
     option helps insure system integrity by cleaning up outstanding
     I/O before allowing a task (for example Dismount) to exit.

11. Multi-user protection

     Enter Yes to generate a multiuser protection system. This option
     protects against destructive interference between users.

12. ANSI magtape

     Enter Yes to include Executive support for ANSI magnetic tapes.

13. On-line formatting (FMT) or on-line user-mode diagnostics

   Enter Yes to include support for the volume format (hardware) utility (FMT) and User-Mode Diagnostics (UMDs).

14. Loadable device drivers

   Enter Yes to include Executive support for loadable device drivers.

15. Should the default for all applicable drivers be loadable

   Enter Yes to default drivers that can be loaded to be loadable, rather than resident.

16. AST and cancel selective MARKTIMEs

   Enter Yes to permit processing of Asynchronous System Traps (ASTs) and provide the ability to cancel selective marktime requests.

17. Task termination and device not ready messages (TKTN)

   Enter Yes to include this option.

18. Power fail recovery

   Enter Yes to include this option.

19. Install, request, and remove or exit

   Enter Yes to include this feature of the Run command. This feature helps optimize use of Executive dynamic memory resources.

20. Large (20K) Executive

   Enter Yes to generate an Executive larger than 16K and thus increase pool space.

21. Logical device assignment

   Enter Yes to include support for the MCR Assign command.

22. Logging of device errors and timeouts

   Enter Yes to permit the error logging subsystem to intercept device errors and write status information in a file.

23. Logging of undefined interrupts

   Enter Yes to permit the error logging subsystem to record traps to undefined interrupt vectors in a file.

24. Logging of memory parity errors

   Enter Yes to permit the error logging susbsystem to record cache and main memory parity error information in a file.

25. Do you intend to include a user-written driver

   Enter Yes if you have written your own device driver(s). SYSGEN will permit you to include your drivers when it assembles the Executive.

26. Include routine $GTWRD

Enter Yes to include support for the $GTWRD Executive routine. This routine obtains, or fetches, a word from a user-defined buffer.

27. Include routine $PTWRD

Enter Yes to include the $PTWRD Executive routine. This routine sends a word to a user-defined buffer.

28. Disk writecheck

Enter Yes to include disk writecheck support. When enabled, this option increases data reliability, but decreases disk throughput.

29. Executive debugging tool (XDT)

Enter Yes to include the Executive Debugging Tool (XDT). XDT is useful in debugging privileged tasks and user-written drivers.

30. Rotating pattern in data lights

Enter Yes to include this option. The processor data lights rotate in a pronounced circular pattern when the processor is idle.

31. Industrial network or DECnet

Enter Yes to include industrial network or DECnet support.

32. Queue manager and queued print spooler

Enter Yes to include complete spooling support.

33. Group global event flags

Enter Yes to include Executive support for group global event flags and MCR support for the Flags command.

34. Enter code for directives

Enter an asterisk (*) for a list of the Executive directives and then enter the letter(s) that correspond to the desired directives. A percent sign (%) selects all the directives. Terminate the question with a period (.).

35. Number of pre-allocated QIO packets

Enter a numeric response in the range 0 to 15 to specify the number of QIO packets to allocate from pool.

A response of 0 excludes the option.

Note that the default response is 5. Therefore, if you simply enter carriage return, you select the option and allocate 5 I/O packets from pool.

36. Size of data transfer vector in words

Enter a numeric response in the range 5 to 33 to specify the number of MOV instructions to include in the data transfer vector.

37. Round-robin scheduling interval in ticks

Enter a numeric response in the range 0 to 1000 to specify the round-robin scheduling interval.

A response of 0 excludes the option.

Note that the default response is 5. Therefore, if you simply enter carriage return, you select the option and specify 5 clock ticks as the scheduling interval.

38. Highest priority class for consideration

Enter a numeric response in the range 1 to 249 to specify the highest, eligible priority class for round-robin scheduling.

39. Lowest priority class for consideration

Enter a numeric response in the range 1 to the response entered in question 38 to specify the lowest, eligible priority class for round-robin scheduling.

40. Executive level disk swapping interval

Enter a numeric response in the range 0 to 5000 to specify the disk swapping interval.

A response of 0 excludes the option.

Note that the default is a value equal to the round-robin scheduling interval multiplied by 6. Therefore, if you simply enter carriage return, you select the option and specify 6 times the round-robin interval as the swapping interval.

If you did not select round-robin scheduling (response of 0 to question 37), the default is 30. Therefore, if you simply enter carriage return, you select Executive level disk swapping and specify 30 as the swapping interval.

41. Swapping priority

Enter a numeric response in the range 1 to 20 to specify the range over which lower priority tasks may checkpoint higher ones.

The default response is 5, which is highly recommended.

42. Size of dynamic storage region (POOL) in words

Enter a numeric response that is in the range 256 to 16384 and a multiple of two.

43. Seconds between printer not ready messages

Enter a numeric response in the range 0 to 255 to specify the number of seconds between line printer not ready messages.

A response of 0 suppresses the messages.

If you make a non-zero entry, the value must be greater than 15.

Note that the default is 30 seconds. If you simply enter carriage return, the message appears every 30 seconds when the line printer is not ready (out of paper, or offline, for example).

44. Seconds between card reader not ready messages

Enter a numeric response in the range 0 to 255.

A response of 0 suppresses the messages.

If you make a non-zero entry, the value must be greater than 15.

Note that the default is 30 seconds. If you simply enter carriage return, the message appears twice a minute when the card reader is not ready.

45. System crash register and stack dump device CSR

Enter 0 to exclude this option. Otherwise, enter a numeric response in the range 160000 to 177700.

Note that the default response selects the option and dumps the Executive stack and registers on the console terminal following a system crash.

46. Checkpointing: A-Yes B-With system ckpnt. file

Enter A to include checkpointing, B to include checkpointing to system checkpoint files (and support the Allocate Checkpoint Space (ACS) command), or carriage return to exclude checkpointing altogether.

47. System controlled partitions: A-Yes B-With auto compaction (SHF)

Enter A to include system controlled partitions, B to include system controlled partitions with the shuffler (SHF), or carriage return to exclude support for system controlled partitions.

48. Dump analysis: A-PANIC B-Crash (CDA)

Enter A to include the panic dump routine (PANIC), B to include the crash dump analyzer (CDA), or carriage return to exclude support for memory dumps following a system crash.

It is recommended that you select either PANIC or CDA.

49. Output notification device CSR

Enter a numeric value in the range 160000 to 177700 to specify the CSR address for the CDA routine to output crash notification.

50. Memory dump device (ddu:)

Enter the device mnemonic and unit number for the device you wish the CDA routine to direct memory dumps.

51. CSR address of dump device

Enter a numeric response in the range 160000 to 177700 to specify the CSR address of the console terminal.

The default response is the default CSR address of the memory dump device.

52. CSR address of PANIC dump device

     Enter a numeric response in the range 160000 to 177700 to specify
     the CSR address of the device for the PANIC routine to dump the
     Executive stack and registers.

     The default response causes PANIC to dump the stack and registers
     to the console terminal.

4.4 SUMMARY OF TERMINAL DRIVER QUESTIONS

The following list comprises the possible terminal driver questions
for SYSGEN Phase I.

1. Terminal driver desired (A/B/C/D, * prints table)

    Enter an asterisk to print a list of the available terminal
    drivers.   Then enter A to select the half duplex terminal driver
    that you tailor to your system requirements, B to select the
    tailored (user-oriented) half duplex terminal driver, C to select
    the full duplex terminal driver, or D to select the baseline half
    duplex terminal driver. Chapter 5 lists the options included in
    the user-oriented and full duplex terminal drivers.

2. Unsolicited input timeout value in seconds

    Enter a numeric response in the range 0 to 2540 to specify the
    interval, in seconds, that the full duplex terminal driver waits
    before discarding unsolicited terminal input.

    A response of 0 inhibits the full duplex terminal driver
    unsolicited input timeout feature.

    Note that the default response is 120 seconds. Therefore, if you
    simply enter carriage return, you select this feature and specify
    that the driver timeout after two minutes.

3. Pass form feeds directly to the terminal

    Enter Yes to suppress conversion of a form feed into 8 line
    feeds.

4. Automatic carriage return/line feed

    Enter Yes to generate a carriage return and line feed whenever
    the terminal buffer is filled, either on output or echo.

5. Task checkpointable during terminal input

    Enter Yes to allow tasks to displace checkpointable tasks from
    memory during terminal input.

6. Unsolicited input character AST

    Enter Yes and a task attaching to a terminal can specify an AST
    entry point on receiving unsolicited input characters.

7. Write with CTRL/O cancellation

   Enter Yes to permit write requests with CTRL/O cancellation to print to the terminal, regardless of whether or not the terminal has suppressed output by CTRL/O.

8. Breakthrough write

   Enter Yes and breakthrough write requests can print to the terminal, regardless of terminal I/O activity.

9. CTRL/R (retype)

   Enter Yes and CTRL/R sends a carriage return/line feed followed by the input buffer to the terminal.

10. Escape sequence handling

    Enter Yes to recognize and treat escape sequences as line terminators.

11. Get multiple characteristics

    Enter Yes to allow tasks to determine characteristics of individual terminals.

12. Set multiple characteristics

    Enter Yes to allow tasks to set or reset characteristics of their TI: terminal. Privileged tasks can set characteristics of any terminal.

13. Get terminal driver options

    Enter Yes to allow tasks to determine which terminal driver options were selected during SYSGEN.

14. Hold screen mode

    Enter Yes to allow terminals (with special hardware) to break output into pages that fit on the screen.

15. Transparent read/write

    Enter Yes to provide support for I/O functions (IO.RAL and IO.WAL) that bypass character filtering and permit output of up to 32K bytes.

16. Settable case conversion for input

    Enter Yes to permit the driver to selectively, on a per-terminal basis, convert lower case input to upper case.

17. Read after prompt

    Enter Yes to permit a read after prompt request to act like a write to the terminal followed by a read. This reduces overhead and eliminates context switching.

18. Read with no echo

    Enter Yes to permit issuing read functions (IO.RLB, IO.RVB, and IO.RPR) specifying that terminal input not be echoed.

19. Read with special terminator

    Enter Yes to permit any character less than 40 octal or greater than 174 octal to terminate a read with special terminator request.

20. CRT rubout support

    Enter Yes to select the backspace-deletion function.

21. Terminal-host synchronization

    Enter Yes to allow CTRL/S and CTRL/Q from a terminal.

22. User terminal input buffering

    Enter Yes to place input characters directly into a non-checkpointable task buffer as received.

23. Variable length terminal input buffering

    Enter Yes to allocate buffers large enough to contain read requests.

24. LA30P support

    Enter Yes to include support for an LA30P; this prevents discarding the second of two rapidly typed characters.

25. Hardware unrecoverable input error support

    Enter Yes to permit the full duplex terminal driver to pass characters received after a hardware error to the soliciting task, with notification.

26. Device independent cursor positioning

    Enter Yes to permit cursor positioning coordinates without specifying terminal-type; the full duplex terminal driver determines terminal-type.

4.5 SUMMARY OF PERIPHERAL QUESTIONS

The following list comprises the possible peripheral questions for SYSGEN Phase I. Read Chapter 5 for details on the peripheral questions and the SYSGEN prompt lines.

Enter [L/R,] vector, CSR for:

1. CR Controller 0 [D: 230,177160]

   Respond with a carriage return to use the default vector and CSR assignments for the first CR11 card reader. You must enter the vector and CSR addresses of subsequent CR11 controllers.

1. CT Controller 0 [D: 260,177500]

   Carriage return uses the default vector and CSR assignments for the first TA11 cassette controller. Subsequent TA11 controllers do not have default assignments.

1. DF Controller 0 [D: 204,177460]

   Carriage return uses the default vector and CSR assignments for the first RF11 controller. Subsequent RF11 controllers do not have default assignments.

1. MS Controller 0 [D: 224,172522]

   Carriage return uses the default vector and CSR assignments for the first TS11 controller. Subsequent TS11 controllers do not have default vector assignments.

1. PP Controller 0 [D: 74,177554]

   Carriage return uses the default vector and CSR assignments for the first PC11 controller. Subsequent PC11 controllers do not have default assignments. See Chapter 5.

1. PR Controller 0 [D: 70,177550]

   Carriage return uses the default vector and CSR assignments for the first PC11/PR11 controller. Subsequent controllers do not have default assignments. See Chapter 5.

1. UD Controller 0 [D: 234,171776]

   Carriage return uses the default vector and CSR assignments for UDC11, Universal Digital Controller.

1. XB Controller 0 [D: 124,172414]

   Carriage return uses the default vector and CSR assignments for the first DA11-B parallel line interface controller. Subsequent DA11-B controllers do not have default assignments.

Enter [L/R,] vector, CSR, number of drives, unit number of first drive, [O=offset recovery support/NO=no support] for:

2. DB Controller 0 [254,176700,,0,O]

   Enter two commas (,,) followed by the number of disk drives for the first RH11 or RH70 controller. This will use the default vector and CSR assignments, specify 0 as the unit number of the first drive, and include offset recovery support. Subsequent controllers default only the unit number of the first drive (to 0).

2. DR Controller 0 [D: 254,176700,,0,0]

Enter two commas (,,) followed by the number of disk drives for the first RH11 or RH70 controller. This will use the default vector and CSR assignments, specify 0 as the unit number of the first RM02 or RM03 drive, and include offset recovery. Subsequent controllers default only the unit number of the first drive (to 0).

Enter [L/R,] vector, CSR, number of drives for:

3. DD Controller 0 [D: 300,176500]

Enter two commas (,,) followed by the number of drives for the first TU58 controller. This will use the default vector and CSR assignments for the DECtape II controller. Subsequent TU58 controllers do not have default responses.

3. DL Controller 0 [D: 160,174400]

Enter two commas (,,) followed by the number of drives for the first RL11 controller. This will use the default vector and CSR assignments for the RL01 cartridge disk controller. Subsequent RL11 controllers do not have default responses.

3. DP Controller 0 [D: 254,176714]

Enter two commas (,,) followed by the number of drives for the first RP11 controller. This will use the default vector and CSR assignments for the RP02/03 disk controller. Subsequent RP11 controllers do not have default responses.

3. DT Controller 0 [D: 214,177342]

Enter two commas (,,) followed by the number of drives for the first TC11 controller. This will use the default vector and CSR assignments for the DECtape controller. Subsequent TC11 controllers do not have default responses.

3. DX Controller 0 [D: 264,177170]

Enter two commas (,,) followed by the number of drives for the first RX11 controller. This will use the default vector and CSR assignments for the RX01 floppy disk controller. Subsequent RX11 controllers do not have default responses.

3. DY Controller 0 [D: 264,177170]

Enter two commas (,,) followed by the number of drives for the first RX211 controller. This will use the default vector and CSR assignments for the RX02 floppy disk controller. Subsequent RX211 controllers do not have default responses.

3. MM Controller 0 [D: 224,172440]

Enter two commas (,,) followed by the number of drives for the first RH11, RH70, TM02, or TM03 controller. This will use the default vector and CSR assignments for the first TU45, TU16, TE16, or TU77 magtape controller. Subsequent controllers of this type do not have default responses.

3. MT Controller 0 [D: 224,172522]

    Enter two commas (,,) followed by the number of drives for
    the first TM11, TMA11, or TMB11 controller. This will use
    the default vector and CSR assignments for the first TS03,
    TU10, or TE10 magtape controller. Subsequent controllers of
    this type do not have default responses.

Enter [L/R,] vector, CSR, F=full duplex/H=half duplex,
        E=error detec. unit/NO=no, C=char. detec unit/NO=no,
        number of sync characters in leader for:

4. XQ Controller [D:,,H,E,C]

    Enter the vector address (from floating vector space starting
    at 300), the CSR address (from floating address space
    starting at 160010), followed by four commas (vector,
    CSR,,,,) and the number of sync characters in a sync leader
    for the first DQ11 synchronous line interface. This will
    specify a half duplex line with error and character detection
    units. Subsequent DQ11s default half duplex and error and
    character detection unit specification.

Enter [L/R,] vector, CSR, number of drives, unit number of first drive for:

5. DS Controller 0 [D: 204,172040,,0]

    Enter two commas (,,) followed by the number of RS03/04
    drives for the first RH11 or RH70 controller. This will use
    the default vector and CSR assignments and specify 0 as the
    unit number of the first RS03/04 drive. Subsequent
    controllers default only the unit number of the first drive
    (to 0).

Enter [L/R,] vector, CSR, highest unit number <0 to 7> for:

6. DK Controller 0 [D: 220,177404]

    Enter two commas (,,) followed by the highest unit number
    (the number of RK05 drives minus one, if you want the first
    unit number to be 0) for the first RK11 controller. This
    will use the default vector and CSR assignments for the RK05
    disk controller and, assign 0 as the unit number of the first
    drive if you enter number of drives minus one for highest
    unit number. Subsequent RK11 controllers do not have default
    responses.

Enter vector, CSR, VT11/VS60, number of CRT monitors for:

7. GR Controller 0 [D: ,172000,,1]

    You must enter the vector address and whether the connected
    terminal(s) is a VT11 or a VS60; the CSR address and the
    number of CRT monitors default to 172000 and 1 respectively.

Enter [L/R,] CSR, number of A/D channels for:

    8. AD Controller 0 [D: 176770]

        Enter a single comma (,) followed by the number of A/D
        channels for the first AD01-D analog-to-digital converter
        controller. This will use the default CSR assignment for the
        controller. Note that this device is used in non-interrupt
        mode and therefore, does not use an interrupt vector address
        assignment. The CSR address does not default for subsequent
        AD01-D controllers.

Enter [L/R,] vector, CSR, number of A/D channels for:

    9. AF Controller 0 [D: 134,172570]

        Enter two commas (,,) followed by the number of A/D channels
        for the first AFC11 analog-to-digital converter controllers.
        This will use the default vector and CSR assignments for the
        AFC11 controller. Subsequent controllers do not have default
        responses.

Enter [L/R,] clock vector, CSR, polarity mask, D=D/A channel/NO=no,
          maximum number of samples/second, DRK=DR11-K/NO=no
          (,DR11-K CSR) for:

   10. AR Controller 0 [D: ,170400,,,,,170420]

        Enter the clock vector address (from floating vector space
        starting at 300), a comma (,) to use the default CSR address,
        the polarity mask word, whether or not a D/A channel is
        present, the maximum number of samples per second, whether or
        not the DR11-K option is present, and, if present, a comma
        (,) to use the default CSR address for the DR11-K.
        Subsequent AR11 controllers default only the CSR address of
        the DR11-K options.

Enter [L/R,] clock vector, CSR, #A/D channels, G=gain ranging option/NO=no,
          polarity mask, bandwith filter channel select delay,
          number of D/A channels, D=digital I/O option/NO=no,
          maximum number of samples/second for:

   11. LS Controller 0 [D: ,170400,,,0,0,0,NO]

        Enter the clock vector address (from floating vector space
        starting at 300), a comma (,) to use the default CSR address,
        the number of A/D channels, whether or not the gain ranging
        option is present, four commas (,,,,) (to specify 16 bi-polar
        channels, no bandwith filter delay, no D/A channels, and no
        digital I/O option), followed by the maximum number of
        samples per second for the first LPS11 controller.
        Subsequent LPS11 controllers do not default the CSR address.

Enter [L/R,] vector, CSR (, number of UMRs) for:

12. LA Controller 0 [D: 300,170460,0]

Enter two commas (,,) for the first LPA11 controller. This will use the default assignments and excludes LPA11-K UNIBUS Mapping Register support.

Enter [L/R,] vector, CSR, # drives, O=offset recovery/NO=no offset rec. for:

13. DM Controller 0 [D: 210,177440,,O]

Enter two commas (,,) followed by the number of drives for the first RK611 controller. This will use the default vector and CSR assignments for the RK06/07 disk controller and include offset recovery support. Subsequent RK611 controllers do not have default responses.

Enter [L/R,] vector, CSR, F=full duplex/H=half duplex,
        number of characters in sync leader for:

14. XL Controller 0 [D: ,,H]

Enter the vector address (from floating vector space), the CSR address (from floating address space starting at 175610), whether the line is half duplex or full duplex (the default is half duplex), and the number of sync characters in a sync leader for the first DL11-E interface. Subsequent DL11-Es do not have a default response.

14. XP Controller 0 [D: ,174770,H]

Enter the vector address (from floating vector space starting at 300) followed by two commas (,,) and the number of sync characters in a sync leader for the first DP11 interface. This will use the default CSR assignment and specify a half duplex line. Subsequent DP11s default only the half duplex parameter.

14. XU Controller 0 [D: ,,F]

Enter the vector address (from floating vector space starting at 300), the CSR address (from floating address space starting at 160010), whether the line is half duplex or full duplex (the default is full duplex), and the number of sync characters in a sync leader for the first DU11 line interface. Subsequent DU11s default only the full duplex parameter.

14. XW Controller 0 [D: ,,H]

Enter the vector address (from floating vector space starting at 300), the CSR address (from floating address space starting at 160010), whether the line is half duplex or full duplex (the default is half duplex), and the number of sync characters in a sync leader for the first DUP11 line interface. Subsequent DUP11s do not have default responses.

Enter [L/R,] vector, CSR, F=full duplex/H=half duplex/P=primary HDX for:

15. XM Controller 0

    Enter the vector address (from floating vector space starting
at 300), the CSR address (from floating address space
starting at 160010), and whether the line is full duplex or
half duplex for the first DMC11 interprocessor link. Note
that if the line is half duplex and the primary station, you
must enter P.

Enter [L/R] vector, CSR, printer type
          (, [KMC timeout count <0=no KMC>, KMC vector, KMC CSR]) for:

16. LP Controller 0 [D: 200,177514,LA180,0,300,160130]

    Enter three commas (,,,) for the first LP11 controller. This
will use the default vector and CSR assignments and exclude
KMC line printer support.

Enter number of modules, module number of first for:

17. UD Controller 0 ADU01 analog input module
17. UD Controller 0 analog output module
17. UD Controller 0 bi-stable output module
17. UD Controller 0 digital interrupt module
17. UD Controller 0 digital sense module
17. UD Controller 0 I/O counter module
17. UD Controller 0 single-shot output module

    The UDC11 supports seven modules; enter the number of each
module and the module number of the first.

Enter [L/R,] terminal number to redirect to (TTn:) for:

18. CO Controller 0 [D: 0]

    Carriage return uses TT0: as the terminal for the console
output driver.

Enter [L/R,] NUM. DL11's <ZL>, NUM. DH11's, NUM. DZ11's, NUM. DJ11's for:

19. The terminal driver [D: 1,0,0,0]

    Enter carriage return to specify that you have one DL11
asynchronous line interface.

    Note that this question appears only if you selected the user
oriented or the baseline terminal drivers; the full duplex
terminal driver is always loadable.

Enter NUM. DL11's <ZL>, NUM. DH11'S, NUM. DZ11'S, NUM. DJ11's for:

20. The terminal driver [D: 1,0,0,0]

Enter carriage return to specify that you have one DL11
asynchronous line interface. This question appears only if
you selected the full duplex terminal driver.

Enter vector, CSR for:

21. ZL Controller 0 [D: 60,177560]

Carriage return uses the default vector and CSR assignments
for the first DL11 asynchronous line interface. Subsequent
DL11s do not have default responses.

Enter vector, CSR, highest line number <0 to 15>
        (,answer speed, DM11-BB vector, DM11-BB CSR) for:

22. DH Controller 0 [D: ,,,300,0,0]

Enter the interrupt vector address (from floating vector
space), the CSR address (from floating address space), and
the highest line number (0=one line, 15=sixteen lines). This
will exclude DM11-BB support for the first DH11 interface.
If the DH11 includes DM11-BB modem support, you must also
enter the answer speed (300 is the default), the DM11-BB
interrupt vector address (from floating vector space), and
the DM11-BB CSR (from floating address space). Subsequent
DH11s do not have default responses.

Enter vector, CSR, highest line number <0 to 15> for:

23. DJ Controller 0

Enter the interrupt vector address (from floating vector
space), the CSR address (from floating address space), and
the highest line number (0=one line, 15=sixteen lines) for
the first DJ11 multiplexer.

Enter vector, CSR, highest line number <0 to 7> [,answer speed] for:

24. DZ Controller 0 [D: ,,,0]

Enter the interrupt vector address (from floating vector
space), the CSR address (from floating address space), and
the highest line number (0=one line, 7=eight lines) for the
first DZ11 multiplexer. This will exclude DZ11 modem
support. If you wish modem support, enter the answer speed
baud rate.

If you selected an MM device, SYSGEN requests the TM02/03 formatter number as follows:

    51. MM controller 0 unit 0. formatter [D R:0-7 D:0]

        The default is unit number 0.

If you selected a DB device, SYSGEN requests drive type as follows:

    52. Contr 0 unit 0. is an RP04,05/RP06 [D:RP06]

        The default is RP06.

If you selected a DL device, SYSGEN requests drive type as follows:

    53. Contr 0 unit 0. is an RL01/RL02 [D:RL01]

        The default is RL01.

If you selected a DM device, SYSGEN requests drive type as follows:

    54. Contr 0 unit 0 is an RK06/RK07 [D:RK06]

        The default is RK06.

If you selected a DP device, SYSGEN requests drive type as follows:

    55. Contr 0 unit 0 is an RP02/RP03 [D:RP03]

        The default is RP03.

If you selected a DR device, SYSGEN requests drive type as follows:

    56. Contr 0 unit 0 is an RM02/RM03 [D:RM03]

        The default is RM03.

If you selected a DS device, SYSGEN requests drive type as follows:

    57. Contr 0 unit 0. is an RS03/RS04 [D:RS04]

        The default is RS04.

If you selected a DY device, SYSGEN requests drive density as follows:

    58. Contr 0 unit 0. is SINGLE/DOUBLE density

        You must specify whether the RX02 drive is at single or double density.

If you selected ICS/ICR subsystems or DSS/DRS modules, SYSGEN asks the following questions.

1. Expanded comments for ICS/ICR questions

   Enter Yes for explanatory text.

2. Do you want task activation from unsolicited interrupts

   Enter Yes to permit the driver to initiate a task when the driver receives unsolicited input.

3. IC controller 0 vector address

   Enter the interrupt vector address.   The   standard   is   234. The acceptable range is 234-774.

4. CSR address

   Enter   the   CSR   address.   The   standard   is   171776.   The acceptable range is 160000-177700.

5. Is it an ICR-11

   Enter Yes to specify an ICR-11, No to specify an ICS-11.

6. Number of A/D converter modules in this ICS/ICR

   Enter the number of modules in the range 0-16.

7. A/D converter module number

   Enter the A/D converter module number in the range 0-35.

8. Number of expansion multiplexers

   Enter a value in the range 0-7.

The ICS/ICR subsystem consists of six modules.   SYSGEN   requests   the number   of   modules   (questions   12-17)   and the module number of each (question 9).

12. Number of D/A converter modules in this ICS/ICR

13. Number of single-shot output modules in this ICS/ICR

14. Number of bi-stable output modules in this ICS/ICR

15. Number of digital sense modules in this ICS/ICR

16. Number of digital interrupt modules in this ICS/ICR

17. Number of I/O counter modules in this ICS/ICR

9. (module name) module number

10. Restore module status on power and error recovery

    Enter Yes to select this option.

11. How many line errors are acceptable per second

    If you selected option 10, enter a value in the range 0-5000.

18. Expanded comments for DSS/DRS questions

    Enter Yes for explanatory text.

19. Number of DRS-11 modules

    Enter a value in the range 0-16. Questions 20, 21, and 22
    pertain to DRS-11 modules;   if you enter 0, these are
    omitted.

20. Restore module status on power and error recovery

    Enter Yes to select this option

21. DRS-11 CSR address

    Enter a value in the range 160000-177700.

22. DRS-11 vector address

    Enter a value in the range 300-774.

23. Number of DSS-11 digital input modules

    Enter a value in the range 0-16 minus the response to
    question 19.

24. DSS-11 CSR address

    Enter a value in the range 160000-177700.

25. DSS-11 vector address

    Enter a value in the range 300-774.

26. Task activation from unsolicited interrupts

    Enter Yes to select this option.

If your system includes IP11/IP300 support, SYSGEN asks the following
questions.

1. Extended comments for IP11/IP300

    Enter Yes for explanatory text.

2. Treat all controllers as one unit

    Enter Yes to generate a single SCB and UCB for all
    controllers.

3. Any latching digital output modules

    Enter Yes to include support in driver.

4. Any single-shot output modules

    Enter Yes to include support in driver.

5. Direct output via QIO

    Enter Yes to simplify coding, but increase overhead.

6. Any non-interrupting digital sense modules

    Enter Yes to assemble code for this module.

7. Any interrupting digital sense modules

    Enter Yes to assemble code for this module.

8. Any change-of-state modules

    Enter Yes to assemble code for this module.

9. Any counter modules

    Enter Yes to assemble code for this module.

10. Direct input via QIO

    Enter Yes to simplify task code at the expense of overhead.

11. Unsolicited interrupt support

    Enter Yes and tasks can monitor unsolicited interrupts from
    the interrupting modules.

12. Event flag linkage to interrupts

    Enter Yes to permit tasks to monitor digital interrupts
    through event flags.

13. Any D/A converters

    Enter Yes to assemble code for this module.

14. Any A014 A/D converters

    Enter Yes to assemble code for this module.

15. Any A020 A/D converters

    Enter Yes to assemble code for this module.

16. How many output bytes should be saved on powerfail

    Enter a value in the range 0-3048(10).

17. IP11 vector

    Enter a value in the range 60-774. The standard vector is
    234.

18. Base address

    Enter the IP11 base address (base address is CSR minus 377
    octal). The default for the first controller is 171000 and
    171400 for the second. Acceptable range is 160000-177400.

CHAPTER 5

DETAILS OF SYSGEN PHASE I

This chapter contains detailed descriptions of SYSGEN Phase I questions by sections. The phase 1 sections are:

- Setup Questions
- Target Questions
- Host Questions
- Executive Questions
- Terminal Driver Questions
- Peripherals Questions

The questions are listed in numeric order. Not all the questions appear; the order of the questions is based on your responses. Also, the peripherals section follows a strict numeric order, not logical sequence.

Figure 5-1 shows the processing steps that take place during SYSGEN Phase I.
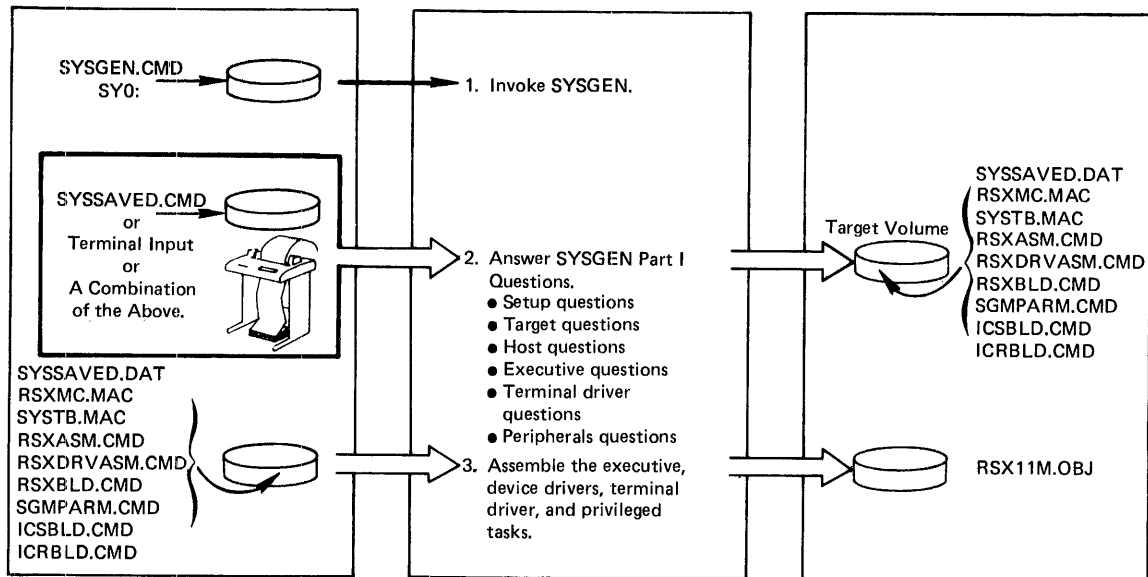
Figure 5-1 Processing Steps in SYSGEN Phase I

Step 1 in Figure 5-1 is invoking SYSGEN, as described in Chapter 3.

Step 2 in Figure 5-1 is answering the questions in each of the sections in SYSGEN Phase I. For this process, you can answer all the questions explicitly at your terminal, you can use saved answers, or you can use a combination of saved answers and explicit answers.

As you answer the Phase I questions that define your system, SYSGEN is building files that correspond to your answers. These files are the output of SYSGEN Phase I:

SYSSAVED   SYSSAVED is the file that contains symbols that correspond to your answers to SYSGEN Phase I questions. SYSSAVED.CMD is used as input to later SYSGENs. SYSSAVED.DAT is the output from a SYSGEN.

RSXMC.MAC   RSXMC.MAC is the assembler source file that comprises the executive features defined during SYSGEN Phase I. This file is assembled in Step 3.

SYSTB.MAC   SYSTB.MAC is the assembler source file that contains the data structures for devices selected during SYSGEN Phase I.

RSXASM.CMD   RSXASM.CMD is the command file that controls assembly of the executive.

RSXDRVASM.CMD   RSXDRVASM.CMD is the command file that controls assembly of the device drivers.

RSXBLD.CMD   RSXBLD.CMD is the command file that controls the task building of the executive.

SGNPARM.CMD   SGNPARM.CMD is the RSX-11M indirect command processor file that contains symbols defined in SYSGEN Phase I for use in controlling SYSGEN Phase II processing.

ICTAB.MAC   ICTAB.MAC contains the ICS/ICR data structures.

Step 3 in Figure 5-1 is the assembly of the executive, device drivers, terminal driver, and privileged tasks.

Input to Step 3 is output of Step 2; refer to description of those files above.

SYSGEN controls the assembly and creates an object file that corresponds to the system you defined in Step 2.

If all assemblies are successful, SYSGEN completes execution and displays the <EOF> prompt.

5.1 SYSGEN SETUP QUESTIONS

The SYSGEN Phase I setup section asks questions that provide SYSGEN with information describing the way you want the program to execute, input to SYSGEN, and what kind of output you want from SYSGEN.

SYSGEN asks a series of questions that define whether to:

- Execute MCR commands

- Use saved answers as input to SYSGEN

- Use breakpoints

When you are generating a system for the first time, you may wish to follow the logical flow through the SYSGEN command files. For this case, the setup section of SYSGEN asks the question:

* 1. Do you want to inhibit the execution of MCR commands [Y/N]:

An affirmative response to this question prevents SYSGEN from creating or deleting files as well as inhibiting MACRO-11 and the Task Builder execution, UIC modification, device mounting, and logical assignments.

When you inhibit MCR commands, SYSGEN asks all Phase I questions as usual, and creates SYSSAVED.DAT if you request it, but doesn't execute MCR commands required to build a system.

This feature allows you to practice the system generation to see how SYSGEN asks questions and to plan the way you want to answer questions when MCR commands are not inhibited in later system generations.

SYSGEN provides breakpoints, or pauses in execution, during system generation. There are three types of breakpoints:

- End-of-Section (EOS) Breakpoints

- End-of-Execution (EOX) Breakpoints

- End-of-Disk (EOD) Breakpoints

These breakpoints are used for various purposes, but can be overridden so that SYSGEN can execute unattended when that is appropriate.

End of section breakpoints are pauses at the end of each section of SYSGEN dialogue questions. In SYSGEN Phase I, there are six sections of dialogue questions. You can choose to answer the questions in all sections without interruption or you can direct SYSGEN to pause after you answer each section. This breakpoint in the dialogue gives you the opportunity to:

- Continue the dialogue
- Repeat the section of question, perhaps to correct previous answers
- Exit the SYSGEN program
- Suspend execution of the SYSGEN program (.PAUSE)

Note that if you type CTRL/Z in response to any question, SYSGEN exits cleanly (for example, closes all files).

Figure 5-2 shows where End-of-Section breakpoints occur in the flow of SYSGEN Phase I.

Execution breakpoints (EOX) in the SYSGEN procedure occur after completion of a MACRO assembly or a Task Build operation. SYSGEN can pause at these points to ensure successful completion of the assembly or build operation. When you know files will execute successfully, you can direct SYSGEN to continue processing without the breakpoint pause.

Figure 5-2 shows where End-of-Execution breakpoints occur in the flow
of SYSGEN Phase I.


```
@SYSGEN
        !
        !
        Setup Questions
        !
        !
      EOS
        !
        !
        Host and Target Questions
        !
        !
      EOS
        !
        !
        Executive Questions
        !
        !
      EOS
        !
        !
        Peripherals Questions
        !
        !
      EOS


                  Executive Assembly
                    !
                    !
                  EOX
                    !
                    !
                      Executive Task Build
                    !
                    !
                  EOX
                    !
                    !
                      Terminal Driver Task Build
                    !
                    !
                  EOX
                    !
                    !
                      Privileged Tasks Task Build
                    !
                    !
                  EOX
```


       Figure 5-2   End-of-Section and End-of-Execution Breakpoints in
                    the Flow of SYSGEN Phase I

As shown in Figure 5-2, a flow of execution through SYSGEN Phase I can
be interrupted by end-of-section breakpoints. During Phase II, SYSGEN
execution can be interrupted by end-of-execution breakpoints. You can
direct SYSGEN to override these breakpoints and execute unattended by
means of questions asked in the setup section of SYSGEN Phase I.

End-of-disk breakpoints (EOD) occur in system generations with RK05
distribution kits. After SYSGEN completes processing with the EXCSRC
volume in the RK05 kit, SYSGEN prompts you for the next disk required:

     * EOD * If not in [dduu:], enter driver source files device
     (dduu:)

At this point, you remove EXCSRC from the drive and replace it with
DRVSRC.

In the same cases, where your configuration includes more than two
drives, you can override EOD breakpoints to run SYSGEN unattended.

Parts I, II, and III of SYSGEN all reside in UFD [200,200]. However,
while it executes, SYSGEN resets the UIC under which it runs to store
files in appropriate UFD's.

When you stop SYSGEN execution, for any reason, and want to resume
execution later, ensure that you set your UIC to [200,200].

The following is a list of the questions.

* 1. **Inhibit MCR command lines (Type <ESC> for explanation)**

     This option permits you to perform a PREPGEN; the SYSGEN
     questions are asked in the logical order (based on your
     responses), but SYSGEN inhibits the processing of MCR commands and
     commands that assemble, build, create, or delete files. A PREPGEN
     permits you to follow the logical flow of a SYSGEN and helps
     familiarize you with the questions specific to your SYSGEN. Also,
     a PREPGEN allows you to schedule actual SYSGEN processing; you
     perform a PREPGEN, save the responses (answer Yes to setup
     question 10), and then submit the saved answer file for SYSGEN
     processing at your convenience.

                                NOTE

              To successfully complete a PREPGEN, you
              must mount all required volumes as well
              as establish logical assignments for
              pseudo devices SY: and LB:. Refer to
              Chapter 3.

     If you respond Yes, SYSGEN asks Setup Question 3; if you respond
     No, SYSGEN asks Setup Question 2.

* 2. **Have you made a copy of the distribution kit**

     A copy of the distribution kit insures that you have a backup copy
     in case you inadvertently delete important files or data during
     the system generation process. Also, a backup copy serves as a
     base for future updates.

     If you answer this question No, SYSGEN displays the message:

     SGN -- You are or will be running on the original copy of the
     distribution kit. Make a copy via the standard procedure and
     restart.

     SYSGEN then exits to allow you to copy the media.

* 3. **Use saved or canned answer file for input responses**

    This question permits you to direct SYSGEN to use a saved answer
    file (either a canned or a SYSGEN created one) as input. If you
    respond Yes, SYSGEN uses a file named SYSSAVED.CMD to obtain
    responses to questions. Note that SYSGEN does not save responses
    for ICS/ICR, DSS/DRS, or IP11/IP300 devices; you must enter the
    responses for these devices. Question 10 provides details
    concerning saved answer files.

    If you respond Yes, SYSGEN asks you whether or not you want to
    re-answer the host or device configuration questions and bypass
    breakpoints in Setup Questions 4, 5, 6, 7, and 8: these questions
    provide options for use with saved answers. If you respond No and
    you are using the RK05 kit, SYSGEN asks question 9; for other
    kits SYSGEN asks question 10.

* 4. **Undefined answer wakeup**

    This feature causes the terminal bell to ring when SYSGEN
    encounters an undefined symbol when using the saved answer file
    SYSSAVED.CMD (SYSGEN precedes the question with a CTRL/G).

    This question is asked only if you responded Yes to question 3
    (Use saved answers).

* 5. **Use saved host configuration**

    This question allows you to use previously-defined (saved) answers
    to host section questions. In the case where you are running
    SYSGEN online and already have all the listings you need, you may
    want to redefine the host answers in the saved answer file
    (SYSSAVED.CMD) to redefine the way SYSGEN handles listings. An
    affirmative response implies that you are performing a SYSGEN on
    the same, or similar, configuration you used to create the saved
    answer file.

    This question is asked only if you responded Yes to question 3
    (Use saved answers).

* 6. **Use saved peripheral configuration**

    This question provides you the opportunity to use the
    previously-defined (saved) peripheral configuration contained in
    the file SYSSAVED.CMD.

    If you respond Yes to this question, SYSGEN uses the saved
    peripheral configuration specified by the symbols $DEV, $DV2, and
    $DV3. If you respond No, SYSGEN asks Executive question 16. Note
    that a negative response does not affect the saved answers and
    does not permit you to change vectors or CSRs of previously
    defined devices. A negative response permits you to change only
    the number of controllers; respond No to add or delete
    controllers.

    This question is asked only if you responded Yes to question 3
    (Use saved answers).

* 7. Skip end of section (EOS) breakpoints

This question allows you to choose whether or not to skip End-of-Section (EOS) breakpoints. At these breakpoints, you can select whether to continue SYSGEN questions, repeat questions in the preceding sections (to correct wrong answers), exit from SYSGEN, or cause SYSGEN to pause. This feature is also one which in combination with other features defined in this section, allows you to run unattended SYSGENs.

Breakpoints occur at the following points in SYSGEN Phase I:

- After the Target and Host section
- After the Executive and Terminal Drivers section
- After the Peripherals questions

If the answers in SYSSAVED.CMD already define the system you want to generate, you can direct SYSGEN to complete execution of Phase I without interruption by answering Yes to this question.

Note that the laboratory and I/O peripherals questions cannot be repeated (as can Executive questions). However, if you specify repeat at the EOS breakpoint, SYSGEN renames SYSSAVED.DAT to SYSSAVED.CMD so that you can continue where you left off.

This question is asked only if you responded Yes to question 3 (Use saved answers).

* 8. Skip end-of-execution (EOX) breakpoints

End-of-Execution (EOX) breakpoints occur after the MACRO-11 assembler and the Task Builder complete execution. If you know that processing will complete successfully, answer Yes to direct SYSGEN to process without pausing at completion of MACRO-11 or Task Builder execution.

If you answer No, SYSGEN pauses after execution of these tasks to allow you to check and correct the results.

This question is asked only if you responded Yes to question 3 (Use saved answers).

* 9. Skip end of disk (EOD) breakpoints

The dual RK05 distribution kit imposes a breakpoint when you must change disks after assembling the Executive. You must swap the EXCSRC disk with the DRVSRC disk to assemble the device drivers.

An affirmative (Yes) response to this question implies that a third disk drive is available and that the drive contains the driver source files. Thus, SYSGEN can assemble the Executive, using the EXCSRC disk, and then assemble the device drivers, without interruption, using the drive that contains the driver source files. If you respond Yes to this question, you are asked (in question 15) to identify the device that contains the driver source files. Note that this device can be a third RK05 drive or a drive of a different type. (If a drive of a different type is used, the volume must completely contain the contents of the DRVSRC disk. Also, the driver must be loaded and you must mount the volume.)

* 10. Save responses (i.e.: create SYSSAVED.DAT)

When you respond Yes to this question and request a saved answer
file, SYSGEN creates an indirect command file named SYSSAVED.DAT.
This file consists of .SET directives which assign values to the
symbols defined by your responses to SYSGEN questions (indirect
command file processor   directives   are   described   in   the
RSX-11M/M-PLUS MCR Operations Manual).   For example, when you
enter a processor type in response to target question 1 (such as
•11/70), SYSGEN writes the following line to the file SYSSAVED.DAT:

        .SETS $TPR "11/70"

Appendix A lists all the symbols that SYSGEN defines in a saved
answer file and identifies the option that each symbol represents.
You can then use the saved answer file as input to a later SYSGEN
simply by renaming the file to SYSSAVED.CMD and responding Yes to
question 3. Thus, saved answer files permit you to generate
duplicate or similar systems without the need to answer the SYSGEN
questions.

More importantly, you can edit the SYSSAVED.DAT file to correct an
errant response or to alter specific system characteristics. For
example, you generate a system, but do not include 20K Executive
support and then find you need more DSR space. The saved answer
file permits you to generate the same system, except with support
for a 20K Executive; simply edit SYSSAVED.DAT and set symbol $20K
to true (.SETT $20K). Then rename SYSSAVED.DAT to SYSSAVED.CMD
and submit the command file as input to SYSGEN. All the options
you included in the 16K Executive system are then included in the
20K Executive system. To correct an errant response, enter Exit
at the next end-of-section breakpoint or respond with CTRL/Z to
any question (CTRL/Z closes SYSSAVED.DAT and exits SYSGEN). You
can then edit and rename the command file and restart SYSGEN.

If you alter specific system characteristics, be sure to read the
detailed description of those options/features. Some options,
like cat and mouse, are mutually exclusive and some options
require or automatically include other options.

Note that in extreme cases where you change the system complexion,
it is more practical to perform a complete SYSGEN rather than
attempt to edit the saved answer file. For example, do not toggle
the settings for $11S or $MAP, since these symbols effect
system-wide characteristics.

You can delete any number of responses in SYSSAVED.CMD;   SYSGEN
asks the respective question when a symbol is missing from the
saved answer file. In this case, it is especially useful to
specify undefined answer wakeup (respond Yes to question 4).

                              NOTE

            SYSGEN does not save answers for
            DRS/DSS, ICS/ICR, or IP11/IP300 devices.

* 11. UIC for SYSSAVED files if not [defaultuic]

    If you want to use saved answer files, enter the UIC of the saved
    answer file you are using or will create. In certain cases, you
    may want to have features for various systems, each system created
    under a different UIC.

    If you respond with a carriage return, SYSGEN uses your current
    UIC for saved responses. Otherwise, enter the UIC under which you
    want responses saved.

* 12. UIC for SYSGEN command files if not [sysgenuic]

    This question allows you to select the UIC under which SYSGEN
    looks command files.

    If you are not inhibiting MCR lines, sysgenuic is [200,200].   If
    you are inhibiting MCR lines, sysgenuic is the same as the default
    UIC of the terminal when you invoke SYSGEN.

* 13. Clean up files from previous GENs

    In cases where you are generating multiple systems on the same
    media, SYSGEN creates files that may not be appropriate from one
    system to the next. This question gives you the opportunity to
    request that SYSGEN delete all such unnecessary files.

    This question is asked only if you respond No to Setup Question 1
    (Inhibit MCR commands).

* 14. Device, when ready, for Executive sources (ddu:)[D:SY:]:

    Enter the device type and unit number (ddu:) for the unit
    containing the Executive source files (on volume EXCSRC), for
    example, DK1:. The trailing colon is appended by SYSGEN when it
    is omitted.

    The default when you are using a big disk distribution kit is SY:.

    This question is always asked.

                              NOTE

          If you are performing a PREPGEN, SYSGEN
          does not issue a Mount command for the
          Executive source device. (See Chapter
          3.)

* 15. Device, when ready, for driver sources (ddu:)

    This question appears only if you are using the dual RK05
    distribution kit and responded Yes to question 9 (skip end-of-disk
    breakpoints).

    Enter the device type and unit number (ddu:) for the unit
    containing the driver source files (DRVSRC), for example, DK3:.
    The trailing colon is appended by SYSGEN when it is omitted.

5.2 TARGET CONFIGURATION DEFINITION QUESTIONS

This section of questions defines the processor type and options, system type, and peripheral devices included in the target system.

* 1. **Processor (e.g.: 11/34, LSI-11) [5:6]**

   Enter the target processor type.

   Valid entries are:

11/03	11/23	11/55
11/04	11/34	11/60
11/05	11/35	11/70
11/10	11/40	LSI-11
11/15	11/45	
11/20	11/50	

   This question is always asked.

* 2. **Does processor have a switch register**

   The switch register is the register that contains the toggle settings on the front panel of your processor. Certain processors (the 11/34, for example) may have neither toggles nor a switch register.

   If your processor does not have a switch register, you are restricted from using the Executive directive, GSSW$ (Get Sense Switch), which reads the contents of the switch register.

   This question appears only if your processor, as defined in Target Question 1, is a PDP-11/03, 11/04, 11/34, or 11/60. Other processors always include a switch register.

* 3. **Generating RSX-11S**

   The answer to this question specifies whether you are generating an RSX-11M or RSX-11S system.

   This question is always asked.

* 4. **Memory size (in K-word blocks) [min:max]**

   Enter the amount of memory for your processor in 1024-word blocks. The legal range is from 16K through 1920K; but depends on the minimum and maximum memory sizes for your processor. SYSGEN calculates the range values (min and max) based on your response to question 1.

   The table below shows the minimum and maximum memory sizes for RSX-11M-supported PDP-11 processors.

   Note that memory size must be specified in 4K increments.

Processor	Default Memory Size			
	11M		11S	
	min	max	min	max
LSI-11, 11/03	not	supported	8	28
11/04	16	28	8	28
11/05, 11/10	16	28	8	28
11/15, 11/20	16	28	8	28
11/70,	32	1920	32	124
all others	16	124	8	124

In the category "all others," above, the processors are the PDP-11/34, 11/35, 11/40, 11/45, 11/50, 11/55, and 11/60.

NOTE

> If your processor is an 11/70 and you want the 22-bit addressing option, you must specify a memory size of 128K or greater.

* 5. Mapped

The answer to this question specifies whether the target system includes the Memory Management Unit (KT-11). If it does, enter Yes to generate a mapped system. This question is always asked.

The memory size you specify in question 4 must be consistent with the mapping option; you must have at least 24K of memory to generate a mapped system and a maximum of 28K to generate an unmapped system.

The LSI-11, PDP-11/03, 11/04, 11/05, 11/10, 11/15, and 11/20 processors do not support mapped systems.

You must answer Yes if your processor has more than 28K of memory. If you enter a memory size inconsistent with the mapping option, SYSGEN displays an error message and repeats both questions.

If you respond Yes to this question, SYSGEN automatically includes Executive support for address checking and I/O rundown (see Executive questions 9 and 10).

* 6. Any K-series laboratory devices

The K-series laboratory options are a set of real-time data acquisition modules which interface to the PDP-11 family of computers.

Answer YES if you want support for the K-series software routines (see the RSX-11M/M-PLUS I/O Drivers Reference Manual). If you enter Yes, SYSGEN automatically includes connect to interrupt and AST and cancel selective marktime support.

* 7. Extended arithmetic element (KE11-A/B EAE) present

The extended arithmetic element (EAE) is a hardware feature that performs signed integer multiplication, division, multiple-position shifts, and normalization. The EAE performs these functions significantly faster than software subroutines.

This question is not asked if the processor has memory management and is not asked for non-UNIBUS PDP-11s (for example, the PDP11/03 and LSI-11).

* 8. **Floating point processor (FP11) present**

The PDP-11 floating point processor (FP11-A,C,E) performs all floating point arithmetic operations and converts data from integer to floating point format and vice versa. The FP11-A is available for the PDP-11/34 processor. The FP11-C is available on the PDP-11/45, 11/50, 11/55, and 11/70 processors. The FP11-E is available for the PDP-11/60 processor. Also, there is a floating point option for the 11/23 that is compatible with the FP11.

This question does not appear for other processors.

If the target processor is a PDP-11/60, floating point support is automatically included and the question is not asked.

This feature should not be confused with the floating instruction set (FIS) available on the PDP-11/40 processor.

If you respond No to this question, Target Question 9 is asked.

If you respond Yes to this question, SYSGEN automatically includes Executive support for Asynchronous System Traps (AST support) (see Executive question 16).

* 9. **Floating instruction set (FIS) present**

The floating instruction set (FIS) feature includes hardware functions that perform floating point add, subtract, multiply, and divide instructions. This feature is available only on the LSI-11, PDP-11/03, and 11/40.

This question is asked only if the target processor is one listed above.

* 10. **If using KW11-P as system clock: number of ints/sec.[0:1000.]**

RSX-11M/S requires a real-time clock for operations. Three clocks are available: the KW11-P programmable frequency clock, the KW11-L line frequency clock, and the DL11-W line frequency clock/console. If your system has a KW-11P and you want to use this clock as your system clock, the acceptable range is from 1 through 1000.

A response of 0 indicates there is no programmable clock in this configuration or that you want to use the line frequency clock.

This question is not asked if your processor is the LSI-11, PDP-11/03, or PDP-11/23.

The number of interrupts you select must be divisible evenly into 10000.

More than 100 (decimal) clock interrupts-per-second greatly increases system overhead; you should carefully consider the impact on your system before specifying a number greater than 100 (decimal) per second.

* 11. **Line frequency: A- 60 Hz B- 50 Hz [Default: "A"]**

    You can specify a line frequency of either 50 or 60 hertz. In the
    USA, line frequency is always 60 hertz. The default response is
    60 hertz.

    This question is always asked.

* 12. **KW11-Y Watchdog timer support**

    The KW11-Y watchdog timer is a hardware clock that constantly
    attempts to time-out system activity. The executive refreshes the
    timer at every clock interrupt. If the system faults or if a
    hardware failure occurs and the timer expires, a signal is
    generated to indicate that the system has been corrupted.

    This question is always asked.

    If you select this feature, the system you generate will run only
    on a configuration that includes the KW11-Y watchdog timer. If
    you attempt to boot your system on a configuration that does not
    include a KW11-Y watchdog timer, the system crashes immediately.

* 13. **Memory parity support**

    If your system includes parity memory and you want Executive
    support to detect parity errors, enter Yes.

    This question is always asked.

    If you respond No to this question, Target Question 14 (cache
    memory) is not asked. If you respond Yes to this question, SYSGEN
    asks Target Questions 14 and 15.

* 14. **Cache memory**

    Cache memory is available on PDP-11/34, 11/60,   and   11/70
    processors.

    If your system includes cache memory and you want Executive
    support to detect parity errors, enter Yes.

    This question is asked only for the processors listed above when
    you select memory parity support (Target Question 13) for those
    processors.

*15. **Highest interrupt vector (If 0 will be computed)[0:774]**

    The response to this question specifies the highest interrupt
    vector address.   If you respond 0 (or carriage return) or with a
    value less than 400, SYSGEN calculates this address based on your
    answers to the peripheral questions.

    This question is always asked.

    Enter a value greater than 400 if you require vector space for
    devices that will not be specified during this SYSGEN.

NOTE

SYSGEN does not write this symbol to
SYSSAVED.DAT until you complete the
peripheral section.

* 16. **Devices**

This question allows you to enter, in mnemonic form, the
peripherals and pseudo-devices for your configuration. To help
select the appropriate device mnemonic, enter an asterisk (*) to
generate a list of devices. The following is a list of the
peripheral devices that RSX-11M supports:

Device Mnemonic	Controller(s)	Description
AD	AD01-D	Analog-to-Digital Subsystem
AF	AFC11	Low Level Analog Input Subsystem
AR	AR11	Analog Real-Time Module
CR	CR11 CM11-F	Punched Card Reader
CT	TA11 TU60	Cassette Drive
DB	RP04 RP05 RP06	Disk Drive
DD	TU58	DECtape Drive
DF	RF11	Fixed-head Disk Drive
DK	RK11 RK03 RK05	DECpack Cartridge Disk Drive
DL	RL11 RL01 RL02	Disk Drive
DM	RK611 RK06	Disk Drive
DP	RP11 RP02 RP03	Disk Drive
DR	RM02 RM03	Disk Drive
DS	RS03 RS04	Fixed-head Disk Drive
DT	TC11 TU56	DECtape Drive
DX	RX11 RX01	Floppy Disk System
DY	RX211/RX02	Floppy Disk System
GR	VT11 VT60	Graphics Display System
IC	ICS ICR11	Subsystems
IP	IP11/IP300	Subsystems
IS	DRS DSS11	Subsystems
LA	LPA11	Laboratory Peripheral Accelerator
LP	LP LS LV11 LA180	Line Printers
LS	LPS11	Laboratory Peripheral System
MM	TU16 TU45 TU78 TE16	Tape Drives
MS	TS04	Tape Drive
MT	TM11 TU10 TE10 TS03	Tape Drives
PP	PC11	High-Speed Paper Tape Reader
PR	PR11 PC11	High-Speed Paper Tape Punch
UD	UDC11	Universal Digital Control Subsystem
XB	DA11-B	Unibus Link
XL	DL11-E	Single Asynchronous Serial Line Interface
XM	DMC11-E	Network Link
XP	DP11	Synchronous Line Interface
XQ	DQ11	NPR Synchronous Line Interface
XU	DU11	Synchronous Line Interface
XW	DUP11	Synchronous Line Interface

Enter devices in the form:

    device[=controllers]

where device is the device mnemonic and controllers is the number
of controllers for the device type. Brackets denote an optional
entry and are not part of the syntax. If you omit the controller
entry (=controllers), SYSGEN assumes one controller for that
device type.

Terminate this question by entering a period(.) either following
the last controller you enter or on a line by itself.

Generally, there may be one controller for several devices of a
given type. For example, four RK05 drives can be connected to one
RK11 controller. In this case, all you are required to enter in
response to this question is DK; SYSGEN defaults to one
controller for all four drives.

If you make a mistake and specify a device type that is not
included in the target configuration, enter device=0. Also, if
you specify the wrong number of controllers, you can correct this
by reentering; SYSGEN uses the most recent response for duplicate
entries. For example, if your system includes two RK11
controllers (four RK05 drives) and one TC11 DECtape controller
(two TU56 drives), the following sequence corrects an errant
response of three RK11s, two TU58s, and one RL11.

        Devices: DK=3
        Devices: DT=2
        Devices: DL
        Devices: DK=2
        Devices: DT
        Devices: DL=0
        Devices: .

                            NOTE

          To specify the number of paper tape
          device controllers, you must consider
          the number of PC11 reader/punch and the
          number of PR11 readers. Enter the
          number of PC11s as PP=n, where n is the
          number of PC11 controllers. Enter the
          number of PR11 controllers as PR=k,
          where k is the number of PR11
          controllers plus n (the number of PC11
          controllers). For example, if your
          system includes one PC11 and two PR11s,
          enter the following:

              PP=1
              PR=3

5.3 HOST CONFIGURATION QUESTIONS

This section of questions defines the configuration on which you are
running SYSGEN.

* 1. **Are you running SYSGEN standalone (on the baseline system)**

    This question specifies whether you are running online or standalone.

    If you respond Yes, SYSGEN assumes that you cannot spool listings and maps and does not ask Host Question 3.

    Note that if you are running SYSGEN online, you cannot direct listings or maps directly to the line printer (LP:).

* 2. **Is a line printer available**

    This question is asked to allow you to specify the device to which maps and listings are sent (line printer if Yes, terminal if No).

    If you respond NO, you cannot specify that the line printer (LP:) is the listing device.

* 3. **Spool assembly listings and Executive and driver maps**

    This question allows you to specify whether or not to spool listings. For example, you can direct listings to an intermediate device. If you want the listings spooled to the line printer respond Yes to this question. If you want to save the listings but not spool them, respond No to this question.

* 4. **Does the listing/map device have at least 120 columns**

    If the listing device does not have at least 120 columns, SYSGEN creates a narrow listing file for map listings. For information on narrow listings, refer to the descriptions of the /LI switch for MACRO-11 and the /WI switch for the Task Builder.

* 5. **Assembly listing file device (ddu:) [D: "NL:"]**

    This question allows you to choose whether or not to direct listings to an RSX-11M logical or pseudo device or to not generate them at all.

    Specify LP: to send the listings to the line printer if you are running standalone, to a disk device (dduu:) if you are running online, and NL: (the null device) to direct SYSGEN not to produce assembly listings.

    NOTE

    SYSGEN does not load the driver for the device you specify.

* 6. **Map device for Executive and device drivers (ddu:) [D: mapdevice]**

    The response to this question defines the default device to which you want to direct the Executive and device driver maps.

    It is recommended that you specify a device for these maps.

For unmapped systems, you should specify a device, since the maps are required to determine the size of the Executive and to layout memory partitions in SYSGEN Phase II.

Note that you can override the device for driver maps in Phase II.

5.4 EXECUTIVE QUESTIONS

This section allows you to choose which of the RSX-11M Executive options you want included in your system.

The RSX-11M/M-PLUS Executive Reference Manual fully describes these directives and Executive options.

Answer Yes to the features you want included in your system.

* 1. Will DBMS-11 be used $DBM

    For details on DBMS-11, refer to the DBMS-11 documentation.

    This question appears only if the target processor memory is greater than 96K, the system is mapped, and you are not generating RSX-11S.

    If you select DBMS-11 support, SYSGEN automatically includes Executive support for: Asynchronous System Traps (AST support); Memory management directives; and Send/receive by reference directives. See Executive questions 16, 6, and 7 respectively.

* 2. FILES-11 ACP $F11

    If you do not select Files-11 ACP, none of the services described in the IAS/RSX-11 I/O Operations Reference Manual are generated in your system.

    If DBMS-11 is requested (Executive Question 1) this question is not asked.

    DEC-supplied software uses the Files-11 ACP; it is recommended that you select this option.

    You specify the appropriate F11ACP for your application during SYSGEN Phase II.

    If you are generating an RSX-11S system, this question is bypassed and Files-11 ACP is not included in your system.

* 3. RMS record locking and placement control $RMS

    RMS is the DIGITAL Record Management System. RMS record locking and placement control is a feature of the RSX-11M Record Management System and is described in the RMS documentation.

    If you selected Files-11 ACP (Executive Question 2) or if it is included in your system by default, this question is asked. Otherwise, the question is bypassed and RMS-11 is not supported.

NRT

* 4. Non-resident tasks (task loader)

Non-resident task support allows tasks that are not permanently resident in your system to be loaded from disk.

If you do not include support for the task loader, all tasks must be installed and fixed into the system image by VMR.

It is highly recommended that you select this option.

RSX-11S does not support this option; the question does not appear.

LLR

* 5. Loadable task loader

The RSX-11M task loader reads tasks scheduled for execution from disk. Making the task loader loadable is an RSX-11M Executive feature that reduces the amount of address space required for the Executive (excluding pool), freeing space for additional Executive dynamic storage.

If you answer No to this question, the loader is linked into the Executive and requires up to 2400 bytes of Executive virtual address space. By making the loader loadable (responding Yes to this question), those 2400 bytes become available for use as dynamic storage (pool space) or for other Executive features.

This option is not available on RSX-11S, on unmapped systems, or if non-resident task support is not included.

NOTE

The loadable loader must be loaded by VMR at the end of Phase II.

MMD

* 6. Memory management (PLAS) directives

Memory management (PLAS) directives provide functions that allow tasks to dynamically modify mapping of their physical addresses in memory. These directives also allow tasks to dynamically create and delete common blocks.

The following lists the memory management directives:

    ATTACH REGION
    CREATE ADDRESS WINDOW
    CREATE REGION
    DETACH REGION
    ELIMINATE ADDRESS WINDOW
    GET MAPPING CONTEXT
    MAP ADDRESS WINDOW
    RECEIVE BY REFERENCE
    SEND BY REFERENCE
    UNMAP ADDRESS WINDOW

Memory management directives are restricted to use on mapped systems. Therefore, the question is not asked for unmapped systems.

If you selected DBMS-11 (Executive Question 1) memory management directives are included by default and this question is not asked.

If you select this option, SYSGEN automatically includes support for address checking (option 9) and I/O rundown (option 10).

If you do not select memory management directives, you cannot include Executive support for send/receive by reference directives (question 7).

The memory management (or PLAS) directives add approximately 1000(10) words to the Executive.

* 7. **Send/Receive by reference directives** $S\,RR$

The SEND/RECEIVE by reference directives allow one task to send to another task a reference to an area within a region. The receiver task is given a specified access which allows it to map to or delete the region.

If you selected DBMS support, SYSGEN automatically includes Executive support for the send/receive by reference directives; this question is not asked.

If you did not include support for the memory management directives, this question is not asked.

If you did not select DBMS-11, but included memory management directives, this question is asked.

* 8. **Get mapping context directive** $G\,Me$

This directive returns to the issuing task parameters describing the current window-to-region mapping assignments. These parameters allow you to restore the mapping context using the memory management CREATE ADDRESS WINDOW directive.

This question appears only if memory management directive support was included.

If you select this feature, Executive support for address checking (option 9) and I/O rundown (option 10) are automatically included.

* 9. **Address checking** ACK

This feature directs the Executive to perform boundary checks, alignment checks, and modulus checks on addresses passed by users in Executive directives.

Note that if you are generating a mapped system, address checking is automatically included; this question is not asked.

Address checking is recommended unless you are running a fully-debugged application system.

* 10. **I/O rundown** IOR

This feature ensures RSX-11M system integrity by cleaning up all outstanding task-related I/O before allowing a task to exit.

It is recommended that you select this feature; I/O rundown is recommended unless you are running a fully-debugged application system. This feature is automatically included if you are generating a mapped system.

* 11. **Multi-user protection**   *MuP*

This feature prevents tasks initiated at one terminal from interfering with tasks initiated at other terminals. Multi-user protection provides for public and private device ownership and login and logoff with password protection.

When you select this feature, SYSGEN automatically includes the following terminal driver features:

- Read with special terminator
- Breakthrough write
- Read with no echo
- CTRL/R support

Select multi-user protection support only if your system has 32K or more of main memory.

Multi-user protection support is not available in an RSX-11S system; the question is not asked.

Multi-user protection increases the size of the Executive by approximately 100(10) words.

* 12. **ANSI Magtape ACP**   *ANM*

This feature provides support for volume and file labels that conform to the ANSI standard for industry-compatible tapes. This feature requires Executive AST support; if you select ANSI magtape ACP support, SYSGEN automatically includes AST support.

RSX-11S systems do not support ANSI magtapes; the question is not asked.

ANSI magtape ACP support increases the size of the Executive by approximately 40(10) words.

OuP

* 13. **On-line formatting (FMT) or on-line user-mode diagnostics**

On-line formatting or on-line user-mode diagnostics enable the Executive and device drivers to perform special I/O functions and return additional device status information required by online diagnostic tasks. (For information on diagnostic tasks, see the RSX-11M/M-PLUS User Mode Diagnostics Manual and the RSX-11 Utilities Manual for online formatter (FMT) information.)

RSX-11S systems do not support online user mode diagnostics nor the FMT task; the question does not appear.

* 14. **Loadable device drivers**   *LOP*

This feature allows you to load and unload most device drivers dynamically using MCR and VMR Load and Unload commands. Only the industrial and process control device drivers (UDC, ICS/ICR, IP11/IP300, and DRS/DSS) and the VT11/VS60 graphics driver are not loadable.

When you select this option, SYSGEN generates loadable device drivers; however, SYSGEN makes all data bases resident.

This question is always asked.

The full duplex terminal driver requires loadable device driver support. Therefore, if you wish to include the full duplex terminal driver, you must include loadable driver support.

* 15. **Should the default for all applicable drivers be loadable** *LLD*

If loadable device driver support is included, this question specifies that all drivers (except UDC, ICS/ICR, DRS/DSS, IP11/IP300, and VT11/VS60) are to be built as loadable by default (you can override the default in the peripheral section). If you respond No to this question, all drivers (except the full duplex terminal driver, if selected) are built as resident.

The response to this question sets the default, either L (loadable) or R (resident) for responses to peripherals questions. You can override the default you set with the response to this question in your responses to peripherals questions.

If loadable device driver support is not requested, all drivers will be resident, and this question does not appear.

* 16. **AST and cancel selective MARKTIMEs** *AST*

This option allows the processing of Asynchronous System Traps and permits you to cancel a single marktime request.

This feature is automatically included when you select any of the following:

- ANSI magtape ACP support
- Floating point processor
- DBMS-11
- LA driver (LPA11-K)
- Console logging driver
- K-series device support routines

If you exclude this option, the terminal driver cannot support unsolicited input character ASTs.

If you want AST support, but do not need the ability to cancel a specific marktime request, enter Yes. You can then edit RSXMC.MAC and remove cancel selective mark time support (locate the line C$$SMT=0 and delete it).

* 17. **Task termination and device not ready messages (TKTN)** *TKT*

This feature directs RSX-11M to automatically generate DEVICE NOT READY and task termination messages.

You must select this option if you want Post Mortem Dump (PMD) and Snapshot Dump (SNAP$) support.

* 18. **Power fail recovery** *$PRF*

This feature provides for automatic system recovery in the event of power failure. Device drivers and tasks that specify a power fail AST are notified when power returns. The option is required to support powerfail ASTs.

* 19. **Install, request, and remove on exit** $IRR

    This feature (the MCR Run command) reduces the number of installed
    tasks in memory, thereby optimizing the use of system memory
    resources and minimizing use of pool. Refer to the description of
    the Run command in the <u>RSX-11M/M-PLUS MCR Operations Manual</u> for
    details of the functions provided by this feature.

    This feature is not available for RSX-11S systems.

* 20. **Large (20K) Executive** $20K

    This feature allows you to generate an Executive larger than 16K
    in order to increase the size of the Executive's virtual address
    space, typically to provide more pool. This reduces to 8K the
    maximum size of privileged tasks.

    If you are generating an unmapped system, this question is
    bypassed.

* 21. **Logical device assignment** $LGD

    This feature (the MCR ASN command) allows you to assign a logical
    name to a physical, pseudo, or other logical device. Assignments
    may be made on a per-terminal (local) or system-wide basis
    (global).

    This option comes to you as highly recommended.

* 22. **Logging of device errors and timeouts** $DTO

    This feature (Error Logging) causes disk and tape device errors to
    be intercepted and status information describing the error to be
    written to a disk file for analysis. When you select this
    feature, checkpointing and the SEND/RECEIVE directives are
    automatically included in your system.

    RSX-11S systems do not support the error logging subsystem; this
    question does not appear.

* 23. **Logging of undefined interrupts** $UNI

    This feature directs the Executive to check for traps to undefined
    interrupt vectors and to store information about these traps in a
    disk file for analysis.

    When you select this feature, checkpointing and the SEND/RECEIVE
    directives are automatically included in your system.

    RSX-11S systems do not support the error logging subsystem; this
    question is not asked.

* 24. **Logging of memory parity errors** $PAR

    This feature directs the Executive to log cache and memory parity
    error traps in a disk file for analysis.

    When you select this feature, SYSGEN automatically includes
    non-resident task support, checkpointing support, and the
    send/receive directives.

This question will only be asked if you specified memory parity support.

RSX-11S systems do not support the error logging subsystem; this question is not asked.

* 25. **Do you intend to include a user-written driver** $UWD

User-written drivers can be included in the assembly of the Executive.

If you answer Yes, questions concerning the Executive routines $GTWRD (GET WORD) and $PTWRD (PUTWORD) are asked. You will also have the opportunity in SYSGEN Phase II, to add a user-written driver to your Executive.

* 26. **Include routine $GTWRD**

This feature (the $GTWRD Executive routine) is used to obtain a word from a user-defined buffer. Refer to the RSX-11M Guide To Writing an I/O Driver for information on how this routine is used.

This question is not asked if you do not intend to include a user-written driver.

* 27. **Do you require routine $PTWRD**

This feature (the $PTWRD Executive routine) is used to send a word to a user-defined buffer. Refer to the RSX-11M Guide To Writing an I/O Driver for information on how this routine is used.

This question is not asked if you do not intend to include a user-written driver.

* 28. **Disk writecheck** $WCH

Writecheck support increases the data reliability of disks at the cost of a degradation in disk throughput. If selected, writecheck may be enabled/disabled dynamically on a per-drive basis via the MCR Set command.

Writecheck is supported for all disks except the RX01, RX02, and the RL01. Disks supported are: DB, DF, DK, DM, DP, DR, and DS.

If you specify writecheck support and issue an MCR Set /WCHK command in a running system, the driver performs a read after each write. If the data cannot be read or does not match the data written, the data is rewritten and another read attempt is performed.

RSX-11S does not support disk writecheck; the question does not appear.

* 29. **Executive Debugging Tool (XDT)** $\uparrow$XDT

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

This feature includes consistency check code in the dynamic memory routines.

* 30. **Rotating pattern in data lights** $ROT

This feature causes the PDP-11 CPU lights to rotate in a pronounced circular pattern when the processor is idle.

This feature functions only on the 11/45, 11/50, 11/55, and 11/70 PDP-11 processors. This question appears only for the target processors listed above.

* 31. **Industrial network or DECnet** $NET

This option allows for the inclusion of DECnet or industrial network support. Refer to DECnet documentation for details on DECnet; refer to Industrial Products documentation (IP11/IP300/DPM50 Application Programmer's Manual) for details on the industrial network.

When you select this option, SYSGEN automatically includes:

● ACP support

● AST and cancel selective marktime support

● Logical device assignment support

● Loadable device driver support

● Address checking support

● Get partition parameters directive support

● Get task parameters directive support

● Extend task directive support

* 32. **Queue manager and queued print spooler** $PRN

The queue manager and queued print spooler provide user-controlled spooling support for RSX-11M systems. Refer to Appendix D for a description of the features of RSX-11M print spoolers.

If you select this option, the required support is built into the Executive. If you respond No, you will be asked in Phase II whether or not you want to build the serial despooler.

This question is asked only for mapped systems.

*33. Group global event flags $GGE

Group global event flags provide each group (in the UIC specification [group,member]) of system users with 32 (decimal) additional event flags. For more information on group global event flags, refer to the RSX-11M/M-PLUS MCR Operations Manual.

* 34. Enter code for directives $DRR

Use this option to include system directives, as indicated by the associated letter in the table below.

Enter * to display table of directives.
Enter % to include all directives.
Enter . to terminate the question.

For descriptions of the directives listed below refer to the RSX-11M/M-PLUS Executive Reference Manual.

A- Get partition parms   B- Get task parameters
C- Send/Receive   D- Alter priority
E- Extend task   F- Connect to interrupt vector
G- Get sense switch   H- Stop bit

If you do not select get partition parameters (option A) and get task parameters (option B), the MCR ASN, ATL, DEV, PAR, TAL, and TAS commands will not execute correctly.

If you select DBMS-11 or DECnet support, SYSGEN automatically includes Stop Bit, Get Partition Parameters, and Get Task Parameters support. Also, the extend task directive is included by default.

If you select ANSI magtape support and error logging support for device timeouts and parity errors, SYSGEN automatically includes Send/Receive support.

If you select loadable driver support, Connect To Interrupt Vector support is included.

If you select K-series devices, Connect To Interrupt Vector support is included.

If the target processor does not have a switch register, SYSGEN does not allow the inclusion of the Get Sense Switch directive.

* 35. Number of pre-allocated QIO packets [0:15.:5.]   NPK

I/O throughput is enhanced by pre-allocating a number of I/O packets from the dynamic storage region, leaving them available for quick use by Queue I/O.

The Executive maintains a Last In First Out (LIFO) list of preallocated I/O packets; you specify the maximum size of this list with your response to this question. When any I/O packet is required, the Executive removes one from this list. If the list is empty, the Executive allocates the packet from dynamic memory; a significantly slower operation. When any I/O packet is deallocated, the packet is linked into the list, provided that the list is not full.

Thus, in each I/O request, two fast LIFO operations replace the slower general pool allocations and deallocations, saving several hundred microseconds. Some I/O requests involving an ACP require two I/O packets and, therefore benefit twice as much.

Each I/O packet you preallocate requires 18 words from pool. To determine the number of I/O packets to preallocate, consider the normal fluctuation in the total number of I/O requests. The fluctuating total number is always smaller than the number of outstanding I/O requests.

Enter a number in the range 0. to 15., indicating the number of packets to be pre-allocated.

The default is 5.

Enter 0 to exclude pre-allocated QIO packets.

* 36. **Size of data transfer vector in words [5:33.:33.]** $DTV

An additional speed improvement is achieved by optimizing data transfers in the Executive module BLXIO. One improvement is the use of a series of MOV instructions which is used to save time on loop control. This is called the data transfer vector.

Enter a number in the range 5. to 33., to specify the number of MOV instructions in the vector. If you enter a value of 16, for example, a 36-word data transfer enters the loop control three times as opposed to 36 times if there were only one MOV instruction in the vector.

The default is 33.

This question does not appear for unmapped systems.

* 37. **Round-robin scheduling interval in ticks [0:1000.:5.]** $RRS

When many competing memory-resident tasks have equal priority, the Executive tends to give CPU time more frequently to tasks that appear first in the Active Task List (ATL). Entries in the ATL with equal priority normally appear in the order in which the tasks were installed.

To avoid this problem, RSX-11M provides the round-robin scheduling option. This Executive scheduling algorithm periodically rotates (when the specified number of ticks elapses) tasks of equal priority within the Active Task List, ensuring that tasks of equal priority share CPU time. The overall effect is to evenly distribute the use of CPU time, giving each task of equal priority time at the head of the Active Task List.

Round-robin scheduling refers to the algorithm whereby each task of a group of tasks is successively given preference when allocating available processor time. The actual algorithm used in RSX-11M is to locate the first task within each priority class that is not blocked from executing, give it a slice of processor time, and when it completes, move that task to the end of its respective priority class. Compute-bound tasks tend to actually round-robin, whereas I/O-bound tasks tend to remain at the front of their respective priority class.

Round-robin scheduling does not affect the normal competition for CPU time of tasks with different priorities. It also does not affect tasks not in the range set by the response to SYSGEN Phase I Executive questions 38 and 39.

Round-robin scheduling affects only those tasks in an ATL (in memory) that are neither blocked nor in the waitfor state.

Tasks that are checkpointed or in a partition wait queue are not affected.

Round-robin scheduling costs little in terms of Executive overhead (time and size).

If you do not want this option, enter 0.

If you want this option, enter a number in the range 1. through 1000. SYSGEN then asks questions 38 and 39.

The default is 5.

* 38. **Highest priority class for consideration [1.:249.:150.]**

Round robin scheduling executes for a specified range of priority classes. A typical range is 1. to 150. Permissible range is 1. to 249.

This entry is the highest priority class eligible for round robin scheduling. Default is 150.

This question appears only if you selected the round robin scheduling option.

* 39. **Lowest priority class for consideration [1.:high.:1]**

This is the lowest priority class eligible for round robin scheduling.

Range is 1. to (highest priority class entered in response to question 38).

Default is 1.

This question appears only if you selected the round robin scheduling option.

* 40. **Executive level disk swapping interval [0:5000.:low.:]**

Disk swapping is an Executive feature that varies the priority of memory resident tasks with the same priority so that those tasks can share the use of memory resources. The feature swaps tasks to disk based on the swapping algorithm.

The swapping algorithm creates an "effective" task priority using the swapping interval (the response to this question) and the swapping priority (the response to question 41). The swapping interval specifies a time parameter, in which the Executive scans the partition list and modifies the effective priority of a resident task. The swapping priority is an absolute numeric value that specifies the range through which a task varies its priority. (The range is negative swapping priority through positive swapping priority.)

The Executive uses a byte in the task header to maintain the swapping priority; symbol S$$WPR in RSXMC.MAC. The symbol S$$WPR is equated to the swapping priority specified in question 41.

Each time a task is read into memory, the Executive initializes the swapping priority in the task header to the value +S$$WPR (for example, +5 if you specify 5 as the swapping priority in question 41). Then, when the swapping interval expires, the Executive decrements the swapping priority of each memory-resident task by one until the task is checkpointed or until the swapping priority reaches the minimum value -S$$WPR (for example, -5).

After decrementing the swapping priority of each task in the partition, the Executive determines whether or not an eligible task on disk can checkpoint a task in the partition. The Executive compares the running priority of the non-resident task with the effective priority of the resident task (effective priority is the sum of the running priority and the swapping priority). If the non-resident task can fit in the resident task's space and if, due to the decrementing of swapping priority, the priority of the non-resident task is higher, the non-resident task can checkpoint the resident task.

This procedure executes for tasks competing for each main partition (except DEVICE and COMMON partitions) and for the highest priority, non-resident task assigned to each partition.

If you select this option, SYSGEN automatically includes support for checkpointing.

The permissible range is 0 to 5000. The default is a value that is equal to the round robin scheduling interval multiplied by 6. If the round robin scheduling interval was 0 (you excluded support), this default is 30.

To disable this option, enter 0.

* 41. **Swapping priority [1:20.:5]**

The swapping priority determines the range over which lower priority tasks may checkpoint higher ones; the larger the swapping priority, the greater the range. With a swapping priority of "S", a task running at priority "P" will have an effective priority range (for checkpointing) from "P+S" to "P-S" as long as it resides in memory.

Enter a number in the range 1 to 20. It is recommended that you enter the default swapping priority of 5.

This question is asked only if Executive level disk swapping was requested.

* 42. **Size of dynamic storage region in words [256.:16384.:1024.]** $DSA

RSX-11M uses the dynamic storage region (pool) to perform many functions. For example, the Executive uses this memory space to process I/O or time-dependent scheduling requests.

Rather than allocate a fixed amount of memory for each function, the RSX-11M Executive makes use of a dynamically allocated memory space called the dynamic storage region (DSR). As demands for space are made, the necessary memory is allocated from this region using a first-fit algorithm. When allocated space is no longer needed, it is released back to the pool of available memory.

Dynamic memory requirements for a system depend on the configuration, application, and degree of system loading. Enough memory must be available to satisfy peak demands; otherwise a degradation in system performance will occur and the system could hang with a DSR deadlock.

On the other hand, if too much memory is made available, it is never used and is thus wasteful of system resources.

The maximum size of the dynamic storage region is limited by physical memory in an unmapped system. In a mapped system, the total size of the Executive, resident drivers, and the dynamic storage region must not exceed 16K if you responded No to question 20 or not exceed 20K if you responded Yes to question 20.

NOTE

> In a mapped system, the automatic VMR process attempts to allocate as much pool as possible (up to the maximum Executive size). If you do not edit the command file (SYSVMR.CMD) that performs this, the response to this question is not critical.

The following list specifies some RSX-11M functions that use dynamic memory. Use this list to calculate how much memory you should allocate.

Tasks: Each task installed in the system requires at least 20 words for a task control block.

I/O Requests: Each I/O request results in the allocation of an 18-word I/O packet, which is queued to the appropriate device driver.

SEND DATA and SEND BY REFERENCE Message: Each Send Data or Send by Reference message sent to a task results in an 18-word message packet being allocated to hold the requisite data.

Partitions and Subpartitions: Each main partition and subpartition requires a partition control block of at least 14 words to describe its memory. In addition, for each active task, fixed task, and loaded driver in a system-controlled partition, (whether the tasks are checkpointed or in memory) a PCB is built and allocated in the dynamic storage region.

Open Files: Each open file requires 18 words for a file control block and 18 words for a window block which contains virtual-to-logical block mapping pointers.

The file system ACP (F11ACP) may be built to store File Control blocks in its own task image rather than in dynamic storage region. (See details of SYSGEN Phase II.) The more space allocated at task build time, the less the demand will be on the pool. However, if the allocated space becomes used up, the overflow will use the dynamic storage region.

Mounted Volumes: Each mounted volume requires 18 words for a volume control block, 18 words for the index file window block, and 18 words for the index file control block. In addition, three 18-word control blocks are required to hold information pertaining to the last three directory files that were accessed. For systems that contain I/O optimization, MOU will try to allocate a window block for the index file of sufficient size to contain all of the retrieval pointers. This could require up to 208 words. If the space is not available, MOU will default to 18 words. Space-saving hint: The directory least-recently-used (LRU) table default is three 18-word file control blocks. The effect of this table is a significant increase in the speed of directory operations. If this level of performance is not required, a volume may be mounted using the /LRU keyword, thereby reducing the number of FCBs used.

Clock Queue Entries: Each clock queue entry requires eight words. These entities represent mark time, schedule, and periodic scheduling requests.

AST-Related Processing: Each powerfail, receive, and floating point processor AST trap-enable for active tasks requires eight words for an AST control block.

I/O Buffers: All terminal output is buffered in the terminal driver before transferring information to the user buffer. Each solicited and unsolicited input request requires a 42-word input buffer.

Card Images: Card images read from the CM/CR11 are buffered by the card reader driver before transferring the translated information to the user buffer. Binary output requires an 80-word buffer, whereas ASCII input requires a 4-word buffer.

LPS11 and AR11 Synchronous Functions: Each LPS11/AR11 synchronous function requires 20 words for a sample control block.

Task Headers: In a mapped system, the task header is copied into a block of memory allocated from the dynamic storage region. Approximately 64 words (dependent upon the number of LUNS and window blocks) are required for each task that is in memory (i.e, in execution and not checkpointed, or inactive and fixed).

Task Linked to ICS/ICR-11 Interrupts: Each task linked to ICS/ICR-11 interrupts requires 16 words of dynamic memory, plus six words for each interrupt linkage.

Data Bases for Loadable Drivers: Data bases that are loaded into a system with a loadable driver require space equal to the size of the data base.

Loadable Drivers: Loaded drivers on a mapped system require space for interrupt linkage as follows:

- 14 words per interrupt entry for single-controller, non-error-logging drivers

- 22 words per interrupt entry for multi-controller, non-error-logging drivers

- 14 words for the first (or only) interrupt entry for error-logging drivers, plus 6 words for each additional interrupt entry for error-logging drivers

Checkpointing: Systems with dynamic checkpoint space allocation require 8 words to describe each checkpoint file and 8 words for each task checkpointed to a checkpoint file.

Memory Management Directives: Systems supporting the memory management directives require 6 words per task (active or fixed) for each region a task is attached to. This includes the task region and all static and dynamic commons.

Connect to Interrupt: Systems supporting the connect to interrupt directive require 22 words for each Interrupt Transfer Block (ITB) used for each interrupt vector serviced by a connect-to-interrupt directive.

Error Logging: Variable-length packets are allocated for each logged error which has not been serviced by the error logger. (See the RSX-11M/M-PLUS Error Logging Reference Manual.)

After you calculate the size of the DSR, add approximately 12-18 percent to cover possible pool fragmentation conditions.

Note that you can later extend this initial allocation using the MCR Set /POOL command.

This entry must be in multiples of two words. The permissible range of entries is 256. to 16384.

The default is 1024.

* 43. **Seconds between printer not ready messages [0:255.:30.]** $ PNR

This question is asked if a line printer was specified in the peripheral configuration and you included TKTN support (the TKTN task prints the message).

Specify the number of seconds between printer not ready messages. An entry of 0 suppresses the messages altogether.

The default is 30. If you make a non-zero entry, the minimum value of this entry is 15.

* 44. **Seconds between card reader not ready messages [0:255.:30.]**

This question is asked if a card reader was specified in the peripheral configuration and you included TKTN support (the TKTN task prints the message).

Specify the number of seconds between card reader not ready messages. An entry of zero suppresses the messages altogether.

The default is 15.

If you enter a non-zero value, the minimum value of the entry is 15.

* 45. **System crash register and stack dump device CSR [0:177700:177564]** *RSD*

    If the system crashes and this option is included, the Executive stack and registers are dumped to the selected device.

    Enter the CSR address of the device. The normal device is the console terminal, which has a CSR address of 177564. This is the default device.

    Enter 0 to suppress this option.

    If you enter a non-zero value, it must be in the range 160000 to 177700.

* 46. **Checkpointing: A- Yes B- With system checkpoint file** *CKP*

    Checkpointing allows the Executive to displace tasks from a partition to yield memory to tasks of higher priority.

    The goal of checkpointing is to avoid preempting the execution of lower-priority tasks unless a higher-priority task can make use of the memory resources allocated to the lower-priority task. This optimizes the use of processor memory while maintaining a priority scheduling algorithm.

    In some cases, an activated task cannot execute because the partition in which the task must execute is occupied.

    If the partition is occupied by a task (TASKA, for example) that is both checkpointable and has a priority lower than the task that is waiting (TASKB, for example), the Executive may move the task with the lower priority (TASKA) to disk, thus making room for the higher priority task (TASKB) waiting on disk.

    When the higher priority task (TASKB) is stopped or allows its priority to be lowered, the lower priority task (TASKA) on disk may be moved back into memory to continue execution.

    This task (TASKA) continues execution from the point at which it was interrupted.

    RSX-11M supports checkpointing in both user-controlled partitions and system-controlled partitions.

    Enter A if you want checkpointing. (SYSGEN automatically includes checkpointing if you selected Executive level disk swapping.)

    Enter B if you want checkpointing with a system checkpoint file. Selection of this (B) option allows checkpointing into a system checkpoint file rather than requiring space in each checkpointable task image.

    Enter carriage return to exclude this feature.

If you select checkpointing with a system checkpoint file (B), you
must allocate space for the file when you start up the system, for
example, in STARTUP.CMD. Refer to the RSX-11M/M-PLUS MCR
Operations Manual for more information.

Note that if you exclude checkpointing support, the terminal
driver cannot support task checkpointing during terminal input.

This option does not apply to RSX-11S systems; the question is
omitted.

* 47. **System-controlled partitions:** A-Yes B-Yes With auto compaction
(SHF)

This option allows as many tasks as will fit into a partition to
be simultaneously resident. The allocation of partition memory is
automatic and is carried out by the RSX-11M Executive dynamically.

Enter A if you want system-controlled partitions.

Enter B if you want system-controlled partitions with automatic
compaction (the Shuffler task).

When the Executive determines that there is insufficient memory to
load a waiting task into a system-controlled partition, the
shuffler executes (following an allocation failure during an
attempt to allocate memory from a system-controlled partition).

The shuffler scans Partition Control Blocks searching for a
system-controlled partition which has at least one eligible task
waiting for memory. When such a partition is found, the shuffler
attempts to compact the memory partition and thus form a
contiguous space large enough to contain the waiting task.

The shuffler algorithm consists of two passes through each
system-controlled partition.

In the first pass, the shuffler unconditionally checkpoints all
stopped, checkpointable tasks. (This includes all tasks stopped
for terminal input if you select option 5 in the terminal driver
section of Phase 1.) The shuffler then starts at the beginning of
the system-controlled partition and tries to move (shuffle) all
tasks that are positioned above a gap of free space down to the
base of the free space. When the shuffler completes its first
pass, all stopped, checkpointable tasks are checkpointed and all
free space in the system-controlled partition has been merged into
one hole at the top of the partition. (However, there may be
additional holes below these tasks that cannot be shuffled.)

If the shuffler completes its first pass and some eligible tasks
are still waiting for space in the partition, the shuffler
executes its second pass. In the second pass, the shuffler
creates an ascending, priority-ordered list of the tasks in the
partition. It then uses this list to determine if the size of the
waiting task is less than the sum of the free space and the size
of one or more of the lower priority, checkpointable tasks. If,
and only if, the size of the waiting task is less than this sum,
the lower priority tasks are checkpointed.

Unmapped systems do not support system-controlled partitions.

If you select DBMS-11, this feature (A) is included by default. However, the shuffler (B) is not; if you want the shuffler, you must select it.

This option does not apply to RSX-11S systems; SYSGEN omits the question.

* 48. **Dump Analysis: A- PANIC B- Crash (CDA)**

If the dump routine option is omitted and a system failure occurs, it may not be possible for the user to capture vital data on the state of the system at failure time. The RSX-11M Guide to Writing an I/O Driver describes the PANIC dump routine. The CDA crash dump routine is normally used in debugging new drivers or privileged tasks after the drivers or tasks crash the system. It provides a means of generating a formatted dump of memory on a line printer or a terminal. For more detailed information, refer to the RSX-11M/M-PLUS Crash Dump Analyzer Reference Manual.

Enter A if you want the panic dump routine

Enter B if you want crash dump analysis (CDA) support

If you select B, SYSGEN asks Executive Questions 49, 50, 51, and 52.

* 49. **Output notification device CSR [160000:177700:177564]**

This question appears if you selected B (crash dump support).

Enter the CSR of the device to which the crash notification is to be output. Typically, this will be the console device (177564).

* 50. **Memory dump device (ddu:) [3:4]**

This question appears only if crash dump analysis (CDA) support was selected.

Enter the mnemonic and unit number of the device on which you want a memory dump. Note that the memory dump device must be part of the target hardware configuration, but not necessarily generated into the target system. Supported devices are DT, DK, MT, MS, MM, DB, DM, DL, DD, and DR.

Avoid, if possible, using your system device as the crash dump device.

* 51. **CSR address of dump device [160000:177700:default]**

> Enter the CSR address of the dump device. The default depends on
> the type of device you specify as the crash dump device:

Device Type	Default CSR
DT	177342
DK	177404
MT	172522
MM	172440
DB	176700
DL	174400
DM	177440
DR	176700
DD	175600
MS	172522

* 52. **CSR address of PANIC dump device [160000:17700:177564]**

> If panic dump was selected, enter the CSR address of the indicated
> panic dump device. Normally, this is the CSR address of the
> console device, which is also the default.

> This device must be a paper tape, terminal, or line
> printer-compatible device. The device must receive a single byte
> at a time.

> This question is asked only when you request panic dump support
> (option A in Executive Question 48).

5.5 TERMINAL DRIVER QUESTIONS

This section allows you to choose which of the RSX-11M terminal
drivers you want as part of your system. The section also allows you
to specify terminal driver options.

Terminal driver options are described fully in the <u>RSX-11M/M-PLUS I/O
Drivers Reference Manual</u>.

Answer Yes to the options you want included in your system.

* 1. **Terminal driver desired (A/B/C/D, * prints table)**

> This question allows you to select the terminal driver you want to
> include in your system. RSX-11M systems use one of two terminal
> drivers:

> ● Half duplex (baseline, no options; tailorable, you select
>   options; and tailored, user-oriented options included by
>   default)

> ● Full duplex

> Enter A to select the half duplex terminal driver that you tailor
> (specify specific options) to meet the needs of your system.

Enter B to select the user-oriented half duplex terminal driver. The user-oriented driver includes the following options:

- Automatic carriage return/line feed (option 4)

- Task checkpointable during terminal input (option 5). Note that if you did not include Executive support for checkpointing, this option is excluded when you select the user-oriented terminal driver.

- Unsolicited input character AST (option 6). Note that this option requires Executive AST support. Therefore, if you did not include Executive AST support, this option is excluded when you select the user-oriented terminal driver.

- Write with CTRL/O cancellation (option 7)

- Breakthrough write (option 8)

- CTRL/R retype (option 9)

- Get multiple characteristics (option 11)

- Get terminal driver options (option 13)

- Transparent read/write (option 15)

- Settable case conversion for input (option 16)

- Read after prompt (option 17)

- Read with no echo (option 18)

- Read with special terminator (option 19)

- CRT rubout support (option 20)

- Terminal-host synchronization (option 21)

- Variable length terminal input buffering (option 23)

If you want more or fewer options with the half duplex terminal driver, you should select the tailorable half duplex terminal driver (enter A).

Enter C to select the full duplex terminal driver. This driver requires a mapped system and loadable driver support. The full duplex driver includes the following options:

- Passes form feeds directly to the terminal (option 3)

- Automatic carriage return/line feed (option 4)

- Task checkpointable during terminal input (option 5). Note that this option requires Executive support for checkpointing. Therefore, if you did not include checkpointing support, this option is excluded when you select the full duplex terminal driver.

- Unsolicited input character AST (option 6). Note that this option requires Executive AST support. Therefore, if you did not include Executive AST support, this option is excluded from the full duplex driver.

- Write with CTRL/O cancellation (option 7)

- Hold screen mode (option 14)

- Transparent read/write (option 15)

- Settable case conversion for input (option 16)

- Read with no echo (option 18)

- Read with special terminator (option 19)

- Terminal-host synchronization (option 21)

- User terminal input buffering (option 22)

- Variable length terminal input buffering (option 23)

- LA30P support (option 24)

- Hardware unrecoverable input error support (option 25)

- Device independent cursor positioning (option 26)

Enter D to select the baseline terminal driver. Note that this
driver and a multiuser protection system are mutually exclusive.
The baseline driver is a minimum half duplex terminal driver with
no SYSGEN options.

* 2. **Unsolicited input timeout value in seconds** TM N

This option is available with the full duplex terminal driver
only; the question does not appear if you responded A, B, or D to
question 1.

The full duplex driver discards unsolicited input upon the
expiration of the timeout value that you specify. Valid timeout
range is 0 to 2540 seconds.

Enter 0 to inhibit the full duplex terminal driver unsolicited
input timeout feature.

Enter carriage return (the default timeout value is 120 seconds)
or specify the number of seconds (in the range 1 to 2540) to wait
to timeout on unsolicited terminal input.

* 3. **Pass form feeds directly to the terminal**

This question appears only if you responded A or B to question 1
(selected the tailorable or pre-tailored half duplex terminal
driver).

The half duplex driver normally converts a form feed into 8 line
feeds. Enter Yes to suppress this conversion.

NOTE

If your system includes an LA120 or an
LA180S terminal, you must respond Yes to
this question and include the option.

This option adds approximately 24(10) words to the terminal
driver.

* 4. Automatic carriage return/line feed

This question appears only if you responded A to question 1
(selected the tailorable half duplex terminal driver); the
user-oriented driver and the full duplex driver include the option
by default.

If you respond Yes to this option (or if the option is included by
default), the terminal driver generates a carriage return and line
feed when the terminal buffer is filled on output or echo. (You
can examine or alter terminal buffer size with the MCR Set /BUF
command.) This option adds approximately 70(10) words to the
terminal driver.

* 5. Task checkpointable during terminal input

This question is omitted if you responded with C to question 1;
the full duplex driver includes the option automatically. Also,
since a response of B to question 1 selects a pre-tailored half
duplex driver, this question does not appear.

The question appears only if your response to question 1 was A and
you included Executive support for checkpointing.

If you select this option, checkpointable tasks can be displaced
from memory during terminal input by another task. This option
adds approximately 110(10) words to the terminal driver.

NOTE

This option can only be included in
systems that contain Executive support
for checkpointable tasks.

* 6. Unsolicited input character AST

This question appears only if you responded A to question 1 and
included Executive support for ASTs; when possible, the
user-oriented and full duplex drivers include the option by
default.

If you select this option, a task that attaches to a terminal can
specify an AST entry point upon receiving unsolicited input from a
terminal (for example, CTRL/C gains the task's attention rather
than MCR). This option adds approximately 160(10) words to the
full duplex terminal driver and approximately 70(10) words to the
half duplex terminal driver.

NOTE

This option requires Executive AST support.

* 7. Write with CTRL/O cancellation

This question appears only if you responded A to question 1.

If you select this option, a task that issues a write request with CTRL/O cancellation can print to the terminal when the target terminal has suppressed output with CTRL/O. This option adds approximately 16(10) words to the terminal driver.

* 8. Breakthrough write

This question appears if you responded A or C to question 1. If you selected multiuser protection support, SYSGEN automatically includes this option.

If you select this option, a privileged task that issues a breakthrough write request can print to a terminal regardless of current or outstanding I/O activity. This option adds approximately 96(10) words to the full duplex terminal driver and approximately 245(10) words to the half duplex terminal driver.

NOTE

When you select this option, SYSGEN automatically includes terminal driver support for the CTRL/R retype option (option 9). Together, these two options add approximately 160(10) words to the full duplex terminal driver and approximately 275(10) words to the half duplex terminal driver.

* 9. CTRL/R retype

This question appears if you responded A or C to question 1 and did not select the breakthrough write option (option 8).

If you select this option, the terminal driver sends a carriage return/line feed followed by the contents of the input buffer whenever you type CTRL/R at the terminal. This option adds approximately 64(10) words to the full duplex terminal driver and approximately 32(10) words to the half duplex terminal driver.

* 10. Escape sequence handling   *ESC*

This question appears if you responded A or C to question 1.

If you select this option, the terminal driver recognizes and treats escape sequences as line terminators for all solicited input except read-pass-all or read-with-special-terminator requests. This option adds approximately 128(10) words to the full duplex terminal driver and approximately 160(10) words to the half duplex terminal driver.

* 11. **Get multiple characteristics**   M L C

    This question appears if you responded A or C to question 1.

    If you select this option, a task can determine physical
    characteristics (for example, CRT, VT52, slaved, or VT100) of
    individual terminals. The task RMDEMO makes use of this option,
    for example.   This option adds approximately 96(10) words to the
    full duplex terminal driver and approximately 110(10) words to the
    half duplex terminal driver.

* 12. **Set multiple characteristics**   S M C

    This question appears if you responded A or C to question 1.

    If you select this option, a task can set or reset physical
    characteristics (for example, CRT, VT52, slaved, or VT100) of its
    TI: terminal. A privileged task can use this option to set
    physical characteristics of any terminal in the system. This
    option adds approximately 256(10) words to the terminal driver.

* 13. **Get terminal driver options**   G T D

    This question appears if you responded A or C to question 1.

    If you select this option, a task can determine which of the
    terminal driver options were selected during system generation.
    This option adds approximately 32(10) words to the full duplex
    terminal driver and approximately 64(10) words to the half duplex
    terminal driver.

* 14. **Hold screen mode**

    This question appears only if you responded A to question 1.

    If you select this option and your terminal(s) include special
    hardware, the terminals can break stream output into pages that
    fit on the screen. (Note that an unsolicited CTRL/C disables hold
    screen mode.)

                              NOTE

                When you select this option, SYSGEN
                automatically includes terminal driver
                support for the transparent read/write
                option (option 15).

    This option adds approximately 92(10) words to the terminal
    driver.

* 15. **Transparent read/write**

    This question appears only if you responded A to question 1 and
    did not include the hold screen option (option 14).

    The terminal driver normally filters terminal input on both input
    and output. This permits the recognition of control characters
    that have special meaning (for example, escape) or require fill

characters (for example, carriage return). If you select this option, the terminal driver provides support for I/O functions (IO.RAL and IO.WAL) that bypass character filtering and permits output of to 32K bytes. This option adds approximately 48(10) words to the terminal driver.

* 16. **Settable case conversion for input**

This question appears only if you responded A to question 1.

The terminal driver normally accepts and echoes characters as received. If you select this option, you can selectively enable (using the MCR Set /LOWER command) so that the driver automatically converts lower case input to upper case. This option also allows the terminal driver to recognize the brace character (175) and the tilde character (176) as ASCII characters rather than a form of escape when the terminal is set to lower case. This option adds approximately 30(10) words to the terminal driver.

* 17. **Read after prompt** R A P

This question appears if you responded A or C to question 1.

If you select this option, a read after prompt request acts like a write to the terminal followed by a read. This reduces the overhead of one I/O request and eliminates context switching. Also, this option removes the execution window, provided the terminal is not attached, by which one task can prompt and another task initiate terminal I/O before the first task (the prompting task) had time to issue its read request. This option adds approximately 128(10) words to the full duplex terminal driver and approximately 185(10) words to the half duplex terminal driver.

* 18. **Read with no echo**

This question appears only if you responded A to question 1 and did not include multi-user protection support. (Multi-user protection support automatically includes this terminal driver option.)

If you select this option, you can issue the read functions IO.RLB, IO.RVB, and IO.RPR and specify that the driver not echo terminal input. This option adds approximately 48(10) words to the terminal driver.

* 19. **Read with special terminator**

This question appears only if you responded A to question 1 and did not include multi-user protection support. (Multi-user protection support automatically includes this terminal driver option.)

The line terminators for a normal read are carriage return or escape. If you select this option, any character less than 40 octal or greater than 174 octal can terminate a read with special terminator request. However, escape sequences cannot be recognized in this mode. Also, note that if the terminal is set to lower case, only 177 octal and characters less than 40 octal can act as terminators. This option adds approximately 45(10) words to the terminal driver.

* 20. **CRT rubout support**   *RUB*

This question appears if you responded A or C to question 1.

If you select this option, the terminal driver echoes rubouts or deletes on a CRT terminal as backspace-space-backspace; effectively, this option erases the character from the CRT screen when you type rubout or delete. This option adds approximately 64(10) words to the terminal driver.

* 21. **Terminal-host synchronization**

This question appears if you responded A to question 1.

If you select this option, you can start and stop terminal output by typing CTRL/S (to stop) and CTRL/Q (to start). This option is useful for high speed display terminals.

                              NOTE

          If your system includes a VT50 terminal
          with the copier option, you must respond
          Yes to this question and include the
          option.

This option adds approximately 84(10) words to the terminal driver.

* 22. **User terminal input buffering**

This question appears only if you responded A to question 1.

The terminal driver normally receives characters and stores the characters in the Executive address space until receiving a line terminator. Upon receiving a line terminator, the driver copies the contents of the buffer into the requesting task's input buffer. If you select this option, the driver, provided that the task is not checkpointable, places the input characters directly into the task buffer as the characters are received. This option adds approximately 12(10) words to the terminal driver.

* 23. **Variable length terminal input buffering**

This question appears only if you responded A to question 1.

Normally, terminal driver input buffers are 80 bytes long, which implicitly limits the maximum size of a terminal input request as well as the size of the minimum buffer allocation from dynamic memory. If you select this option, the terminal allocates buffers large enough to satisfy the read request. The largest buffer can be 255 bytes long. This option adds approximately 24(10) words to the terminal driver.

* 24. **LA30P support**

This question appears only if you responded A to question 1.

The LA30P DECwriter connects to the processor via a single buffered interface. If you do not select this option, the second of two rapidly typed characters may be discarded by the terminal driver.

NOTE

Choose this option only if your system includes an LA30P terminal; the terminal driver properly supports all other combinations of DEC terminals and interfaces.

This option adds approximately 48(10) words to the terminal driver.

* 25. **Hardware unrecoverable input error notification** HR E

This question appears only if you responded C to question 1.

If you select this option, the full duplex terminal driver detects and flags framing errors, character parity errors, and data overruns and then passes the input character(s) to the requesting task with notification (including type) of an input error. If you do not select this option, the driver discards hard receive errors. This option adds approximately 32(10) words to the terminal driver.

* 26. **Device independent cursor positioning** DIC

This question appears only if you responded C to question 1.

If you select this option, the full duplex terminal driver supports terminal independent cursor positioning commands. When you specify a cursor positioning character, the driver outputs a cursor positioning character string before it outputs the buffer. This option adds approximately 192(10) words to the terminal driver.

5.6 **PERIPHERAL QUESTIONS**

This section of questions describe the peripheral devices included in your target configuration. The questions define unique hardware and software information that RSX-11M uses to communicate with peripheral devices. SYSGEN generates questions only for those devices you specified in response to target configuration question 16.

During this section, you enter device-dependent parameters which define addressing information as well as special attributes for the peripheral devices. SYSGEN displays a prompt line that describes the required parameters and then a specific device question, which includes any default values for the parameters.

If you selected loadable driver support, the general form of a SYSGEN prompt is:

    Enter [L/R,] parameter1, parameter2,...parametern for:

where:

    L/R   is an optional parameter that specifies whether the
                driver is loadable (L) or resident. Note that you
                specified the default value for this parameter in your
                response to Executive question 15. If your response to
                question 15 was No, all drivers are resident unless you
                override the default by specifying L. Likewise, if
                your response to question 15 was Yes, all drivers are
                loadable unless you override the default by specifying
                R.

                The process control drivers (UDC, ICS/ICR, IP11/IP300
                and DRS/DSS drivers) and the VT11/VS60 graphics driver
                are not loadable; this parameter does not appear for
                these drivers since they are always resident.

                The full duplex terminal driver is always loadable;
                this parameter does not appear for the full duplex
                terminal driver.

                If you override the default (specify an L or an R), you
                must terminate this parameter with a comma (,), even if
                it is the only parameter on the line.

    parameter   is a device dependent parameter (parameters 1 through
                n).

If you did not select loadable driver support, the general form of a
SYSGEN prompt is:

    Enter parameter1, parameter2,...parametern for:

where parameters 1, 2, through n are device dependent parameters.

In the SYSGEN prompts, parameters enclosed in brackets ([]) are
permitted only in the response for the first controller. Parameters
enclosed in parenthesis (()) are required only if the indicated option
is present in the target system.

Some devices require common parameters. To display the specific
device question, SYSGEN groups the devices that require common
parameters together and then shares the respective SYSGEN prompt line.
Table 5-1 lists all the SYSGEN prompt lines and the devices that use
each.

The device specific questions display default values for the
parameters listed in the SYSGEN prompt line. When the question does
not display a parameter, you must enter a value for that parameter. A
comma (,) is the parameter delimiter. Note that blanks or tabs are
not permitted between parameters.

When you specify a required parameter or override the default value,
SYSGEN applies a minimum and maximum range (the acceptable range) for
each parameter. If the value you enter is not within the acceptable
range, SYSGEN issues an error message that identifies the parameter by
number, according to its position in the prompt line. Note that if
your system includes loadable driver support, the optional L/R
parameter is not included in the parameter count. For example, if you

enter 300 as the CSR address for a CR11 controller (SYSGEN prompt 1), SYSGEN displays:

    SGN -- Parameter (#2) "300" out of range 160000 to 177700 -- RETRY

and then repeats the question. The number in parenthesis is the parameter count (excluding L/R if applicable) and the value in quotes is the invalid parameter.

                              CAUTION

            When you enter a numeric response, do
            not include a period (to specify
            decimal) or a pound sign (to specify
            octal). This will cause an error;
            SYSGEN attempts to validate your
            response and does not permit explicit
            decimal or octal entries.

            Enter numeric values within the
            acceptable range. SYSGEN interprets the
            response to be octal or decimal as
            required.

            Refer to the detailed description if you
            are unsure of the base for a specific
            numeric response.

                          Table 5-1
                    SYSGEN Prompt Lines

Enter [L/R,] vector, CSR for:

    Devices that use this prompt are (group 1 devices):   CR11 card
    reader (CR:), TA11 cassette (CT:), RF disks (DF:), TS04 magtape
    (MS:), PC11 paper tape punch (PP:), PC11/PR11 paper tape reader
    (PR:), UDC11 universal digital controller (UD:), DA11 parallel
    line interface (XB:)

Enter [L/R,] vector, CSR, number of drives, unit number of first drive,
          [O=offset recovery support/NO=no support] for:

    Devices that use this prompt are (group 2 devices):   RP04/05/06
    disk packs (DB:), RM02/03 disks (DR:)

Enter [L/R,] vector, CSR, number of drives for:

    Devices that use this prompt are (group 3 devices): TU58 DECtape
    II (DD:), RL01 cartridge disks (DL:), RP02/03 disks (DP:), TC11
    DECtape (DT:), RX01 floppy disk (DX:), RX02 floppy disk (DY:),
    TU45/TU16/TE16/TU77 magtapes (MM:), TS03/TU10/TE10 magtapes (MT:)

Table 5-1 (Cont.)
SYSGEN Prompt Lines

Enter [L/R,] vector, CSR, F=full duplex/H=half duplex,
           E=error detec. unit/NO=no, C=char. detec. unit/NO=no,
           number of sync characters in leader for:

   Devices that use this prompt are (group 4 devices):   DQ11
   synchronous line interface (XQ:)

Enter [L/R,] vector, CSR, number of drives, unit number of first drive for:

   Devices that use this prompt are (group 5 devices):   RS03/04
   disks (DS:)

Enter [L/R,] vector, CSR, highest unit number <0 to 7> for:

   Devices that use this prompt are (group 6 devices):   RK05
   cartridge disks (DK:)

Enter vector, CSR, VT11/VS60, number of CRT monitors for:

   Devices that use this prompt are (group 7 devices):   VT11/VS60
   graphics display processor and scope (GR:)

Enter [L/R,] CSR, number of A/D channels for:

   Devices that use this prompt are (group 8 devices):   AD01
   analog-to-digital converter (AD:)

Enter [L/R,] vector, CSR, number of A/D channels for:

   Devices that use this prompt are (group 9 devices):   AFC11
   analog-to-digital converter (AF:)

Enter [L/R,] clock vector, CSR, polarity mask, D=D/A channel/NO=no,
           maximum number of samples/second, DRK=DR11-K/NO=no,
           (,DR11-K CSR) for:

   Devices that use this prompt are (group 10 devices):   AR11
   laboratory peripheral system (AR:)

Enter [L/R,] clock vector, CSR, #A/D channels, G=gain ranging option /NO=no,
           polarity mask, bandwith filter channel select delay,
           number of D/A channels, D=digital I/O option/NO=no,
           maximum number of samples/second for:

   Devices that use this prompt are (group 11 devices):   LPS11
   laboratory peripheral system (LS:)

Table 5-1 (Cont.)
SYSGEN Prompt Lines

Enter [L/R,] vector, CSR (, number of UMRs) for:

    Devices that use this prompt are (group 12 devices):   LPA11-K
    laboratory peripheral accelerator (LA:)

Enter [L/R,] vector, CSR, #drives, O=offset recovery/NO=no offset rec. for:

    Devices that use this prompt are (group 13 devices):   RK06/07
    cartridge disks (DM:)

Enter [L/R,] vector, CSR, F=full duplex/H=half duplex
           number of characters in sync leader for:

    Devices that use this prompt are (group 14 devices):   DL11-E
    asynchronous   line   interface   (XL:), DP11 synchronous line
    interface (XP:), DU11 synchronous line interface (XU:), DUP11
    synchronous line interface (XW:)

Enter [L/R,] vector, CSR, F=full duplex/H=half duplex/P=primary HDX for:

    Devices that use this prompt are (group 15 devices):   DMC
    interprocessor link (XM:)

Enter [L/R,] vector, CSR, printer type
           (, [KMC timeout count <0=no KMC>, KMC vector, KMC CSR]) for:

    Devices that use this   prompt   are   (group   16   devices):
    LA180/LS11/LP11/LV11 line printers (LP:)

Enter number of modules, module number of first for:

    Devices that use this prompt are (group 17 devices):   UDC   ADU01
    analog input module, UDC analog output module, UDC bi-stable
    output module, UDC digital interrupt module, UDC digital sense
    module, UDC I/O counter module, UDC single-shot output module
    (all UD:)

Enter [L/R,] terminal number to redirect to (TTn:) for:

    Devices that use this prompt are (group 18 devices):   Console
    output device (pseudo device CO:) with console logging enabled

Enter [L/R,] num. DL11's <ZL>, num. DH11's, num. DZ11's, num. DJ11's for

    Devices that use this prompt are (group 19 devices): Half duplex
    terminal driver, baseline terminal driver

Table 5-1 (Cont.)
SYSGEN Prompt Lines

Enter num. DL11's <ZL>, num. DH11's, num. DZ11's num. DJ11's for:

    Devices that use this prompt are (group 20 devices): Full duplex
    terminal driver

Enter vector, CSR for:

    Devices that use this prompt are (group 21 devices): DL11
    asynchronous line interface (TT:). SYSGEN refers to this device
    as ZL.

Enter vector, CSR, highest line number <0 to 15>
              (, answer speed, DM11-BB vector, DM11-BB CSR) for:

    Devices that use this prompt are (group 22 devices): DH11
    terminal interface (TT:). SYSGEN refers to this device as DH.

Enter vector, CSR, highest line number <0 to 15> for:

    Devices that use this prompt are (group 23 devices): DJ11
    terminal interface (TT:). SYSGEN refers to this device as DJ.

Enter vector, CSR, highest line number <0 to 7> [, answer speed] for:

    Devices that use this prompt are (group 24 devices): DZ11
    terminal interface (TT:). SYSGEN refers to this device as DZ.

The following is a detailed description of all the possible peripheral
questions.

Enter [L/R,] vector, CSR for:

    1. CR controller 0 [D:230,177160]

        Enter the interrupt vector address (the default value is 230)
        and the CSR address (the default value is 177160) for the
        first CR11 card reader controller.

        If you do not enter the default values for the vector and CSR
        assignments, the acceptable range is 60-774 for the vector
        and 160000-177700 for the CSR, both in octal.

        Subsequent CR11 controllers do not default the vector and CSR
        assignments; you must enter a value within the acceptable
        range.

    1. CT controller 0 [D:260,177500]

        Enter the interrupt vector address (the default value is 230)
        and the CSR address (the default value is 177160) for the
        first TA11 cassette controller.

        If you do not enter the default values for the vector and CSR
        assignments, the acceptable range is 60-774 for the vector
        and 160000-177700 for the CSR, both in octal.

Subsequent TA11 controllers do not default the vector and CSR assignments.; you must enter a value within the acceptable range.

1. DF controller 0 [D:204,177460]

   Enter the interrupt vector address (the default value is 204) and the CSR address (the default value is 177260) for the first RF11 controller.

   If you do not enter the default values for the vector and CSR assignments, the acceptable range is 60-774 for the vector and 160000-177700 for the CSR, both in octal.

   Subsequent RF11 controllers do not default the vector and CSR assignments; you must enter a value within the acceptable range.

1. MS controller 0 [D:224,172522]

   Enter the interrupt vector address (the default value is 224) and the CSR address (the default value is 172522) for the first TS11 controller.

   If you do not enter the default values for the vector and CSR assignments, the acceptable range is 60-774 for the vector and 160000-177700 for the CSR.

   Subsequent TS11 controllers do not default the vector and CSR assignments; you must enter a value within the acceptable range.

1. PP controller 0 [D:74,177554]

   Enter the interrupt vector address (the default value is 74) and the CSR address (the default value is 177554) for the first PC11 controller.

   If you do not enter the default values for the vector and CSR assignments, the acceptable range is 60-774 for the vector and 160000-177700 for the CSR, both in octal.

   Subsequent PC11 controllers do not default the vector and CSR assignments; you must enter a value within the acceptable range.

1. PR controller 0 [D:70,177550]

   Enter the interrupt vector address (the default value is 70) and the CSR address (the default value is 177550) for the first PC11/PR11 controller.

   If you do not enter the default values for the vector and CSR assignments, the acceptable range is 60-774 for the vector and 160000-177700 for the CSR, both in octal.

   Subsequent PC11/PR11 controllers do not default vector and CSR assignments; you must enter a value within the acceptable range.

1. UD controller 0 [D:234,171776]

Enter the interrupt vector address (the default value is 234) and the CSR address (the default value is 171776) for the UDC11 controller.

If you do not enter the default values for the vector and CSR assignments, the acceptable range is 60-774 for the vector and 160000-177700 for the CSR, both in octal.

After you specify the interrupt vector address and the CSR address for the UDC11, SYSGEN immediately prompts for UDC11 module information using SYSGEN prompt line 17. For clarity, this section lists the prompt lines in numeric order, not in logical sequence. If you were performing a SYSGEN and included a UDC11 controller, the questions for UDC11 would follow the vector and CSR assignments.

1. XB controller 0 [D:124,172414]

Enter the interrupt vector address (the default value is 124) and the CSR address (the default value is 172414) for the first DA11-B interface.

If you do not enter the default values for the vector and CSR assignments, the acceptable range is 60-774 for the vector and 160000-177700 for the CSR, both in octal.

Subsequent DA11-B interfaces do not default the vector and CSR assignments; you must enter a value within the acceptable range.

Enter [L/R,] vector, CSR, number of drives, unit number of first drive, [O=offset recovery support/NO=no support] for:

2. DB controller 0 [254,176700,,0,0]

Enter the interrupt vector address (the default is 254), the CSR address (the default is 176700), the number of RP04/05/06 drives (there is no default for this parameter), the unit number of the first drive (the default for the first physical unit number is 0), and whether or not the controller supports offset recovery (the default is O, to support offset recovery) for the first RH11 or RH70 controller.

Offset recovery support provides a higher degree of data integrity in environments where disk packs are frequently moved from drive to drive. This support moves the disk head on either side of the cylinder centerline in an attempt to pick up a stronger signal. Thus, offset recovery support allows data to be read in instances where it could not otherwise be recovered.

If you use the default values (enter two commas (,,) followed by the number of drives), the acceptable range for the number of drives is 1-8.

If you do not use the default values, the acceptable ranges
(response) are:

vector	60-774 (octal)
CSR	160000-177700 (octal)
number of drives	1-8 (decimal)
unit number of first drive	1-7 (decimal)
offset recovery	O or NO

Subsequent RH11 or RH70 controllers for DB: default only the
unit number of the first drive (to 0).

NOTE

You can only specify offset recovery
support for the first DB controller. If
you include support for the first
controller, you automatically include
offset recovery support for subsequent
controllers. Likewise, if you exclude
support, you exclude offset recovery
support for subsequent controllers.

After you enter the parameters for each RH11 or RH70
controller included in your system, SYSGEN immediately
prompts for drive type using SYSGEN prompt line 52. For
clarity, this section lists the prompt lines in numeric
order, not in logical sequence. If you were performing a
SYSGEN and included an RH11 or RH70 controller for DB:
devices (RP04/05/06), the questions that specify the type of
drive would follow the DB controller parameter specification.

2. DR controller 0 [D:254,176700,,0,0]

Enter the interrupt vector address (the default is 254), the
CSR address (the default is 276700), the number of RM02/03
drives (there is no default for this parameter), the physical
unit number of the first drive (the default is 0), and
whether or not the controller supports offset recovery (the
default is O, to support offset recovery) for the first RH11
or RH70 controller.

Offset recovery support provides a higher degree of data
integrity in environments where disk packs are frequently
moved from drive to drive. This support moves the disk head
on either side of the cylinder centerline in an attempt to
pick up a stronger signal. Thus, offset recovery support
allows data to be read in instances where it could not
otherwise be recovered.

If you use the default values (enter two commas (,,) followed
by the number of drives), the acceptable range for the number
of drives is 1-8.

If you do not use the default values, the acceptable ranges (response) are:

vector	60-774 (octal)
CSR	160000-177700 (octal)
number of drives	1-8 (decimal)
unit number of first drive	0-7 (decimal)
offset recovery	0 or NO

Subsequent RH11 or RH70 controllers for DR: default only the unit number of the first drive (to 0).

NOTE

You can only specify offset recovery support for the first DR controller. If you include support for the first controller, you automatically include offset recovery support for subsequent controllers. Likewise, if you exclude support, you exclude offset recovery support for subsequent controllers.

After you enter the parameters for each RH11 or RH70 controller included in your system, SYSGEN immediately prompts for drive type using SYSGEN prompt line 56. For clarity, this section lists the prompt lines in numeric order, not in logical sequence. If you were performing a SYSGEN and included an RH11 or RH70 controller for DR: devices (RM02/03), the questions that specify the type of each drive would follow the DR controller parameter specification.

Enter [L/R,] vector, CSR, number of drives for:

3. DD controller 0 [D:300,176500]

Enter the interrupt vector address (the default value is 300), the CSR address (the default value is 176500), and the number of DECtape II drives (there is no default for this parameter) for the first TU58 controller.

The acceptable range for the number of DECtape II drives is 1-2.

If you do not enter the default values for the vector and CSR assignments, the acceptable range is 60-774 for the vector and 160000-177700 for the CSR, both in octal.

Subsequent TU58 controllers do not default the vector and CSR assignments; you must enter a value, within the acceptable range, for the vector and CSR assignments as well as the number of drives.

3. DL controller 0 [D:160,174400]

Enter the interrupt vector address (the default value is 160), the CSR address (the default value is 174400), and the number of RL01/02 disk drives (there is no default for this parameter) for the first RL11 controller.

The acceptable range for the number of RL01/02 disk drives is 1-4.

If you do not enter the default values for the vector and CSR assignments, the acceptable range is 60-774 for the vector and 160000-177700 for the CSR, both in octal.

Subsequent RL11 controllers do not default the vector and CSR assignments; you must enter a value, within the acceptable range, for the vector and CSR assignments as well as the number of RL01/02 drives.

After you specify the vector and CSR assignments and the number of RL01/02 drives, SYSGEN immediately prompts for drive type using SYSGEN prompt line 53. For clarity, this section lists the prompt lines in numeric order, not in logical sequence. If you were performing a SYSGEN and included an RL11 controller for DL: devices (RL01/02), the questions that specify the type of drive would follow the DL controller parameter specification.

3. DP controller 0 [D:254,176714]

Enter the interrupt vector address (the default value is 254), the CSR address (the default value is 176714), and the number of RP02/03 disk drives (there is no default for this parameter) for the first RP11 controller.

The acceptable range for the number of RP02/03 disk drives is 1-8(10).

If you do not enter the default values for the vector and CSR assignments, the acceptable range is 60-774 for the vector and 160000-177700 for the CSR, both in octal.

Subsequent RP11 controllers do not default the vector and CSR assignments; you must enter a value, within the acceptable range, for the vector and CSR assignments as well as the number of RP02/03 drives.

After you specify the vector and CSR assignments and the number of RP02/03 drives, SYSGEN immediately prompts for drive type using SYSGEN prompt line 55. For clarity, this section lists the prompt lines in numeric order, not in logical sequence. If you were performing a SYSGEN and included an RP11 controller for DP: devices (RP02/03), the questions that specify the type of drive would follow the DL controller parameter specification.

3. DX controller 0 [D:264,177170]

Enter the interrupt vector address (the default value is 264), the CSR address (the default value is 177170), and the number of RX01 floppy disk drives (there is no default for this parameter) for the first RX11 controller.

The acceptable range for the number of RX01 floppy disk drives is 1-2.

If you do not enter the default values for the vector and CSR assignments, the acceptable range is 60-774 for the vector and 160000-177700 for the CSR, both in octal.

Subsequent RX11 controllers do not default the vector and CSR assignments; you must enter a value, within the acceptable range, for the vector and CSR assignments as well as the number of RX01 floppy disk drives.

3. DY controller 0 [D:264,177170]

Enter the interrupt vector address (the default value is 264), the CSR address (the default value is 177170), and the number of RX02 floppy disk drives (there is no default for this parameter) for the first RX211 controller.

The acceptable range for the number of RX02 floppy disk drives is 1-2.

If you do not enter the default values for the vector and CSR assignments, the acceptable range is 60-774 for the vector and 160000-177700 for the CSR.

Subsequent RX211 controllers do not default the vector and CSR assignments; you must enter a value, within the acceptable range, for the vector and CSR assignments as well as the number of RX02 floppy disk drives.

After you specify the vector and CSR assignments and the number of RX02 drives, SYSGEN immediately prompts for drive density using SYSGEN prompt line 58. For clarity, this section lists the prompt lines in numeric order, not in logical sequence. If you were performing a SYSGEN and included an RX211 controller for DY: devices (RX02), the questions that specify the density of each RX02 drive would follow the DY controller parameter specification.

3. MM controller 0 [D:224,172440]

Enter the interrupt vector address (the default value is 224), the CSR address (the default value is 172440), and the number of TU45, TU16, TE16, or TU77 magtape drives (there is no default for this parameter) for the first RH11 or RH70 controller, TM02 or TM03 tape controller.

The acceptable range for the number of tape drives is 1-8.

If you do not enter the default values for the vector and CSR assignments, the acceptable range is 60-774 for the vector and 160000-177700 for the CSR, both in octal.

Subsequent controllers of this type do not default the vector and CSR assignments; you must enter a value, within the acceptable range, for the vector and CSR assignments as well as the number of tape drives.

After you specify the vector and CSR assignments and the number of TU45, TE16, TU16, or TU77 tape drives, SYSGEN immediately prompts for the TM02 or TM03 number using SYSGEN prompt line 51. For clarity, this section lists the prompt lines in numeric order, not in logical sequence. If you were performing a SYSGEN and included an MM: device (TU45, TU16, TE16, or TU77), the questions that specify the TM02 or TM03 number would follow the MM controller parameter specification.

3. MT controller 0 [D:224,172522]

    Enter the interrupt vector address (the default value is 224), the CSR address (the default value is 172522), and the number of TS03, TU10, or TE10 magtape drives (there is no default for this parameter) for the first TM11, TMA11, or TMB11 controller.

    The acceptable range for the number of tape drives is 1-8(10).

    If you do not enter the default values for the vector and CSR assignments, the acceptable range is 60-774 for the vector and 160000-177700 for the CSR, both in octal.

    Subsequent controllers of this type do not default the vector and CSR assignments; you must enter a value, within the acceptable range, for the vector and CSR assignments as well as the number of tape drives.

Enter [L/R,] vector, CSR, F=full duplex /H=half duplex,
            E=error detec. unit /NO=no, C=char. detec unit /NO=no,
            number of sync characters in leader for:

4. XQ controller 0 [D:,,H,E,C]

    The vector address for the DQ11 synchronous line interface is assigned from the floating vector space starting at 300. Thus, there is no default vector address for the DQ11. Enter a vector address between 300 and 774. Consult Field Service if the vector address is unknown.

    The CSR address for the DQ11 synchronous line interface is assigned from the floating address space starting at 160010. Thus, there is no default CSR assignment for the DQ11. Enter a CSR address between 160010 and 177700. Consult Field Service if the CSR address is unknown.

    The first DQ11 line defaults to a half duplex line (H), with an error detection expander unit (E), and a character detection expander unit (C). Enter F, NO, or NO respectively to override these defaults.

    There is no default value for the parameter that specifies the required number of sync characters in a sync leader. You must enter a value in the range 3-14(10). A typical response is 4-6. If the line is to run at high speeds or if the expected system load is to be heavy, specify a greater number of sync characters.

    Subsequent DQ11 lines do not default any of the parameters; you must enter values for the vector and CSR assignments (vector range is 300-774, CSR range is 160010-177700 both octal), whether the line is half duplex (H) or full duplex (F), whether an error detection expander unit is present (E) or not (NO), whether a character detection expander unit is present (C) or not (NO), and the required number of sync characters in a sync leader (range is 3-14 decimal).

Enter [L/R,] vector, CSR, number of drives, unit number of first drive for:

5. DS controller 0 [D:204,172040,,0]

    Enter the interrupt vector address (the default value is 204), the CSR address (the default value is 172040), the number of RS03/04 disk drives (there is no default value for this parameter), and the unit number of the first RS03/04 drive (the default value is 0) for the first RH11 or RH70 controller.

    The acceptable range for the number of RS03/04 drives is 1-8.

    If you do not use the default values, the acceptable ranges are:

vector	60-774 (octal)
CSR	160000-177700 (octal)
number of drives	1-8 (decimal)
unit number of first drive	0-7 (octal)

    Subsequent RH11 or RH70 controllers default only the unit number of the first drive (to 0).

    After you enter the parameters for each RH11 or RH70 controller included in your system, SYSGEN immediately prompts for drive type using SYSGEN prompt line 57. For clarity, this section lists the prompt lines in numeric order, not in logical sequence. If you were performing a SYSGEN and included an RH11 or RH70 controller for DS: devices (RS03/04), the questions that specify whether each drive is an RS03 or an RS04 would follow the DS controller parameter specification.

Enter [L/R,] vector, CSR, highest unit number <0 to 7> for:

6. DK controller 0 [D:220,177404]

    Enter the interrupt vector address (the default value is 220), the CSR address (the default value is 177404), and the highest RK05 unit number (there is no default value for this parameter) for the first RK11 controller.

    The acceptable range for the highest RK05 unit number is 0-7. Note that if you want the first RK05 unit number to be 0, enter the number of RK05 drives minus one as the highest unit number.

    If you do not enter the default vector and CSR assignments, the acceptable range is 60-774 for the vector and 160000-177700 for the CSR, both in octal.

    NOTE

    Fixed platter RK05 drives (RK05F) are handled as two units. The first of each RK05F pair must be an even unit number; for example, 0 and 1, 2 and 3. Be sure to take this into account when you calculate the highest RK05 unit number.

Enter vector, CSR, VT11/VS60, number of CRT monitors for:

7. GR controller 0 [D:,172000,,1]

RSX-11M supports the graphics display subsystem with the following restrictions.

1. One, and only one, VT11 or VS60 in the system

2. The graphics display driver does not operate on PDP-11/70 processors in 22-bit mode; memory size must be less than or equal to 124K-words.

3. For systems using the VT11, the display buffer of the task driving the VT11 must completely reside in the low 28K-words of system memory

The vector address for the graphics display subsystem is assigned from the floating vector space starting at 300. Thus, there is no default vector address for the graphics display subsystem. Enter a vector address between 300 and 774. Consult Field Service if the vector address is unknown.

After you specify the vector address, enter the CSR address (the default value is 172000), whether the connected terminal is a VT11 or a VS60 (there is no default for this parameter), and the number of CRT monitors (the default value is 1).

If you do not enter the default values for the CSR assignment and the number of CRT monitors, the acceptable range is 160000-177700 for the CSR and 1-2 for the number of CRT monitors, all in octal.

NOTE

Only the VS60 can drive two CRT monitors independently. Thus, if your system includes the VT11 you must specify one, the default value, for the number of CRT monitors.

Enter [L/R,] CSR, number of A/D channels for:

8. AD controller 0 [D:176770]

The AD01-D analog-to-digital converter is a non-interrupt device. Therefore, you do not enter an interrupt vector address.

Enter the CSR address (the default value is 176770) and the number of A/D channels (there is no default for this parameter) for the first AD01-D controller.

The acceptable range for the number of A/D channels is 1-64(10). If you do not enter the default value for the CSR assignment, the acceptable range is 160000-177700 (octal).

Subsequent AD01-D controllers do not default the CSR assignment; you must enter a value within the acceptable range.

Enter [L/R,] vector, CSR, number of A/D channels for:

9. AF controller 0 [D:134,172570]

    Enter the interrupt vector address (the default value is
    134), the CSR address (the default value is 172570), and the
    number of A/D channels (there is no default for this
    parameter) for the first AFC11 controller.

    The acceptable range for the number of A/D channels is
    1-1024(10).

    If you do not enter the default values for the vector and CSR
    assignments, the acceptable range is 60-774 for the vector
    and 160000-177700 for the CSR, both in octal.

    Subsequent AFC11 controllers do not default the vector and
    CSR assignments; you must enter a value, within the
    acceptable range, for the vector and CSR assignments as well
    as the number of A/D channels.

Enter [L/R,] clock vector, CSR, polarity mask, D-D/A channel /NO=no,
          maximum number of samples/second, DRK=DR11-K/NO=no
          (,DR11-K CSR) for

10. AR controller 0 [D:,170400,,,,,170420]

    The clock vector address for the AR11 controller is assigned
    from the floating vector space starting at 300. It is
    located at an offset of four (4) from the beginning of the
    AR11 vector space. Thus, there is no default clock vector
    address for the AR11. Enter a clock vector address between
    300 and 774. Consult Field Service if the clock vector
    address is unknown.

    The standard CSR address for the AR11 is 170400. Specify the
    address of the first word of the AR11 CSR group (the default
    value is 170400). If you do not enter the default CSR
    address, the acceptable range is 160000-177700.

    The polarity mask word specifies whether an individual
    channel is uni-polar or bi-polar; it corresponds one-to-one
    with the 16 possible channels. A 1-bit designates a
    uni-polar channel and a 0-bit designates a bi-polar channel.
    The acceptable range for the polarity mask word is 0-177777
    octal (0 specifies 16 bi-polar channels, 177777 specifies 16
    uni-polar channels).

    The AR11 module includes a D/A converter. However, support
    for the D/A is optional in the driver. If you do not include
    support (enter NO for parameter 4), the driver will be
    significantly shorter.

    The maximum number of samples must be evenly divisible into
    10,000 and within the acceptable range of 1-2500(10).

    The AR11 does not include the 16-bit digital I/O option that
    is available with the LPS11. However, you can achieve the
    same functionality using the DR11-K. The DR11-K must be
    jumper selected to use the 16 individual input lines without
    interrupts. If the DR11-K option is present, enter the CSR
    address of the DR11-K (the default value is 170420). If you
    do not enter the default DR11-K CSR address, the acceptable
    range is 160000-177700, octal.

Subsequent AR11 controllers default only the CSR address of the DR11-K option; you must enter values within the acceptable ranges. Also, if subsequent AR11 controllers do not include the DR11-K option, you must exclude this parameter.

Enter [L/R,] clock vector, CSR, #A/D channels, G=gain ranging option /NO=no,
        polarity mask, bandwith filter channel select delay,
        number of D/A channels, D=digital I/O option /NO=no,
        maximum number of samples/second for:

11. LS controller 0 [D:,170400,,,0,0,0,NO]

The clock vector address for the LPS11 controller is assigned from the floating vector space starting at 300. It is located at an offset of four (4) from the beginning of the LPS11 vector space. Thus, there is no default clock vector address for the LPS11. Enter a clock vector address between 300 and 774 octal. Consult Field Service if the clock vector address is unknown.

The standard CSR address for the LPS11 is 170400. Specify the address of the first word of the LPS11 CSR group (the default value is 170400). If you do not enter the default CSR address, the acceptable range is 160000-177700 octal.

The next parameter is the number of A/D channels; enter a value in the range 1-64(10) to specify the number of A/D channels on the first LPS11 controller.

You must then enter whether or not the gain ranging option is present. If the gain ranging option is present, you must specify the polarity mask word and the bandwith filter channel select delay (if required).

The polarity mask word specifies whether an individual channel is uni-polar or bi-polar; it corresponds one-to-one with the 16 possible channels. A 1-bit designates a uni-polar channel and a 0-bit designates a bi-polar channel. The acceptable range for the polarity mask word is 0-177777 octal (0 specifies 16 bi-polar channels, 177777 specifies 16 uni-polar channels).

With bandwith filtering enabled, the LPS11 driver imposes a software delay between changing channels on the multiplexer and initiating an A/D conversion. This delay can range from 85 usec to 8.5 msec. Consult the LPS11 documentation to determine the proper delay for your application. Note that the response must be in 100 usec units (for example, specify 25 to delay 2.5 msec). The acceptable range is 0-85. Enter 0 to disable bandwith filtering.

If your system includes the D/A option, enter the number of channels in the range 0-10(10). A response of 0 indicates the option is not present. The first two D/A channels correspond to the X and Y registers of the display controller. Up to eight additional D/A channels may be specified if the external D/A option is present.

The LPS11 supports a digital I/O and relay module. You must
specify whether or not the option is present. You then enter
the maximum number of samples per second.   The acceptable
range is 1-2500(10). Note that this value must be a multiple
of 10,000 (1, 2, 4, 5, 8, 10, 16, 20, 25, 40, 50, 80, 100,
125, 200, 250, 400, 500, 625, 1000, 1250, 2000, or 2500).

Enter [L/R,] vector, CSR (, number of UMRs) for

12. LA controller 0 [D:300,170460,0]

Enter the interrupt vector address (the default value is
300), the CSR address (the default value is 170460), and the
number of UNIBUS Mapping Registers (UMRs) for the LPA11-K.

The UMR parameter applies only to PDP-11/70 processors with
extended memory (22-bit mapping) support. Enter a value to
specify the maximum number of UMRs that the LPA11-K driver
can use to map all currently active LPA11-K I/O transfers.
See the RSX-11M/M-PLUS I/O Drivers Reference Manual for
details.

NOTE

The vector address is assigned from
floating vector space.   Consult Field
Service if the location is unknown.
Also, the required CSR address is that
of the first word of the LPA11 CSR
group.   Again, consult Field Service if
unknown.

Enter [L/R,] vector, CSR, # drives, O=offset recovery /NO=no offset rec. for:

13. DM controller 0 [230,177440,,O]

Enter the interrupt vector address (the default value is
210), the CSR address (the default value is 177440), the
number of RK06/07 disk drives (there is no default for this
parameter), and whether or not the controller is to support
offset recovery (the default is to include offset recovery
support (O)) for the first RK611 controller.

The acceptable range for the number of RK06/07 drives is
1-8(10).

Offset recovery support provides a higher degree of data
integrity in environments where disk packs are frequently
moved from drive to drive. This support moves the disk head
on either side of the cylinder centerline in an attempt to
pick up a stronger signal. Thus, offset recovery support
allows data to be read in instances where it could not
otherwise be recovered.

If you do not use the default vector and CSR assignments, the
acceptable range is 60-774 for the vector and 160000-177700
for the CSR, both octal.

Subsequent RK611 controllers do not default the vector and CSR assignments; you must enter a value, within the acceptable range, for the vector and CSR assignments as well as the number of RK06/07 drives.

NOTE

You can only specify offset recovery support for the first controller. If you include support for the first RK611 controller, you automatically include offset recovery support for subsequent controllers. Likewise, if you exclude support, you exclude offset recovery support for subsequent RK611 controllers.

After you enter the parameters for each RK611 controller included in your system, SYSGEN immediately prompts for drive type using SYSGEN prompt line 54. For clarity, this section lists the prompt lines in numeric order, not in logical sequence. If you were performing a SYSGEN and included an RK611 controller for DM: devices (RK06/07), the questions that specify whether each drive is an RK06 or an RK07 would follow the DM controller parameter specification.

Enter [L/R,] vector, CSR, F=full duplex /H=half duplex,
        number of characters in sync leader for:

14. XL controller 0 [D:,,H]

The vector address for the DL11-E asynchronous line interface is assigned from the floating vector space starting at 300. Thus, there is no default vector address for the DL11-E. Enter a vector address between 300 and 774. Consult Field Service if the vector address is unknown.

The CSR address for the DL11-E asynchronous line interface is assigned from the floating address space starting at 175610. Thus, there is no default CSR assignment for the DL11-E. Enter a CSR address between 175610 and 177700 octal. Consult Field Service if the CSR address is unknown.

The first DL11-E line defaults to a half duplex line (H). Enter F to specify a full duplex line.

There is no default value for the parameter that specifies the required number of sync characters in a sync leader. You must enter a value in the range 3-14(10). A typical response is 4-6. If the line is to run at high speeds or if the expected system load is to be heavy, specify a greater number of sync characters.

Subsequent DL11-E lines do not default any of the parameters; you must enter values for the vector and CSR assignments (vector range is 300-774, CSR range is 175610-177700), whether the line is half duplex (H) or full duplex (F), and the required number of sync characters in a sync leader (range is 3-14).

14. XP controller 0 [D:,174770,H]

The vector address for the DP11 synchronous line interface is
assigned from the floating vector space starting at 300.
Thus, there is no default interrupt vector address for the
DP11. Enter a vector address between 300 and 774 octal.
Consult Field Service if the vector address is unknown.

The standard CSR assignment for the DP11 is 174770. If you
do not enter the default CSR address, enter a value in the
range 160000-177700 octal.

The first DP11 line defaults to a half duplex line (H).
Enter F to specify a full duplex line.

There is no default value for the parameter that specifies
the required number of sync characters in a sync leader. You
must enter a value in the range 3-14(10). A typical response
is 4-6. If the line is to run at high speeds or if the
expected system load is to be heavy, specify a greater number
of sync characters.

Subsequent DP11 lines default only the half duplex parameter
(H); you must enter values for the vector and CSR
assignments (vector range is 300-774, CSR range is
160000-177700 both octal), and the required number of sync
characters in a sync leader (range is 3-14 decimal).

14. XU controller 0 [D:,,F]

The vector address for the DU11 synchronous line interface is
assigned from the floating vector space starting at 300.
Thus, there is no default interrupt vector address for the
DU11. Enter a vector address between 300 and 774 octal.
Consult Field Service if the vector address is unknown.

The CSR address for the DU11 synchronous line interface is
assigned from the floating address space starting at 160010.
Thus, there is no default CSR assignment for the DU11. Enter
a CSR address between 160010 and 177700 octal. Consult Field
Service if the CSR address is unknown.

The first DU11 line defaults to a full duplex line (F).
Enter H to specify a half duplex line.

There is no default value for the parameter that specifies
the required number of sync characters in a sync leader You
must enter a value in the range 3-14(10). A typical response
is 4-6. If the line is to run at high speeds or if the
expected system load is to be heavy, specify a greater number
of sync characters.

Subsequent DU11 lines default only the full duplex parameter
(F); you must enter values for the vector and CSR
assignments (vector range is 300-774, CSR range is
160010-177700 both octal), and the required number of sync
characters in a sync leader (range is 3-14 decimal).

14. XW controller 0 [D:,,H]

The vector address for the DUP11 synchronous line interface
is assigned from the floating vector space starting at 300.
Thus, there is no default interrupt vector address for the
DUP11. Enter a vector address between 300 and 774 octal.
Consult Field Service if the vector address is unknown.

The CSR address for the DUP11 synchronous line interface is
assigned from the floating address space starting at 160010.
Thus, there is no default CSR assignment for the DUP11.
Enter a CSR address between 160010 and 177700 octal. Consult
Field Service if the CSR address is unknown.

The first DUP11 line defaults to a half duplex line (H).
Enter F to specify a full duplex line.

There is no default for the parameter that specifies the
required number of sync characters in a sync leader. You
must enter a value in the range 3-14(10). A typical response
is 4-6. If the line is to run at high speeds or if the
expected system load is to be heavy, specify a greater number
of sync characters.

Subsequent DUP11 lines do not default any of the parameters;
you must enter values for the vector and CSR assignments
(vector range is 300-774, CSR range is 160010-177700 both
octal), whether the line is half duplex (H) or full duplex
(F), and the required number of sync characters in a sync
leader (range is 3-14 decimal).

Enter [L/R,] vector, CSR, F=full duplex/H=half duplex /P=primary HDX for:

15. XM controller 0

The vector address for the DMC11 interprocessor link is
assigned from the floating vector space starting at 300.
Thus, there is no default interrupt vector address for the
DMC11. Enter a vector address between 300 and 774 octal.
Consult Field Service if the vector address is unknown.

The CSR address for the DMC11 interprocessor link is assigned
from the floating address space starting at 160010. Thus,
there is no default CSR assignment for the DMC11. Enter a
CSR address between 160010 and 177700 octal. Consult Field
Service if the CSR address is unknown.

Normally, the DMC11 is a full duplex serial communications
link. When the DMC11 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. Specify an H to indicate that
the line is a secondary station or P to indicate that the
line is a primary station.

Enter [L/R,] vector, CSR, printer type
        (,[KMC timeout count <0=noKMC>, KMC vector, KMC CSR]) for:

16. LP controller 0 [D:200,177514,LA180,0,300,160130]

Enter the interrupt vector address (the default value is
200), the CSR address (the default value is 177514), and the
printer type (the default type is LA180) for the first LP
controller. Valid printer types are: LA180; LP11-C;
LP11-D; LP11-F; LP11-H; LP11-J; LP11-K; LP11-R; LP11-S;
LP11-V; LP11-W; LP11-Y; LP11-Z; LS11; LV11. For printer
widths and speed, consult Field Service or the PDP-11
Peripherals Handbook.

If your system includes KMC line printer support, you must
enter the KMC timeout count (the default of 0 excludes KMC
support), the KMC interrupt vector address (the default value
is 300), and the KMC CSR address (the default value is
160130).

The timeout count specifies the interval in which the KMC
polls the line printer between print lines. This value is
measured in units of 50 micro seconds. For example, if you
enter 1, the KMC polls the line printer every 100 micro
seconds (as each print buffer empties). The acceptable range
is 0-100 decimal. For slower printers, poll less frequently
(enter a higher number); the polling interval
increases/decreases UNIBUS latency.

The acceptable range for the KMC interrupt vector address is
60-774 and for the KMC CSR address the range is
160000-177700, both in octal.

NOTE

If you select KMC support, all printers
must use the KMC; those that do not
will not operate.

You can connect a maximum of eight line printers to the
system.

Enter number of modules, module number of first for:

17. UD controller 0 xxxx module

NOTE

If you specified a UDC11 controller,
this SYSGEN prompt line and the
questions that follow appear immediately
after you enter the vector and CSR
assignments for the UDC11.

The UDC11 supports up to 252 modules, which can be classified
into seven types:

• Analog input
• Analog output
• Bi-stable output

- Digital interrupt
- Digital sense
- I/O counter
- Single-shot output

Modules of the same type must occupy consecutive locations within the UDC11. Thus, if there are seven analog input modules and the first module starts at slot 0, then the last analog input module must be at slot 6. Module types cannot overlap, but unassigned slots are permitted.

SYSGEN asks the following questions to establish UDC11 module boundaries. You must enter the number of each module contained in the UDC11 and identify the slot for that module to begin. The permissible range for each entry is 0-252(10). Note, however, that SYSGEN decrements the range value for the number of each module by the total number of previously specified UDC11 modules. For example, if you specify 50 analog input modules, you are limited to 152 of the other modules (maximum 252 UDC11 modules). Both responses are in octal.

17. UD controller 0 ADU01 analog input module

17. UD controller 0 analog output module

17. UD controller 0 bi-stable output module

17. UD controller 0 digital interrupt module

17. UD controller 0 digital sense module

17. UD controller 0 I/O counter module

17. UD controller 0 single-shot output module

Enter [L/R,] terminal number to redirect to (TTn:) for:

18. CO controller 0 [D:0]

This poorly phrased question requests a terminal number. The console output driver redirects the pseudo device CO: to the terminal you specify.

The default is 0 (TT0:).

If you do not use the default value, the acceptable range is 0-77 octal.

Enter [L/R,] num. DL11's <ZL>, num. DH11's, num. DZ11's, num. DJ11's for:

19. The terminal driver [D:1,0,0,0]

This question appears only if you selected either one of the half duplex drivers including the baseline driver. (The full duplex terminal driver is always loadable and appears in question 20.)

For RSX-11M systems, you must generate at least one DL11 asynchronous terminal interface into the system. RSX-11S does not require a DL11.

All responses are in decimal.

Enter the number of each type of terminal interface included in your system. The default response includes one DL11 asynchronous terminal interface. If you do not use the default response, the acceptable range is 1-8 for the DL11 and 0-16 for the DH11, DZ11, and DJ11 terminal interfaces.

Enter num. DL11's <ZL>, num. DH11's, num. DZ11's, num. DJ11's for:

20. The terminal driver [D:1,0,0,0]

    This question appears only if you selected the full duplex terminal driver. Note that the optional Loadable/Resident parameter does not appear since the full duplex driver is always loadable.

    For RSX-11M system, you must generate at least one DL11 asynchronous terminal interface into the system. RSX-11S does not require a DL11.

    All responses are in decimal.

    Enter the number of each type of terminal interface included in your system. The default response includes one DL11 asynchronous terminal interface. If you do not use the default response, the acceptable range is 1-8 for the DL11 and 0-16 for the DH11, DZ11, and DJ11 terminal interfaces.

Enter vector, CSR for:

21. ZL controller 0 [D:60,177560]

    This question always appears; you must include at least one DL11 line interface in an RSX-11M system.

    The standard interrupt vector address for the first DL11 line is 60. If you do not use the default vector assignment, the acceptable range is 60-774 octal.

    The standard CSR address for the first DL11 line is 177560. If you do not use the default CSR assignment, the acceptable range is 160000-177700 octal.

    If you specified more than one DL11, you must enter the vector and CSR assignment for each additional line.

    Interrupt vector addresses for additional DL11 lines are assigned from the floating vector space starting at 300. There is no default vector address for any additional DL11 lines. You must enter a value within the range 300-774 octal. Consult Field Service if the interrupt vector address of additional lines is unknown.

    CSR addresses for additional DL11 lines are assigned from floating address space starting at 176000. There is no default CSR address for any additional DL11 lines. You must enter a value within the range 176000-176770 octal. Consult Field Service if the CSR address of additional lines is unknown.

Enter vector, CSR, highest line number <0 to 15>
        (, answer speed, DM11-BB vector, DM11-BB CSR) for:

22. DH controller 0 [D:,,,300,0,0]

     This question appears only if you specified a DH11
     asynchronous line interface. Note that the Loadable/Resident
     parameter does not appear.

     The interrupt vector address for the DH11 is assigned from
     floating vector space starting at location 300. Thus, there
     is no default vector assignment for the DH11. Enter a vector
     address between 300 and 774 octal. Consult Field Service if
     the interrupt vector address is unknown.

     The CSR address for the DH11 is assigned from floating
     address space starting at 160010. Thus there is no default
     CSR assignment for the DH11. Enter a CSR address between
     160010 and 177700 octal. Consult Field Service if the CSR
     address is unknown.

     The DH11 can service up to 16 remote and local lines. Remote
     lines occupy consecutive line locations. Line assignment is
     by groups of four. Local lines also occupy consecutive line
     locations and their assignment follows the assignment of any
     remote lines specified. Enter the total number of lines
     desired by specifying the highest line number in the range
     0-15 decimal (0 indicates one line, 15 indicates 16 lines).

     If your DH11 includes DM11-BB modem support, you must enter
     the baud rate at which all DH11 remote lines are answered.
     The default answer speed is 300. If you do not use the
     default response, the acceptable answer speed baud rates are
     50, 75, 110, 134.5, 150, 200, 300, 600, 1200, 2400, 4800, or
     9600. If included, you must also specify the DM11-BB vector
     and CSR assignments. The default response of 0 excludes
     DM11-BB modem support. To include DM11-BB modem support, you
     must enter a value for the vector and CSR assignments.

     The DM11-BB interrupt vector address is assigned from
     floating vector space starting at 300. Thus, you must enter
     a value between 300 and 774 octal to include DM11-BB modem
     support. Consult Field Service if the interrupt vector
     address is unknown.

     The standard CSR address for the DM11-BB is 170500. If you
     include DM11-BB support, enter 170500 or a value within the
     range 160000-177700 octal for the CSR assignment.

     SYSGEN repeats this question for each DH11 specified.

Enter vector, CSR, highest line number <0 to 15> for:

23. DJ controller 0

     This question appears only if you specified a DJ11
     asynchronous line multiplexer. Note that the
     Loadable/Resident parameter does not appear. This is because
     the DJ11 uses the same driver as the DL11 and the DH11.

The interrupt vector address for the DJ11 is assigned from floating vector space starting at 300. Thus, there is no default vector assignment for the DJ11. Enter a vector address between 300 and 774 octal. Consult Field Service if the vector address is unknown.

The CSR address for the DJ11 is assigned from floating address space starting at 160010. Thus , there is no default CSR assignment for the DJ11. Enter a CSR address between 160010 and 177700 octal. Consult Field Service if the CSR address is unknown.

Each DJ11 can service up to 16 asynchronous serial lines. Enter the total number of lines by specifying the highest line number in the range 0 to 15 decimal (0 indicates one line, 15 indicates 16 lines).

SYSGEN repeats this question for each DJ11 specified.

Enter vector, CSR, highest line number <0 to 7> [, answer speed] for:

24. DZ controller 0 [D:,,,0]

This question appears only if you specified a DZ11 asynchronous line multiplexer. Note that the Loadable/Resident parameter does not appear.

The interrupt vector address for the DZ11 is assigned from floating vector space starting at 300. Thus, there is no default vector assignment for the DZ11. Enter a vector address between 300 and 774 octal. Consult Field Service if the vector address is unknown.

The CSR address for the DZ11 is assigned from floating address space starting at 160010. Thus, there is no default CSR assignment for the DZ11. Enter a CSR address between 160010 and 177700 octal. Consult Field Service if the CSR address is unknown.

Each DZ11 can service up to 8 asynchronous lines. Enter the total number of lines by specifying the highest line number in the range 0 to 7 decimal (0 indicates one line, 7 indicates 8 lines).

The DZ11 can maintain a full duplex connection through 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 wish to include modem support, specify the baud rate at which all DZ11 remote lines are to be answered. Acceptable answer speed baud rates are 50, 75, 110, 134.5, 150, 200, 300, 600, 1200, 2400, 4800, or 9600. Note that the default for this parameter (0) excludes modem support.

SYSGEN repeats this question for each DZ11 specified.

The following questions provide additional device information and immediately follow the respective SYSGEN prompt line for controller information.

*51. MM controller 0 unit 0. formatter [D R:0-7 D:0]

This question immediately follows parameter specification for each MM controller (SYSGEN prompt line 3). You must identify the number (the unit plug) for the TM02/03 formatter (tape controller) on the RH11 or RH70. The default is 0. If you do not use the default response, the acceptable range is 0-7.

SYSGEN repeats this question for each device unit specified for each controller.

*52. Contr 0 unit 0. is an RP04,05/RP06 [D:RP06]

This question immediately follows parameter specification for each DB controller (SYSGEN prompt line 2). You must specify the type of drive. Enter RP06 (the default response), RP04 or RP05.

SYSGEN repeats this question for each device unit specified for each controller.

*53. Contr 0 unit 0. is an RL01/RL02 [D:RL01]

This question immediately follows parameter specification for each DL controller (SYSGEN prompt line 3). You must specify the type of drive. Enter either RL01 (the default response) or RL02.

SYSGEN repeats this question for each device unit specified for each controller.

*54. Contr 0 unit 0. is an RK06/RK07 [D:RK06]

This question immediately follows parameter specification for each DM controller (SYSGEN prompt line 13). You must specify the type of drive. Enter either RK06 (the default response) or RK07.

SYSGEN repeats this question for each device unit specified for each controller.

*55. Contr 0 unit 0. is an RP02/RP03 [D:RP03]

This question immediately follows parameter specification for each DP controller (SYSGEN prompt line 3). You must specify the type of drive. Enter either RP02 or RP03 (the default response).

SYSGEN repeats this question for each device unit specified for each controller.

*56. Contr 0 unit 0. is an RM02/RM03 [D:RM03]

This question immediately follows parameter specification for each DR controller (SYSGEN prompt line 2). You must specify the type of drive. Enter either RM02 or RM03 (the default response).

SYSGEN repeats this question for each device unit specified for each controller.

*57. Contr 0 unit 0. is an RS03/RS04 [D:RS04]

This question immediately follows parameter specification for each DS controller (SYSGEN prompt line 5). You must specify the type of drive. Enter either RS03 or RS04 (the default response).

SYSGEN repeats this question for each device unit specified for each controller.

*58. Contr 0 unit 0. is SINGLE/DOUBLE density

This question immediately follows parameter specification for each DY controller (SYSGEN prompt line 3). You must specify whether each RX02 drive is initially at single density or at double density. Enter either SINGLE or DOUBLE.

SYSGEN repeats this question for each device unit specified for each controller.

If your system includes ICS/ICR process I/O subsystems or DSS/DRS modules, SYSGEN asks the following questions. Note that UDC11 support precludes ICS/ICR support; ICS/ICR and UDC11 are mutually exclusive.

*1. Expanded comments for ICS/ICR questions

Expanded comments provide explanatory text that helps you answer the ICS/ICR questions.

*2. Do you want task activation from unsolicited interrupts

This option permits the ICS/ICR driver to initiate a task when the driver receives unsolicited input. The option provides support for tasks to link to interrupts and obtain activation data upon initiation.

*3. IC controller 0 vector address

The standard vector address for the ICS/ICR subsystem is 234. Enter a value within the range 234-774. Subsequent IC controllers obtain vector assignments from floating vector space starting at 300. Consult Field Service if the vector addresses are unknown.

*4. CSR address

The standard CSR address for the ICS/ICR subsystem is 171776. Enter a value within the range 160000-177700. CSR addresses for subsequent IC controllers are assigned starting at 171766 and proceed downward in eight byte intervals (for example, 171766, 171756, and 171746).

*5. Is it an ICR-11

Specify whether the subsystem is an ICR-11 or an ICS-11. SYSGEN repeats this query for each IC controller specified.

*6. Number of A/D converter modules in this ICS/ICR

The ICS/ICR subsystem supports up to 16 analog to digital converter modules, each with 8 channels. Enter a value in the range 0-16. If you enter a non-zero value, SYSGEN asks question 7. SYSGEN repeats this question and, if applicable, question 7, for each IC controller specified.

*7. A/D converter module number

   Enter the module number in the range 0-15.

*8. Number of expansion multiplexers

   Enter a value in the range 0-7.

The ICS/ICR subsystem consists of six distinct modules:

- D/A converter

- Single-shot output

- Bi-stable output

- Digital sense

- Digital interrupt

- I/O counter

SYSGEN prompts for the number of each module in your system (in questions 12 through 17) and then asks for the module number of each (in question 9).

*12. Number of D/A converter modules in this ICS/ICR

*13. Number of single-shot output modules in this ICS/ICR

*14. Number of bi-stable output modules in this ICS/ICR

*15. Number of digital sense modules in this ICS/ICR

*16. Number of digital interrupt modules in this ICS/ICR

*17. Number of I/O counter modules in this ICS/ICR

*9. (module name) module number

   This question appears for each module you include (specify a non-zero number of modules). Enter a value in the range 0-15.

*10. Restore module status on power and error recovery

   This question appears only if the system includes a bi-stable output, D/A converter, or I/O counter module (non-zero response to questions 14, 12, or 17 respectively).

   If you select this option, the ICS/ICR driver restores the state of all bi-stable digital outputs, analog outputs, and I/O prescalar values on power recovery and recovery from sustained serial transmission errors.

*11. How many line errors are acceptable per second

   This question appears only if you include the restore module status option (respond Yes to question 10).

   When serial line errors exceed the limit you specify in response to this question, the IC driver places the affected subsystem offline (when the line errors cease, the driver automatically places the subsystem online). Enter a value in the range 0-5000.

*18. Expanded comments for DSS/DRS questions

Expanded comments provide explanatory text that helps you answer the DSS/DRS questions.

*19. Number of DRS-11 modules

Enter the number of DRS-11 digital output modules in the range 0-16. If you enter 0, SYSGEN omits questions 20, 21, and 22.

*20. Restore module status on power and error recovery

If you select this option, the DRS driver restores the state of all 48 buffered digital output modules on power recovery and recovery from sustained transmission errors.

*21. DRS-11 CSR address

Enter a value for the CSR address in the range 160000-177700.

*22. DRS-11 vector address

Enter a value for the vector address in the range 300-774.

*23. Number of DSS-11 digital input modules

Enter the number of DSS-11 digital input modules. Note that the total number of DRS-11 and DSS-11 modules cannot exceed 16. Thus, the acceptable range for this response is 0 to 16 minus the number of DRS-11 modules specified in question 19. If you enter 0, SYSGEN omits questions 24, 25, and 26.

*24. DSS-11 CSR address

Enter a value for the CSR address in the range 160000-177700.

*25. DSS-11 vector address

Enter a value for the vector address in the range 300-774.

*26. Task activation from unsolicited interrupts

This option permits the DSS/DRS driver to initiate a task when the driver receives unsolicited input. The option provides support for tasks to link to interrupts and obtain activation data upon initiation.

If your system includes IP11/IP300 support, SYSGEN asks the following questions. Consult the IP11/IP300 documentation for details on the IP11/IP300 I/O subsystem.

*1. Extended comments for IP11/IP300

Expanded comments provide explanatory text that helps you answer the IP11/IP300 questions.

*2. Treat all controllers as one unit

If you respond Yes, SYSGEN generates one SCB and one UCB to cover all IP11 controllers. This creates the appearance of a single, large IP11 controller with all of the I/O modules connected to it. This option results in a loss of system efficiency and also decreases the total number of A/D converters to sixteen.

If you respond No, SYSGEN generates one SCB and one UCB for each IP11 controllers. Each controller must then be referenced with a different LUN. If you enter No, each controller can support sixteen A/D converters, but the programmer must know which controller a particular I/O module is on as well as the module index.

For example, consider a PDP-11 that has two IP11 controllers. Controller No. 0 has one M6011 digital output module (16 points) and eight A014 A/D converter modules. Controller No. 1 has two M6011 modules (32 points), one M5010 digital input module (32 points), and three A014 modules. If all controllers are treated as one unit (Y to the above question), the driver will cause the system to respond as if there were only one controller with 48 digital output points (M6011), 32 digital input points (M5010), and eleven A/D converter modules (A014).

*3. Any latching digital output modules

Because the IP11/IP300 device driver determines the system configuration at bootstrap or power-up time, it is not necessary to specify how many of each type of module are present. You are asked whether you have (or will ever have) each module type so that the code to support unused modules will not be assembled.

*4. Any single-shot output modules

*5. Direct output via QIO

This option allows a task to output to digital or single-shot output modules without overmapping the I/O page. The option simplifies task code, but increases overhead.

Note that the direct output via QIO support is not required in order for FORTRAN support to work. However, if present, it will not interfere with FORTRAN support.

The question appears only if you include a latching digital output module or a single-shot output module (Yes response to question 3 or 4).

*6. Any non-interrupting digital sense modules

*7. Any interrupting digital sense modules

*8. Any change-of-state modules

*9. Any counter modules

*10. Direct input via QIO

This option allows a task to perform digital input with a QIO directive rather than by mapping over the I/O page. The option simplifies task code, but increases overhead.

Note that direct input via QIO is not required for FORTRAN support to work. However, if present, it will not interfere with FORTRAN support.

This question appears only if you responded Yes to one or more of questions 6, 7, 8, or 9.

*11. Unsolicited interrupt support

The M5011, M5012, and M5013 interrupting modules can produce
unsolicited interrupts when certain input bits change state.
If you select this option, the interrupts can be monitored by
a task.

This question appears only if you responded Yes to question 7
or 8.

*12. Event flag linkage to interrupts

A task can monitor digital interrupts by linking a contiguous
group of event flags to interrupting bits. If you select
this option, the driver sets the corresponding event flag
whenever its associated bit causes an interrupt.

*13. Any D/A converters

*14. Any A014 A/D converters

*15. Any A020 A/D converters

*16. How many output bytes should be saved on powerfail

The answer to this query reserves table space in the
IP11/IP300 driver. If the answer to the query is n, 4*n
bytes are reserved. This space is part of the Executive, so
available pool space is correspondingly decreased.

At powerfail time, if there is not enough space in the table
to save all outputs, the excess outputs will be lost and will
not be restored.

This question appears only if the system includes one or more
output modules and you included Executive support for power
fail recovery. Output modules are the M6010, M6012, and
M6013 Latching Digital Output modules; the M6011 Single-Shot
Output module; and the A630 D/A Converter module.

The acceptable range is 0-3048(10).

Enter 0 (or carriage return) to disable output restoration.

*17. IP11 vector

Enter the interrupt vector address for the first IP11
controller. The standard vector address, and the default
value, is 234. If you do not use the default assignment, the
acceptable range is 60-774. Subsequent IP11 controllers are
assigned vector addresses from floating vector space and
there is no default. Enter a value within the acceptable
range. Consult Field Service if the IP11 vector address is
unknown.

*18. Base address

Note that this question requests the IP11 base address and
not the CSR address. The base address is the CSR address
minus 377 octal.

For the first IP11 controller, the default base address is
171000. For the second IP11 controller, the default base
address is 171400.

The acceptable range for the IP11 base address is 160000-177400.

The third and subsequent IP11 controllers are assigned base addresses from floating address space and do not have default responses. Enter a value within the acceptable range.

Consult Field Service if the IP11 base address is unknown.

5.7 DETAILS OF SYSGEN PROCESSING

During a system generation, SYSGEN issues command lines and displays comment lines. This section uses a console listing from an actual system generation to detail and describe the command lines as well as interpret the more obscure comment lines.

The console listing appears below. It is followed by notes which are keyed to the listing.

```
   RSX-11M V3.2 BL26    28K
>RED DL:=SY:
>RED DL:=LB:                        ❶
>MOU DL:RSXM26
>@DL:[1,2]STARTUP
>* PLEASE ENTER TIME AND DATE (HR:MN DD-MMM-YY) [S]: ^Z

>@ <EOF>
>INS $BOO
>BOO DL:[1,54]                      ❷

   RSX-11M V3.2 BL26    64K    MAPPED
>RED DL:=SY:
>RED DL:=LB:
>MOU DL:RSXM26
>@DL:[1,2]STARTUP
>* PLEASE ENTER TIME AND DATE (HR:MN DD-MMM-YY) [S]: 12:00 23-MAY-79
>TIM 12:00 23-MAY-79
>* ENTER LINE WIDTH OF THIS TERMINAL [D D:132.]:
>SET /BUF=TI:132.
>ACS SY:/BLKS=512.
>;
>; NOTE - The Baseline INDirect must be replaced by BIGIND with
>;        a priority of 10. for SYSGEN.
>;
>;   ie  >REM ...AT.
>;        >INS $BIGIND/PRI=10.
>;
>@ <EOF>
>REM ...AT.
>INS $BIGIND/PRI=10.
INS -- WARNING - PRIVILEGED TASK OVERMAPS I/O PAGE
>INS  $BIGI\I\MAC/INC=50000                          ❸
INS -- PARTITION PAR14K NOT IN SYSTEM, DEFAULTING TO GEN
>ASN DL:=SY:
>@SYSGEN
>;
>; RSX-11M Version 3.2 BL26 System Generation 3.2.2c done on 23-MAY-79 at 12:01:
>;
>; Copyright (C) 1979 Digital Equipment Corporation, Maynard Mass.
>;
>; RL01 distribution kit
>;
>*  1. Inhibit MCR command lines (Type <ESC> for explanation)? [Y/N]:
>*  2. Have you made a copy of the distribution kit? [Y/N]:Y
>*  3. Use saved or canned answer file for input responses? [Y/N]:
>* 10. Save responses (i.e.: create SYSSAVED.DAT)? [Y/N]:Y
>* 11. UIC for SYSSAVED files if not [200,200]  [S]:
>* 12. UIC for SYSGEN command files if not [200,200] [S]:
>* 13. Clean up files from previous GENs? [Y/N]:
>* 14. Device, when ready, for Executive sources (ddu:)  [S]: DL1:
>;
>MOU DL1:MAPSRC
>ASN DL1:=LB:                       ❹
>INS SY:$PIP
>PIP /FR

DL0: HAS 3315. BLOCKS FREE, 6925. BLOCKS USED OUT OF 10240.
LARGEST CONTIGUOUS SPACE = 3315. BLOCKS

>SET /UIC=[11,10]
>;
>; Target configuration
>;
>*  1. Processor (e.g.: 11/34, LSI-11) [S R:5-6]: 11/70
>*  3. Generating RSX-11S? [Y/N]:
>*  4. Memory size (in K-word blocks) [D R:32.-1920.]: 512
>*  5. Mapped? [Y/N]:Y
>*  6. Any K-series laboratory devices? [Y/N]:
```

```
>*  8. Floating point processor (FP-11) present? [Y/N]:Y
>* 10. If using KW11-P as system clock: number of intrps./sec. [D R:0.-1000.]:
>* 11. Line frequency:    A- 60 Hz    B- 50 Hz    [D: "A"] [S]:
>* 12. KW11-Y Watchdog timer support? [Y/N]:
>* 13. Memory parity support? [Y/N]:Y
>* 14. Cache memory? [Y/N]:Y
>* 15. Highest interrupt vector (If 0 will be computed) [O R:0-774]:
>;     For device configuration: "*" Prints device table, "." Terminates inquiry
>;     Enter devices and number of controllers for devices which require drivers
>* 16. Devices [S]: DB
>* 16. Devices [S]: DK
>* 16. Devices [S]: DS
>* 16. Devices [S]: DM
>* 16. Devices [S]: DX
>* 16. Devices [S]: TT
>* 16. Devices [S]: MM
>* 16. Devices [S]: DT
>* 16. Devices [S]: DL
>* 16. Devices [S]: LP
>* 16. Devices [S]: .
>;
>; Processor:11/70   Memory Size:512K,Mapped   System:RSX-11M
>;
>; Host configuration
>;
>*  1. Are you running SYSGEN standalone (on the baseline system)? [Y/N]:Y
>*  2. Is a line printer available? [Y/N]:
>*  4. Does the listing/map device have at least 120 columns? [Y/N]:Y
>*  5. Assembly listings device (ddu:) [D: "NL:"] [S]:
>*  6. Map device for Executive and device drivers (ddu:) [D: SY:] [S]:
>;
>* EOS * Do you want to: <CR>-continue R-repeat section E-exit P-pause [S]:
>;
>; Executive Options
>;
>;     Answer Y(ES) if the following support is desired
>;
>*  1. Will DBMS-11 be used? [Y/N]:
>*  2. FILES-11 ACP ? [Y/N]:Y
>*  3. RMS record locking and placement control? [Y/N]:Y
>*  4. Non-resident tasks (task loader)? [Y/N]:Y
>*  5. Loadable task loader? [Y/N]:Y
>*  6. Memory management (PLAS) directives? [Y/N]:Y
>*  7. Send/Receive by reference directives? [Y/N]:Y
>*  8. Get mapping context directive? [Y/N]:Y
>;     Address checking support will be included
>;     I/O rundown support will be included
>* 11. Multi-user protection? [Y/N]:Y
>* 12. ANSI Magtape ACP? [Y/N]:Y
>* 13. On-line formatting (FMT) or on-line user-mode diagnostics? [Y/N]:Y
>* 14. Loadable device drivers? [Y/N]:Y
>* 15. Should the default for all applicable drivers be loadable? [Y/N]:Y
>;     AST support will be included
>;     Cancel selective MARKTIMEs support will be included
>* 17. Task termination and device not ready messages (TKTN)? [Y/N]:Y
>* 18. Power fail recovery? [Y/N]:Y
>* 19. Install, request, and remove on exit? [Y/N]:Y
>* 20. Large (20K) Executive? [Y/N]:Y
>* 21. Logical device assignment? [Y/N]:Y
>* 22. Logging of device errors and timeouts? [Y/N]:Y
>* 23. Logging of undefined interrupts? [Y/N]:Y
>* 24. Logging of memory parity errors? [Y/N]:Y
>* 25. Do you intend to include a user-written driver? [Y/N]:
>* 28. Disk writecheck? [Y/N]:Y
>* 29. Executive Debugging Tool (XDT)? [Y/N]:Y
>* 30. Rotating pattern in data lights? [Y/N]:Y
>* 31. Industrial network or DECnet? [Y/N]:
>* 32. Queue manager and queued print spooler? [Y/N]:Y
>* 33. Group global event flags? [Y/N]:Y
```

```
>;      For directives: "*" Prints table, "." Terminates inquiry, "%" Gets all
>* 34. Enter code for directives [S]: %.
>* 35. Number of pre-allocated QIO packets [D R:0.-15. D:5.]:
>* 36. Size of data transfer vector in words [D R:5.-33. D:33.]:
>* 37. Round-robin scheduling interval in ticks [D R:0.-1000. D:5.]: 0
>* 40. Executive level disk swapping interval [D R:0.-5000. D:30.]:
>* 41. Swapping priority [D R:1.-20. D:5.]:
>* 42. Size of dynamic storage region (POOL) in words [D R:256.-16384. D:1024.]:
>* 43. Seconds between printer not ready messages [D R:0.-255. D:30.]: 255
>* 45. System crash register and stack dump device CSR [O R:0-177700 D:175564]:
>* 46. Checkpointing:              A- Yes     B- With system ckpnt. file     [S]: B
>* 47. System cntrled partitions: A- Yes   B- With auto compaction (SHF) [S]: B
>* 48. Dump analysis:             A- PANIC   B- Crash (CDA)                 [S]: B
>* 49. Output notification device CSR [O R:160000-177700 D:175564]:
>* 50. Memory dump device (ddu:) [S R:3-4]: DK0
>* 51. CSR address of dump device [O R:160000-177700 D:177404]: 177400
>;
>; Terminal driver options
>;
>*  1. Terminal driver desired (A/B/C/D, * prints table) [S]: A
>;
>;      Answer Y(ES) if the following support is desired
>;
>*  3. Pass form feeds directly to terminal? [Y/N]:Y
>*  4. Automatic carriage return/line feed? [Y/N]:Y
>*  5. Task checkpointable during terminal input? [Y/N]:Y
>*  6. Unsolicited input character AST? [Y/N]:Y
>*  7. Write with CTRL/O cancellation? [Y/N]:
>;      Breakthrough write support will be included
>;      CTRL/R support will be included
>* 10. Escape sequence handling? [Y/N]:
>* 11. Get multiple characteristics? [Y/N]:Y
>* 12. Set multiple characteristics? [Y/N]:Y
>* 13. Get terminal driver options? [Y/N]:Y
>* 14. Hold screen mode? [Y/N]:Y
>;      Transparent read/write support will be included
>* 16. Settable case conversion for input? [Y/N]:Y
>* 17. Read after prompt? [Y/N]:
>;      Read with no echo support will be included
>;      Read with special terminator support will be included
>* 20. CRT rubout support? [Y/N]:Y
>* 21. Terminal-host synchronization? [Y/N]:Y
>* 22. User terminal input buffering? [Y/N]:Y
>* 23. Variable length terminal input buffering? [Y/N]:
>* 24. LA30P support? [Y/N]:
>;
>* EOS * Do you want to: <CR>-continue R-repeat section E-exit P-pause [S]:
>;
>;      Thinking ...
>;
>; End of Executive option generation at 12:12:49 on 23-MAY-79
>;
>; Peripheral configuration
>;
>;      Parameters appearing in square brackets "[...]" can only be
>;      specified for the first controller of a particular device.
>;      Parameters appearing in parentheses "(...)" only need be specified
>;      if the indicated option is present on the target system.
>;
>;      The default for loadable drivers has been set to *TRUE*.
>;      To override this setting enter R (resident) as the first parameter
>;      for the first controller of the specified device.
>;
>; A/D and Laboratory devices: None specified
>;
>; Interprocessor communication devices: None specified
>;
>; Unit record devices: LP
>;
```

```
>; Enter [L/R,] vector, CSR, printer type
>;            (,[KMC timeout count <0=no KMC>, KMC vector, KMC CSR]) for:
>;
>* 16. LP controller 0 [D: 200,177514,LA180,0,300,160130] [S]: ,1773\3\510,LP11-C
>;
>; Disks: DB, DK, DL, DM, DS, DT, DX
>;
>; Enter [L/R,] vector, CSR, number of drives, unit number of first drive,
>;            [O=offset recovery support/NO=no support] for:
>;
>*  2. DB controller 0 [D: 254,176700,,0,0]           [S]: ,,4
>* 52. Contr 0 unit 0. is an RP04,05/RP06 [D: RP06] [S]:
>* 52. Contr 0 unit 1. is an RP04,05/RP06 [D: RP06] [S]:
>* 52. Contr 0 unit 2. is an RP04,05/RP06 [D: RP06] [S]: RP05
>* 52. Contr 0 unit 3. is an RP04,05/RP06 [D: RP06] [S]: RP04
>;
>; Enter [L/R,] vector, CSR, highest unit number <0 to 7> for:
>;
>*  6. DK controller 0 [D: 220,177404]               [S]: ,177400,3
>;
>; Enter [L/R,] vector, CSR, number of drives for:
>;
>*  3. DL controller 0 [D: 160,144400]               [S]: ,177520,2
>* 53. Contr 0 unit 0. is an RL01/RL02 [D: RL01]    [S]:
>* 53. Contr 0 unit 1. is an RL01/RL02 [D: RL01]    [S]:
>;
>; Enter [L/R,] vector, CSR, # drives, O=offset recovery/NO=no offset rec. for:
>;
>* 13. DM controller 0 [D: 210,177440,,0]            [S]: ,,2
>* 54. Contr 0 unit 0. is an RK06/RK07 [D: RK06]    [S]:
>* 54. Contr 0 unit 1. is an RK06/RK07 [D: RK06]    [S]:
>;
>; Enter [L/R,] vector, CSR, number of drives, unit number of first drive for:
>;
>*  5. DS controller 0 [D: 204,172040,,0]            [S]: ,172090,2
>;    SGN -- Illegal character in numeric response  -- RETRY
>*  5. DS controller 0 [D: 204,172040,,0]            [S]: ,,2
>* 57. Contr 0 unit 0. is an RS03/RS04 [D: RS04]    [S]:
>* 57. Contr 0 unit 1. is an RS03/RS04 [D: RS04]    [S]:
>;
>; Enter [L/R,] vector, CSR, number of drives for:
>;
>*  3. DT controller 0 [D: 214,173342]               [S]: ,177340,2
>;
>*  3. DX controller 0 [D: 264,171170]               [S]: ,,2
>;
>; Tapes: MM
>;
>; Enter [L/R,] vector, CSR, number of drives for:
>;
>*  3. MM controller 0 [D: 224,172440]               [S]: ,,2
>* 51. MM controller 0 unit 0. formatter  [O R:0-7 D:0]:
>* 51. MM controller 0 unit 1. formatter  [O R:0-7 D:0]:
>;
>; Non-physical (pseudo) devices: CO, TT, TI, CL, LB, SY
>;
>; Enter [L/R,] num. DL11's <ZL>, num. DH11's, num. DZ11's, num. DJ11's for:
>;
>* 19. The terminal driver  [D: 1,0,0,0]             [S]: ,3
>;
>; Enter vector, CSR for:
>;
>* 21. ZL controller 0 [D: 60,177560]                [S]:
>;
>; Enter vector, CSR, highest line number <0 to 15>
>;            (,answer speed, DM11-BB vector, DM11-BB CSR) for:
>;
>* 22. DH controller 0 [D: ,,,300,0,0]               [S]: 310,160020,15,,300,170500
>* 22. DH controller 1 [D: ,,,300,0,0]               [S]: 320,160040,15
```

```
>* 22. DH controller 2 [D: ,,,300,0,0]                    [S]: 330,160060,5
>;
>* EOS * Do you want to: <CR>-continue R-repeat section E-exit P-pause [S]:
>;
>; End of interrupt vector area has been set to 400
>;
>;
>; Create Executive build files
>;
>PIP RSXMC.MAC=LB:RSXMCO.MAC/AP   ❺
>;
>; Assemble the Executive
>;
>PIP [11,24]/NV=RSXASM.CMD,RSXDRVASM.CMD   ❻
>PIP RSXASM.CMD;0/DE,RSXDRVASM;0
>REM PIP
>;
>*  1. Do you wish to edit any of the Executive files? [Y/N]:
>;
>;
>* EOS * Do you want to: <CR>-continue R-repeat section E-exit P-pause [S]:
>;
>;SET /COFFEEBREAK=TI: Start of Executive assembly at 12:31:45 on 23-MAY-79   ❼
>SET /UIC=[11,24]
>MAC @RSXASM
>;SET /NOCOFFEEBREAK=TI: Executive assembly ended at 12:56:36 on 23-MAY-79
>;
>* EOX * Did the Executive assemble correctly? [Y/N]:Y
>;
>;SET /COFFEEBREAK=TI: Start of device drivers assembly at 12:56:45 on 23-MAY-79 ❽
>SET /UIC=[11,24]
>MAC @RSXDRVASM
>;SET /NOCOFFEEBREAK=TI: Device drivers assembly ended at 13:03:55 on 23-MAY-79
>;
>* EOX * Did the device drivers assemble correctly? [Y/N]:Y
>;
>;
>; Prepare for task building
>;
>INS SY:$PIP
>PIP RSX.OBS=*.OBJ
>PIP *.OBJ;*/DE/NM
>PIP RSX11M.OBJ/RE=RSX.OBS   ❾
>SET /UIC=[1,24]
>PIP /NV=[11,10]RSXBLD.CMD
>REM PIP
>;
>* EOS * Do you want to: <CR>-continue R-repeat section P-pause [S]:
>;
>;
>; End of SYSGEN phase I at 13:08:54 on 23-MAY-79
>;     --- To continue type: @[200,200]SYSGEN2
>;
>SET /UIC=[200,200]
>@ <EOF>
>
```

Notes:

1 This is the display from the hardware boot of the [1,50] unmapped system prior to SYSGEN.

2 This is the software boot of the [1,54] mapped system.

3 Preparing for SYSGEN; remove the 8K-word indirect, install BIGIND (priority of 10 permits other tasks, for example PIP, to checkpoint AT.), install BIGMAC (increment of 50000 speeds MACRO-11 assembly operations), assign the baseline system disk to the pseudo device SY:, and initiate SYSGEN.

4 Distribution kit variance. If you are performing a SYSGEN using the dual RK05 kit or the RL01 kit, SYSGEN mounts and assigns the source disk to LB:. If you are performing a PREPGEN, you must mount and assign the source disk to LB:.

Big disk distribution kits contain the source files; the commands are omitted.

SYSGEN then installs PIP and displays the number of free disk blocks.

5 PIP command to append temporary file to the assembly prefix file. RSXMC.MAC now contains Executive options and peripheral components.

6 PIP command to copy Executive and device drivers assembly command files from [11,10] to [11,24]. SYSGEN then issues a PIP command to delete the assembly command files from [11,10] and removes PIP.

7 At this point, SYSGEN is ready to assemble the Executive. Depending on the host processor and the options you selected, Executive assembly takes anywhere from 20 minutes to 2 hours. You have two options:

A) Go have some coffee (note that if you responded B to target question 11, you will probably have some tea).

B) Read on for methods of correcting DSR space problems and some space saving tips.

If you select A, go have some coffee and read the description following note number 8.

If you select B, read the following.

During the running of RSX-11M, it is possible to exhaust dynamic memory. This can occur if a large number of tasks are installed, if many volumes are mounted, of if a number of other conditions are present. When you exhaust dynamic memory space, the problem manifests itself in the lack of response from the system. Although the system looks like it is operating successfully, it cannot accept any MCR commands or complete execution of presently running tasks because they all require dynamic memory.

Another manifestation of the problem may be I/O errors being received by tasks or failures in the Loader due to pool allocation failures. The only solution to this problem is to bootstrap the system and make more dynamic space available (SET /POOL), remove tasks, mount fewer volumes, rebuild FCP with space for more file control blocks in its partition, or rebuild the system with more dynamic memory.

The following lists potential methods of saving dynamic memory space.

By including the install, request, and remove on exit capability into a generated system, considerable dynamic memory may be saved for tasks that are initiated from a terminal. The MCR RUN command will install the tasks when needed and cause them to be removed when they exit (see the RSX-11M/M-PLUS MCR Operations Manual). Thus, task control blocks need not be permanently allocated. Typical tasks in this category are the program development and utility tasks provided with the RSX-11M system, (PIP, MAC, TKB, etc.).

The use of checkpointing and nonresident tasks, where appropriate, can reduce the number of tasks that are simultaneously in memory. This saves space in a mapped system, since fewer task headers need to be copied.

The file system ACP (F11ACP) may be built to store File Control blocks in its own task image rather than in the dynamic storage region. The more space allocated at task build time the less the demand will be on the pool. However, if the allocated space becomes used up, the overflow will use the dynamic storage region.

The directory least-recently-used table default is three 18-word file control blocks. The effect of this table is a significant increase in the speed of directory operations. If this level of performance is not required, a volume may be mounted using the /LRU keyword, thereby reducing the number of FCBs used. See the description of the Mount command in the RSX-11M/M-PLUS MCR Operations Manual.

Now go have some coffee; SYSGEN is ready to assemble the device drivers. When you return, read the description following note number 9.

⑧ At this point, SYSGEN is ready to assemble the device drivers. Read the following for the methods of correcting DSR space problems and some space saving tips.

During the running of RSX-11M, it is possible to exhaust dynamic memory. This can occur if a large number of tasks are installed, if many volumes are mounted, or if a number of other conditions are present. When you exhaust dynamic memory space, the problem manifests itself in the lack of response from the system. Although the system looks like it is operating successfully, it cannot accept any MCR commands or complete execution of presently running tasks because they all require dynamic memory.

Another manifestation of the problem may be I/O errors being received by tasks or failures in the Loader due to pool allocation failures. The only solution to this problem is to bootstrap the system and make more dynamic space available (SET /POOL), remove tasks, mount fewer volumes, rebuild FCP with space for more file control blocks in its partition, or rebuild the system with more dynamic memory.

The following lists potential methods of saving dynamic memory space.

By including the install, request, and remove on exit capability into a generated system, considerable dynamic memory may be saved for tasks that are initiated from a terminal. The MCR RUN command will install the tasks when needed and cause them to be removed when they exit (see the RSX-11M/M-PLUS MCR Operations Manual). Thus, task control blocks need not be permanently allocated. Typical tasks in this category are the program development and utility tasks provided with the RSX-11M system, (PIP, MAC, TKB, etc.).

The use of checkpointing and nonresident tasks, where appropriate, can reduce the number of tasks that are simultaneously in memory. This saves space in a mapped system, since fewer task headers need to be copied.

The file system ACP (F11ACP) may be built to store File Control blocks in its own task image rather than in the dynamic storage region. The more space allocated at task build time the less the demand will be on the pool. However, if the allocated space becomes used up, the overflow will use the dynamic storage region.

The directory least-recently-used table default is three 18-word file control blocks. The effect of this table is a significant increase in the speed of directory operations. If this level of performance is not required, a volume may be mounted using the /LRU keyword, thereby reducing the number of FCBs used.

Now read the description following note number 9.

9 At this point, SYSGEN has assembled the Executive and all selected device drivers. You have had some coffee (or tea) and read some tips on conserving DSR space. SYSGEN installs PIP to concatenate all existing object files cataloged under the UFD [11,24] into a file RSX.OBS. PIP then deletes all .OBJ files and renames RSX.OBS to RSX11M.OBJ if you are generating an RSX-11M system or to RSX11S.OBJ if you are generating an RSX-11S system.

SYSGEN then changes the UIC and creates a new version of the build command file in [1,24] for mapped systems or [1,20] for unmapped systems.

You are now ready to start SYSGEN Phase II and task build the Executive and device drivers.

CHAPTER 6

SUMMARY OF SYSGEN PHASE II QUESTIONS

SYSGEN Phase II is controlled by the command file SYSGEN2.CMD.
Initiate Phase II by typing

>@SYSGEN2

This chapter provides a summary of Phase II. Read Chapter 7 for
complete details.

6.1 SUMMARY OF SYSGEN PHASE II QUESTIONS

1. In what UIC is SGNPARM.CMD if not [current UIC]

    Enter a UIC to override the default specified in Phase I.

2. Expanded comments desired for SYSGEN Phase II

    Enter Yes for instructions during Phase II processing.

3. Is SYSGEN still running online

    Enter Yes if performing an online SYSGEN.

4. Is SYSGEN still running standalone

    Enter Yes if performing SYSGEN standalone.

5. If not in dev enter object files device when ready (ddu:)

    Enter the device that contains object files (default is
    device specified in Phase I).

6. Have you already built the libraries, the Exec, and the loadable drivers

    Enter Yes to skip Executive build and start privileged task
    build.

7. Delete (uic) to insure enough space for SYSGEN Phase II

    Enter Yes to delete mapped system if running unmapped or to
    delete unmapped system if running mapped. See Chapter 7.

8. Create ANSLIB to support Big-buffering

    Enter Yes to create ANSLIB as if ANSI magtape support was not
    included.

9. Add the lab device's Purdue ISA routines to library

    Enter Yes to include Purdue ISA routines for IC:, IS:, UD:,
    AR:, or LS: devices.

10. List Executive map

    Enter Yes to print map of Executive global symbols.

11. FCP desired (Type <ESC> for explanation) [D:MIDDLE]

    Enter the FCP you wish to include in your system. For mapped
    systems, enter NON-MULTIHEADER, SMALL, MIDDLE, LARGE, PLAS,
    or OTHER. For unmapped systems, enter NON-MULTIHEADER,
    SMALL, MIDDLE, or OTHER.

12. SYSPAR's base address in 32 word blocks

    Enter the base address of partition SYSPAR. The default is
    300 for systems that include FCPNMH and 301 if not.

13. Build the unprivileged queue manager utilities

    Enter Yes to build the nonprivileged queue manager utilities.

14. Build the task PMD

    Enter Yes to build the Post Mortem Dump task.

15. Build RMDEMO

    Enter Yes to build the system display task RMDEMO.

16. Build the non-queue manager print spooler

    Enter Yes to build the serial despooler.

17. Edit any privileged task build files

    Enter Yes to change partition statements for the privileged
    tasks.

18. Map device for privileged tasks (ddu:) [D:NL:]

    These maps are rarely needed. Enter a device specification
    if you want them.

19. Edit SYSVMR.CMD

    Enter Yes if you are generating an unmapped system. If you
    are generating a mapped system, SYSVMR.CMD typically produces
    a valid system image. See Chapter 7.

6.2 SUMMARY OF LOADABLE DRIVER BUILD PHASE

The file SGNBLDDRV.CMD controls task builder processing of loadable
drivers and user-written drivers.

During Phase II, SYSGEN calls this file to build loadable or
user-written drivers. However, you can initiate SGNBLDDRV.CMD as a
command file. If you initiate SGNBLDDRV.CMD, you must answer
questions 1-5; if SYSGEN calls the file, these parameters are known.

SUMMARY OF SYSGEN PHASE II QUESTIONS

1. Are you building drivers for a mapped system

2. Does your system include any user written drivers

3. Are you building drivers for an RSX-11S system

4. Does your system include the KMC-LP driver

5. Does your system have the full duplex terminal driver

6. Device for driver's maps

    Enter a device specification for the task builder maps of the drivers.

7. Spool maps

    Enter Yes if you want the maps spooled.

8. Does the map device have at least 120 columns

    Enter Yes for wide maps, No for narrow format maps.

9. Build all selected loadable drivers into DRVPAR

    Enter Yes to build all the drivers you selected for the system-controlled partition DRVPAR.

10. Driver 2-character device mnemonic

    Enter the 2-character device mnemonic for each loadable driver you want to build.

11. Driver partition name

    Enter the partition name for each driver specified in question 10. (Default for mapped systems is DRVPAR. Default for unmapped systems is devPAR where dev corresponds to the 2-character device mnemonic specified in question 10.)

12. devPAR's partition base address

    Enter the base address of the specified partition.

CHAPTER 7

DETAILS OF SYSGEN PHASE II

Input to SYSGEN Phase II consists of object and build files from SYSGEN Phase I. Phase II builds the user-tailored Executive, privileged tasks and, if selected, the loadable device drivers. At the completion of the task builder processing, SYSGEN Phase II attempts to define memory partitions and installs the system image on the target volume using the Virtual Monitor Console Routine (VMR).

SYSGEN Phase II requires four files: RSXBLD.CMD, RSX11M.OBJ, SGNPARM.CMD and optionally, TTDRVBLD.CMD for the full duplex terminal driver. These files must exist on the system disk. In addition, the files for the UDC, DRS/DSS11, or ICS/ICR-11 common blocks must also reside on the system disk if user tasks are going to access the device registers.

The file RSXBLD.CMD directs the Task Builder in constructing the user-tailored Executive. SYSGEN Phase I creates this file based on your responses.

The file RSX11M.OBJ is the concatenated object module file produced by PIP from the user-tailored Executive object modules following the assembly operation in Phase I.

The file SGNPARM.CMD serves as input to Phase II. This file insures that Phase II processing is compatible with the responses from Phase I.

The file TTDRVBLD.CMD directs the Task Builder in constructing the full duplex terminal driver. SYSGEN Phase I creates this file when you select the full duplex terminal driver.

Figure 7-1 shows the processing steps that take place during SYSGEN Phase II.
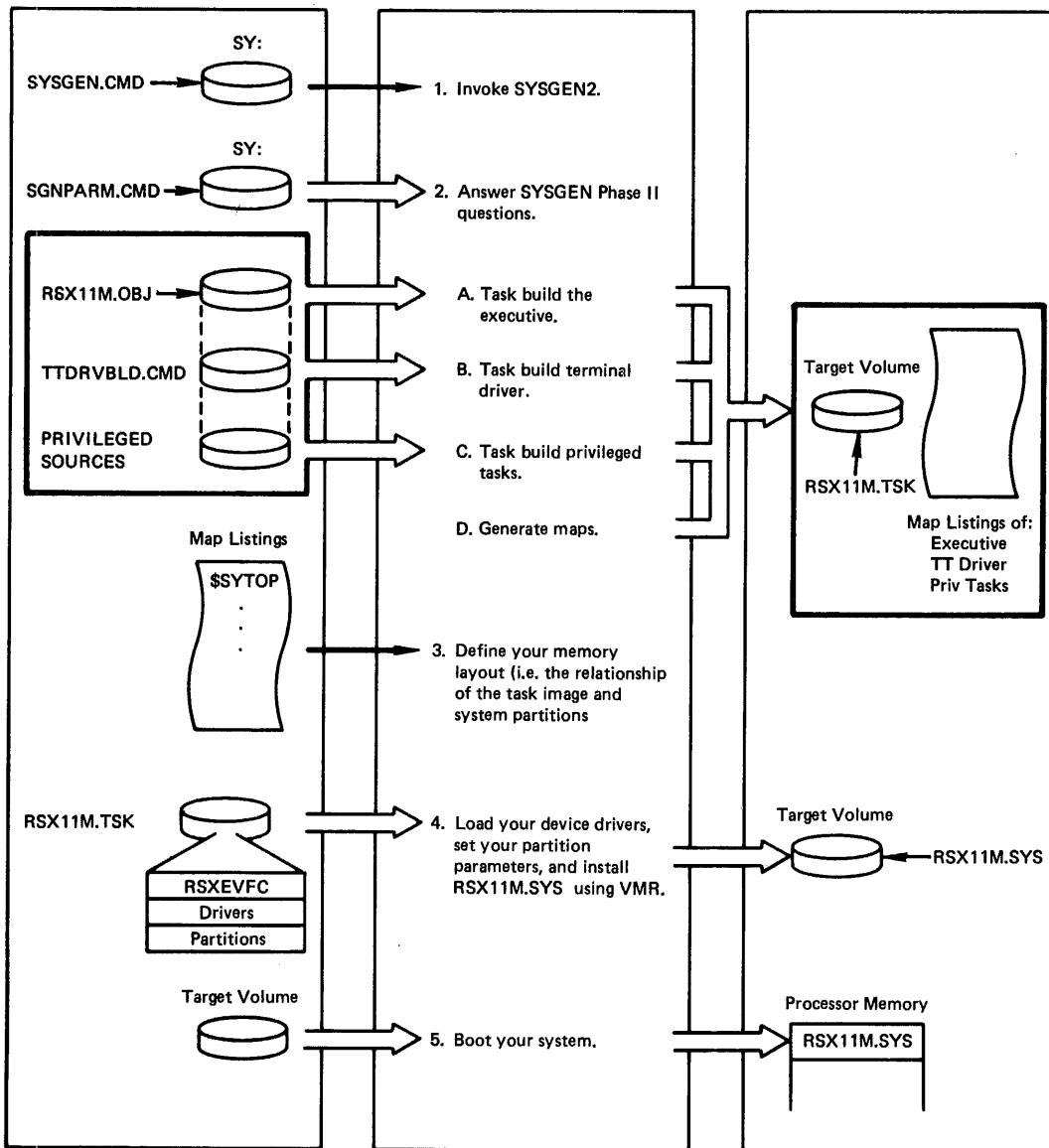
Figure 7-1   SYSGEN Phase II Processing Steps

CAUTION

It is likely that you will exhaust RL01
disk   space   on   the   mapped (MAPSRC) or
unmapped   (UNMSRC)   source   disk.   This
prevents successful completion of SYSGEN
Phase II.   Therefore, it is   recommended
that RL01 kit users delete unused driver
source files (for devices   not   included
in   the   system)   from   [11,10]   before
beginning SYSGEN.   The   following   lists
·seldom-used devices and thus the driver
source files.

Communication devices:

XBDRV.MAC	DA11-B	UNIBUS link
XLDRV.MAC	DL11-E	Serial line
XPDRV.MAC	DP11	Synchronous line
XQDRV.MAC	DQ11	Synchronous line
XUDRV.MAC	DU11	Synchronous line
XWDRV.MAC	DUP11	Synchronous line

Process I/O and Laboratory devices:

ICDRV.MAC	ICS/ICR11	Subsystems
IPDRV.MAC	IP11/IP300	Subsystems
ISDRV.MAC	DRS/DSS11	Subsystems
UDDRV.MAC	UDC11	Subsystems
LSDRV.MAC.	LPS11	Laboratory system
LADRV.MAC	LPA11	Laboratory accelerator
ARDRV.MAC	AR11	Analog module

7.1 DETAILS OF SYSGEN PHASE II

1. In what UIC is SGNPARM.CMD if not [current uic]

   The file SGNPARM.CMD contains the parameters from Phase I that are necessary in Phase II. SYSGEN Phase I creates this file in the UFD corresponding to the default UIC specified in Phase I. Enter a UIC to override the default.

2. Expanded comments desired for SYSGEN Phase II

   Enter Yes if you are unfamiliar with SYSGEN processing; comments provide instructions during Phase II processing.

3. Is SYSGEN still running online

   This question appears only if you responded No to Host question 1. In Phase I, you specified that you were performing an online SYSGEN. Enter Yes if that remains true.

4. Is SYSGEN still running stand-alone

   This question appears only if you responded Yes to Host question 1. In Phase I, you specified that you were performing a SYSGEN using the baseline system. Enter Yes if that remains true.

5. If not in dev enter object files device when ready (ddu:)

   This question appears only if you are using a dual RK05 or an RL01 distribution kit. Enter the device that contains the object files. Note that the default device is the device for the source files specified in Phase I. Enter a device specification if you have moved the disk to another drive.

   If you are using a single RL01 drive and have not copied the object files, enter No or None.

6. Have you already built the libraries, the Exec, and the loadable drivers

   Note that SYSGEN truncates this question if you did not select loadable driver support; you are not asked whether or not the drivers were previously built.

This question asks whether or not the Executive has been linked together by the Task Builder. SYSGEN Phase I does not link the Executive, it only assembles it. Therefore, the first time you encounter this question, it should be answered negatively.

Typically, before a partition can be laid out for unmapped systems, the user needs a Task Builder map of the newly built user-tailored Executive. This occurs later in SYSGEN2.CMD and may require a lengthy off-line analysis of the partition layout for the target system. After analyzing the partition layout, SYSGEN2.CMD can be re-initiated. If, at this point, an affirmative answer is typed, the process of building libraries, device drivers and user-tailored Executive is skipped, and SYSGEN2.CMD advances to the dialogue to build the privileged tasks.

If you respond Yes to this question, SYSGEN skips questions 7-10.

7. Delete (uic) to insure enough space for SYSGEN Phase II

This question appears only if you are using a dual RK05 distribution kit.

Disk space on the dual RK05 kits is critical. To avoid the possibility of running out of free disk blocks, you should enter Yes to this question (see the Caution below).

If you are generating an unmapped system and you respond Yes to this question, SYSGEN deletes the files for a mapped system (in [1,54]) from the baseline system disk (RSXM26).

If you are generating a mapped system and you respond Yes to this question, SYSGEN deletes the files for an unmapped system (in [1,50]) from the baseline system disk (RSXM26).

CAUTION

If you are generating a mapped system using an unmapped system (for example, you booted the unmapped baseline system) and you delete the unmapped system image. You have destroyed your disk. You must make another copy of the distribution kit and reboot. Likewise if you are generating an unmapped system using a mapped system image and you delete the mapped system. In other words, if you are running standalone, do not delete the running system image; generate an unmapped system using an unmapped system image and generate a mapped system using a mapped system image.

8. Create ANSLIB to support Big-buffering

If you did not select ANSI magtape support in Phase I, this question permits you to get big-buffering FCS support. When you enter Yes, SYSGEN creates ANSLIB as it would if ANSI magtape support was included.

9. Add the lab device's Purdue ISA routines to library

    This question permits you to include the Purdue ISA routines with
    IC:, IS:, UD:, AR:, or LS: devices. See the appropriate device
    documentation for more information.

10. List Executive map

    The Executive map defines the Executive global symbols and their
    locations in memory. These locations are used to layout
    partitions. If you are generating a large mapped system, the map
    is not necessary. If you are generating an unmapped system, the
    map is required so that you know where to build the drivers.

    If you respond Yes, SYSGEN prints or spools the map on the line
    printer (if the system includes one) or terminal.

11. FCP desired (Type <ESC> for explanation)

    This question appears only if you selected Files-11 support in
    Phase I.

    Mapped RSX-11M systems support five versions of the file system:

    ● 2K-word non-multiheader (disk overlayed)

    ● 2.25K-word multiheader (disk overlayed)

    ● 5K-word fast multiheader (disk overlayed)

    ● 6.5K-word optimized multiheader (disk overlayed)

    ● 10K-word resident (memory-resident overlayed)

    Unmapped RSX-11M systems support three versions of the file
    system:

    ● 2K-word non-multiheader (disk overlayed)

    ● 2.25K-word multiheader (disk overlayed)

    ● 5K-word fast multiheader (disk overlayed)

    This question permits you to select the FCP best suited to your
    application needs and memory limits.

    The non-multiheader version (FCPNMH) is the minimum size F11ACP.
    This FCP restricts files to a maximum of 26,112 blocks of 512
    bytes (no multiheader files) and does not support RMS record
    locking. Use FCPNMH with DECtapes, floppy disks, or with small
    unmapped systems; additional use in a large or multiuser system
    is not recommended. SYSGEN builds FCPNMH to run in partition
    SYSPAR, which is 10000(8) bytes long. For unmapped systems,
    SYSPAR starts at 30100(8). If you want to change partition
    parameters for FCPNMH, you must edit the build command file.
    Enter NON-MULTIHEADER to select this version. (FCPNMH is the
    default for unmapped systems.)

    The multiheader version (FCPSM0) is a full functionality and
    heavily overlayed F11ACP. Use FCPSM0 with a small memory system.
    Enter SMALL to select this version.

The fast multiheader version (FCPMD1) stores as many File Control Blocks (FCBs) as possible in its task image before overflowing into the dynamic storage region. Use FCPMD1 for applications which use the file system in a heavy open/close and read/write environment; this version treats file creates, deletes, and extends as secondary operations. Enter MIDDLE to select this version, (FCPMD1 is the default for mapped systems.)

The optimized multiheader version (FCPLG1) is a larger, less overlayed F11ACP and is not supported on unmapped systems. This version limits disk overlay activity to exception cases and file deletions. Use FCPLG1 for development systems and in applications which extensively use the file system to create and extend files. FCPLG1 is recommended for systems without strict memory limitations as well as an alternative to a memory resident structure for systems with limited memory. Enter LARGE to select this version.

The resident version (FCPRO2) is supported only on mapped systems that include Executive support for memory management directives (PLAS). This version eliminates disk overlay activity. Use FCPRO2 for development systems and other high performance systems that extensively use the file system to manipulate files. Enter PLAS to select this version.

When you select the FCP that best fits your memory limits, you can consider Task Builder options that improve FCP performance. For all versions except FCPNMH, the distribution kits include multiple build command files for the FCPs. This permits you to tailor an FCP, but does not require you to edit the build command files. To build a tailored FCP, enter OTHER in response to this question; SYSGEN will pause prior to building the privileged tasks to allow you to specify the FCP build command file that best suits your application needs. The following lists the FCP build command files and summarizes the task builder options of each.

FCPNMHBLD.CMD

    Size: 2.0K
    No task builder options

FCPSM0BLD.CMD

    Size: 2.25-2.5K
    FCBs: 0
    Shared directory buffer: 1 block

FCPSM1BLD.CMD

    Size: 2.75-3.0K
    FCBs: 32
    Shared directory buffer: 1 block

FCPMD0BLD.CMD

      Size: 3.6-4.0K
      FCBs: 0
      Shared directory buffer: 1 block

FCPMD1BLD.CMD

      Size: 5.0-5.25K
      FCBs: 32
      Separate directory buffer: 3 blocks

FCPMD2BLD.CMD

      Size: 6.1-6.4K
      FCBs: 64
      Separate directory buffer: 5 blocks

FCPLG0BLD.CMD

      Size: 4.75-5.0K
      FCBs: 0
      Shared directory buffer: 1 block

FCPLG1BLD.CMD

      Size: 6.4-6.7K
      FCBs: 32
      Separate directory buffer: 4 blocks

FCPLG2BLD.CMD

      Size: 8.3-8.6K
      FCBs: 64
      Separate directory buffer: 8 blocks
      Also includes separate buffer for index file bitmap

FCPLG3BLD.CMD

      Size: 9.6-9.9K
      FCBs: 128
      Separate directory buffer: 12 blocks
      Also includes separate buffer for index file bitmap

FCPCO0BLD.CMD

      Size: 6.0-6.25K
      FCBs: 0
      Separate directory buffer: 0 blocks

FCPRO0BLD.CMD

      Size: 6.75-7.0K
      FCBs: 0
      Separate directory buffer: 1 block

FCPRO1BLD.CMD

      Size: 8.0-8.25K
      FCBs: 32
      Separate directory buffer: 4 blocks

FCPRO2BLD.CMD

      Size: 9.8-10.1K
      FCBs: 64
      Separate directory buffer: 8 blocks
      Also includes separate buffer for index file bitmap

FCPRO3BLD.CMD

      Size: 13.0-13.25K
      FCBs: 123
      Separate directory buffer: 12 blocks
      Also includes separate buffer for index file bitmap

For systems with several high-performance disks, it is possible
to increase file system throughput by mounting each volume with a
separate F11ACP. Distinct ACPs allow a separate pool of FCBs for
each disk volume in each F11ACP partition, and allows overlapping
directory requests on each volume. The ACP default name
algorithm of the Mount command simplifies specifying separate
ACPs (see the RSX-11M/M-PLUS MCR Operations Manual). For
example, if your system includes DECtape, install a separate
version of F11ACP (the non-multiheader version, FCPNMH, is
adequate for DECtapes) with the name DT01F1, the primary default,
or DTAACP, the secondary default.

NOTE

It is recommended that file system not
share a user-partition with tasks that
perform file-structured I/O, especially
in systems with minimal user memory.
The operation of RSX-11M is heavily
dependent on the file system. Nearly
all tasks request processing from it.
Thus, for a system to operate properly,
the file system must be in a partition
where it can react promptly. Most tasks
request an I/O operation through F11ACP,
and while this I/O operation is in
progress, the tasks cannot be
checkpointed. Thus, if F11ACP is
running in the same partition, it may
not be able to be loaded into memory to
process the request and a deadlock
situation can occur.

12. SYSPAR's base address in 32 word blocks [100:1700:N]

This question appears for unmapped systems only. Note that the
default response (N) is determined by the FCP you selected (300
for FCPNMH, 301 for another FCP).

SYSGEN uses the response to this question in a nominal attempt to
ease user burden in an unmapped system generation. SYSGEN
creates a file (SYSPAR.CMD) which contains the base address and
length of parition SYSPAR. However, SYSGEN cannot determine the
exact location for partition SYSPAR. You should consult the map
of the Executive to determine where the Executive ends and thus
where to begin SYSPAR (symbol $SYTOP in the map of the Executive
is the highest Executive location).

13. Build the unprivileged queue manager utilities

The response to this question specifies whether or not the
nonprivileged queue manager utilities are built by Phase II.
Appendix D describes the queue manager.

14. Build the task PMD

The response to this question specifies whether or not the Post
Mortem Dump task is built by Phase II. The RSX-11M/M-PLUS Task
Builder Manual describes the PMD task.

15. Build RMDEMO

The response to this question specifies whether or not the RMDEMO
task is built by Phase II. Appendix B describes RMDEMO.

16. Build the non-queue manager print spooler

If you did not select support for the queue manager in Phase I,
this question permits you to build the serial despooler (V3.1
spooler).

The serial despooler prints listings simultaneously with the operation of other tasks. The MACRO-11 assembler, Task Builder, and FORTRAN compilers try to spool all listings or map files to disk. If neither the serial despooler nor the queue manager are installed, the files remain on disk. If the serial despooler is installed, it is started and thus prints any files in its receive list.

For optimum operation, the serial despooler should occupy its own 2K partition, although this is not necessary if the GEN partition is large. It can be built checkpointable or not checkpointable.

Under normal circumstances, the serial despooler deletes only a small class of files after printing. You can build a deleting serial despooler by editing the task-build command file PRTBLD.CMD; locate the line GBLPAT=PRT:$DELET and change it to read GBLPAT=PRT:$DELET:1.

You may supply an alternative file deletion algorithm and include it in task PRT. The module should define the global entry point $DELCK. The routine is called with register R0 containing the FDB of the file just printed. On return, R0 must be preserved and the processor status C-bit should be set to indicate that the file is to be deleted.

Use of this feature bypasses all of PRT's default file deletion logic. To include this module, insert it in the object library PRT.OLB, and edit the task-build command file PRTBLD.CMD, deleting the following line:

    GBLDEF=$DELCK:0

Before a file is printed, an identification page is generated. This page contains the RSX-11M version number; the date and time; and the device, UFD, and name of the file being printed. In addition, the file name is printed in large block letters for readability. Two formats are available, a large one for 132-column printers, and a smaller one for 80-column printers.

You may build PRT to omit the file identification page by modifying a global patch in the task-build command file as follows:

    *F GBLPAT=PRT:$FLAG
    GBLPAT=PRT:$FLAG:1
    *C/1/0/
    GBLPAT=PRT:$FLAG:0

Note that the value specified in the GBLPAT statement is used to determine the number of title pages printed. There are additional options for specifying flag page size and the number of trailing form feed characters to be printed. The task-build command file, PRTBLD.CMD, contains detailed commentary concerning these options.

SYSGEN then displays a list of the build files for the privileged tasks to be built and asks question 17.

17. Edit any privileged task build files

A Yes response causes SYSGEN to pause to allow selective editing
of the privileged task build command files.

For mapped systems, it is not required that you edit the task
build command files.

For unmapped systems, you may have to edit the privileged task
build command files so that the partition statements reflect
actual base addresses. All of the tasks to be built have task
build command files that specify either partition SYSPAR, GEN, or
PAR14K. You specified the base address of SYSPAR in question 12.
Thus you do not have to edit the SYSPAR partition statement.
Partition GEN is assumed to be based at 40000(8) and to be
40000(8) bytes long.   You must edit the build command files if
this assumption is inaccurate. Also, partition PAR14K is assumed
to start at 40000(8) and to be 70000(8) bytes long.

The privileged tasks must always be rebuilt when the Executive
has been rebuilt.   The privileged tasks are linked to the
Executive symbol table file and map into the Executive address
space so that they may access various system lists and data
structures. If the Executive is changed, these addresses change;
thus, the tasks have to be rebuilt.

The Line Text Editor (EDI) may be used to examine the PAR command
line in each file that may require modification. Every file in
question must be checked, since a Partitions command which does
not reflect the requirements of the user-tailored system can
produce tasks which will not run or could crash the system.

For an unmapped system, tasks built to run in SYSPAR have the
proper task builder command.   Those built to run in the GEN
partition specify

     PAR=GEN:40000:40000

For mapped systems, the respective commands are:

     PAR=SYSPAR:0:10000
     PAR=GEN:0:40000

If alteration is necessary, the change may be accomplished as
shown below.   Suppose, for example, the GEN subpartition is to
start at 50000(8). The above sequence would be changed to:

     >EDI BOOBLD.CMD
     [PAGE 1]
     *L PAR
     PAR=GEN:40000:40000
     *C/N:4/N:5
     PAR=GEN:50000:40000
     *EX
     [EXIT]

There are two versions of MCR: a single user version, MCR;   and
a multiuser version, MCRMU. The single user version processes
commands serially and runs in partition SYSPAR.   The multiuser
version consists of two tasks, MCRMU and SYS.   Task MCRMU
receives commands in serial, but passes most on to task SYS for
processing.   The   multiuser   version achieves a degree of
parallelism since multiple copies of task SYS can be running (one
for each terminal).   Task MCRMU runs in partition SYSPAR while

task SYS runs in GEN. Edit the task build command files to
change partition statements. (Note that MCRMUBLD.CMD controls
the task-build of both MCRMU and SYS.)

The default partition for TKTN is SYSPAR. Normally, you need not
edit the build command file.

The tasks BOO, DMO, AT., INI, INS, LOA, MOU, SAV, UFD, and UNL
build to run in GEN. For unmapped systems, you will have to edit
the build command files if partition GEN does not start at
40000(8).

18. Map device for privileged tasks (ddv:) [D:NL:]

Usually, these maps are of little use to the mapped system user
and are not needed. The default response directs the maps to the
null device. For an unmapped system user, the maps are of use if
you want to determine the exact size of the tasks.

If you want the maps, enter a device specification. Note that if
you enter other than LP:, SY:, LB:, TI:, or TT:, the device must
be mounted and a UFD entry of [1,30] for unmapped systems or
[1,34] for mapped systems must exist.

19. Edit SYSVMR.CMD

SYSGEN Phase II creates a file (SYSVMR.CMD) to create the
partition structure, install tasks, and load loadable drivers.

This question permits you to edit the SYSVMR.CMD file.

For mapped systems, it is not necessary to edit this file;
although it may not produce an optimal system on small
configurations. SYSVMR.CMD typically produces a valid mapped
system image. The following depicts a mapped system partition
structure that results from executing SYSVMR.CMD

| DEV common (optional) |
| GEN |
| FCPPAR (optional) |
| SYSPAR |
| DRVPAR (optional) |
| TTPAR (optional) |
| LDRPAR (optional) |
| Executive |

DETAILS OF SYSGEN PHASE II

For mapped systems, SYSVMR:

- Extends pool space to the maximum size of the Executive (either 16K or 20K). If you do not want to use the maximum amount of pool, edit SYSVMR.CMD; locate the line SET /POOL=* and change the wildcard specification to use the value of $SYTOP rounded up to the next 32-word block.

- If you selected the loadable loader, creates the partition LDRPAR and installs and fixes the loader in it.

- If you selected the full duplex terminal driver, creates partition TTPAR and loads the terminal driver into it.

- If you selected loadable drivers, creates partition DRVPAR and loads all loadable drivers built during the running of Phase II into it. If you do not want to load all drivers, edit SYSVMR.CMD; delete the load command for each driver you wish to exclude. Note that you should load the system disk driver first so that you can boot the system from an unmapped system.

NOTES

If you are restarting SYSGEN Phase II (you responded Yes to question 6), SYSGEN cannot determine which drivers were built for the system. Therefore, you must edit SYSVMR.CMD and insert the load commands for the drivers.

SYSGEN uses wildcards (*) to create DRVPAR's size as the sum total of all drivers loaded at VMR time. If you wish to allow space for other drivers, edit the partition statement and specify sufficient space.

Rather than delete command lines that load drivers that you do not need, it is suggested that you insert a semicolon (;) at the beginning of the line. (VMR treats such lines as comments.)

- Creates partition SYSPAR and, if you selected FCPNMH, installs FCPNMH into it.

- If you selected other than FCPNMH, creates partition FCPPAR and installs the FCP.

- Creates partition GEN (from end of last partition to top of memory)

- If you selected direct access to device registers for IP11/IP300, ICS/ICR, UDC11, or DSS/DRS devices, creates DEV common, which overmaps the I/O page to permit direct access to the device registers.

For unmapped systems, it is not possible for SYSVMR.CMD to create an optimal partition structure; you must edit SYSVMR.CMD. The following depicts an unmapped 16K to 24K system that results from

executing SYSVMR.CMD.   Note   that   for unmapped systems, SYSVMR
does not create driver partitions.

```
┌──────────────────────┐
│                      │
│                      │
│        devPAR        │
│                      │
│                      │
├──────────────────────┤  1000
│                      │
│         GEN          │
│                      │
├──────────────────────┤  400
│                      │
│        SYSPAR        │
│                      │
├──────────────────────┤  300,301
│                      │
│       Executive      │
│                      │
└──────────────────────┘  0
```
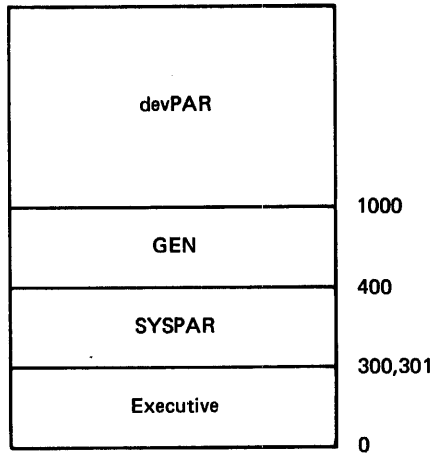
For unmapped 16K - 24K systems, SYSVMR:

- If you selected other than FCPNMH, establishes the top of
  pool and the Executive at location 30100. If you selected
  FCPNMH, establishes the top of pool and the Executive at
  location 30000.

- Creates partition SYSPAR. The base address, and thus the
  length, depends on the FCP you selected. For FCPNMH,
  SYSPAR starts at 30000 and is 10000 bytes. For other than
  FCPNMH, SYSPAR starts at 30100 and is 7700 bytes.

- Creates partition GEN and attempts to install all tasks
  into it.

The following depicts an unmapped 24K-28K system that results
from executing SYSVMR.CMD.   Note that for unmapped systems,
SYSVMR does not create driver partitions.

```
┌──────────────────────┐
│                      │
│        devPAR        │
│                      │
├──────────────────────┤
│                      │
│        FCPPAR        │
│       (optional)     │
│                      │
├──────────────────────┤  1300
│        PAR14K        │
│              ┌───────┤  1000
│              │  GEN  │
├──────────────┴───────┤  400
│                      │
│        SYSPAR        │
│                      │
├──────────────────────┤  300,301
│                      │
│       Executive      │
│                      │
└──────────────────────┘  0
```
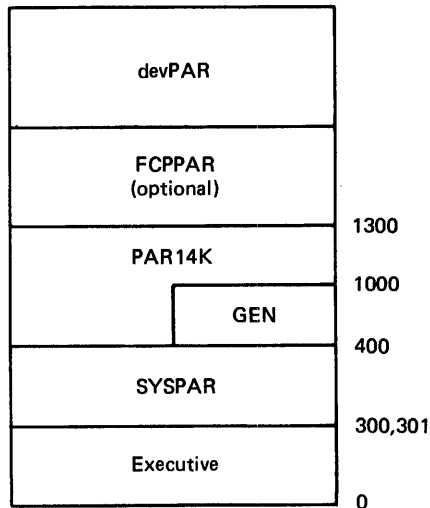
For unmapped 24K-28K systems, SYSVMR:

- Establishes the top of pool and the Executive at location 30100 for other than FCPNMH or at location 30000 for FCPNMH. Be sure that this location is above the Executive (for example, $SYTOP).

- Creates partition SYSPAR. The base address, and thus the length, depends on the FCP you selected. For FCPNMH, SYSPAR starts at 30000 and is 10000 bytes. For other than FCPNMH, SYSPAR starts at 30100 and is 7700 bytes.

- Creates partition PAR14K (base address is 40000, length is 70000 bytes) and a subpartition GEN (base address is 40000, length is 40000 bytes).

- If you selected other than FCPNMH, creates partition FCPPAR.

7.2 DETAILS OF LOADABLE DRIVER BUILD PHASE

This section provides details for SYSGEN processing of loadable driver task-build command files.

The file SGNBLDDRV.CMD controls the task building of loadable drivers and also permits incorporation of user written drivers.

This command file executes during SYSGEN Phase II when your system includes loadable drivers or if you specified that you wish to include a user written driver. Note that the file can be used by itself to aid in task building (or re-task building) drivers.

If you initiate SGNBLDDRV.CMD, you must answer questions 1-5; if SYSGEN calls the file, these parameters are known.

1. Are you building drivers for a mapped system

2. Does your system include any user written drivers

3. Are you building drivers for an RSX-11S system

4. Does your system include the KMC-LP driver

5. Does your system have the full duplex terminal driver

6. Device for driver's maps

   Unmapped systems require these maps. If you are generating an unmapped system, the default map device is SY:.

   Typically, mapped systems do not require these maps. If you are generating a mapped system, the default map device is NL:.

   NOTE

   If you want (or require) the maps and specify a device other than SY:, LP:, LB:, TT:, or TI:, SYSGEN requires that the device be mounted, ready, and that the proper UFD ([1,30] for unmapped, [1,34] for mapped) exists. Also, the driver must be loaded.

7. Spool maps

   This question does not appear if SYSGEN calls SGNBLDDRV since you specified whether or not to spool listings and driver maps in Phase I.

8. Does the map device have at least 120 columns

   This question does not appear if SYSGEN calls SGNBLDDRV since you specified whether or not the map device has 120 columns in Phase I.

   If you enter No, the task builder uses the /-WI switch to print narrow maps.

9. Build all selected loadable drivers into DRVPAR

   This question appears for mapped systems only. Normally, all loadable drivers in a mapped system are built to run in partition DRVPAR.

   If you enter Yes, SYSGEN builds all the loadable drivers you selected in Phase I for partition DRVPAR.

   If you enter No, SYSGEN prompts for the drivers you want to build (see question 10).

10. Driver 2-character device mnemonic

    This question appears for unmapped systems and all systems that include user written drivers. The question also appears if you are generating a mapped system, but do not want to build all selected drivers or if you wish to build mapped loadable drivers for other than partition DRVPAR (responded No to question 9).

    Enter the 2-character device mnemonic for each loadable driver you want to build. SYSGEN then prompts for the partition name (in question 11). When complete, enter carriage return.

11. Driver partition name

    The default for mapped systems is partition DRVPAR.

    The default for unmapped systems is partition devPAR where dev is the 2-character device mnemonic specified in question 10.

    For unmapped systems, consider building the system disk driver for the partition that corresponds to 2-character device mnemonic. This is also recommended for other drivers that run in their own partition (for example, TTPAR). A suggested partition name for less frequently used drivers is DEVPAR. You can Load a driver as you need it (after unloading other drivers).

12. devPAR's partition base address

    This question appears for unmapped systems only.

    Enter the base address of the specified partition.

7.3 DETAILS OF SYSGEN PHASE II PROCESSING

During a system generation, SYSGEN issues command lines and displays
comment lines. This section uses the console listing from the SYSGEN
described in Chapter 5 to detail and describe the command lines as
well as interpret the more obscure comment lines.

The console listing appears below. It is followed by notes which are
keyed to the listing.

```
>@SYSGEN2
>;
>; RSX-11M Version 3.2 BL26 System Generation Phase II
>;
>; Copyright (C) 1978 Digital Equipment Corporation, Maynard Mass.
>;
>; SYSGEN Phase II started at 13:10:31 on 23-MAY-79
>;
>*  1. In what UIC is SGNPARM.CMD if not [200,200] [S]:
>;
>; RL01 distribution kit SYSGEN versions 3.2.2c / 2:3.2.2c
>;
>; Continuation from SYSGEN phase I done on 23-MAY-79 at 13:08:18
>;
>*  2. Expanded comments desired for SYSGEN phase II? [Y/N]:
>*  4. Is SYSGEN still running stand-alone? [Y/N]:Y
>*  5. If not in DL1: enter object files device when ready (ddu:) [S]:
>;
>MOU DL1:MAPSRC
MOU -- OTHER VOLUME MOUNTED - DL1:  ❶
>ASN DL1:=LB:
>ASN SY:=TK:
>INS SY:$PIP
>PIP /FR


DL0: HAS 2957. BLOCKS FREE, 7283. BLOCKS USED OUT OF 10240.
LARGEST CONTIGUOUS SPACE = 2750. BLOCKS

>*  6. Have you already built the libraries, the Exec, and the loadable drivers? [Y/N]:
>;
>; Start of Executive and driver build phase at 13:11:44 on 23-MAY-79
>;
>;
>; Create system libraries
>;
>INS $LBR
>SET /UIC=[1,1]
>PIP ANSLIB.OLB/NV=SYSLIB.OLB  ❷
>LBR ANSLIB/RP=LB:FCSMTA
MODULE "ANSPAD" REPLACED

MODULE "ASSLUN" REPLACED

MODULE "BIGBUF" REPLACED

MODULE "CLOSE " REPLACED

MODULE "CREATE" REPLACED

MODULE "DIRECT" REPLACED

MODULE "GET   " REPLACED

MODULE "GETSQ " REPLACED

MODULE "OPEN  " REPLACED

MODULE "OPFID " REPLACED

MODULE "OPFNB " REPLACED

MODULE "POINT " REPLACED

MODULE "PUT   " REPLACED

MODULE "PUTSQ " REPLACED

MODULE "RDWAIT" REPLACED

MODULE "RETADR" REPLACED

MODULE "RWBLK " REPLACED

MODULE "WATSET" REPLACED

MODULE "WTWAIT" REPLACED
```

```
>SET /UIC=[1,24]
>PIP RSX11M.OLB;*/DE/NM
>LBR RSX11M/CR:80.:640.:256.=[11,24]RSX11M.OBJ   ❸
>REM PIP
>INS SY:$BIGTKB
INS -- PARTITION PAR14K NOT IN SYSTEM, DEFAULTING TO GEN
>;
>; Taskbuild the Executive
>;
>INS SY:$PIP
>PIP [1,34]*.*;*/DE/NM   ❹
>REM PIP
>TKB @RSXBLD
>;
>* EOX * Did the Executive build successfully? [Y/N]:Y
>;
>SET /UIC=[1,54]
>INS SY:$PIP        ❺
>PIP LB:/NV=RSX11M.STB
>REM PIP
>INS SY:$PIP
>* 10. List Executive map? [Y/N]:
>;
>; Build Loadable drivers
>;
>*  6. Device for driver's maps [D: NL:] [S]:
>*  9. Build all selected loadable drivers into DRVPAR? [Y/N]:Y
>;
>SET /UIC=[1,24]
>TKB @[200,200]TTDRVBLD
>PIP [200,200]TTDRVBLD.CMD;*/DE
>PIP [1,54]TTDRV.STB/TR
>TKB @[200,200]DBDRVBLD
>PIP [200,200]DBDRVBLD.CMD;*/DE
>PIP [1,54]DBDRV.STB/TR           ❻
>TKB @[200,200]DKDRVBLD
>PIP [200,200]DKDRVBLD.CMD;*/DE
>PIP [1,54]DKDRV.STB/TR
>TKB @[200,200]DLDRVBLD
>PIP [200,200]DLDRVBLD.CMD;*/DE
>PIP [1,54]DLDRV.STB/TR
>TKB @[200,200]DMDRVBLD
>PIP [200,200]DMDRVBLD.CMD;*/DE
>PIP [1,54]DMDRV.STB/TR
>TKB @[200,200]DSDRVBLD
>PIP [200,200]DSDRVBLD.CMD;*/DE
>PIP [1,54]DSDRV.STB/TR
>TKB @[200,200]DTDRVBLD
>PIP [200,200]DTDRVBLD.CMD;*/DE
>PIP [1,54]DTDRV.STB/TR
>TKB @[200,200]DXDRVBLD
>PIP [200,200]DXDRVBLD.CMD;*/DE
>PIP [1,54]DXDRV.STB/TR
>TKB @[200,200]LPDRVBLD
>PIP [200,200]LPDRVBLD.CMD;*/DE
>PIP [1,54]LPDRV.STB/TR
>TKB @[200,200]MMDRVBLD
>PIP [200,200]MMDRVBLD.CMD;*/DE
>PIP [1,54]MMDRV.STB/TR
>;
>; End of library, Executive and driver build phase at 13:25:50 on 23-MAY-79
>;
>; Task Build the privileged tasks
>;
>* 11. FCP desired  (Type <ESC> for explanation)  [D: MIDDLE] [S]:
>* 13. Build the unprivileged queue manager utilities? [Y/N]:Y
>* 14. Build the task PMD? [Y/N]:Y
>* 15. Build RMDEMO? [Y/N]:Y
>* 17. Edit any privileged task build files? [Y/N]:
>* 18. Map device for privileged tasks (ddu:) [D: NL:] [S]:
```

```
>;
>ASN NL:=MP:
>ASN LB:=SY:
>ASN =LB:
>ASN =SY:
>ASN DL1:=SY:
>ASN DL0:=LB:
>TKB @BOOBLD
>TKB @DMOBLD
>TKB @FCPMD1BLD
>TKB @INDBLD      ! GENERATING SMALL INDIRECT            ❼
>TKB @INIBLD
>TKB @INSBLD
>TKB @MCRMUBLD
>TKB @MOUBLD
>TKB @QMGBLD
>TKB @QMGCLIBLD
>TKB @QMGPRTBLD
>TKB @LPPBLD
>TKB @F11MSGBLD
>TKB @MTABLD
>TKB @SAVBLD
>TKB @TKNBLD
>TKB @UFDBLD
>TKB @LOABLD
>TKB @UNLBLD
>TKB @PMDBLD
>TKB @RMDBLD
>TKB @SHFBLD
>TKB @ACNTBLD
>TKB @BYEBLD
>TKB @HELBLD
>TKB @BROBLD
>TKB @SHUTUPBLD
>TKB @ACSBLD
>TKB @ERFBLD
>TKB @ERLBLD
>;
>* EOX * Did the priviledged tasks build successfully? [Y/N]:Y
>;
>REM TKB
>ASN LB:=SY:
>ASN =LB:
>ASN =SY:                   ❽
>ASN DL0:=SY:
>ASN DL1:=LB:
>SET /UIC=[1,54]
>PIP /FR

DL0: HAS 1253. BLOCKS FREE, 8987. BLOCKS USED OUT OF 10240.
LARGEST CONTIGUOUS SPACE = 1017. BLOCKS

>;
>;      SGN -- SYSGEN will now pause to allow you to create your
>;             RSX11M.SYS file using the following example.  Ideally
>;             your system it should occupy the same number of blocks
>;             as indicated in the example.
>;
>;             PIP RSX11M.SYS/NV/CO/BL:498.=RSX11M.TSK

AT. -- PAUSING. TO CONTINUE TYPE "RES ...AT."        ❾
PIP RSX11M.SYS/NV/CO/BL:498.=RSX11M.TSK
>RES ...AT.

AT. -- CONTINUING
>
>REM PIP
>;
>* 19. Edit SYSVMR.CMD? [Y/N]:
>;
>INS SY:$BOO;-1
>INS $VMR;-1                ❿
>ASN SY:=LB:
>VMR
```

```
ENTER FILENAME: @SYSVMR
VMR -- INSTALLED TASKS MAY NO LONGER FIT IN PARTITION    ⑪
SET /TOP=DRVPAR:-*
POOL=1200:5870.:05870.
LDRPAR 117734 00120000 00002400 MAIN TASK
DRVPAR 117420 00122400 00030400 MAIN SYS
       117354 00122400 00002000 SUB    DRIVER - DB:
       117254 00124400 00001100 SUB    DRIVER - DK:
       117154 00125500 00002100 SUB    DRIVER - DL:
       117054 00127600 00002500 SUB    DRIVER - DM:
       116754 00132300 00001000 SUB    DRIVER - DS:
       116654 00133300 00001100 SUB    DRIVER - DT:
       116554 00134400 00001400 SUB    DRIVER - DX:
       116454 00136000 00001100 SUB    DRIVER - LP:
       116354 00137100 00003700 SUB    DRIVER - MM:
       116254 00143000 00010000 SUB    DRIVER - TT:       ⑫
SYSPAR 115654 00153000 00010000 MAIN TASK
FCPPAR 115610 00163000 00024000 MAIN SYS
GEN    115544 00207000 03571000 MAIN SYS
...LDR 11     117634 LDRPAR 248. 00002400 LB0:-00016770 FIXED
TKTN   03.94  112344 SYSPAR 248. 00010000 LB0:-00020165
...RMD V01    114644 GEN    225. 00040000 LB0:-00021331
MTAACP 0010   114044 GEN    200. 00013500 LB0:-00021064
...DMO 22.00  114344 GEN    160. 00040000 LB0:-00017367
MCR... 02.01  113244 SYSPAR 160. 00010000 LB0:-00020241
...MOU 22.15  112744 GEN    160. 00040000 LB0:-00020202
...MCR 01     112444 GEN    160. 00020000 LB0:-00020400
F11ACP M0320  115444 FCPPAR 149. 00024000 LB0:-00017605
PMD... 05     113444 GEN    140. 00020000 LB0:-00021444
SHF... 04     112544 SYSPAR 105. 00010000 LB0:-00020304
...INS 04     113544 GEN    100. 00040000 LB0:-00017657
...SAV 04.22  112644 GEN    100. 00040000 LB0:-00021233
...UFD V0410  112244 GEN    100. 00040000 LB0:-00020265
QMG... 01.04  115344 GEN     75. 00040000 LB0:-00020575
PRT... 01.01  115044 GEN     70. 00001100 LB0:-00020147
LPP0   01.06  114744 GEN     70. 00040000 LB0:-00021000
...AT. 04.25  113744 GEN     65. 00040000 LB0:-00020001
...ERF 02     114244 GEN     61. 00040000 LB0:-00020175
...INI 20.01  113644 GEN     60. 00040000 LB0:-00020105
...QUE 1.0    115244 GEN     50. 00040000 LB0:-00020650
...PRI 1.0    115144 GEN     50. 00040000 LB0:-00020650
...ACS 01     114544 GEN     50. 00040000 LB0:-00020323
...BOO 03.4   114444 GEN     50. 00040000 LB0:-00017451
ERRLOG 02     114144 GEN     50. 00040000 LB0:-00021727
...LOA 03.3   113344 GEN     50. 00040000 LB0:-00021274
...HEL 01.24  113144 GEN     50. 00037000 LB0:-00021635
...BYE 02.1   113044 GEN     50. 00003700 LB0:-00020310
...UNL 02.8   112144 GEN     50. 00040000 LB0:-00020544
LP0:    LOADED
DB0:    LOADED
DB1:    LOADED
DB2:    LOADED
DB3:    LOADED
DK0:    LOADED
DK1:    LOADED
DK2:    LOADED
DK3:    LOADED
DL0:    LOADED
DL1:    LOADED
DM0:    LOADED
DM1:    LOADED
DS0:    LOADED
DS1:    LOADED
DT0:    LOADED
DT1:    LOADED
DX0:    LOADED
DX1:    LOADED
MM0:    LOADED
MM1:    LOADED
TT0:    LOADED
TT1:    LOADED
TT2:    LOADED
TT3:    LOADED
TT4:    LOADED
```

```
TT5:     LOADED
TT6:     LOADED
TT7:     LOADED
TT10:     LOADED
TT11:     LOADED
TT12:     LOADED
TT13:     LOADED
TT14:     LOADED
TT15:     LOADED
TT16:     LOADED
TT17:     LOADED
TT20:     LOADED
TT21:     LOADED
TT22:     LOADED
TT23:     LOADED
TT24:     LOADED
TT25:     LOADED
TT26:     LOADED
TT27:     LOADED
TT30:     LOADED
TT31:     LOADED
TT32:     LOADED
TT33:     LOADED
TT34:     LOADED
TT35:     LOADED
TT36:     LOADED
TT37:     LOADED
TT40:     LOADED
TT41:     LOADED
TT42:     LOADED
TT43:     LOADED
TT44:     LOADED
TT45:     LOADED
TT46:     LOADED
TIO:
COO:  TTO:
CLO:  TTO:
LBO:  DBO:
SYO:  DBO:
VMR>^Z

>;
>;      When the indirect file exits, boot in your target system,
>;      set the date and time, and save the system with a bootstrap.
>;      When your system reboots itself, purge the old task files.
>;
>;
>;      An alternate version of SYSLIB called ANSLIB has been created
>;      on the RSXM26 disk to take into account ANSI support and Bis-buffering.
>;
>;      Since you have selected ANSI magtape support you may want to
>;      rebuild PIP and other utilities in SYSGEN phase III to take
>;      advantage of ANSI support.  Note this will cause an increase
>;      in the size of the utility compared with the non-ANSI version.
>;
>;      Don't forget to create accounts after saving your system
>REM LBR
>ASN =LB:
>;
>; End of SYSGEN phase II at 14:36:36 on 23-MAY-79
>;
>@ <EOF>
>
```

NOTES

❶ SYSGEN mounts the mapped source disk, establishes logical assignments, and issues a PIP command to display the amount of free disk space.

❷ This section creates the system libraries and uses the librarian (LBR) to replace modules with their ANSI equivalents.

❸ The old libraries are deleted and then SYSGEN invokes LBR to create the Executive libraries.

❹ SYSGEN deletes the task build maps.

❺ SYSGEN creates a new symbol table (.STB) file (the baseline system STB file is no longer needed).

❻ This section builds the loadable drivers. Note that SYSGEN deletes unnecessary driver build command files after the task build completes and truncates the STB files.

❼ This section builds the privileged tasks. Note that SYSGEN builds the small version of the indirect command file processor. If you want to build the larger version of AT., you must do so manually.

For mapped systems, build the 12K-word version from [1,24] (BIGINDBLD.CMD) to gain symbol table space.

For unmapped systems, built the 14K-word version from [1,20] (BIGINDBLD.CMD) to gain symbol table space.

❽ SYSGEN swaps the logical assignments of the pseudo devices SY: and LB: and issues a PIP command to display free disk space.

❾ Kit variance. For RL01 and dual RK05 kit users, you must create the file RSX11M.SYS based on the example. For big disk kit users, SYSGEN creates this file.

❿ SYSGEN installs Boot and VMR and then establishes logical assignments for VMR.

⓫ This is a VMR warning message only. The message results from the VMR command that contracts the driver partition (SET /TOP=DRVPAR:-*).

⓬ The command file SYSVMR loads drivers, installs tasks and issues the following display commands:

    SET /POOL
    PAR
    TAS
    DEV

VMR then prompts to allow users to issue further commands or to exit.

At this point, the system generation process is complete. The RSXM26 disk contains a tailored and bootable RSX-11M version 3.2 system image. The following console display confirms it.

```
>INS $BOO
>MOU DL:RSXM26
>BOO DL:[1,54]

   RSX-11M V3.2 BL26    512K    MAPPED
>RED DL:=SY:
>RED DL:=LB:
>MOU DL:RSXM26
>@DL:[1,2]STARTUP
>* PLEASE ENTER TIME AND DATE (HR:MN DD-MMM-YY) [S]: 12:00 6-JUN-79
>TIM 12:00 6-JUN-79
>* ENTER LINE WIDTH OF THIS TERMINAL [D D:132.]:
>SET /BUF=TI:132.
>ACS SY:/BLKS=512.
>;
>; NOTE - The Baseline INDirect must be replaced by BIGIND with
>;      a priority of 10. for SYSGEN.
>;
>;  ie  >REM ...AT.
>;      >INS $BIGIND/PRI=10.
>;
>@ <EOF>
>
>TIM,\,
12:00:25 06-JUN-79
>;IT SEEMS OK
>DEV
LP0: OFFLINE LOADED
DB0: LOADED TYPE=RP06
DB1: LOADED TYPE=RP06
DB2: LOADED TYPE=RP04
DB3: LOADED TYPE=RP04
DK0: LOADED
DK1: LOADED
DK2: LOADED
DK3: LOADED
DL0: PUBLIC MOUNTED LOADED LABEL=RSXM26 TYPE=RL01
DL1: LOADED TYPE=RL01
DM0: LOADED TYPE=RK06
DM1: LOADED TYPE=RK06
DS0: LOADED TYPE=RS04
DS1: LOADED TYPE=RS04
DT0: LOADED
DT1: LOADED
DX0: LOADED
DX1: LOADED
MM0: LOADED
MM1: LOADED
TT0: [,] - LOGGED ON  LOADED
TT1: LOADED
TT2: LOADED
TT3: LOADED
TT4: LOADED
TT5: LOADED
TT6: LOADED
TT7: LOADED
TT10: LOADED
TT11: LOADED
TT12: LOADED
TT13: LOADED
TT14: LOADED
TT15: LOADED
TT16: LOADED
TT17: LOADED
```

```
TT20: LOADED
TT21: LOADED
TT22: LOADED
TT23: LOADED
TT24: LOADED
TT25: LOADED
TT26: LOADED
TT27: LOADED
TT30: LOADED
TT31: LOADED
TT32: LOADED
TT33: LOADED
TT34: LOADED
TT35: LOADED
TT36: LOADED
TT37: LOADED
TT40: LOADED
TT41: LOADED
TT42: LOADED
TT43: LOADED
TT44: LOADED
TT45: LOADED
TT46: LOADED
TIO:
COO:      TTO:
CLO:      TTO:
LBO:      DLO:
SYO:      DLO:
>PIP [1,54]*.*/PU
MCR -- TASK NOT IN SYSTEM
>INS $PIP
>PIP [1,54]*.*/PU
PIP -- FAILED TO DELETE FILE
DLO:[1,54]BOO.TSK;1 -- PRIVILEGE VIOLATION
PIP -- FAILED TO DELETE FILE
DLO:[1,54]DMO.TSK;1 -- PRIVILEGE VIOLATION
PIP -- FAILED TO DELETE FILE
DLO:[1,54]IND.TSK;1 -- PRIVILEGE VIOLATION
PIP -- FAILED TO DELETE FILE
DLO:[1,54]INI.TSK;1 -- PRIVILEGE VIOLATION
PIP -- FAILED TO DELETE FILE
DLO:[1,54]INS.TSK;1 -- PRIVILEGE VIOLATION
PIP -- FAILED TO DELETE FILE
DLO:[1,54]LOA.TSK;1 -- PRIVILEGE VIOLATION
PIP -- FAILED TO DELETE FILE
DLO:[1,54]MOU.TSK;1 -- PRIVILEGE VIOLATION
PIP -- FAILED TO DELETE FILE
DLO:[1,54]SAV.TSK;1 -- PRIVILEGE VIOLATION
MCR>ABO PIP
P
 TASK "...PIP" TERMINATED
ABORTED VIA DIRECTIVE OR MCR
AND WITH PENDING IO REQUESTS

>
>;FORGOT TO CHANGE UIC, CAN'T DELETE FILES
>SET /UIC=[1,54]
>PIP [1,54]*.*/PU
>PIP /FR

DLO: HAS 1242. BLOCKS FREE, 8998. BLOCKS USED OUT OF 10240.
LARGEST CONTIGUOUS SPACE = 519. BLOCKS

>REM PIP
>
```
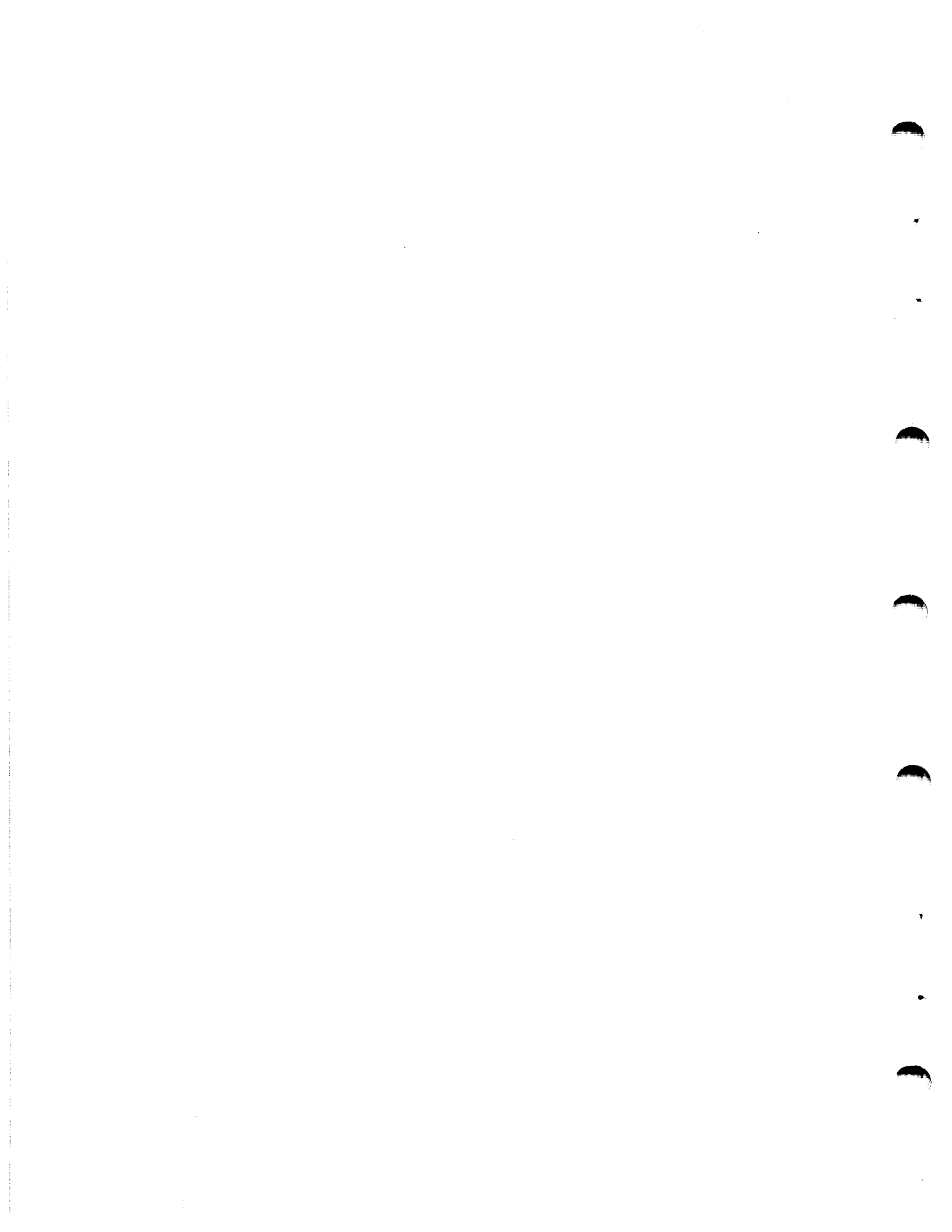
CHAPTER 8

VMR COMMANDS

The Virtual Monitor Console Routine (VMR) is an RSX-11M system program that allows complete configuration of an RSX-11M system image file for booting. As its name suggests, VMR provides the capability to execute Monitor Console Routine (MCR) commands that are directed to the disk image of a system.

VMR supports a compatible subset of the MCR commands described in the RSX-11M/M-PLUS MCR Operations Manual. All VMR commands have the same syntax and semantics as their MCR counterparts with the one exception of the SAVE command.

8.1 STARTING VMR

You can start VMR four ways. The first three methods apply when you have installed VMR and it is ready to be executed. The fourth method installs VMR automatically, executes it, and then removes it on exit.

Method 1:

>VMR @indirect

The system loads VMR and executes the specified indirect command file; VMR then exits.

Method 2:

>VMR

The system loads VMR, and VMR responds with the following prompt:

ENTER FILENAME:

Method 3:

>RUN VMR

The system loads VMR, and VMR responds with the following prompt:

ENTER FILENAME:

Method 4:

>RUN $VMR

The system installs VMR from the pseudo device LB: under the system UIC (normally, [1,50] or [1,54]) and loads it; VMR then responds with the following prompt:

ENTER FILENAME:

In all starting methods except method 1, VMR prompts with:

    ENTER FILENAME:

At this point, you specify the file that contains the image of the RSX-11M system you want to modify. VMR expects to find a symbol table file of the same name as the system image file, but with a file extension of .STB, on the same device and under the same UFD as the system image file (except when you use the /IM switch; see Section 8.2). For example, suppose you enter the following file specifier in response to the prompt:

    RSX11S.SYS

A corresponding file, RSX11S.STB, must exist that contains the symbol definitions for the RSX11S.SYS system image. Note that the pseudo devices LB: and SY: on the running system must refer to the disk containing the system image file.

The system image and symbol table files are in the standard format produced by the RSX-11M Task Builder.

Upon receiving a valid file specifier, VMR opens and reads the symbol table file; it also opens the system image file and verifies that the file is actually a system image. VMR then prompts with

    VMR>

You can now enter any valid VMR command or end VMR by typing CTRL/Z.[1]

If you used method 1 to start VMR, the specified file contains a series of commands to be executed by VMR. The first record in the file must contain a file specifier for the system image file that is to be modified.

In addition to specifying an indirect file to start VMR, you can also enter the following any time that VMR prompts for input:

    @filespecifier

This directs VMR to extract input from the specified file until it reaches an end-of-file and to return to the terminal for further input. This feature of VMR is useful when you want to repeat a series of commands for several generated systems (INSTALL commands, for example).

8.2 VMR FILE SPECIFIERS

File specifiers accepted by VMR are in the standard RSX-11M format:

    dev:[g,m]filename.type;ver[/IM]

---

[1] CTRL/Z is typed by simultaneously depressing the CTRL and Z keys.

Parameters

dev:

> The device unit on which the volume containing the desired file
> is mounted (for example, DK0 or DT1). The name consists of 2
> ASCII characters, followed by an optional 1- or 2-digit octal
> unit number. The default device is SY0.

[g,m]

> The User File Directory (UFD), consisting of a group number and a
> member number. The default is the UFD that corresponds to the
> UIC under which VMR is running.

filename

> The name of the file. An RSX-11M file name can be up to 9
> alphanumeric characters long. The file name and file type are
> always separated by a period (.). You must specify a file name;
> no default is applied.

typ

> The file type, consisting of up to 3 alphanumeric characters.
> The defaults are SYS for system image files and CMD for indirect
> command files.

ver

> The version number in the range of 0 through 77777(8). The
> default is the highest version.

/IM

> A switch option that, when attached to the system image file
> specification and used with the SAVE command, overrides the VMR
> requirement for the symbol table file.
>
> This is the only switch provided with VMR. You use it to write
> non-RSX-11M system images to secondary media in bootstrappable
> format.
>
> When you use the IM switch with the file specification, the only
> command VMR will accept is the SAVE command. This switch is
> useful when you use an RSX-11M system as a host system to develop
> and create small, main memory resident systems that must be
> loaded from a serial medium (such as paper tape).

8.3 COMMAND SYNTAX

You do not have to type an entire command name to VMR. VMR accepts
the first three characters of a command and then searches for a blank
or tab followed by the command parameters or by a carriage return if
there are no parameters. Because a blank or a tab is required before
parameters, VMR does not allow embedded blanks in a command name. If
you enter a command incorrectly, VMR displays an error message at your
terminal.

The following example illustrates the TIME command. Note that the square brackets in the example indicate that the "E" is optional:

```
VMR>TIM[E] <CR>
14:00:04 21-MAY-79
```

8.3.1 Keywords

Some commands use keywords that generally apply to a command argument. A keyword consists of a slash (/), followed by an ASCII identification, and optionally followed by an equal sign (=) and the value of the keyword, as follows:

```
/keyword=value
```

You can enter keywords in any order. As an example of keyword usage, the INSTALL command requires a file name argument specifying the task to be installed. You can append keywords to the file name. One such keyword, /TASK, specifies the name under which the task is to be installed.

```
VMR>INS BOB.TSK/TASK=AMBER
```

This command causes the task contained in the file named BOB.TSK to be installed with a name of AMBER. Keywords are command specific and are defined with each command.

8.3.2 Comments

VMR treats a line of text as a comment if the first character in the line is a semicolon (;). In addition, you can use the exclamation mark (!) to delimit comments in a command. The first exclamation mark starts the comment and the next exclamation mark or end of line terminates the comment. VMR ignores all text between the two exclamation marks. For example:

```
VMR>;  THIS LINE IS A COMMENT

VMR>TAS !THIS IS A COMMENT STRING!
```

Comments are especially useful to clarify commands in VMR indirect command files. (Refer to the RSX-11M/M-PLUS MCR Operations Manual for further information about indirect command files.)

8.4 COMMAND SUMMARY

The VMR commands described in this chapter are listed below by category. This command summary provides a compact overview of the facilities available through VMR. The detailed descriptions of the VMR commands given in Section 8.5 are presented in alphabetical order.

Initialization Commands

ASSIGN   Define or delete a global logical device assignment. List current assignments on console terminal.

INSTALL   Install a task into the system image.

LOAD   Load a device driver.

REDIRECT   Redirect all I/O requests from one physical device to
                    another.

SAVE   Write the system image of memory onto a secondary
                    media in bootstrappable format.

SET   Set system and terminal characteristics; define
                    partitions; display terminal and partition
                    characteristics on entering terminal.

TIME   Enter time and/or date into the system image; display
                    the time and date on entering terminal.

UNLOAD   Unload a device driver.

Informational Commands

DEVICES   Display on the entering terminal a list of peripheral
                    devices defined in the system image.

LUNS   Display on the entering terminal the list of LUN
                    assignments for an indicated task.

PARTITIONS   Display on the entering terminal the list of
                    partitions defined in the system image.

TASKLIST   Display on the entering terminal a list of all tasks
                    installed in the system image.

Task Control Commands

ALTER   Alter the priority of a task.

CANCEL   Cancel the time-based initiation requests for a task.

FIX   Fix a task in system image.

REASSIGN   Change a task's LUN assignment.

REMOVE   Remove a task from the system image.

RUN   Schedule a task's activation. The task may run after
                    one clock tick, after a delay, or in synchronization
                    with the system clock. Periodic rescheduling is
                    optional.

UNFIX   Unfix a task from the system image.

8.5 VMR COMMAND DESCRIPTIONS

The following subheadings are used in the detailed command
descriptions in this section. Subheadings that do not apply to a
particular command are omitted from the command description.

COMMAND NAME

This subheading consists of the command name in capital letters. The
minimal VMR command acronym is shown on the right margin. The text
following the name describes the command's function.

Format

   The command format is given, and all parameters are described.

Parameters

   Parameters are listed and described.

Examples

   Examples of using the command are shown.

Notes

   A list of special considerations that may assist you in using the
   command properly appears under this subheading.

ALT

ALTER

Use the ALTER command to change the static priority of an installed task.

Format

ALT[ER] taskname /PRI=priority

Parameters

taskname

The name of the task whose priority is to be altered.

/PRI

The keyword that changes the task's static priority.

priority

The new priority to be assigned to the specified task, from 1 to 250 (decimal).

Example

>ALT TEST /PRI=248.

Alter the static priority of task TEST TO 248(10).

ASN

ASSIGN

Use the ASSIGN command to define, delete, or display logical-device assignments. Logical-device assignments are a way to associate logical names with physical devices, pseudo devices, or other logical devices. When you assign a logical name to a pseudo or logical device, the system resolves the assignment to the associated physical device. There are three types of logical-device assignment: global, local, and login. VMR supports the manipulation of global assignments only. See the RSX-11M/M-PLUS MCR Operations Manual for additional information on local and login assignments.

The manipulation of global assignments applies to all tasks in the running system.

A logical-device name has the same syntax as a physical device unit. It consists of a 2-character ASCII name (alphabetic) and an optional 1- or 2-digit octal unit number, followed by a colon (:). The 2-character name can either be equivalent to a standard RSX-11M device name (for example, DK:) or two letters picked at random (for example, XY:).

When you install a task, or the system executes an ASSIGN LUN directive, the system scans the logical device table before it scans the physical device table when it searches for a specified device. As a result, you can define logical device names that are identical to physical device names even though the logical and physical device names do not refer to the same physical device. The system resolves a specified device name to the first matching table entry found. If a logical device name is identical to a physical device name, the logical name has precedence.

Formats

ASN ppnn:=llnn:/GBL

Define a global assignment that associates the logical name llnn; with device ppnn:.

ASN /GBL

Display all global assignments for the system.

ASN =[llnn:]/GBL

Delete the specified global logical-device assignment or all global assignments if the command omits llnn:.

Parameters

pp

A physical, logical, or pseudo device name.

nn

    A unit number.

ll

    A logical device name.

Examples

VMR>ASN	DK:=GB0:/GBL	!Define global logical device !name
VMR>ASN GB0:	/GBL DK0: GLOBAL	!List all assignments
VMR>ASN	=/GBL	!Delete all global assignments

CAN

CANCEL

Use the CANCEL command to cancel time-based initiation requests for a task. These requests result from the RUN$ directive or any of the time-synchronized variations of the VMR RUN command.

CANCEL does not affect the execution of the task that may be active in the saved system image. It removes only the time-based schedule requests still in the clock queue.

Format

      CAN[CEL] taskname

Parameter

taskname

      The name of the task whose time-base initiation request is to be canceled.

Example

      VMR>CAN XKE

      Cancel all periodic rescheduling and time-based initiation requests for task XKE.

DEVICES

Use the DEVICES command to display on the entering terminal the symbolic names of all device-units or, optionally, all of a particular device type defined in the system image. The device names appear in a single vertical column. A second column contains any additional information about each device.

Formats

DEV[ICES]

DEV[ICES] dd:

Parameter

dd:

The particular device type to be displayed.

Examples

```
VMR>DEV
DB0:      LOADED
DB1:      LOADED
DB2:      LOADED
DB3:      OFFLINE LOADED
DK0:      LOADED
DK1;      LOADED
DK2:      LOADED
DS0:
DS1:
DT0:      LOADED
DT1:      LOADED
LP0:      LOADED
MM0:      LOADED
MM1:      LOADED
PP0:      UNLOADED
PR0:      UNLOADED
TT0:
TT1:
TT2:
TT3:
TT4:
CO0:      TT0:
CL0:      LP0:
SY0:      DB0:
LB0:      DB0:
VMR>DEV DK:
DK0:      LOADED
DK1:
DK2:
```

The following list describes the messages that can appear in the second column. More than one message can appear on the same line.

- OFFLINE indicates that, although the system tables contain entries for this device, the system as saved did not contain the related device.

- LOADED indicates that the driver for the device is loadable and is currently loaded.

- UNLOADED indicates that the driver for the device is loadable and is currently not loaded.

- A device name in the second column is the device to which the corresponding device in the first column has been redirected.

- Absence of either LOADED or UNLOADED in the second column indicates that the driver is permanently resident; it is linked to a part of the Executive.

FIX

FIX-IN-MEMORY

Use the FIX-IN-MEMORY command to load a task into its partition in the system image. The system can service requests for running the task more quickly because the task is memory-resident and does not have to be loaded from the disk before it can run. VMR can fix a task in the system image only if the partition in which it is to be fixed is available. On RSX-11S systems, all installed tasks must be fixed since they cannot be loaded into the running RSX-11S system.

Fixed tasks remain in memory even after they exit. Therefore, they do not have to be reloaded when a request is made to run them. (Note that re-executing fixed tasks is not always practical.) Only an UNFIX or REMOVE command can free the occupied partition.

The following restrictions apply to the fixing of tasks:

● Checkpointable tasks cannot be fixed,

● Active tasks cannot be fixed,

● A task must be installed before it can be fixed,

● A task can only be fixed in a task partition, and not in system-controlled partitions.

Format

    FIX taskname

Parameter

taskname

    The task that you wish to fix in memory.

Example

    VMR>FIX XKE

Fix task XKE in its partition.

INS

INSTALL

Use the INSTALL command to make a specified task known in the system image, or to load a common into a common partition. An installed task is dormant until the Executive receives a request for it to run. The optional keywords either provide parameters that were not specified at task build or override parameters that were.

When a task is installed, VMR creates a Task Control Block (TCB) for the task in a system image table called the System Task Directory (STD). The task parameters contained in the TCB enable the system to run the task when requested to do so by an MCR command, VMR command, or a system directive. A task cannot be run until you install it.

A task's TCB contains the address of the load-device Unit Control Block (UCB) and the Logical Block Number (LBN) of the task image file. The Executive can therefore load the task image in one transfer when an MCR command or system directive requests an installed task. (Loading requires more than one transfer if the task is greater than 32K words.)

When VMR installs a task in a virgin system, it stores the task's logical block numbers in the task header. When you save a system, the SAVE command places the file identification, rather than the file's LBN, in the TCB. Then, when the system is rebooted, it reopens the task file and stores the task's new LBN in its TCB. If a task has been deleted, the system cannot open the task file when the system is rebooted. The system then automatically removes the task's TCB from the STD. When VMR installs a task in a saved system image, it stores the task's file identification, rather than the LBN, in the TCB to allow a reboot to occur successfully.

Also a saved system does not retain the physical addresses of installed tasks. The Disk Save and Compress (DSC) utility can compress and copy a disk containing a saved system, thus moving the task files to different physical locations. But because the TCB entries contain task file identifications, rather than LBNs, after a system save, the system can function normally when it is rebooted.

Format

        INS[TALL] filespec [/keyword] [/keyword] ...

Parameters

filespec

        A task image file specifier in the form:

                dev:[group,member]filename.type;version

        The type defaults to TSK. Standard defaults apply to the remaining fields.

keyword

One of the keywords listed below:

/CKP=option

/INC=size

/PAR=pname   /SLV=option

/PMD=option   /TASK=taskname

/PRI=number   /UIC=[group,member]

/PRO=[system,owner,group,world]

Keywords

/CKP=option

The option is yes or no. If CKP=YES (default for checkpointable tasks), checkpointing is enabled for the task.   If CKP=NO, checkpointing is disabled for the task.

The /CKP keyword overrides the /CP switch specified at task build.

On systems that support the dynamic allocation of checkpoint space, the task image file does not need to contain allocated checkpoint space. The presence of the /CKP=YES keyword instructs the system to allocate checkpoint space for the task when required from a checkpoint file.

/INC=size

The size is the number of additional words of address space to be allocated to a task. The extension size is usually expressed in octal but may also be expressed in decimal by appending a period. This keyword overrides the Task Builder's EXTTSK or PAR option keyword. Tasks such as MACRO-11, TKB, PIP, VFY, and AT. use the space from the end of the task image to the end of their address space as dynamic memory in which to allocate symbol tables and buffers.   The INC keyword defines the number of words in this dynamic region. The default size is the size specified at task-build time, or, if none specified at task build, zero.

/PAR=pname

A partition name that overrides the partition specified at task-build time.

If the keyword specifies a nonexistent partition, VMR issues a warning message and attempts to install the task in the GEN partition.

Default: TKB uses the name GEN.

/PMD=option

> The option is yes or no. If PMD=YES, the system will perform a post-mortem dump of the task if it aborts the task because of an SST error condition. If PMD=NO (the default from a task-build), the system will not perform a dump at SST abort time.
>
> To generate a dump, you must install the post-morem dump task PMD... in the system.
>
> This keyword overrides the Task Builder's /PM switch.   The default is specified at task-build time.

/PRI=number

> The number is the priority at which the task is to be installed. The value range is 1 through 250(10). Standard RSX-11M number conventions apply to this parameter. The default is PRI=50.

/PRO=[system,owner,group,world]

> The PRO keyword establishes a protection mask for a common.   The user groups are defined as:
>
> - System – All system tasks running under a UIC group number less than or equal to 10(8).
>
> - Owner – Tasks that run under the same UIC as the files owner.
>
> - Group – Any task that is running under the same UIC group as the file's owner.
>
> - World – Any task that does not fit in one of the above categories.
>
> The PRO keyword establishes the access rights for each group. The four types of access are:
>
> - Read
>
> - Write
>
> - Extend
>
> - Delete
>
> For example:
>
> INS COM/PRO[RWED,RWED,R,R]
>
> gives read, write, extend, and delete access to the system and owner and read access to the group and world.

/SLV=option

> The option is yes or no. If the command specifies /SLV=YES, data sent to the installed task is marked with the TI: of the sending task. When the installed task receives the data, the system sets the task's TI: to that associated with the data. This keyword overrides the Task Builder's /SL switch.
>
> If the command specifies /SLV=NO, the TI: of the task does not change when receiving data.   The default is specified at task build.

/TASK=taskname

>The name to be used to install the task. The default is the name specified at task-build time or the first 6 characters of the file name.

/UIC=[group,member]

>The square brackets are required syntax. This UIC is the default for the task. You can override it with the RUN command. The task UIC determines the file-protection class (system, owner, group, world) in which a task belongs, and thus directly influences file access. Note that file protection may differ from file to file.

>The default is from the task build. This default applies only to tasks started by a RUN$ directive or a RUN command that specifies a time delay before runtime. Tasks started by typing the name as a command (for example, PIP and TKB) run under the default UIC of the terminal from which the command was issued.

Examples

>VMR>INSTALL SCAN

Install task SCAN using the default priority and UIC.

>VMR>INSTALL DK1:[1,111]SCAN.TSK;4/PRI=103

Install task SCAN, file type TSK, version 4 from device DK1:, group number 1, member number 111, with a priority of 103(8).

>VMR>INS MAC/INC=4096./PAR=SYSCTL

Install task MAC in the partition SYSCTL and increase the task size by 4096 decimal words.

LOA

LOAD

Use the LOAD command to load a nonresident device driver into the system image. The LOAD command constructs the data base and interrupt vector linkages required to allow access to the device. This command eliminates the need to link infrequently used device drivers permanently into the Executive. (Executive support of loadable device drivers is a system generation option.)

Format

    LOA[D] dd:[/keyword=value][/keyword][/keyword]...

Parameters

dd:

    A 2-character ASCII device name.

keyword

    One of the following three- or four-letter keywords:

    /PAR=pname

    /SIZE=psize

Keywords

/PAR=pname

    The pname is a partition name. The PAR keyword is used to name the partition into which the driver is to be loaded. It overrides the partition specified at task build time.

/SIZE=psize

    The psize is partition size. The SIZE keyword is used to establish the minimum size (octal words) of the partition into which the driver is to be loaded. VMR rounds psize up to the next largest unit of 100 octal. Psize must be less then 77741.

Examples

        VMR>LOAD   MM: !LOAD TU16 DRIVER (MMDRV)

        VMR>LOA   LS:/PAR=DRVPAR !LOAD LPS11 DRIVER (LSDRV) INTO
                                   !DRVPAR

Notes

    1. Guidelines for building loadable device-driver tasks are rigidly defined. These guidelines are described in the RSX-11M Guide to Writing an I/O Driver. The system generation procedures include provisions to simplify the task building of drivers.

2. The LOAD command requires that a driver's TSK and STB files
    reside under the same UFD and on the same disk as the system
    image upon which you are working. For example, the following
    command requires that the files DTDRV.TSK and DTDRV.STB
    reside on SY: under the current UIC.

        LOA DT:

3. The LOAD command requires pool space as follows:

    a. If the driver data base is being loaded, the command
        needs pool space equal in size to the size of the data
        base.

    b. The command needs pool space for an Interrupt Control
        Block (ICB) for each interrupt entry point in the driver.

    c. The command needs pool space for a Partition Control
        Block (PCB).

LUN

LOGICAL UNIT NUMBERS

Use the LUN command to display at the entering terminal the static LUN assignments for a specified task. (Static assignments are those recorded in the task's disk-image file.) The display consists of a list of physical device units in one column, with the corresponding LUNs in an adjoining column.

Format

    LUN[S] taskname

Parameter

taskname

    The task for which the LUNs are to be displayed.

Example

        VMR>LUN XKE
        SY0: 1
        SY0: 2
        CL0: 3
        TT3: 4
        TT3: 5
        DK0: 6
        TT3: 7

    The display shows static assignments for LUNs 1 through 7 as recorded in the task-image file header; no other LUNs are statically assigned to the task XKE.

PAR

PARTITION DEFINITIONS

Use the PAR command to display on the entering terminal a description of each memory partition in the system image. The display consists of six columns that specify:

1. Partition name

2. Partition Control Block address (octal)

3. Partition base address (octal)

4. Partition size (octal)

5. The partition type and, following the partition type, the partition occupant(s) -- task, driver, common, etc.,

6. The name of partition occupant(s).

Format

    PAR[TITIONS]

Example

```
            Name      PCB      Base       Size        PAR/TASK Name

            VMR>PAR
            TTPAR    117734  00120000  00040000  MAIN    TASK
            SYSPAR   117670  00160000  00010000  MAIN    TASK
            TKNPAR   117624  00170000  00010000  MAIN    TASK
            DRVPAR   117560  00200000  00027700  MAIN    SYS
                     117340  00200000  00002000  SUB     DRIVER - DB:
                     117240  00202000  00001100  SUB     DRIVER - DK:
                     117140  00203100  00002500  SUB     DRIVER - DM:
                     117040  00205600  00002300  SUB     DRIVER - DR:
                     116740  00210100  00001000  SUB     DRIVER - DS:
                     116640  00211100  00001100  SUB     DRIVER - DT:
                     116540  00212200  00001400  SUB     DRIVER - DX:
                     116440  00213600  00002100  SUB     DRIVER - DL:
                     116340  00215700  00001300  SUB     DRIVER - LP:
                     116204  00217200  00003700  SUB     DRIVER - MM:
                     115550  00223100  00003000  SUB     DRIVER - CO:
            LDRPAR   117514  00227700  00002400  MAIN    TASK
            BASIC2   117450  00232300  00040000  MAIN    COM
            GEN      117404  00272300  00175000  MAIN    SYS
                     060400  00272300  00040000  SUB     (...SAV)
            VMR>
```

REA

REASSIGN

Use the REASSIGN command to reassign a task's Logical Unit Numbers (LUNs) from one physical device unit to another. The reassignments affect only the static assignments recorded in the task's disk image file.

The command does not affect a memory-resident task. Therefore, REASSIGN has no effect on the assignments for a task that is fixed or loaded in memory.

Format

    REA[SSIGN] taskname lun nud:

Parameters

taskname

    The name of the task for which the LUNs are to be reassigned.

lun

    The logical unit number.

nud

    The new device unit, which can be a physical, logical, or pseudo device.

Examples

        VMR>REA JOE 3 TT0:

    Reassign LUN 3 of task JOE to device TT0:.

        VMR>REA BILL 2 TT1:

    Reassign LUN 2 of task BILL to device TT1:

        VMR>REA TEST 3 XX:

    Reassign LUN 3 of task TEST to logical device XX:.

RED

REDIRECT

Use the REDIRECT command to redirect all I/O requests from one physical device-unit to another physical device-unit.

Note that an attached device and the device TI: cannot be redirected. In addition, one pseudo device cannot be redirected to another pseudo device.

Format

        RED[IRECT] nud:=old:

Parameters

nud:

        The new device unit to which requests will be redirected.

old:

        The old device unit from which requests have been directed.

Examples

        VMR>RED TT3:=TT6:

        Redirect all I/O requests for device TT6: to device TT3:.

        VMR>RED TT:=LP:

        Redirect all I/O requests for device LP0: to device TT0:.

REM

REMOVE

Use the REMOVE command to delete a task or region name from the system image. Removing a task from the system image makes the task unknown to the system. The action resulting from this command is the complement of INSTALL.

The REMOVE command cannot remove an active task from a saved system. An example of such a task is the SAVE task; an attempt to remove SAVE from a saved system results in an error. The message TASK ACTIVE is displayed.

Formats

    REM[OVE] name

Parameter

name

    The name of the task to be removed.

Example

        VMR>REM SCAN

    Remove the task named SCAN from the system image. The task-image file remains unaffected. Note that tasks installed as ...XXX can be removed by

        >REM XXX

            or

        >REM ...XXX

Notes

    1. If a task that is the object of a REMOVE command is fixed, the command automatically unfixes the task from the system image.

    2. REMOVE automatically cancels all time-based schedule requests for the specified task.

    3. You cannot remove a task if it has send or send-by-reference packets queued to it.

RUN

Use the RUN command to initiate the execution of a task. The command,
which has four formats, can cause a task to be:

- Started one clock tick after system boot

- Started at a time increment from the system image time

- Started at a time increment from clock unit synchronization

- Started at an absolute time of day

All of these options are available with or without rescheduling.

Format 1

Run one clock tick after system boot

RUN taskname [/RSI=magu][/UIC=[uic]]

Parameters

taskname

A 1- to 6-character taskname of the task that you wish the system
to run.

RSI

The reschedule interval. The format is the same as for dtime,
which is detailed below under format 2. The reschedule interval
specifies how often you want the system to rerun the task.   Each
time the interval of time you have specified lapses, the system
will make an initiation request for the task. The default is no
rescheduling.

UIC

The UIC that has the format [g,m] where g and m represent the
group and member numbers respectively. Legal group and member
numbers range from 1 through 377(8).   The square brackets are
required syntax.   This is the UIC under which the task is
requested. It determines which files the task may access.   The
default is the value established for terminal CO:.

Format 2

Run at a time increment from the system image time

RUN taskname dtime [/RSI=magu][/UIC=[uic]]

Parameters

taskname

A 1- to 6-character taskname.

dtime

> The time at which the task is initiated in time units from current system image time. It has the form:
>
> magu
>
> mag
>
> > The magnitude
>
> u
>
> > Time units specified as follows:
> >
> > T for ticks. A tick is a clock interrupt, and the rate at which interrupts occur depends on the type of clock installed in the system.
> >
> > For a line frequency clock, the tick rate is either 50 or 60 ticks per second, corresponding to the line frequency.
> >
> > For a programmable clock, a maximum of 1000 ticks per second is available. (The frequency is selected at system generation.)
> >
> > S for seconds.
> >
> > M for minutes.
> >
> > H for hours.
>
> The magnitude is the number of units to be clocked, but the magnitude value cannot exceed 24 hours in specified units.
>
> > Units = T. Any Positive value is valid (maximum of 15 bits).
> >
> > Units = S. Any Positive value is valid (maximum of 15 bits).
> >
> > Units = M. The maximum magnitude is 1440(10).
> >
> > Units = H. The maximum magnitude is 24(10).

RSI

> See format 1, above.

UIC

> See format 1, above.

Format 3

> Run at a time increment from clock unit synchronization
>
> The task start-time is determined by computing the number of ticks until the next time unit's occurrence (hour, minute, second, tick) and then adding on the number of ticks for the specified time increment to elapse.
>
> RUN taskname sync [dtime] [/RSI=magu] [/UIC=[uic]]

Parameters

taskname

    A 1- to 6-character taskname.

sync

    H = synchronize on the next hour
    M = synchronize on the next minute
    S = synchronize on the next second
    T = synchronize on the next tick

dtime

    Defined in format 2, above; dtime, if present, is added to the
    synchronization unit to produce the actual run time for running
    the task.

RSI

    See format 1, above.

UIC

    See format 1, above.

Format 4

    run at an absolute time of day

    RUN taskname atime [/RSI=magu] [/UIC=[uic]]

Parameters

taskname

    A 1- to 6-character taskname.

atime

    The absolute time of day when this task will be initiated. Input
    format is hh:mm:ss.

    hh = hours (decimal assumed)
    mm = minutes (decimal assumed), and
    ss = seconds (decimal assumed).

RSI

    See format 1, above.

UIC

    See format 1, above.

Examples

      >RUN XKE 15M

    Run task XKE 15 minutes from the current system image time.

>RUN XKE 15M/RSI=90S/UIC=[3,1]

Run task XKE 15 minutes from the current system image time, rescheduling it every 90 seconds, with a UIC of [3,1].

Note

The correct value to be inserted in the clock for forms 2 through 4 is computed from the current value of the system time stored in the system image. Thus, the system image time must be set before any RUN requests are made or they may not occur at the correct time after the system is booted.

SAVE

Use the VMR SAVE command to write the image of a system onto a sequential medium in bootstrappable format. With this command you can copy an RSX-11S or a foreign system onto a tape or a floppy disk. You can then transport the tape or floppy to another computer and bootstrap it, using a hardware bootstrap or the /BO switch in PRESRV (refer to the description of the /IM switch in Section 8.2 of this chapter).

System images created with the SAVE command on all media, except paper tape, are in a format compatible with the logical tape format in PRESRV. Thus, any of PRESRV's logical tape operations can be performed on system images created with the SAVE command. System images created by the SAVE command always start at the beginning of the medium.

On paper tape, system images are created in absolute loader format and must be bootstrapped with the absolute loader.

Format

>   SAV[E] ddnn:[label]

Parameters

ddnn:

>   The device-unit onto which the system image is to be written.
>   Valid devices are as follows.

>   CT: Tape cassette
>   DD: DECtape II
>   DT: DECtape
>   DX: Flexible diskette
>   DY: RX02 floppy disk
>   MM: TE/TU16/TU45 magtape
>   MS: TS04 magtape
>   MT: TE/TU10/TS03 magtape
>   PP: Paper tape.

label

>   The file label name that must be specified for all secondary
>   media except paper tape. It consists of from one to twelve
>   alphanumeric characters.

Example:

>   VMR>SAV MT:MYSYS

>   In this example, the system image is written onto MT: in
>   bootstrappable format. System changes, made by other VMR
>   commands, are also saved with the system image.

Notes

1. When you use the /LI command in PRESRV to list the contents of a medium (other than paper tape) that contains one or more system images created with the SAVE command, each system image causes a line to be printed which contains the following:

   a. VW (for VMR), indicated as the source device

   b. The label specified in the SAV command line

   c. A block size of 512

   d. The number of 512-byte blocks in the system image (excluding boot and label blocks)

   e. The date and time that the system was saved

2. When you save RSX-11S systems on paper tape and you do not apply the /IM switch to the system's file name, the last 1000(8) bytes of the system image are not written out. This allows space to accommodate the absolute loader. When you specify the /IM switch with the system's file name, the entire system image is written out to paper tape. In this case, it is your responsibility to ensure that the system image is not so large that it overlays the Absolute Loader.

3. When saving a system on paper tape, contiguous blocks that contain zero only and that begin on a 32-word address are compressed into a 2-word descriptor. This compression significantly reduces both the amount of paper tape required and the time expended to create the tape and to read it into memory. After the entire image has been loaded into memory, a short routine zeroes the appropriate blocks of memory before passing control to the bootstrapped system.

4. When bootstrapping systems on media other than paper tape, regardless of the size of the system image, the last 1000(8) bytes of physical memory are not copied to accommodate the bootstrap.

5. Systems saved on a TE/TU10/TS03, 9-track magtape drive can be booted from a TE/TU16 drive, and vice-versa, but not on a TS04.

6. When you specify the /IM switch with the system file specifier, the SAVE command always uses a bootstrap that does not enable memory management.

7. The maximum memory size of a mapped system is 124K words. The SAVE command imposes maximum sizes on saved images in mapped systems for certain devices. If a mapped system is saved, and its memory size is greater than the maximum size imposed by the SAVE command for the specified device, only the amount of memory equal to the maximum size (starting at physical location 0) is saved; no diagnostic message is issued. The devices for which the SAVE command imposes a maximum size on saved system images are:

   a. Paper tape punch (PP) - 28K words

   b. Flexible disk (DX) - 123K words

    c. Flexible disk (DY) in single density - 123K words

    d. Cassette tape (CT) - 28K words

8. None of the bootstraps require that the target RSX-11S system have a driver for the bootstrap device.

9. The MM: drives are forced to 800 b.p.i. before writing to the tape.

SET

SET

You can use the SET command to alter a number of system-wide characteristics. The following list describes all the available options. The text in parentheses specifies keywords associated with the options. The SET command allows you to:

- Display the status (determined by the keyword specified) for all terminals.

- Establish device characteristics for any device in the system (BUF, CRT, ESCSEQ, LA30S, LOWER, REMOTE, SPEED...,).

- Establish the default UIC for any terminal in the system (UIC).

- Establish the system UIC used by the LOAD command and the Install-Run-Remove option of the RUN command.

- Set the status of any terminal in the system (PRIV or SLAVE).

- Create partitions

- Add space to the system dynamic memory (POOL).

- Enable write check on devices that support it (WCHK).

Improper use of the SET command can result in a situation in which the system will not accept privileged operator input. The following two situations should be avoided:

- The system does not have any non-slave, privileged terminals. Non-privileged terminals cannot enter privileged commands. Slaved terminals cannot enter unsolicited input to MCR. See the description of the /SLAVE keyword below.

- The buffer length of all non-slave, privileged terminals is shorter than 14 bytes. In this case, the terminal buffer is too short to enter many important commands required to continue system operation or alter the status of other terminals. See the description of the /BUF keyword below.

A number of SET command options (CRT, ESCSEQ, LOWER, and WCHK) require Executive features that must be included at system generation. If you specify an option which has not been generated into the system image, the SET command has no effect and results in an error.

VMR permits only one keyword per command. You can prefix most keywords by NO to negate or disable the function of the keyword. Exceptions are BUF, HFILL, LINES, TERM, POOLSIZE, POOL, SPEED, UIC, and SYSUIC; VMR returns a syntax error when NO precedes one of these keywords.

Format

    SET /keyword=values

Parameter

/keyword=value

Either a device characteristics keyword or a memory allocation keyword. The device characteristics keywords are listed below:

/BUF=dev:[size]	/REMOTE[=dev:]
/CRT[=dev:]	/RPA[=dev:]
/ESCSEQ[=dev:]	/SLAVE[=dev:]
/EBC[=dev:]	/SPEED=dev:[recv:xmit]
/ECHO[=dev:]	/SYSUIC[=uic]
/FDX[=dev:]	/TERM=dev:[value]
/FORMFEED[=dev:]	/TYPEAHEAD[=dev]
/HFILL=dev:[value]	/UIC[=uic[:dev:]]
/HHT[=dev:]	/VFILL[=dev:]
/LINES=dev:[value]	WCHK[=dev:]
/LOWER[=dev:]	/WRAP[=DEV:]
/PRIV[=dev:]	

The memory allocation keywords are listed below:

BOT	POOL
PAR	POOLSIZE
NOPAR	TOP

Device Characteristics Keywords

/BUF=dev:[size].

Sets or displays the default buffer size of the specified device. If you omit the buffer size, this keyword causes the current size to be displayed. The size you specify must be greater than 0 and less than or equal to 255 decimal (for a terminal, the buffer size must be greater than or equal to two). BUF is particularly useful for defining line printer width (80 or 132 columns).

/CRT[=dev:],

The dev: is not a cathode ray tube (CRT) terminal. The CRT keyword defines the terminal as a CRT and enables the backspace deletion option. When the backspace deletion option is enabled, typing the RUBOUT or DELETE key moves the printing position one space to the left and erases any character displayed in that position.

When you omit the device specification, VMR displays all the devices that are defined as CRTs.

/NOCRT[=dev:],

    The dev: is a cathode ray tube (CTR) terminal. The NOCRT keyword deletes the CRT status of the specified device and disables the backspace deletion option.

    When you omit the device option, VMR displays all the terminals that are not defined as CRTs.

/ESCSEQ[=dev:]

    The dev: is a terminal. The ESCSEQ keyword enables the recognition of escape sequences from the specified terminal. The terminal driver treats the ESC character as the beginning of an escape sequence rather than as a line terminator. See the RSX-11M I/O Drivers Reference Manual for further information about escape sequences.

    When you omit the device specification, VMR displays all the terminals that recognize escape sequences.

/NOESCSEQ[=dev:]

    The dev: is a terminal. The NOESCSEQ keyword disables the recognition of escape sequences at the specified terminal.

    When you omit the device option, VMR displays all the terminals that do not support the recognition of escape sequences.

/EBC[=dev:],

    The dev: is a terminal. The EBC keyword enables the eight bit character option. The full duplex terminal driver will pass all 8 bits of the input characters to the specified device.

    When you omit the device specification, the system will display the devices that have the eight bit character option enabled.

/NOEBC[=dev:],

    The dev: is a terminal. The NOEBC keyword disables the eight bit character option. The full duplex terminal driver strips off the parity bits of the input characters before passing them to the device.

    When you omit the device specification, the system will display the devices that do not have the eight bit character option enabled.

/ECHO[=dev:],

    The dev: is a terminal. The ECHO keyword enables the echo option. The full duplex terminal driver will display each character that is typed on the specified device.

    When you omit the device specification, the system will display the devices that have the echo option enabled.

/NOECHO[=dev:]

    The dev: is a terminal. The NOECHO keyword disables the echo option. The full duplex terminal driver will not display the characters that are typed on the terminal.

    When you omit the device specification, the system will display the devices that have the echo option disabled.

/FDX[=dev:],

    The dev: is a terminal. The FDX keyword enbles the full duplex option. The full duplex terminal driver will accept input from the specified device while simultaneously outputing to it.

    When you omit the device specification, the system will display the devices that have the full duplex option enabled.

/NOFDX[=dev:],

    The dev: is a terminal. The NOFDX keyword disables the full duplex option. The full duplex terminal driver will not process input and output from the specified device simultaneously.

    When you omit the device specification, the system will display the devices that do not have the full duplex option enabled.

/FORMFEED[=dev:],

    The dev: is a terminal. The FORMFEED keyword indicates that the specified device has a hardware formfeed.

    When you omit the device specification, VMR will display the devices that have hardware formfeeds.

/NOFORMFEED[=dev:],

    The dev: is a terminal. The NOFORMFEED keyword indicates that the specified device does not have a hardware formfeed.

    When you omit the device specification, VMR will display the devices on the system that do not have hardware formfeeds.

HFILL=dev:[value]

    The value is a number between 0 and 7. The HFILL keyword specifies the number of file characters that the full duplex terminal driver is to place after a carriage return when outputing to the specified device.

    When you omit the value parameter, VMR will display the number of fill characters currently being output by the device driver to the specified device.

/HHT[=dev:],

    The dev: is a terminal. Full duplex terminal driver only. The HHT keyword indicates that the specified device has a hardware horizontal tab.

    When you omit the device specification, VMR will display the terminals on the system that have hardware horizontal tabs.

/NOHHT[=dev:],

    The dev: is a terminal. Full duplex terminal driver only.   The
    NOHHT keyword indicates that the specified device does not have a
    horizontal tab.

    When you omit the device specification, VMR will display all of
    the terminals that do not have hardware horizontal tabs.

/LINES=dev:[value],

    The value is a number between 1-255 that establishes the number
    of lines per page on the specified device. If you specify a
    number that is larger than the number of lines per page possible
    for a given device, VMR will default to the largest number
    possible for that device.

    When you do not specify a value, VMR will display the lines per
    page for the specified device.

/LOGON

    Enables logging onto terminals in a multiuser protection system.

/NOLOGON

    Disables logging onto terminals in a multiuser protection system.
    LOGON and NOLOGON clear and set a flag checked by the HELLO
    command when a user attempts to log onto a terminal.   This Set
    option provides a means of preventing users from accessing the
    system during system maintenance or account file maintenance
    activity, for example.

/LOWER[=dev:],

    The dev: is a terminal.   The LOWER keyword specifies that
    lower-case characters are not to be converted to upper case when
    they are received from the specified terminal.

    When you omit the device specification, VMR will display all
    terminals for which lower-case characters are not converted.

/NOLOWER[=dev:],

    The dev: is a terminal. The NOLOWER keyword resets the terminal
    characteristics of the specified terminal so that lower-case
    characters received on input are automatically converted to upper
    case and echoed as upper case.

    When you omit the device specification, VMR will display all
    terminals for which conversion to upper case is specified.

/PRIV[=dev:],

    The dev: is a terminal. The PRIV keyword sets the specified
    terminal to privileged status.

    When you omit the device specification, VMR will display all
    privileged terminals on the system.

NOPRIV /NOPRIV[=dev:].

    Sets the identified terminal to nonprivileged status. Absence of
    =dev: results in a display of all nonprivileged terminals.

/REMOTE[=dev:],

>   The dev: is a terminal with a line to a DZ11 multiplexer. (The
>   line can also be a DH11 with the full duplex terminal driver.)
>   The REMOTE keyword declares that the specified terminal is
>   connected to a modem and can therefore be connected to the system
>   by means of a dial-up network.

>   When you omit the device specification, VMR will display all
>   remote lines (including DH11 lines).

/NOREMOTE[=dev:],

>   The dev: is a line to a DZ11 multiplexer. (The line can also be
>   a DH11 with the full duplex terminal driver.) The NOREMOTE
>   keyword establishes the terminal's line as a local line not
>   connected to a modem.

>   When you omit the device specification, VMR will display all
>   local lines (including DL11, DH11, DJ11, and DZ11 multiplexers).

/RPA[=dev:],

>   The device is a terminal. The RPA keyword enables the
>   read-pass-all option. The full duplex terminal driver will pass
>   all characters input at the keyboard to the terminal's input
>   buffer.

>   When you omit the device specification, VMR will display all of
>   the devices on the system that have the read-pass-all option
>   enabled.

/NORPA[=dev:],

>   The dev: is a terminal. The NORPA key word disables the
>   read-pass-all option. The full duplex terminal driver will not
>   pass special function characters (for example CNTRL C) input at
>   the keyboard to the terminal's input buffer.

>   When you omit the device specification, VMR will display all the
>   devices on the system that have the read-pass-all option
>   disabled.

/SLAVE[=dev:]

>   The dev: is a terminal. The keyword establishes the specified
>   terminal as one that can enter data only if it is solicited from
>   a task; thus, the specified terminal always rejects unsolicited
>   input (other than CTRL/O, CTRL/Q, and CTRL/S).

>   When you omit the device specification, VMR will display all
>   terminals currently classified as slaved.

/NOSLAVE[=dev:],

>   The dev: is a terminal. The NOSLAVE keyword sets the specified
>   terminal to nonslave status.

>   When you omit the device specification, VMR will display all
>   terminals currently classified as nonslave.

/SPEED=dev:[recv:xmit],

>The dev: is a terminal. The recv argument is the baud rate at which characters are input to the computer from the terminal. The xmit argument is the baud rate at which the computer outputs characters to the terminal. The SPEED keyword establishes the receive and transmit baud rate for terminals attached to the system through a DH11 or DZ11 multiplexer. You must specify both arguments when setting the speed. If you do not specify either VMR will display the current settings.
>
>Valid baud rates for the DH11 are: 0, 110, 150, 200, 300, 600, 1200, 1800, 2400, 4800, 9600. A (user-specified baud rate A), and B (user-specified baud rate B). Valid baud rates for the DZ11 are: 0, 110, 150, 300, 600, 1200, 1800, 2000, 2400, 3600, 4800, 7200, and 9600. The receive and transmit baud rates for the DZ11 must be the same; the DZ11 does not support split speeds.

/SYSUIC[=uic],

>The uic has the format [g,m] and g and m are octal numbers that represent a group and member respectively. The /SYSUIC keyword establishes the UIC for the system and all system tasks. On most systems, the system UIC is [1,54]. These UIC values are the initial defaults on virgin systems.
>
>This UIC becomes the default UIC used by the Load command and the install-run-remove option of the Run command.
>
>When you omit the UIC specification, VMR will display the current UIC.

/TERM=dev:[value],

>The dev: is a terminal and value is a RSX-11M supported terminal type. The TERM keyword establishes the terminal type of the specified device. When VMR sets the terminal type, it automatically sets the HFILL, VFILL, CRT, FORMFEED, and HHT characteristics for the terminal. The standard terminal types are as follows:
>
>| | | | |
>|---|---|---|---|
>| ASR33 | ASR35 | KSR33 | LA30P |
>| LA30S | LA36 | LA120 | LA180S |
>| VT05B | VT50 | VT52 | VT55 |
>| VT61 | VT100 | | |
>
>If you specify a terminal type that is unknown to VMR, VMR will not set any device characteristics for the terminal. However, VMR will store the value you have specified in the Unit Control Block (UCB).
>
>When you omit the value parameter, VMR will display the terminal type of the specified device.
>
>Note that VMR will also accept another form of the SET command, as follows:
>
>   SET /term-type=dev:

term-type

One of the standard terminal types listed above

dev:

An ASCII device name

For example, SET /VT52=TT16: is equivalent to SET /TERM=TT16:VT52.

/TYPEAHEAD[=dev:],

The dev: is a terminal. The TYPEAHEAD keyword enables the TYPEAHEAD option for the specified device. The full duplex terminal driver will buffer input characters before passing them to a requesting task. Thus characters input during periods between requests will not be lost.

/NOTYPEAHEAD[=dev:],

The dev: is a terminal. The NOTYPEAHEAD keyword disables the TYPEAHEAD option for the specified device. The full duplex terminal driver will not buffer characters to prevent their loss.

/UIC[=uic[:dev:]]

The specified UIC is established as the default UIC for the entering terminal unless dev: is specified. If you specify dev:, the default UIC is set for that terminal. All tasks run from the terminal are run with the UIC of the terminal, except in a multiuser protection system. In such a system, a privileged user can override the terminal UIC with the UIC switch in the RUN command. Further, external MCR function tasks[1] are requested with this UIC.

When you do not specify uic (SET /UIC), the current UIC is displayed. If only dev: is specified (SET /UIC:dev:), the UIC for the specified terminal is displayed.

/VFILL[=dev:],

The device is a terminal. The VFILL keyword enables the vertical fill characters option for the specified device. The full duplex terminal driver will add 4 fill characters following each linefeed.

When you omit the device specification, VMR will display all of the terminals on the system that have the VFILL option enabled.

/NOVFILL[=dev:],

The device is a terminal. The NOVFILL keyword disables the vertical fill characters option for the specified device. The full duplex terminal driver will not add any verticle file characters following linefeeds.

When you omit the device specification, VMR will display all of the terminals on the system that do not have the VFILL option enabled.

---

1 These tasks are the MCR MOUNT, INSTALL, DMO, and UFD commands (which run as tasks) and all system-supplied software.

/WCHK [=dev:],

> The WCHK keyword specifies for all Files-11 devices except DX:, DY:, and DL: and magnetic tape (MM:, MS:, and MT:) that all writes are to be followed by a write check. This feature provides high reliability for data transfers to the specified disk. Executive support for write check is a SYSGEN option and must be selected for this command to have any effect.

> When you omit the device specification, VMR displays all Files-11 disk drives with write check enabled.

/NOWCHK [=dev:],

> The NOWCHK keyword specifies that write check is to be disabled for the specified device.

> When you omit the device specification, VMR will display all disks that support write check, but that have write check disabled.

/WRAP [=dev:],

> The device is a terminal. The WRAP keyword enables the wrap-around option for the specified device. The full duplex terminal driver will automatically generate a carriage return/linefeed sequence when the number of input characters exceeds the buffer size of the specified device. Both the carriage return and linefeed are transparent and do not appear in the input buffer.

> When you omit the device specification, VMR will display all of the terminals on the system that have the wrap-around options enabled.

/NOWRAP [=dev:]

> The device is a terminal. The NOWRAP keyword disables the wrap around option for the specified device. The full duplex terminal driver will not accept input characters beyond the input buffer size.

> When you omit the device specification, VMR will display all of the terminals on the system that have the wrap around option disabled.

Example

```
    >SET /BUF=LP0:
    BUF=LP0:132.
```

Displays the current buffer size of LP0:

```
    >SET /BUF=TT1:40.
```

Set TT1: buffer size to 40(10).

```
    >SET /CRT=TT3:
```

Enable the backspace deletion option on the display terminal TT3:.

```
>SET /CRT
CRT=TT3:
```

Display all terminals that support the backspace deletion option.

```
>SET /ESCSEQ=TT3:
```

Establish terminal TT3: as a terminal that can send escape sequences.

```
>SET /ESCSEQ
ESCSEQ=TT3:
```

Display all terminals that can send escape sequences.

```
>SET /NOESCSEQ=TT3:
```

Disable support of escape sequences on TT3:.

```
>SET /LA30S=TT2:
>SET /LA30S
LA30S=TT0:
LA30S=TT2:
```

Set TT2: as an LA30S.
Display all LA30S terminals.

```
>SET /PRIV=TT0:
```

Set TT0: to a privileged terminal.

```
>SET /PRIV
PRIV=TT0:
PRIV=TT1:
```

Display all privileged terminals.

```
>SET /REMOTE=TT21:
```

Set the terminal line corresponding to TT21: as a remote dial-in line.

```
>SET /REMOTE
REMOTE=TT1:
REMOTE=TT2:
REMOTE=TT3:
REMOTE=TT4:
REMOTE=TT21:
```

Display all terminals that are currently set as remote dial-in lines. TT1:, TT2:, TT3:, and TT4:

```
>SET /SLAVE=TT3:
```

Set TT3: to a slave terminal.

```
>SET /WCHK=DK1:
```

Enable write check on DK1:.

Memory Allocation Keywords

/BOT=pname:value,

The pname is a 1- to 6-character alphanumeric partition name and value a number of 64-byte blocks. The BOT keyword directs VMR to move the bottom boundary of the specified system-controlled partition up or down the amount indicated by the value parameter. The BOT keyword modifies the bottom boundary of a partition even though it has tasks installed in it. If you contract a partition that contains an installed task or loaded driver, VMR displays a warning message; the task or driver may no longer fit in the partition.

The value parameter can be supplied in five formats:

+value

Moves the bottom boundary up by the specified amount. Moving the bottom boundary up makes the partition smaller.

NOTE

You can supply the value in the same units as the base and size parameters in the MAIN keyword described below.

-value

Moves the bottom boundary down by the specified amount. Moving the bottom boundary down makes the partition larger.

value

Establishes the total partition size equal to the specified value by moving the bottom of the partition.

+*or*

Moves the bottom boundary up as far as possible. Note that using this format will cause the bottom boundary to move up to the bottom of the first fixed task or driver loaded into the partition at the time the BOT keyword is executed. If there is nothing loaded into the partition, it will assume a size of 1 64-byte block.

-*

Moves the bottom boundary down as far as possible. Using this format will cause the bottom boundary of the partition to move down to the top boundary of the partition below it or to the top of the Executive if the effected partition is the lowest partition in memory.

/MAIN=pname[:base:size:type]

Establishes a main partition.

pname

The 1- to 6-character alphanumeric partition name.

:base

    The physical base address of the partition specified as a number of 64-byte blocks.

:size

    The size of the partition specified as a number of 64-byte blocks. The maximum size is 0 to 1920.K words for a task, common, or main partition.

:type

    SYS for a main partition, DEV for a common partition that maps the device registers, COM for a common partition, or TASK for a task partition.

Main partitions are allocated for user tasks and loadable drivers.

Device partitions are allocated for device commons which are used by tasks to access the device registers on the I/O page.

You may enter base and size in any of the following formats;

Format	Calculated Value
nnnn	Octal (nnnn*100)
nnnn.	Decimal (nnnn.*64.)
nnnK	Octal K (nnn*4000)
nnn.K	Decimal K (nnn.*2048.)

nnnn is a number to which a multiplication factor is applied to determine the value used. Valid ranges of calculated values are:

Octal	0<=base<177777	0<size<2000
Decimal	0.<=base<65535	0.<size<1024.
Octal K	0K<=base<3777K	0K<size<40K
Decimal K	0.K<=base<2047.K	0.K<size<32.K

For system controlled partitions, size may range from 0 to 1920.K or any valid representation of these limits.

You can specify the base address of a partition through a wildcard (*) for TASK or SYS partitions in a mapped system. When you specify a wildcard (*), VMR creates a partition at the lowest address possible for a partition of the size you have specified.

You can also specify the size of a partition through a wildcard (*) for SYS partitions. When you specify the wildcard (*), VMR creates the largest possible partition starting at the base address you have specified in the base parameter.

When you specify wildcards for both the base and size, VMR will create a partition that will completely fill the first gap in the existing partition layout.

If you do not specify base, size, or type, VMR will display the values of these parameters for the named partition. If the named partition is a main task-controlled partition, VMR also displays the parameters of all its subpartitions.

/NOMAIN=pname

    Eliminates a named partition from the system. The partition you specify will be eliminated from the list of partitions and the system. If any tasks or commons are installed in or attached to the partition, the partition will not be eliminated and VMR will generate an error message.

SUB

    is the keyword that establishes a subpartition. Subpartitions may only be established in user-controlled main partitions.

    mname

        is the 1- to 6-character main partition name. The subpartition being defined becomes a subpartition in the named main partition.

    :pname

        is the 1- to 6-character subpartition name. The subpartition being defined becomes a subpartition of the main partition specified in mname.

    :base

        is the physical base address of the subpartition, specified as a number of 64-byte blocks.

    :size

        is the size of the subpartition, specified as a number of 64-byte blocks.

    Base and size may be entered in any of the following formats; nnnn is a number to which a multiplication factor is applied to determine the value used.

Format	Calculated Value
nnnn	Octal (nnnn*100)
nnnn.	Decimal (nnnn.*64.)
nnnK	Octal K (nnn*4000)
nnn.K	Decimal K (nnn.*2048.)

    Valid ranges of values are:

Octal	0<=base<10000	0<size<2000
Decimal	0.<=base<4096.	0.<size<1024.
Octal K	0K<=base<200K	0K<size<40K
Decimal K	0.K<=base<2047.K	0.K<size<32.K

    Example:

    Any of the following inputs for size will allocate a 2048. byte subpartition.

    40
    32.
    1K
    1.K

    If base and size are omitted, the current values will be displayed for the named subpartition.

NOSUB

> is the keyword that eliminates the named subpartition from the system.

/POOL[=TOP]

> Increases the size of the dynamic storage region.

> TOP

>> The first location in memory used for partition allocation. You specify TOP in units of 64-byte blocks. You can specify it in octal or decimal. When you do not specify TOP, VMR displays the current top of memory, the size of the longest block of pool space in words, and the total number of words in the pool. The display's format is:

>> POOL = top:max:total

>> where top is given in units of 64-byte blocks, and max and total are in decimal words.

> You can specify TOP as a wildcard (*). The wildcard directs VMR to supply the maximum amount of pool possible. Specify the wildcard as follows: SET /POOL=*.

> If more pool is requested than can be supplied, a warning message is printed, and the maximum amount of pool possible is supplied.

/POOLSIZE[=value]

> This command allows you to specify a total amount of pool rather than a top address. If you do not specify a value, VMR will display the current top of memory, the size of the longest block of pool space in words, and the total number of words in the pool.

/TOP=pname:value

> Where pname is a 1- to 6-character alphanumeric partition name and value is a number of 64-byte blocks. The TOP keyword directs VMR to move the top boundary of the specified system-controlled partition up or down the amount indicated by the value parameter. The TOP keyword modifies the top boundary of a partition even if the partition has tasks installed in it. If you modify the partition so that it is too small to hold the tasks installed in it, VMR will display a warning message and modify the partition anyway.

> The value parameter can be supplied in five formats:

> +value

>> Moves the top boundary up by the specified amount. Moving the top boundary up makes the partition larger.

>> NOTE

>> You can supply the value in the same units as the base and size parameters in the PAR keyword described above.

-value

Moves the top boundary down by the specified amount. Moving the top boundary down makes the partition smaller.

value

Establishes the total partition size equal to the specified value.

+* or*

Moves the top boundary up as far as possible. Using this format causes the top boundary to move to the bottom boundary of the partition above it or to the top of memory if the partition is the top partition in memory.

-*

Moves the top boundary down as far as possible. Using this format causes the top boundary to move down to the top of the first fixed task, driver, or common loaded into the partition at the time the TOP keyword is executed. If nothing is loaded into the partition, the partition assumes a size of 1 64-byte block.

Examples

    >SET /MAIN=SYSPAR:420:140:TASK

Define a partition called SYSPAR whose base address is 42000(8) and whose length is 14000(8) bytes.

    >SET /MAIN=SYSPAR
    MAIN=SYSPAR:0420:0140:TASK
    SUB=SYSPAR:MCRPAR:0445:0056

Display the parameters of the main partition SYSPAR and all of its subpartitions.

    >SET /NOMAIN=SYSPAR

Eliminate main partition SYSPAR.

    SET /MAIN=GEN:1000:6000:SYS

Define a main partition called GEN as a system-controlled partition whose base address is 100000(8) and whose length is 600000(8) bytes.

    >SET /POOL=420

Define the first location in memory for partition allocation (No user defined partition can begin below 42000(8)).

    >SET /POOL

    POOL=0420:150:430.

The first available location for user partitions is 42000(8); the longest free block is 150. words, and the total of all pool space is 430. words.

Notes

1. If a partition currently hosts installed tasks or loaded drivers, and a command (for example, /NOMAIN) attempts to eliminate the partition, VMR rejects the command.

2. When you define a partition, the name must not already be defined as a partition. In addition, a main partition cannot overlap any other main partition. (An exception is for DEV partitions in the I/O page; these can overlap.)

3. The numeric value convention (a number followed by a period (.) is explicitly decimal) applies to all the SET command numeric values.

4. The address specified with the POOL command must be lower than the base address of the first partition in the system with the exception of partition LDR for a resident loader, which is in the Executive; LDR for loadable Loader.

5. Once you have allocated space to the dynamic storage region, you cannot recover the space for use in partitions (you cannot contract pool).

6. If the last partition is system-controlled, its top address is modified by Save at boot time to reflect the actual top of physical memory of the hardware in use.

TAS

TASKLIST

Use the TASKLIST command to display a description of each installed task in the system. The display contains in columnar form, from left to right:

1. Task name

2. Task version identification

3. Task Control Block (TCB) address

4. Partition name

5. Task priority

6. Size of task in bytes (octal)

7. Load device identification

8. Disk address logical block number (octal) in a virgin system, and the image or task file identification in a saved system image

9. Task memory state

Format

TAS[KLIST]

Example

```
VMR>TAS
...LDR 10      115450 LDRPAR 248. 00002400 LB0:- FILE ID:(2177,15) FIXED
TKTN    03.94  113400 TKNPAR 248. 00010000 LB0:- FILE ID:(2247,14)
MCR... 02.01   114300 SYSPAR 160. 00010000 LB0:- FILE ID:(2234,15)
...MCR 01      112500 GEN    160. 00012000 LB0:- FILE ID:(2251,14)
F11ACP M0320   115200 GEN    149. 00024000 LB0:- FILE ID:(2252,14)
DB0FCP M0320   115100 GEN    149. 00063500 LB0:- FILE ID:(15221,124)
...DMO 22.00   114700 GEN    140. 00040000 LB0:- FILE ID:(2230,14)
...INI 20.01   114500 GEN    140. 00040000 LB0:- FILE ID:(2232,14)
...MOU 22.15   114200 GEN    140. 00040000 LB0:- FILE ID:(2240,14)
...UFD V0410   113700 GEN    140. 00040000 LB0:- FILE ID:(2246,14)
PMD... 04      113300 GEN    130. 00020000 LB0:- FILE ID:(3775,30)
SHF... 04      113200 SYSPAR 105. 00010000 LB0:- FILE ID:(3256,546)
...INS 04      114400 GEN    100. 00040000 LB0:- FILE ID:(2231,14)
...SAV 04.22   114100 GEN    100. 00040000 LB0:- FILE ID:(2237,14)
...BAD 05      112600 GEN    100. 00137700 LB0:- FILE ID:(1462,23)
...AT. 04.24   114600 GEN     65. 00057700 LB0:- FILE ID:(1467,15)
...BOO 03.4    115000 GEN     50. 00040000 LB0:- FILE ID:(2226,14)
...ACS 01      113600 GEN     50. 00040000 LB0:- FILE ID:(2224,14)
LPINIT 01      113500 GEN     50. 00015500 LB0:- FILE ID:(4346,32)
...PIP M1332   113100 GEN     50. 00054200 LB0:- FILE ID:(1511,15)
...LOA 03.3    113000 GEN     50. 00040000 LB0:- FILE ID:(2233,15)
...UNL 02.8    112700 GEN     50. 00040000 LB0:- FILE ID:(2250,14)
VMR>
```

On a system image generated for a PDP-11/70 with more than 124K words of memory, the size field (fifth column) contains 8-digit rather than 6-digit numbers. This display is for a virgin system image.

FIXED indicates that the task is fixed in memory.

```
VMR>TAS
. LDR.     LDR     248. 000000 LB0:- FILE ID:(0,0) FIXED
TKTN       SYSPAR  248. 010000 LB0:- FILE ID:(2572,11)
...MCR     SYSPAR  160. 010000 LB0:- FILE ID:(2563,11)
...SYS     GEN     160. 010000 LB0:- FILE ID:(2565,11)
F11ACP     FCPAR   149. 026000 LB0:- FILE ID:(2576,11)
...DMO     GEN     140. 040000 LB0:- FILE ID:(2556,11)
...INI     GEN     140. 040000 LB0:- FILE ID:(2557,11)
...MOU     GEN     140. 040000 LB0:- FILE ID:(2567,11)
...UFD     GEN     140. 040000 LB0:- FILE ID:(2573,11)
PMD...     PMDPAR  130. 020000 LB0:- FILE ID:(2610.12)
SHF...     SYSPAR  105. 010000 LB0:- FILE ID:(2606,11)
...INS     GEN     100. 040000 LB0:- FILE ID:(2562,11)
...SAV     GEN     100. 040000 LB0:- FILE ID:(2570,11)
...BAD     GEN     100. 040000 LB0:- FILE ID:(6162,34)
PRT...     PMDPR    70. 020000 LB0:- FILE ID:(5210,6)
...BOO     GEN      50. 040000 LB0:- FILE ID:(2273,30)
...ACS     GEN      50. 040000 LB0:- FILE ID:(1066,22)
...PIP     GEN      50. 054300 LB0:- FILE ID:(2627,11)
...PSE     GEN      50. 031600 LB0:- FILE ID:(5552,4)
...AT.     GEN       1. 040000 LB0:- FILE ID:(5013,4)
```

The preceding display is from a saved system. It differs from a virgin system in that the file ID of the task file, rather than the logical block number, is displayed.

TIM

TIME

Use the TIME command to set the time of day and the date, or to display the time and date.

Formats

> TIM[E] [hrs:mins[:secs]] [ml/day/year]
>
>   or
>
> TIM[E] [hrs:mins[:secs]] [day-m2-year]

Parameters

hrs	Hours (range 0 through 23).
mins	Minutes (range 0 through 59).
secs	Seconds (range 0 through 59); this parameter is optional.
ml	Numeric representation of month (range 1 through 12).
m2	Three-letter abbreviation for month.
day	Day (range 1 through 31).
year	Year (range 0 through 99). Year is relative to 1900; thus, 1977 is entered as 77.

Examples

```
>TIM
10:23:31 03-MAY-79
```

Display the current system image time and date.

```
>TIM 1:30 5/3/79
```

Set the time to 01:30:00 and the date to 03-MAY-79

Notes

1. If you specify neither time nor date, VMR displays the current system image time and date.

2. If you specify the time and date, VMR sets the system image clock and calendar. If you specify only the time, VMR sets only the clock; if you specify only the date, VMR sets only the calendar.

3. You can specify the time and date in any order.

4. All numeric values are decimal. No terminating period is used.

UNFIX

Use the UNFIX command to free a fixed task from the system image. UNFIX is the complement of the FIX command.

If a fixed task exits or aborts, it still occupies the system image memory of the partition.

Format

UNF[IX] taskname

Parameter

taskname

The task that you wish to unfix in memory.

Example

>UNFIX XKE

Unfix task XKE, freeing the partition in which it resides.

UNL

UNLOAD

Use the UNLOAD command to remove a loadable device driver from the system image. If a device is attached, its driver cannot be unloaded.

To unload a device driver from the system image, the driver's STB file must reside on the same disk and under the UFD that corresponds to the UIC of the system image file.

The UNLOAD command cannot remove a data base from the system image, even if the data base was loaded by means of the LOAD command.

Format

     UNL[OAD] dd:

Parameter

dd:

     A 2-character ASCII device name

Example

          VMR>UNL LS: !UNLOAD LPS11 DRIVER (LSDRV)

8.6 VMR ERROR MESSAGES

Following are the VMR command error messages. When a VMR error
message applies to more than one command, the applicable command is
indicated above the associated message description.

VMR -- ADDRESSING EXTENSIONS NOT SUPPORTED

INSTALL
You are trying to install a task that was built using the VSECT
(Virtual section) directive into a system image that does not
support the VSECT feature.

VMR -- ALIGNMENT ERROR

The base address or size of the partition you are attempting to
create conflicts with existing partitions or physical memory.

VMR -- BASE ADDRESS MUST BE ON A 4K BOUNDARY

INSTALL
The virtual base address of your task is not aligned on a 4k
boundary.

VMR -- BASE MISMATCH COMMON BLOCK <common-name>

INSTALL
The base address of the partition does not match that of the
common block. Applicable to unmapped system images only.

VMR -- CANNOT FIX A TASK IN A SYSTEM CONTROLLED PARTITION

FIX
This is a VMR restriction. To fix a task in a system-controlled
partition, use the MCR Fix command and then save the system
image.

VMR -- CANNOT INSTALL TASKS FROM OTHER THAN LB:

INSTALL
When you SAVE a system, SAVE deletes from the system image all
tasks and commons that were not installed from the library device
LB:. Therefore, you cannot install a task or a common from other
than LB:.

VMR -- CANNOT LOAD/UNLOAD A PSEUDO DEVICE

LOAD AND UNLOAD
The device name you specified was that of a pseudo device.
Pseudo devices cannot be loaded or unloaded.

VMR -- CHECKPOINT AREA TOO SMALL

INSTALL
The area you have allocated for checkpointing in your task image
file is smaller than the partition into which you are attempting
to install your task. The system image does not support the
dynamic allocation of checkpoint space.

VMR -- CHECKPOINT SPACE TOO SMALL, USING CHECKPOINT FILE

INSTALL
This is a warning message. The checkpoint space you have allocated in your task image file is too small to hold your task (usually because of the /INC keyword). The system image supports the dynamic allocation of checkpoint space. It will use the checkpoint file to store your task when it rolls it out to disk. Since no checkpoint file exists when you boot your system, you should consider this message to be a fatal error if it is issued by any of the system tasks during the boot. These tasks are MCR, MOU, SAV, and F11ACP.

VMR -- CIRCULAR REDIRECT ERROR

REDIRECT
Your attempt to redirect a device has failed because it would result in a circular device list.

VMR -- COMMAND I/O ERROR

The system has detected an I/O error during a read from an indirect file.

VMR -- COMMAND SYNTAX ERROR command line

The syntax of the printed command line is incorrect.

VMR -- COMMON BLOCK CURRENTLY INSTALLED

INSTALL
You are attempting to install a common block that has already been installed.

VMR -- COMMON BLOCK IS A TASK PARTITION common-name

INSTALL
A task's request for access to a common block has been rejected because the requested partition is a task partition.

VMR -- COMMON BLOCK NOT LOADED common-name

INSTALL
The common block specified by VMR in the error message has been linked to your task but it has not been installed. The common block must be installed before your task can be installed.

VMR -- COMMON BLOCK OCCUPIED

INSTALL
An attempt was made to load a common block that was occupied.

VMR -- COMMON BLOCK PARAMETER MISMATCH common-name

INSTALL
The parameters of the common block named in the error message do not match the parameters in the label block of the task that references the common.

VMR -- COMMON BLOCK SEGMENT COUNT ERROR

INSTALL
The command attempted to install a resident library with overlays, but the number of overlay segments in the task header differs from the number specified in the segment descriptors.

VMR -- DEVICE ddn: IS ATTACHED

UNLOAD

You are attempting to unload a driver that has one or more of its device units attached. The first attached unit is ddn:. You cannot unload a driver that has device units attached.

VMR -- DEVICE ddn: NOT IN SYSTEM

DEVICES

The device you requested in the Device command does not exist in the system image.

SAVE

You are attempting to save an image on a device that does not exist on your host system.

REDIRECT

You are attempting to redirect I/O requests to a device that does not exist on your host system.

LOAD AND UNLOAD

You have specified a device in your load command for which there is no data base. This is caused by one of two conditions:

1. The device does not exist in the system device tables,

2. The driver file does not contain a loadable data base.

INSTALL

You have specified a device in your INSTALL command that has not been defined in the system image.

VMR -- DEVICE NOT MOUNTED

You have not mounted the device that contains the system image file.

VMR -- DEVICE NOT REDIRECTABLE

REDIRECT

The specified device cannot be redirected.

VMR -- DRIVER ALREADY RESIDENT

LOAD

You have specified a device driver that is already loaded or that is permanently resident in the system image.

VMR -- DRIVER BUILT WITH WRONG STB FILE

LOAD

The symbol definition file for the driver is not compatible with the Executive symbol definition file for the current system image. This means that your driver has been built for another system and must be rebuilt before you can load it into the current system.

UNLOAD

The symbol definition file for the driver is not compatible with the symbol definition file of the current Executive. This probably means that the most recent copy of the driver is built for another Executive. If they exist, try making older versions of the driver have the highest file sequence number.

VMR -- DEVICE NOT TERMINAL

SET
You have attempted to set terminal characteristics for a nonterminal device.

VMR -- DEVICE NOT VARIABLE SPEED MULTIPLEXER

SET
You have attempted to set the baud rate for a terminal that is not attached to a DH11 or DZ11 multiplexer.

VMR -- DRIVER CANNOT BE UNLOADED

UNLOAD
You have attempted to unload a permanently resident driver (that is, a driver linked to the Executive).

VMR -- DRIVER NOT LOADED

UNLOAD
You have specified a driver in your UNLOAD command that is not resident in memory.

VMR -- DRIVER REQUIRES RUNNING SYSTEM FOR LOAD/UNLOAD

LOAD
The driver you have requested has the symbols $ddLOA or $ddUNL in its source. RSX-11M does not support those calls. Note however, that these symbols are reserved for future use by the MCR LOAD and UNLOAD commands.

VMR -- EXECUTIVE IS TOO LARGE

Your Executive is too large to be accommodated in the system image. If your Executive is larger than 16K words, this message indicates that you have not included 20K Executive support during SYSGEN. If you did include support for a 20K Executive, this message indicates that the Executive is larger than 20K. In either case, the system is unusable.

VMR -- FILE name HAS ILLEGAL FORMAT

LOAD
Your driver's symbol definition file contains illegal object code or data.

VMR -- FILE name HAS INCONSISTENT DATA

FIX-IN-MEMORY
You are attempting to fix a partition or a task that is logically beyond the end of the system image file.

LOAD
The partition for loadable drivers is logically beyond the end of the system image file.

Your driver task does not conform to the loadable driver guidelines or the driver has an invalid loadable data base. (Refer to RSX-11M Guide to Writing an I/O Driver.)

INSTALL
The partition of the common library you are attempting to load is logically beyond the end of the system image file.

VMR -- FILE name NOT A VALID DRIVER TASK IMAGE

One of three things has occurred:

1. Your driver's task image has been overlaid,

2. Your driver has a header,

3. Your driver has referenced a resident library.

VMR -- FILE NOT CONTIGUOUS

INSTALL

You have attempted to install a task from a   noncontiguous   file.
Task images must be contiguous files.

LOAD

The   file   ddDRV.TSK   is   not   contiguous.   This   file   must   be
contiguous.

VMR -- FILE NOT FOUND

You have requested a file that is not in the UFD of the volume
you have specified.

VMR -- FILE NOT TASK IMAGE

INSTALL

The data in the label block of your task is incorrect, indicating
that your file is not a task image.

VMR -- ILLEGAL DEVICE/VOLUME

SAVE

You have attempted to save your system image on an invalid
device. Valid devices are:

CT: Tape cassette

DD: DECtape II

DT: DECtape

DX: Flexible diskette

DY: RX02 floppy disk

MM: TE/TU16/TU45 magnetic tape

MS: TS04 magtape

MT: TE/TU10/TS03 magnetic tape

PP: Paper tape

VMR -- ILLEGAL DRIVER TASK APR USAGE

LOAD

Your device driver must be built for APR 5 (addresses must start
at 120,000).

VMR -- ILLEGAL ERROR SEVERITY CODE code

This message indicates an internal failure in VMR. If this error
message persists, contact a Digital software representative.

VMR -- ILLEGAL FILE SPECIFICATION file specification

    The file specification printed following the error message has an
illegal format or contains wild card specifiers.

VMR -- ILLEGAL FIRST APR

INSTALL

You have built your task using an incorrect base APR. The
following rules apply:

1. A nonprivileged task must be built with APR 0 as its base
APR.

2. A privileged task that wishes to map the Executive routines
and data structures must be built with APR 4 as its base APR
if the Executive is 16K words or less.

3. A privileged task that wishes to map the Executive routines
and data structures must be built with APR 5 as its base APR
if the Executive is 20K words or less.

4. A privileged task that does not map into the Executive must
be built with APR 0 as its base APR.

VMR -- ILLEGAL FUNCTION

    You have entered a command that VMR does not recognize.

VMR -- ILLEGAL GET COMMAND LINE ERROR CODE

    This error indicates a system failure. If this message persists,
contact a Digital software representative.

VMR -- ILLEGAL KEYWORD VALUE

    You have entered a value for a keyword that exceeds its limits.

VMR -- ILLEGAL OPERATION FOR UNMAPPED SYSTEM

SET

The specified keyword (/POOLSIZE) is valid in mapped systems
only.

VMR -- ILLEGAL PRIORITY

INSTALL AND ALTER

You have specified a priority that is out of range (that is, not
1 to 250(10), inclusive).

VMR -- ILLEGAL SWITCH /switch

    The switch printed following the error message is incorrect in
the context of the command line you have entered.

VMR -- ILLEGAL USE OF WILDCARD

SET

In an unmapped system, specification of a wildcard (*) with the
/TOP, /BOT, and /POOL keywords is not permitted. Also, you
cannot specify a wildcard for the "size" parameter with task
partitions.

VMR -- ILLEGAL VALUE FOR SYMBOL symname IN FILE name

LOAD AND UNLOAD
LOAD or UNLOAD has determined that symbol symname in the STB file
name has been defined to an illegal value. This can occur for
several reasons, some general and some specific to individual
symbols. For example, in general, most symbols cannot be defined
to zero or to an odd number. A specific example is the symbol
$INTSV. $INTSV must not be referenced by mapped loadable
drivers.

VMR -- INCORRECT ASSIGNMENT OF SY: OR LB:

This is a warning message. The device, SY: and LB: are not
assigned to the same device as the system image file you are
attempting to VMR.

VMR -- INDIRECT COMMAND SYNTAX ERROR command line

You have entered an improper indirect command file specifier.

VMR -- INDIRECT FILE DEPTH EXCEEDED command line

You have attempted to exceed more than two levels of indirect
files.

VMR -- INDIRECT FILE OPEN FAILURE command line

The indirect command file in the printed command line could not
be opened.

VMR -- INSTALL DEVICE NOT LB0:

INSTALL
You have attempted to install a task from other than the boot
device.

VMR -- INSTALLED TASKS MAY NO LONGER FIT IN PARTITIONS

SET
You have shortened a partition so that the tasks that are
installed in it may no longer fit. This is a warning message.
VMR will shorten the partition even though this situation exists.

VMR -- INTERRUPT VECTOR ALREADY IN USE

LOAD
LOAD has determined that your interrupt vector does not point to
one of the nonsense interrupt entries in the system image. This
usually means that another driver is using the interrupt vector.

VMR -- INVALID DRIVER DATA BASE AT OFFSET xxxx IN FILE name

LOAD
The driver name has an invalid data base value at offset xxxx
relative to the symbol $ddDAT.

VMR -- INVALID INTERRUPT VECTOR

LOAD
You have specified an interrupt vector address in your driver
data base that is too high for the current system image.

VMR -- INVALID KEYWORD

You have specified a keyword that is incorrect in the context of your command.

VMR -- INVALID RECORD ADDRESS FOR FILE name

ANY COMMAND
The command has attempted to write outside of the system image file or at a byte boundary. Two possible causes are:

1. A corrupted system image or

2. An STB file that does not match the system image.

VMR -- INVALID SPEED

SET
This message can be caused by two things:

1. You have requested a speed that the multiplexer line you have specified does not support.

2. You have specified unequal receive and transmit speeds for a DZ11. The DZ11 does not support split speeds.

VMR -- INVALID TIME PARAMETER

RUN
The date or time field you have specified is incorrect.

VMR -- INVALID UIC

You have specified an illegal value for either a group number or a member number.

VMR -- I/O ERROR ON INPUT FILE filename

An input I/O error occurred on the indicated file.

VMR -- I/O ERROR ON OUTPUT DEVICE

SAVE
SAVE has encountered an I/O error on the output device while writing the system image.

VMR -- I/O ERROR ON OUTPUT FILE filename

An output I/O error occurred on the indicated file.

VMR - KEYWORD NOT SUPPORTED FOR THIS TERMINAL DRIVER

SET
The terminal driver specified during SYSGEN does not support the specified keyword (for example, typeahead is a full duplex terminal driver option only and your system contains the half duplex driver).

VMR -- LENGTH MISMATCH COMMON BLOCK blockname

INSTALL
The length parameter for the common block, as described in the label block for the task image, does not match the corresponding length parameter defined in the system image. A task's label block data must match system data for that task before it can be installed.

VMR -- LINE NOT DZ11

SET
You have attempted to set a line to remote that is not attached to a DZ11 and your system contains the half duplex terminal driver.

VMR -- LOADABLE DRIVER SUPPORT NOT IN SYSTEM

LOAD AND UNLOAD
You have attempted to load a device into or unload a device from a system image that does not support loadable device drivers.

VMR -- LOGICAL DEVICE NOT IN SYSTEM

ASSIGN
The device you have specified has not been defined and therefore ASSIGN cannot find it in the logical device assignment table.

VMR -- LUN OUT OF RANGE

REASSIGN
You have attempted to reassign a LUN number that is higher than the maximum number of LUNs that you allocated at task build.

VMR -- NO CHECKPOINT SPACE, ASSUMING NOT CHECKPOINTABLE

INSTALL
This is a warning message. You have attempted to install a task as checkpointable that you have not built as checkpointable. This means that there is no checkpoint space allocated in the task image file. Since your system does not support the dynamic allocation of checkpoint space, INSTALL does not consider the task to be checkpointable.

VMR -- NO LUNS

LUN
The task that you have specified as an argument of the LUN command does not have any logical units assigned to it. This is not an error message; rather, it is simply an indication that there are no assignments to display.

VMR -- NO POOL SPACE

LOAD
The pool space required by the driver is not available in the system image.

VMR -- NON EXISTENT MEMORY

SET
You have attempted to define a partition in nonexistent memory.

VMR -- NOT ENOUGH APRS FOR TASK IMAGE

INSTALL

The Task Builder allows you to specify the virtual base address
of a task image as a multiple of 4K. Privileged tasks that
access the Executive start at either virtual 100000(8) or at
120000(8) depending on the size of the Executive. If the virtual
base address of the task is set too high, there will not be
enough APRs remaining to map the task image. (Refer to the
RSX-11M/M-PLUS Task Builder Manual for information on privileged
tasks.)

VMR -- OLD DEVICE ATTACHED

REDIRECT

You have attempted to redirect an attached device.

VMR -- OPEN FAILURE ON FILE filename

The indicated file cannot be opened.

VMR -- PARTITION ALREADY EXISTS

SET

You have attempted to define a partition with a name already in
use.

VMR -- PARTITION IS BUSY

LOAD

The partition into which you attempted to load your driver is
full, therefore, your task cannot be loaded.

FIX

You have attempted to fix a task or common region partition that
is full, therefore the task cannot be fixed.

VMR -- PARTITION name IS A COMMON

LOAD

You have attempted to load a device driver into a common
partition. A device driver cannot be loaded into a common
partition.

VMR -- PARTITION pname IS NOT A COMMON

LOAD

Partition xxCOM was found, but it is not a common partition.

VMR -- PARTITION pname NOT IN SYSTEM

LOAD

You are attempting to load a driver into a partition that does
not exist in the system or LOAD found a symbol $xxCOM in the
driver and partition xxCOM does not exist in the system.

VMR -- PARTITION pname IS TOO SMALL

INSTALL

You are attempting to install a task that is too large for the
partition you have specified.

VMR -- PARTITION NOT COMMON

INSTALL

A partition specified for a common area or library is not defined as a common partition.

VMR -- PARTITION NOT IN SYSTEM

LOAD

The partition you have specified is not in the system image.

VMR -- PARTITION NOT SYSTEM CONTROLLED

SET

The /TOP and /BOT keywords are valid for system controlled partitions only.

VMR -- PARTITION par NOT IN SYSTEM, DEFAULTING TO GEN

INSTALL

This is a warning message. You have attempted to install a task in a partition that does not exist. VMR will attempt to install the task in the partition GEN.

VMR -- PRIVILEGED TASK LARGER THAN 12K

INSTALL

You have attempted to install a privileged task that is larger than 12K words. (Refer to the RSX-11M/M-PLUS Task Builder Manual for information on privileged tasks.)

VMR -- POOL LINK ERROR AT xxxx BLOCK=yyyy zzzz

SET

When SET /POOL traced the pool linkage, it detected an error at location xxxx in the system image. The contents of xxxx is yyyy and the contents of xxxx+2 is zzzz.

VMR -- PSEUDO DEVICE ASSIGNMENT ERROR

ASSIGN

You have attempted to assign a logical device name to a pseudo device. Logical device names cannot be assigned to pseudo devices.

VMR -- PSEUDO DEVICE REDIRECT ERROR

REDIRECT

You have attempted to redirect one pseudo device to another pseudo device.

VMR -- RECEIVE DATA OR BY REFERENCE LIST NOT EMPTY

REMOVE

A task with entries in its receive queues cannot be removed from the system image.

VMR -- SPACE USED

SET

You have attempted to create a partition in a storage area that is already occupied.

VMR -- SPECIFIED PARTITION FOR COMMON BLOCK

INSTALL
You are attempting to install a task into a common block.

VMR -- SPECIFIED PARTITION TOO SMALL

INSTALL
You are attempting to install a task into a partition that is smaller than the task.

LOAD
You are attempting to install a driver into a partition that is smaller than the driver.

VMR -- SYMBOL symname IS DOUBLY DEFINED BY FILE name

LOAD AND UNLOAD
The symbol symname is defined twice in file name. Duplicate symbols are illegal.

VMR -- SYMBOL symname IS UNDEFINED IN FILE name

LOAD AND UNLOAD
LOAD found the symbol symname in the file name, but the symbol is not defined.

VMR -- SYNTAX ERROR

You have typed the command incorrectly.

VMR -- SYSTEM IMAGE IS RSX-11M-PLUS

You are attempting to use VMR on an RSX-11M-PLUS system image file. This will not work and is not permitted.

VMR -- TASK ACTIVE

The task you have specified as an argument of your command is active.

VMR -- TASK ALREADY FIXED

FIX
You have attempted to fix a task in memory that is already fixed in memory.

VMR - TASK AND PARTITION BASES MISMATCH

INSTALL
The base of the partition does not match that of the task being installed. Applicable to unmapped system images only.

VMR -- TASK IS CHECKPOINTABLE

FIX
You have attempted to fix a checkpointable task in memory. Checkpointable tasks cannot be fixed in memory.

VMR -- TASK IMAGE CURRENTLY INSTALLED

INSTALL

You are attempting to install a checkpointable task that has checkpoint space allocated in its task image. The task has already been installed. The system will allow you to install checkpointable tasks more than once subject to the following rules:

1. You must allocate checkpoint space for your task in a system checkpoint file.

2. You must use a different name for your task each time you install it.

VMR -- TASK IMAGE I/O ERROR

INSTALL

Your device is write-locked. VMR could not read the task-image file or could not rewrite the task image header.

VMR -- TASK IMAGE VIRTUAL ADDRESS OVERLAPS COMMON BLOCK block-name

INSTALL

The virtual addresses you have reserved for the task image overlap those you have reserved for the common block specified in the error message. Corruption of the task image file may have caused the overlap.

VMR -- TASK NAME ALREADY IN USE

INSTALL

You have attempted to install a task of the same name as one already in the system image.

VMR -- TASK NOT FIXED

UNFIX

You have attempted to unfix a task that is not fixed in memory.

VMR -- TASK NOT IN SYSTEM

You have referenced a task that you have not installed in the system.

VMR -- TI REDIRECT ERROR

You have attempted to redirect the pseudo device TI:. TI: cannot be redirected.

VMR -- TOO MANY COMMON BLOCK REQUESTS

INSTALL

You are attempting to install a task that contains too many common-block requests. A task is limited to seven common block references.

VMR -- TOO MANY LUNS

INSTALL

You are attempting to install a task that contains more than 255(10) LUN assignment requests.

VMR -- TOP OF POOL SET TO value, REQUESTED AMOUNT NOT AVAILABLE

SET

You have requested more pool space than the system can provide, so the maximum amount was used. This is a warning message.

VMR -- UNDEFINED COMMON BLOCK block-name

INSTALL

You are attempting to install a task that references a common block that is not defined in the system image. This message may indicate that the task was built for another system.

VMR -- UNKNOWN MAIN PARTITION

You are attempting an operation on a main partition which does not exist in the system.

VMR -- WARNING - LOADABLE DRIVER LARGER THAN 4K

LOAD

You are loading a driver that is larger than 4K words. This is a warning message.

VMR -- WARNING - PRIVILEGED TASK OVERMAPS I/O PAGE

INSTALL

A privileged task that is mapped into the Executive is often mapped to the I/O page as well. However, many privileged tasks do not require access to the I/O page and can use the extra 4K of address space that would be allocated to the I/O page for the task image. This message warns that a privileged task that may require access to the I/O page does not have that access. If your task does not require access to the I/O page, this message can be ignored.

VMR -- WRITE CHECK NOT SUPPORTED FOR DEVICE

SET

You have attempted to enable write check on a device that does not support it. Write check is supported for all disks except DL:, DX:, and DY:.

CHAPTER 9

SYSGEN PHASE III

This chapter lists and describes the questions in SYSGEN Phase III.

9.1 DETAILS OF SYSGEN PHASE III

Expanded comments for SYSGEN Phase III

> Expanded comments provide descriptions for SYSGEN Phase III questions.

ARE YOU RUNNING ON A MACHINE WITH AT LEAST 24K WORDS

> If the current system has less than 24K-words of memory, the utility tasks cannot be built. SYSGEN displays the following message and the exits.
>
> > SORRY, YOU CANNOT BUILD ANY UTILITIES AND/OR USER MODE DIAGNOSTICS WITH A MACHINE SMALLER THAN 24K WORDS!
>
> If your system has at least 24K-words, SYSGEN continues.

ARE YOU BUILDING A MAPPED SYSTEM

> SYSGEN uses the response to this question to determine the correct system UIC ([1,50] for unmapped, [1,54] for mapped).

DO YOU HAVE THE DUAL RK05 DISTRIBUTION KIT

> If you are using the dual RK05 kit, you must identify the RK05 units that contain the baseline system disk (RSXM26) and the utility object files disk (UTLOBJ). SYSGEN asks the following two questions.

IN WHICH DEVICE IS THE RSXM26 DISK MOUNTED (ddu:)

> Enter the RK05 drive that contains the baseline system disk.

IN WHICH DEVICE IS THE UTILOBJ DISK mounted (ddu:)

> Enter the RK05 drive that contains the utility object files.
>
> SYSGEN then assigns the utility disk to the pseudo device SY: and the baseline system disk to the pseudo device LB:.

If you are not using the dual RK05 kit, SYSGEN asks the following question.

DO YOU HAVE THE RL01 DISTRIBUTION KIT

    Enter No if you are using a big disk kit.

ARE YOU RUNNING ON A MACHINE WITH A LINE PRINTER

WAS ANSI MAGTAPE SUPPORT SELECTED IN SYSGEN PHASE I

WAS USER MODE DIAGNOSTIC SUPPORT SELECTED IN SYSGEN PHASE I

    SYSGEN Phase III can build either utility tasks or user mode diagnostic tasks or both. The following questions determine further action (the second question does not appear if you respond No to this question).

DO YOU WANT TO (RE)BUILD ANY UTILITY TASKS
DO YOU WANT TO BUILD ANY USER MODE DIAGNOSTICS

<center>***UTILITY TASKS***</center>

```
;
; IN ORDER FOR THE UTILITY TASKS TO USE ANSI FORMAT TAPE
; THEY MUST BE BUILT WITH THE ANSI FCS ROUTINES.  THESE
; ROUTINES MAY CAUSE CERTAIN TASKS TO INCREASE BEYOND THE
; NORMAL 8K SIZE.
;
; IF YOU WANT TO BUILD THE UTILITY TASKS WITH
; ANSI MAGTAPE SUPPORT, YOU HAVE TO EDIT THE TASK
; BUILD COMMAND FILES FOR THESE TASKS.
;
```

    The task-build command file for a particular utility task has to be edited only if the task size turns out to be above 8K words. This means that SYSGEN3 may have to be run a second time.

```
;
; MOST OF THE TASKS TO BE BUILT HAVE TASK BUILD
; COMMAND FILES WHICH SPECIFY PARTITION GEN OR
; PAR14K. GEN IS ASSUMED TO BE 40000(8) BYTES LONG
; AND IS ASSUMED TO BE BASED AT 40000(8).
; PAR14K IS A PARTITION WHICH IS 70000(8) BYTES LONG
; AND IS ASSUMED TO BE BASED AT 40000(8).
;
```

    For a mapped system, no physical base addresses are required for partitions, and the corresponding two lines above are suppressed.

```
;
; TASK FTB IS A FAST TASK BUILDER WITH LIMITED FUNCTIONALITY.
; IT DOES NOT SUPPORT OVERLAYS OR GLOBAL CROSS-REFERENCE
; BUT IT IS THREE TIMES FASTER THAN BIGTKB.  IT REQUIRES
; A 20K PARTITION TO RUN IN AND IS NOT DISTRIBUTED IN TASK
; IMAGE FORM. YOU MUST BUILD IT IF YOU INTEND TO USE IT.
;
; THE TASK DSC IS THE DISK SAVE AND COMPRESS UTILITY.  IT IS
; DISTRIBUTED AS A STANDALONE SYSTEM ON ALL DISTRIBUTION SYSTEMS
; AS DSCSYS.SYS.  IT MAY ALSO BE BUILT AS A TASK, BUT IS NOT
; DISTRIBUTED IN THAT FORM.  IT REQUIRES A 14K PARTITION TO RUN IN.
;
; ALL OF THE TASK BUILD COMMAND FILES BUILD CHECKPOINTABLE
; TASKS FOR USE WITH SYSTEMS WITH DYNAMIC ALLOCATION OF
; CHECKPOINT SPACE.  IF YOUR SYSTEM DOES NOT SUPPORT
; THIS OPTION, INSTALL WILL DEFAULT THEM TO NON-CHECKPOINTABLE.
; IF YOU WISH YOU MAY BUILD TASKS WHICH ARE CHECKPOINTABLE
; AND WHICH ALLOCATE SPACE IN THEIR TASK IMAGE BY CHANGING
; THE /CP SWITCH TO THE /AL SWITCH IN THE BUILD COMMAND FILE.
;        NOTE: TASKS WHICH ALLOCATE CHECKPOINT SPACE IN THEIR
;        TASK IMAGE REQUIRE MORE DISK SPACE THAN TASKS THAT DON'T.
SET /UIC=[1,2x]
INS $EDI
```

SYSGEN then asks the following question:

Do you want to E edit and build, B - build task tskname

where tskname is replaced by the name of the utility (for example,
MAC).   Enter E if you must edit the build command file, B to simply
build the task, and carriage return to not build the task. SYSGEN
repeats the above question for the following utility tasks (each task
listed replaces tskname):

```
MAC
BIGMAC
TKB
BIGTKB
PIP
FLX
VFY
DMP
EDI
SLP
LBR
PSE
SYE
CRF
ZAP
BAD
VMR
FTB
CMP
PAT
DSC
CDA
EDT
FMT
IOX
```

If you enter E, SYSGEN invokes EDI and specifies the corresponding
build command file (tsknameBLD.CMD) to be edited. When you exit EDI,
SYSGEN builds the task.

SYSGEN then installs PIP and BIGTKB.

DO YOU WANT TO PRINT THE MAPS FOR THE UTILITY TASKS

    The maps for the utility tasks are of little use;   normally, respond No.

    If you want the maps and specified a line printer, the maps will be printed on the line printer. If you want the maps but did not specify a line printer, they print on your terminal.

The next display depends on the distribution kit you are using.   The RL01 and the dual RK05 kits require some preparation prior to building the utility tasks. Read the pertinent section.

No preparations are necessary for big disk kits.

<div align="center">**RL01 KITS**</div>

; DEPENDING ON THE SECONDARY STORAGE MEDIUM AND THE NUMBER
; OF TASKS TO BE COPIED, YOU MAY HAVE TO MOUNT A BLANK MEDIUM
; IN THE DRIVE AFTER COPYING A TASK. THE RECOMMENDED NUMBER OF FILES
; PER MEDIUM IS:
;   RK05,RL01 AND MAGTAPE (TS03,RU10,TU16,TU45) - ALL TASKS WILL FIT
;   FLOPPY DISK AND DECTAPE - 4 TASKS PER DISK OR TAPE
;   CASSETTE - 1 TASK PER CASSETTE
;
; IF YOUR SECONDARY STORAGE IS OTHER THAN RK05, RL01 OR MAGTAPE,
; AFTER COPYING A TASK, YOU WILL BE ASKED IF YOU WISH TO MOUNT
; A NEW MEDIUM. IF SO THE INDIRECT FILE PROCESSOR WILL
; PAUSE TO ALLOW TIME TO MOUNT IT.
;
; THE FOLLOWING ARE LEGAL SECONDARY STORAGE DEVICES:
;   DK   (RK05 DISK, FOR RK05 DISTRIBUTION KITS ONLY)
;   DL   (RL01 DISK, FOR RL01 DISTRIBUTION KITS ONLY)
;   DX   (RX01 FLOPPY DISK)
;   CT   (TU60 CASSETTE TAPE)
;   DT   (TU56 DECTAPE)
;   MT   (TS03, TE10, OR TU10 MAGTAPE)
;   MM   (TU16, TE16, OR TU45 MAGTAPE)
;   DY   (RX211 FLOPPY DISK)
;

* ENTER DEVICE FOR SECONDARY STORAGE [DDU] [S]:

    The next query displayed is dependent on your secondary storage device.

<div align="center">*DK: or DL: as Secondary Storage Device*</div>

    The following assumes DK: was entered as the secondary storage device.

; PUT YOUR TARGET SYSTEM DISK IN DK:

* IS DK: READY? [Y/N]:

    This query is repeated until the device is ready (Y response).

* ENTER VOLUME LABEL OF DK: [S]:

      The device is then mounted using this volume label.

MOU DK: label

                    DX: as Secondary Storage Device

      If DX: is not loaded, the MCR LOA command is issued.

LOA DX:

                CT:,DT:,MT:, or MM:, as Secondary Storage

      The following assumes DT: was entered as the secondary
      storage device.

      If the secondary storage device is not loaded, the   MCR   LOA
      command is issued.

LOAD DT:

                    DUAL RK05 Kits

* DO YOU HAVE AN EMPTY RK05 REMOVABLE DRIVE AVAILABLE?   [Y/N]:

      If not, instructions are given for copying the task image
      files from secondary storage to the system disk.

      If an empty drive is available, you are asked to identify
      the unit number.

* WHAT IS THE UNIT NUMBER OF THE EMPTY DRIVE?   [O R:0-3]:

      The following assumes that DK2: is the empty drive.

; PLACE THE SYSTEM DISK IN DK2: AND START IT UP (WRITE
; ENABLED). WE WILL COPY THE TASKS DIRECTLY TO THE SYSTEM DISK.

* IS THE SYSTEM DISK READY? [Y/N]:

      This question is repeated until the disk is ready (Y
      response). When ready, the disk is mounted.

MOU DK2:SYSTEM

* WAS THE SYSTEM DISK MOUNTED SUCCESSFULLY? [Y/N]:

      If not, the MOU command is issued again.

;
; NOW WE BUILD THE REQUESTED UTILITY TASKS
;
ASN LP:=MP:
ASN TT:=MP:
ASN NL:=MP:
SET /UIC=[1,20]

The selected utility tasks are now built.

If using the RL01 or the dual RK05 kit, the build files are
copied to your secondary storage device and the old versions
are deleted. Depending on your secondary storage device,
either PIP or FLX is used to accomplish this (PIP for DL:,
DK:, or DX: as secondary storage and FLX for CT:, DT:, MM:,
MT: as secondary storage). The appropriate command is
issued following the task builder directive. The following
is an example of the display for a dual RK05 SYSGEN using an
RK05 (DK:) for secondary storage.

```
TKB @[1,2x] MACBLD
PIP DK:[1,5x]/NV=[1,5x]MAC.TSK
* WAS MAC COPIED SUCCESSFULLY?   [Y/N]:
PIP [1,5x]MAC.TSK;0/DE
```

For brevity, the PIP and/or FLX commands, which appear only
if you are using an RL01 kit or the dual RK05 kit, are
omitted here.

Note that all commands are suppressed for a specific task if
that task was not selected to be rebuilt. The following
displays all of the tasks.

Similar commands are issued to build each of the selected
utility tasks. In some cases, the old versions are purged
(PIP.../PU), leaving the most recent version, instead of
being deleted (PIP.../DE). The reason for this is to keep
tasks that may be required at later stages during SYSGEN.

```
TKB @[1,2x]MACBLD
TKB @[1,2x]BIGMACBLD
TKB @[1,2x]TKBBLD
TKB @[1,2x]BIGTKBBLD
TKB @[1,2x]PIPBLD
TKB @[1,2x]FLXBLD
TKB @[1,2x]VFYBLD
TKB @[1,2x]DMPBLD
TKB @[1,2x]EDIBLD
TKB @[1,2x]SLPBLD
TKB @[1,2x]LBRBLD
TKB @[1,2x]PSEBLD
TKB @[1,2s]SYEBLD
TKB @[1,2x]CRFBLD
TKB @[1,2x]ZAPBLD
TKB @[1,2x]BADBLD
TKB @[1,2x]VMRBLD
TKB @[1,2x]PATBLD
TKB @[1,2x]CDABLD
TKB @[1,2x]CMPBLD
TKB @[1,2x]FTBBLD
TKB @[1,2x]DSCBLD
TKB @[1,2x]SRDBLD
TKB @[1,2x]EDTBLD
TKB @[1,2x]RMSBCKBLD
TKB @[1,2x]RMSCNVBLD
TKB @[1,2x]RMSDEFBLD
TKB @[1,2x]RMSDFNBLD
TKB @[1,2x]RMSDSPBLD
TKB @[1,2x]RMSRTIBLD
TKB @[1,2x]VTECBLD
```

The task-builds are complete.

If user mode diagnostics were to be built, control passes to
the indirect command file BLDUMD.CMD (see Section 9.2). The
task image files that have been built (utilities and/or user
mode diagnostics) will now be transferred to secondary
storage.

```
;
; WE WILL PAUSE NOW TO ALLOW YOU TO COPY
;      - ANY FILES THAT WERE NOT SUCCESSFULLY TRANSFERRED
;      - THE DIAGNOSTIC TASKS
; WHEN THE DIAGNOSTIC TASKS HAVE BEEN COPIED, YOU
; MAY DELETE THEM FROM THIS DISK.
; WHEN DONE, RESUME AT. AS SHOWN BELOW.
```

If only user mode diagnostics were selected to be built and
no utility task, an example of how to do the transfers is
displayed like the one below.

```
;
;      (PUT A BLANK MEDIUM IN MT0:)
;      >REM PIP
;      >INS [1,54]FLX;-1
;      >FLX MT0:/ZE
;      >FLX MT0:/DO=RK05.TSK/RS,TS03.TSK,TERM.TSK
;      >RES ...AT.
;
```

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

At this time, you may manually copy any files that were not
successfully transferred by the previous commands, and/or
the user mode diagnostics if they were selected to be built.

DMO DX0:
UNL DX0:

The secondary storage is dismounted and the driver unloaded.

If you have a dual-RK05 system, the task image files are now
resident on the target system disk. Otherwise, the
following section of text is displayed to guide you in
transferring the task image files to the target system disk.

```
;
; TO COPY THE TASK IMAGE FILES FROM THE SECONDARY
; STORAGE MEDIUM TO THE SYSTEM DISK, PROCEED AS FOLLOWS
; AFTER SYSGEN3 HAS TERMINATED:
;
```

If your secondary storage is DX, the following example is
displayed (u is replaced by the actual unit number):

```
;      (BOOT THE SYSTEM DISK)
;      >SET /UIC=[1,5x]
;      >INS PIP
;      >LOA DX:
;
;                          ! REPEAT FROM HERE...
;      >MOU DXu:TASKX      !     REPLACE "TASKX" BY
;                          !     ACTUAL VOLUME LABEL
;      >PIP =DXu:*.*
;      >DMO DXu:           ! ...TO HERE FOR ALL VOLUMES
;                          ! USED FOR TRANSFER
;      >UNL DX:
;      >REM PIP
;
```

If your secondary storage is MT, MM, CT or DT, the following example is displayed (dd is replaced by the actual device mnemonic, and u is replaced by the actual unit number):

```
;       (BOOT THE SYSTEM DISK)
;       >SET /UIC=[1,5x]
;       >INS FLX
;       >LOA dd:
;
;                               ! REPEAT FROM HERE...
;       >FLX =ddu:*.*
;                               ! ...TO HERE FOR ALL VOLUMES
;                               ! USED FOR TRANSFER
;       >UNL dd:
;       >REM FLX
;       >INS PIP;-1
;       >@MTSKCO                 ! MAKE TASK FILES CONTIGUOUS
;                               ! A SERIES OF PIP COMMANDS FOLLOW
;       >@ <EOF>
;       >PIP MTSKCO.CMD;0/DE
;       >REM PIP
;
REM FLX
REM INI
REM UFD
REM PIP
```

USER MODE DIAGNOSTICS

Due to space limitations and the physical locations of files on the RK05 distribution kits, the user mode diagnostics are built in slightly differing ways. Read the section pertinent to your distribution kit.

```
SET /UIC=[1,20]
```

RL01 Kits

```
; NOW WE BUILD AND COPY THE TASK TO THE SECONDARY
; STORAGE MEDIUM.
; DEPENDING ON THE SECONDARY STORAGE MEDIUM AND THE NUMBER
; OF TASKS TO BE COPIED, YOU MAY HAVE TO MOUNT A BLANK MEDIUM
; IN THE DRIVE AFTER COPYING A TASK.  THE RECOMMENDED NUMBER OF FILES
; PER MEDIUM IS:
;       RK05,RL01 AND MAGTAPE (TS03,TU10,TU16,TU45) - ALL TASKS WILL FIT
;       FLOPPY DISK AND DECTAPE - 4 TASKS PER DISK OR TAPE
;       CASSETTE - 1 TASK PER CASSETTE
;
; IF YOUR SECONDARY STORAGE IS OTHER THAN RK05, RL01 OR MAGTAPE,
; AFTER COPYING A TASK, YOU WILL BE ASKED IF YOU WISH TO  MOUNT
; A NEW MEDIUM. IF SO THE INDIRECT FILE PROCESSOR WILL
; PAUSE TO ALLOW TIME TO MOUNT IT.
;
; THE FOLLOWING ARE LEGAL SECONDARY STORAGE DEVICES:
;       DK      (RK05 DISK, FOR RK05 DISTRIBUTION KITS ONLY)
;       DL      (RL01 DISK, FOR RL01 DISTRIBUTION KITS ONLY)
;       DX      .(RX01 FLOPPY DISK)
;       CT      (TU60 CASSETTE TAPE)
;       DT      (TU56 DECTAPE)
;       MT      (TS03, TE10, OR TU10 MAGTAPE)
;       MM      (TU16, TE16, OR TU45 MAGTAPE)
```

* ENTER DEVICE FOR SECONDARY STORAGE [DDU] [S]:

> The next query displayed is dependent on your secondary
> storage device.

                DK: or DL: as Secondary Storage Device

> The following assumes DK: was entered as the secondary
> storage device.

; PUT YOUR TARGET SYSTEM DISK IN DK:

* IS DK: READY? [Y/N]:

> This query is repeated until the device is ready (Y
> response).

* ENTER VOLUME LABEL OF DK: [S]:

> The device is then mounted using this volume label.

MOU DK:volume label

> Control then passes to the indirect command file BLDUMD.CMD
> (see that Section).

                DX: as Secondary Storage Device

> If DX: is not loaded, the MCR LOA command is issued.

LOA DX:

```
; TO COPY THE TASK IMAGE FILES FROM THE SECONDARY
; STORAGE MEDIUM TO THE SYSTEM DISK, PROCEED AS FOLLOWS
; AFTER SYSGEN3 HAS TERMINATED:
;
;
;       (BOOT THE SYSTEM DISK)
;       >SET /UIC = [1,5x]
;       >INS $PIP
;       >LOA DX:
;
;               !REPEAT FROM HERE...
;       >MOU DX:TASKX   !        REPLACE "TASKX" BY
;                       !        ACTUAL VOLUME LABEL
;       >PIP = DX:*.*
;       >DMO DX:
;               !...TO HERE FOR ALL VOLUMES
;               !USED FOR TRANSFER
;       >UNL DX:
```

> Control then passes to the indirect command file BLDUMD.CMD
> (see Section 9.2).

     CT:, DT:, MT:, or MM: as Secondary Storage Device

> The following assumes DT: was entered as the secondary
> storage device.

> If the secondary storage device is not loaded, the MCR LOA
> command is issued.

LOA DT:

; TO COPY THE TASK IMAGE FILES FROM THE SECONDARY
; STORAGE MEDIUM TO THE SYSTEM DISK, PROCEED AS FOLLOWS
; AFTER SYSGEN3 HAS TERMINATED:
;
;   (BOOT THE SYSTEM DISK)
;   >SET /UIC = [1,5x]
;   >INS $FLX
;   >LOA DT:
;   ! REPEAT FROM HERE...
;   >FLX = DT:*.*
;   ! ... TO HERE FOR ALL VOLUMES
;   ! USED FOR TRANSFER
;   >UNL DT:

; >REM FLX

        Control then passes to the indirect command file BLDUMD.CMD
        (see Section xxx).

                        Dual RK05 Kits

* DO YOU HAVE AN EMPTY RK05 REMOVABLE DRIVE AVAILABLE? [Y/N]:

        If not, instructions are given for copying the task image
        files from secondary storage to the system disk.

        If an empty drive is available, you are asked to identify
        the unit number.

* WHAT IS THE UNIT NUMBER OF THE EMPTY DRIVE? [O R:0-3]:

        The following assumes that DK2: is the empty drive.

; PLACE THE SYSTEM DISK IN DK2: AND START IT UP (WRITE
; ENABLED). WE WILL COPY THE TASKS DIRECTLY TO THE SYSTEM DISK.

* IS THE SYSTEM DISK READY? [Y/N]:

        ·This question is repeated until the disk is ready (Y
        response). When ready, the disk is mounted.

MOU DK2:SYSTEM

* WAS THE SYSTEM DISK MOUNTED SUCCESSFULLY? [Y/N]:

        If not, the MOUnt command is issued again.

        If mounted successfully, control passes to the indirect
        command file BLDUMD.CMD (see Section 9.2).

            All Kits Except RL01 Kit and RK05 Kits

        Control is passed directly to the indirect command file
        BLDUMD.CMD (see Section 9.2).

        End of SYSGEN Phase III.

9.2 BLDUMD.CMD FILE DETAILS

BLDUMD is the indirect command file to task-build all or selected User Mode Diagnostics. BLDUMD is called from SYSGEN Phase III if the corresponding question is answered appropriately. It may also be called manually at any time with the following command:

>@[200,200]BLDUMD

The following is a detailed description of all the steps in BLDUMD.

```
;
; BLDUMD <VERSION 03.1>
;
; COPYRIGHT (C) 1976, 1977, 1979
; DIGITAL EQUIPMENT CORP., MAYNARD, MASS.   01754
;
;       BUILD ALL OR SELECTED USER MODE DIAGNOSTICS.
;
;
* ARE YOU RUNNING ON A MACHINE WITH AT LEAST 24K WORDS? [Y/N]:
;
```

> If the answer is N, the following text is displayed and BLDUMD terminates.

```
;
; SORRY, YOU CANNOT BUILD (OR RUN) THE USER MODE DIAGNOSTICS
; ON A MACHINE WITH LESS THAN 24 K WORDS!
;
```

> Otherwise, processing continues here.
>
> As in the previous sections of SYSGEN, you must identify your distribution kit.

* DO YOU HAVE THE DUAL RK05 DISTRIBUTION KIT?   [Y/N]:

> If you do, you are asked to identify the RK05 drives that contain the UTLOBJ and RSXM26 disks. The UTLOBJ disk is then assigned to SY: and the RSXM26 disk is assigned to LB:.

* IN WHICH RK05 DRIVE IS THE UTLOBJ DISK MOUNTED?   [0 R:0-3]:

* IN WHICH RK05 DRIVE IS THE BASLINE DISK MOUNTED?   [0 R:0-3]:

> The following assumes DK0: for the UTLOBJ disk and DK1: for the RSXM26 disk.

```
ASN DK0:=SY:
ASN DK1:=LB:
```

> If you replied negatively to the dual RK05 query, the next query displayed is

* IS THE CURRENT SYSTEM DISK AN RP02/03/04/05/05 OR RK06/07?

* DO YOU WANT EXPANDED COMMENTS FOR THE UMD BUILD PROCEDURE?   [Y/N]:

> Expanded comments provide a lot of descriptive text that the experienced user might want to dispense with.

```
;
; DIAGNOSTIC TASKS CAN BE BUILT FOR THE FOLLOWING DEVICES:
;
; MNEMONIC    DEVICE        DIAGNOSTIC NAME
;
; DB:    RJP04/RWP04       RP04
; DB:    RJP05/RWP05       RP05
; DB:    RJP06/RWP06       RP06
; DF:    RF11/RS11         RF11
; DK:    RK11/RK05         RK05
; DM:    RK611/RK06        RK06
; DM     RK611/RK07        RK07
; DP:    RP11/RP02         RP02
; DP:    RP11/RP03         RP03
; DP:    RP11E/RPR02       RPR02
; DS:    RJS03/RWS03       RS03
; DS:    RJS04/RWS04       RS04
; DT:    TC11/TU56         TU56
; MM:    TJU16/TWU16       TU16
; MM:    TJU16/TWU45       TU45
; MT:    TMA11/TU10        TU10
; MT:    TMA11/TS03        TS03
; TT:    TERMINAL          TERM
;
;        DRIVE
;        COMPATIBILITY COMP
* DO YOU WANT DIAGNOSTICS FOR A MAPPED SYSTEM? [Y/N]:
* IS THE TARGET SYSTEM AN 11/70 [Y/N]:
;
SET UIC=[1,2x]
```

> If you are using other than a dual RK05 distribution kit,
> the task image files will be generated on the system disk,
> and the next section is bypassed.

```
;
; THE DIAGNOSTIC TASKS WILL BE STORED ON THE SYSTEM DISK BY DEFAULT.
; IF YOUR SYSTEM DISK IS AN RK05 YOU MAY BE REQUIRED TO STORE THE
; DIAGNOSTICS ON A SEPARATE DISK TO AVOID ALLOCATION PROBLEMS.
;
; IF YOU HAVE THE DUAL RK05 RELEASE KIT, YOU SHOULD SPECIFY
; THAT THE DIAGNOSTICS BE STORED ON ANOTHER DISK. IF YOU HAVE
; A THIRD RK05 PUT THE PRIVOBJ DISK IN IT AND STORE THE DIAGNOSTICS
; ON IT. OTHERWISE, STORE THEM ON LB0:.

* DO YOU WANT THE DIAGNOSTICS STORED ON ANOTHER DISK? [Y/N:]
```

> If this question is answered with an N, the next section is
> bypassed. Otherwise, you are asked for the device mnemonic
> and unit number of the disk where to store the diagnostics.

```
* ENTER THE OUTPUT DEVICE NAME AND UNIT NUMBER (E.G.  DK1) [S]:
```

> It is assumed in the following lines that you answered this
> question with DK1.

```
;
; THE COMMAND BUILD FILE WILL NOW PAUSE WHILE YOU MOUNT DK1:
; YOU MUST CREATE THE UFD'S [1,3x] AND [1,5x] ON THE DISK
; (THE FORMER ONLY IF YOU WANT THE TASK BUILD MAPS) IF THEY
; DO NOT ALREADY EXIST.
;
; EXAMPLE:
;       >INIT DK1:DIAGNOSTICS
;       >MOUNT DK1:DIAGNOSTICS
;       >UFD DK1:[1,3x]
;       >UFD DK1:[1,5x]
;
 AT. -- PAUSING. TO RESUME TYPE "RES ...AT."
```

Whatever the system disk type is, processing continues here.

```
;
; DIAGNOSTICS ARE GENERALLY RUN WITH THE FOLLOWING ATTRIBUTES:
;
;       PARTITION =     GEN
;       BASE ADDRESS =  40000
;       SIZE =          40000
;
```

The last two lines appear only if you are building
diagnostics for an unmapped system.

```
;
; IF YOUR SYSTEM IS DIFFERENT ANSWER YES TO THE FOLLOWING QUESTION.
* DO YOU WANT TO ALTER THE DEFAULT PARTITION ATTRIBUTES? [Y/N]:
```

The following three questions are bypassed if you answered
this question with an N.

```
* ENTER THE PARTITION NAME (DEFAULT=GEN) [S]:
```

The following question is asked only if you are building
diagnostics for an unmapped system.

```
* ENTER THE PARTITION BASE ADDRESS (DEFAULT=40000) [S]:
* ENTER THE PARTITION SIZE (DEFAULT=40000) [S]:
;
; THE DIAGNOSTIC TASKS ARE NORMALLY BUILT TO TRANSFER DATA VIA
; A 2000 OCTAL BYTE DATA BUFFER. YOU MAY SPECIFY A DIFFERENT
; BUFFER SIZE BY ANSWERING THE NEXT QUESTION.
;
* ENTER THE BUFFER SIZE IN OCTAL BYTES (DEFAULT=2000) [S]:
;
; NORMALLY DIAGNOSTIC TASK BUILD MAPS ARE NOT REQUIRED.
; IN THE UNLIKELY EVENT YOU NEED THEM, ANSWER "YES" TO THE
; FOLLOWING QUESTION.
;
* DO YOU WANT TASK BUILD MAPS? [Y/N]:
* DO YOU WANT THE MAPS LISTED ON THE LINEPRINTER? [Y/N]:
```

If you answered Y to the first question and N to the second
of the two questions above, the maps will be directed to UFD
[1,3x] on the output disk.

```
;
; NORMALLY YOU ENTER EACH DIAGNOSTIC NAME REQUIRED FOR YOUR SYSTEM.
; AN ALTERNATE METHOD IS PROVIDED WHICH ALLOWS BUILDING ALL
; AVAILABLE DIAGNOSTICS. THIS METHOD REQUIRES ABOUT 500 BLOCKS OF
; DISK SPACE ON THE OUTPUT DEVICE. THE DIAGNOSTICS THAT DO NOT APPLY
; CAN BE DELETED AT A LATER TIME.
;
* DO YOU WANT TO BUILD ALL AVAILABLE DIAGNOSTICS? [Y/N]:
* HAVE ALL QUESTIONS BEEN ANSWERED TO YOUR SATISFACTION? [Y/N]:
```

If you answered these questions with N, processing will restart at the beginning of BLDUMD. Otherwise, if you want to build all diagnostics, the next section that asks for diagnostic names is bypassed.

```
;
; ENTER THE NAME OF THE DIAGNOSTIC TASKS TO BUILD, ONE AT
; A TIME. WHEN DONE, ENTER A SINGLE CARRIAGE RETURN.
;
; THE FOLLOWING IS A LIST OF VALID DIAGNOSTIC NAMES:
;       RP04,RP05,RP06,RF11,RK05,RK06,RP02,RP03,RPR02,RS03
;       RS04,TU56,TU16,TU45,TU10,TS03,TERM
;
; HERE IS A SAMPLE DIALOGUE TO BUILD THE RJP04/RWP04 DISK AND THE
; TMA11/TS03 MAGTAPE DIAGNOSTICS ( <CR> = CARRIAGE RETURN) :
;
;       NAME [S]:RP04<CR>
;       NAME [S]:TS03<CR>
;       NAME [S]:<CR>
;
```

The next question requires as a response, the name of the next diagnostic to build, out of the list shown above.

```
* NAME [S]:
```

If an invalid name is entered (for example "XX"), the following message is displayed, and the question is repeated.

```
;***** "XX" DIAGNOSTIC IS NOT AVAILABLE*****
```

The question "* NAME [S]:" is repeated to allow you to enter the names of all diagnostics to be built. When done, answer with a single carriage return.

If you chose to build all the diagnostics, or when you have entered the names of all the desired diagnostics, processing continues here.

```
;
; NOW WE TASK BUILD THE SELECTED DIAGNOSTICS
;
INS $BIGTKB
TKB @UMDBLD
```

The command above builds the selected diagnostics, according to specifications defined by the previous sections.

```
REM TKB
```

End of UMDBLD.

The following sample dialogue builds diagnostics for RK05,
TU16, and terminals to run on an unmapped system. The GEN
partition in that system starts at 50000. The task image
files are directed to the target system disk which is put in
drive DK1:.

```
>@[200,200]BLDUMD
>;
>; BLDUMD <VERSION 03.1>
>;
>; COPYRIGHT (C) 1976, 1977, 1979
>; DIGITAL EQUIPMENT CORP., MAYNARD, MASS. 01754
>;
>;       BUILD ALL OR SELECTED USER MODE DIAGNOSTICS.
>;
>* ARE YOU RUNNING ON A MACHINE WITH AT LEAST 24K WORDS? [Y/N]:Y
>* DO YOU HAVE THE DUAL RK05 DISTRIBUTION KIT? [Y/N]:
>* IS THE CURRENT SYSTEM DISK AN RP02/03/04/05/06 OR RK06? [Y/N]: Y
>* DO YOU WANT EXPANDED COMMENTS FOR THE UMD BUILD PROCEDURE? [Y/N]:
>* DO YOU WANT DIAGNOSTICS FOR A MAPPED SYSTEM? [Y/N]:
>SET /UIC=[1,20]
>* DO YOU WANT THE DIAGNOSTICS STORED ON ANOTHER DISK? [Y/N]:Y
>* ENTER THE OUTPUT DEVICE NAME AND UNIT NUMBER (E.G. DK1) [S]: DK1
>;
>; THE COMMAND BUILD FILE WILL NOW PAUSE WHILE YOU MOUNT DK1:
>; YOU MUST CREATE THE UFD'S [1,30] AND [1,50] ON THE DISK
>; (THE FORMER ONLY IF YOU WANT THE TASK BUILD MAPS) IF THEY
>; DO NOT ALREADY EXIST.
>;
AT. -- PAUSING. TO CONTINUE TYPE "RES ...AT"
>MOU DK1:UNMOBJ
>RES ...AT
AT. -- CONTINUING
>
>* DO YOU WANT TO ALTER THE DEFAULT PARTITION ATTRIBUTES? [Y/N]:Y
>* ENTER THE PARTITION NAME (DEFAULT=GEN) [S]:
>* ENTER THE PARTITION BASE ADDRESS (DEFAULT=40000) [S]: 50000
>* ENTER THE PARTITION SIZE (DEFAULT=40000) [S]:
>* ENTER THE BUFFER SIZE IN OCTAL BYTES (DEFAULT=2000) [S]:
>* DO YOU WANT TASK BUILD MAPS? [Y/N]:
>* DO YOU WANT TO BUILD ALL AVAILABLE DIAGNOSTICS? [Y/N]:
>* HAVE ALL QUESTIONS BEEN ANSWERED TO YOUR SATISFACTION? [Y/N]:Y
>;
>; ENTER THE NAME OF THE DIAGNOSTIC TASKS TO BUILD, ONE AT
>; A TIME. WHEN DONE, ENTER A SINGLE CARRIAGE RETURN.
>;
>* NAME [S]: RK05
>* NAME [S]: TU16
>* NAME [S]: TERM
>* NAME [S]:
>;
>; NOW WE TASK BUILD THE SELECTED DIAGNOSTICS
>;
>TKB @UMDBLD
>;
>@ <EOF>
>
```

CHAPTER 10

INSTALLATION VERIFICATION PROCEDURE

10.1 INTRODUCTION

The RSX-11M Installation Verification Procedure checks out the software-hardware system that you created during the SYSGEN process. The procedure does not replace the hardware diagnostics that DIGITAL Field Service runs on individual devices nor does it substitute for software testing during software development. The procedure merely verifies that your generated system has produced a working system with the configuration that you requested during SYSGEN.

The Installation Verification Procedure consists of a set of controlling command files that run a series of test modules that gives the system a rigorous exercising. The procedure exercises two areas of the system: hardware, discussed in Section 10.2 and software, discussed in Section 10.3.

10.2 HARDWARE

As a result of running this procedure, you know what devices were successfully generated into the system and you have verified the functioning of all disk and tape units under operating system control. The procedure operates the devices under varying system loads.

10.2.1 System I/O Exerciser

The system I/O exerciser verifies the functioning of all disk and tape units on the system and identifies all devices to be tested. The exerciser tests disks as Files-11 volumes (mounted automatically) that are public or not allocated by another user. Also, the exerciser tests DECtape, cassettes, and magtape by using AST driven QIO requests.

After the test, the exerciser deletes all files that it has created on these volumes. However, the exerciser does not modify the disk structure or any existing disk data. Be aware that the exerciser overwrites tapes and destroys their contents.

10.3 SOFTWARE

The software verification modules of the procedure quickly access and exercise those discrete system software components that can be operated under command file control. This operation tests the completeness of the System Generation procedure.

10.3.1 CPU-bound Load Test

The CPU-bound load test determines whether the system can handle a
heavy loading of parallel processing, compute-bound tasks. This test
determines whether the entire memory encompassed by the system
partition, GEN, is available to the system. This test uses the
checkpointing, swapping, and round-robin scheduling Executive options
when present. Also, this test uses the Send and Receive Executive
directives. This test cannot be run in an unmapped system and
therefore is skipped in an unmapped system.

10.3.2 System Utilities Verification

This test invokes most of the standard RSX-11M system utilities and
verifies their presence and operation by using an indirect command
file routine. The test invokes interactive editors and the ACNT
program to demonstrate that an executable task file exists. You can
choose to execute some functions in these programs or exit from them
immediately.

10.4 OPERATING PROCEDURES

Your system must meet certain configuration and operational
requirements to run the entire Installation Verification Procedure.
These requirements follow.

10.4.1 Configuration Restrictions

- The hardware verification section requires that the system
  support ASTs. The I/O exerciser and CPU-bound load test use
  ASTs.

- If the system is unmapped, the procedure does not execute the
  CPU-bound load test.

If your system does not support any of the following features, the
CPU-bound load test cannot run. However, the procedure determines
whether your system supports the following features. It does not run
the CPU-bound test if any are missing.

The required features for the CPU-bound load test are:

- Send/Receive directives

- Alter Priority directive

- Get Partition Parameters directive

- AST support

- Dynamic checkpointing

10.4.2 Operating Environment

- Run the Installation Verification Procedure following the completion of SYSGEN. The devices to be tested cannot be allocated to other users.

- You should run the Installation Verification Procedure on a stand-alone basis if possible. The procedure puts a heavy load on the system to the detriment of the throughput of other system users. The procedure should have an unlimited access to system features and devices to properly do its assigned task.

- You must run the procedure from a privileged terminal.

- The procedure runs from UIC [2,300]. If you wish, you can delete the entire contents of [2,300] after a successful run.

- You must place scratch tapes on all magnetic tape drives, including cassettes and DECtapes. Files-11 initialized disks must be placed on all disk drives.

- The procedure can be repeated without the necessity of rebuilding DEFINE.TSK if DEFINE is installed.

- The procedure needs only one terminal to run. If a second, CRT terminal exists, you can use it to run RMDEMO. If one terminal is a printing terminal, use it to run the procedure to allow you to check the printout for errors. If you must run the procedure from a CRT terminal, you must watch the terminal very closely to avoid missing important information (for example, error messages) that you may need later.

10.4.3 Operating Instructions

1. Boot the system.

2. Allocate a large checkpoint space for the system.

3. Place scratch media on all DECtape, cassette and magtape drives. Place initialized disk packs on all empty drives. The packs need not be scratch packs because data is not lost on them.

4. Execute the command file, SAM. For example:

   >@[2,300]SAM

5. From this point, the operating instructions are part of the console dialogue, which follows in Section 10.4.4, "Sample Console Dialogue". When the procedure runs to completion, examine the dialogue for error messages. These fall into three categories:

   a. A function did not execute because this system intentionally does not contain the function.

   b. A function did not execute because of a SYSGEN error.

   c. A hardware problem occurred.

10.4.4 Sample Console Dialogue

The following console dialogue is from an actual session of running
the RSX-11M Installation Verification Procedure. It is included here
to guide you and give you an indication of what to expect when you run
your procedure.   Before you begin, mount the Executive source disk
(EXCSRC) and assign it to SY:.

```
>SET /UIC=[2,300]
>MOU DL0:/OVR
>PIP =DL0:SAM.CMD
>@SAM
;
;          *****************************************************
;          *                                                   *
;          *    RSX-11M INSTALLATION VERIFICATION PROCEDURE *
;          *                                                   *
;          *****************************************************
>;
>SET /UIC=[2,300]
>INS LB:$PIP
>RUN ERRLOG
ERL -- ERROR LOG INITIALIZED
>;
>* DO YOU WISH TO RUN RMDEMO? [Y/N]: N
ERL -- ERROR LOG INITIALIZED
>;
>* ENTER UNIT NUMBER OF TERMINAL [S]: 0
>;
>;
>;
>;
>;                  **** NOTE ****
>;
>; TEST MEDIA MUST BE LOADED ON ALL TAPE AND DISK DRIVES.  USE SCRATCH
>; TAPES AND FILES-11 FORMAT DISKS.
>;
>; ALL MAGTAPES BEING TESTED ARE OVER-WRITTEN.  THE DISKS ARE
>; TESTED WITH FILE-STRUCTURED I/O WITH NO NEGATIVE EFFECT ON DATA
>; OR STRUCTURE.
>;
>; BEFORE PERFORMING THE FILE-STRUCTURED I/O TEST, ALL UNMOUNTED
>; DISKS ARE MOUNTED AUTOMATICALLY.
>* DO YOU NEED TO INITIALIZE ANY DISKS? [Y/N]: N
>;
>TIM
12:57:52 06-FEB-79
>; NEEDED UTILITIES WILL BE INSTALLED NOW.
>; **********
>; *************************************************************
>PIP TAILOR.DAT=DEVM.SAM/AP
>MAC DEFINE=[11,10]RSXMC/PA:1,[2,300]DEFINE
>TKB DEFINE/PR/CP=DEFINE,LB:[1,54]RSX11M.STB,[1,1]EXELIB/LB
>INS DEFINE/TASK=DEFINE
>PIP *.*/PU
>RUN DEFINE
>
>;
>;        * CPU-BOUND LOAD TEST *
>;
>INS DUMMY/TASK=DUM00/PRI=40.
>INS LOGGER/TASK=LOG00
>INS QTRUN /TASK=QTR00
```

```
>RUN DUM00
>;
>; FOR THE NEXT FEW MINUTES A NUMBER OF COMPUTE BOUND TASKS WILL BE
>; EXERCISING THE MEMORY, THE MULTI-TASKING CAPABILITIES OF THE
>; SYSTEM AND, IF INCLUDED IN THIS SYSTEM, THE ROUND-ROBIN SCHEDULER,
>; THE SHUFFLER, AND CHECKPOINTING.  THE ACTION OF THESE LAST THREE
>; FEATURES CAN BE SEEN ON THE RMDEMO SCREEN.  IF THE SYSTEM IS
>; PERFORMING PROPERLY, ALL OF THE "GEN" IS USED AND THE "QT"
>; TASKS ARE SHARING THE SYSTEM RESOURCES IN A MANNER CONSISTENT
>; WITH THE FEATURES AVAILABLE.  NOTE THAT CHECKPOINTING IS DISABLED
>; FOR THE SECOND HALF OF THE TEST.
>;
>;        *** THIS TEST RUNS FOR A MAXIMUM OF 6 MINUTES ***
>;
>RUN QTR00
>
>TIM
12:59:51 06-FEB-79
>INS NUL3/TASK=QT0000
>INS NUL3/TASK=QT0100
>INS NUL3/TASK=QT0200
>INS NUL3/TASK=QT0300
>INS NUL3/TASK-QT0400
>INS NUL3/TASK=QT0500
>;      >>>>>> THE LOAD TEST IS RUNNING <<<<<<
>
>TIM
13:06:15 06-FEB-79
>REM QT0000
>REM QT0100
>REM QT0200
>REM QT0300
>REM QT0400
>REM QT0500
>;
>;        * TEST COMPLETED *
>;
>;
>;
>;        * SYSTEM I/O EXERCISER *
>;
>; THE FOLLOWING DEVICES HAVE BEEN GENERATED INTO YOUR SYSTEM.   THOSE
>; LISTED AS "OFFLINE" ARE NOT PHYSICALLY PRESENT AND ARE NOT
>; TESTED.  INDIVIDUAL MAG TAPE, DEC TAPE AND RK05 UNITS
>; CAN BE SHOWN ERRONEOUSLY AS ONLINE WHEN THE CONTROLLER IS ONLINE.
>; THEY ARE TESTED AND THE TEST FAILS AFTER SEVERAL MINUTES
>; OF ERROR MESSAGES.
>;
>DEV
LP0:     LOADED
DB0:     OFFLINE LOADED TYPE=RP04
DB1:     LOADED TYPE=RP04
DB2:     OFFLINE LOADED TYPE=RP04
DB3:     MOUNTED LOADED LABEL=RSX26 TYPE=RP04
DB4:     OFFLINE LOADED TYPE=RP04
DD0:     OFFLINE UNLOADED
DD1:     OFFLINE UNLOADED
DK0:     LOADED
DK1:     LOADED
DL0:     OFFLINE UNLOADED TYPE=RL01
DL1:     OFFLINE UNLOADED TYPE=RL01
DM0:     OFFLINE LOADED TYPE=RK06
DM1:     LOADED TYPE=RK06
DP0:     UNLOADED TYPE=RP02
```

```
DP1:    UNLOADED TYPE=RP02
DR0:    OFFLINE UNLOADED TYPE=RM03
DR1:    UNLOADED TYPE=RM03
DS0:    OFFLINE UNLOADED TYPE=RS04
DS1:    OFFLINE UNLOADED TYPE=RS03
DT0:    OFFLINE LOADED
DT1:    OFFLINE LOADED
DX0:    OFFLINE LOADED
DX1:    OFFLINE LOADED
MM0:    UNLOADED
MM1:    UNLOADED
MT0:    OFFLINE LOADED
MT1:    OFFLINE LOADED
MS0:    OFFLINE UNLOADED
TT0:    [2,300] - LOGGED ON LOADED
TT1:    LOADED
TT2:    LOADED
TT3:    LOADED
TT4:    LOADED
TT5:    LOADED
TT6:    LOADED
TT7:    LOADED
TT10:   LOADED
TT11:   LOADED
TT12:   LOADED
TT13:   LOADED
TT14:   LOADED
TT15:   LOADED
TT16:   LOADED
TT17:   LOADED
TT20:   LOADED
TT21:   LOADED
TT22:   LOADED
TT23:   LOADED
TT24:   LOADED
TT25:   LOADED
TT26:   LOADED
TT27:   LOADED
TT30:   LOADED
TT31:   LOADED
TT32:   LOADED
TT33:   LOADED
TT34:   LOADED
TT35:   LOADED
TT36:   LOADED
TT37:   LOADED
NL0:
TI0:
CO0:    TT0:
CL0:    TT0:
LB0:    DB3:
SY0:    DB3:
WK0:    DB0:
>;
>;
>; IF ANY DRIVERS ARE UNLOADED, THEY ARE LOADED NOW.
>;
>; **********
>LOA DP:
>LOA MM:/PAR=GEN
LOA -- INTERRUPT VECTOR ALREADY IN USE
>; *****************************************************
>INS [2,300]IOX/TASK=...SIO
>MOU DB1:/OVR/VI
```

```
MOUNT-**VOLUME INFORMATION**
DEVICE  = DB1:
CLASS   = FILE 11
LABEL   = RSX11M
UIC     = [1,1]
ACCESS  = [RWED,RWED,RWED,RWED]
CHARAC  = []
>MOU DK1:/OVR/VI
MOUNT-**VOLUME INFORMATION**
DEVICE  = DK1:
CLASS   = FILE 11
LABEL   = SYSTEM
UIC     = [1,1]
ACCESS  = [RWED,RWED,RWED,RWED]
CHARAC  = []
>MOU DK0:/OVR/VI
MOUNT-**VOLUME INFORMATION**
DEVICE  = DK0:
CLASS   = FILE 11
LABEL   = UTIL
UIC     = [2,300]
ACCESS  = [RWED,RWED,RWED,RWED]
CHARAC  = []
>MOU DM1:/OVR/VI
MOUNT-**VOLUME INFORMATION**
DEVICE    = DM1:
CLASS     = FILE 11
LABEL     = RSXM26
UIC       = [1,1]
CLASS     = [RWED,RWED,RWED,RWED]
CHARAC    = []
>;
>;
>;      THE SYSTEM I/O EXERCISER WILL RUN FOR 3 MINUTES
>;
>TIM
13:06:18 06-FEB-79
>SIO @IOXCNF
SIO -- DRIVER NOT LOADED
SIO -- FAILED TO ATTACH UNIT

SIO -- SUMMARY OF EXERCISER ACTIVITY AT 6-FEB-79 13:09:39
   TIME -- RUN: 3 MIN.   ELAPSED: 3 MIN.   REMAINING: 0 MIN.
   DB1: -- 7,053. REQUESTS TOTALING 7,053. BLOCKS WITH NO ERRORS
   DB3: -- 7,052. REQUESTS TOTALING 7,052. BLOCKS WITH NO ERRORS
   DK0: -- 2,348. REQUESTS TOTALING 2,348. BLOCKS WITH NO ERRORS
   DK1: -- 2,341. REQUESTS TOTALING 2,341. BLOCKS WITH NO ERRORS
   DM1: -- 6,547. REQUESTS TOTALING 6,547. BLOCKS WITH NO ERRORS
   IDLE-LOOP COUNT: 1,988. ITERATIONS

  A C C U M U L A T E D   T O T A L S :
  - - - - - - - - - - -   - - - - - - -
   TIME -- RUN: 3 MIN.   ELAPSED: 3 MIN.   REMAINING: 0 MIN.
   DB1: -- 7,053. REQUESTS TOTALING 7,053. BLOCKS WITH NO ERRORS
   DB3: -- 7,052. REQUESTS TOTALING 7,052. BLOCKS WITH NO ERRORS
   DK0: -- 2,348. REQUESTS TOTALING 2,348. BLOCKS WITH NO ERRORS
   DK1: -- 2,341. REQUESTS TOTALING 2,341. BLOCKS WITH NO ERRORS
   DM1: -- 6,547. REQUESTS TOTALING 6,547. BLOCKS WITH NO ERRORS
   IDLE-LOOP COUNT: 1,988. ITERATIONS


>REM SIO
>TIM
13:10:05 06-FEB-79
```

```
>;
>;          * TEST COMPLETED *
>;
>;
>;
>;          * UTILITIES VERIFICATION SECTION *
>;
>;
>RUN DEFINE
>
>;
>;
>;          * CMP VERIFICATION *
>;
>TIM
13:10:17 06-FEB-79
>PIP COMPAR.CMD=SIOE.CMD
>! INVOKE CMP TO COMPARE IDENTICAL FILES
>CMP TI:= COMPAR.CMD,SIOE.CMD
   1)     COMPAR.CMD;1
   2)     SIOE.CMD;1

  NO DIFFERENCES FOUND
TI:=COMPAR.CMD,SIOE.CMD
>! NO DIFFERENCES SHOULD HAVE BEEN FOUND
>!
>! INVOKE CMP TO COMPARE DIFFERING FILES
>CMP TI:FILE1.,FILE2.
****************************************************
   1)   FILE.;1
     6    .; IF CMP IS FUNCTIONING, THIS LINE FROM FILE1. IS DIFFERENT
     7    .; THE REST OF THE LINES ARE IDENTICAL
***************
   2)   FILE2.;1
     6    .; THIS LINE IS THE FILE2. LINE WHICH DIFFERS FROM THE ABOVE.
     7    .; THE REST OF THE LINES ARE IDENTICAL.

     1 DIFFERENCES FOUND
TI:=FILE1.,FILE2.
>! ONE DIFFERENCE SHOULD HAVE BEEN FOUND
>PIP COMPAR.CMD;*/DE
>;
>TIM
13:10:46 06-FEB-79
>;
>;          * CMP VERIFICATION COMPLETE *
>;
>;          * ALL, BAD, INI, MOU, UFD, VFY, DMO, AND DEA VERIFICATION *
>;
>TIM
13:10:52 06-FEB-79
>;
>; THIS ROUTINE CHECKS THE DISK-ACCESSING MCR COMMANDS ALL, BAD, INI,
>; MOU, UFD, VFY, DMO AND DEA.
>; ALL AND DEA ARE TESTED ONLY FOR A MULTI-USER SYSTEM.
>; THIS ROUTINE REQUIRES EITHER ONE DISK DRIVE (OTHER THAN SY:) OR
>; DECTAPE OR ANSI SUPPORT FOR MAGTAPE.  IT WILL NOT USE A PUBLIC
>; DISK. IF ONLY MAGTAPE IS AVAILABLE, A SUB-SET OF THE TEST IS RUN.
>;
>;
>INS $BAD
>;
>;
>DMO DK0:
```

```
>DEA DK0:
 *** DK0: -- DISMOUNT COMPLETE
>;
>;
>;
>;
>;
>; *** BE SURE THERE IS A SCRATCH MEDIUM ON DK0: ***
>;
>* DO YOU WISH TO CONTINUE WITH THIS MODULE ? [Y/N]: Y
>;
>INS $VFY/TASK=...VFY
>ALL DK0:
>BAD DK0:
BAD -- DK0: TOTAL BAD BLOCKS= 0.
>INI DK0:UTIL/BAD=[AUTO]/UIC=[2,300]
>MOU DK0:UTIL/VI
MOUNT ** VOLUME INFORMATION **
DEVICE     = DK0:
CLASS      = FILES 11
LABEL      = UTIL
UIC        = [2,300]
ACCESS     = [RWED,RWED,RWED,RWED]
CHAR       = []
>UFD DK0:[2,300]
>PIP DK0:=DISK.CMD
>VFY DK0:/FR

DK0: HAS 4634. BLOCKS FREE, 166. BLOCKS USED OUT OF 4800.
>DMO DK0:
>;
*** DK0:  -- DISMOUNT COMPLETE
>;
>DEA DK0:
>;
TIM
13:12:42 06-FEB-79
>REM VFY
>REM BAD
>;
>;        * ALL, BAD, INI, MOU, UFD, VFY, DMO, AND DEA *
>;             * VERIFICATION COMPLETE *
>;
>;        * FLX VERIFICATION *
>;
>;
>INS [1,54]FLX/TASK=...FLX
>;
>;   THE FOLLOWING QUESTION WILL BE ANSWERED: DOES FILEX FUNCTION?
>;
>; THE TAPE ON DRIVE MM0: WILL BE OVER WRITTEN.
>;
>FLX MM:/ZE
FLX -- DEVICE HANDLER MISSING

>FLX MM:/DO=FI.LEX,FUNCTI.ONS/RS
FLX -- DEVICE HANDLER MISSING

>FLX MM:/LI
FLX -- DEVICE HANDLER MISSING

>REM FLX
>TIM
13:13:07 06-FEB-79
```

```
>;
>;
>;          * FLX  VERIFICATION  COMPLETE *
>;
>;
>;          * DMP  VERIFICATION *
>;
>TIME
13:13:12 06-FEB-79
>INS SY:[1,54]DMP/TASK=...DMP
>DMP TI:=ASRC.XXX/AS/RC




DUMP OF DB3:[2,300]ASRC.XXX;1 - FILE ID 2171,1,0
                RECORD NUMBER 00. - SIZE 16. BYTES


000000    D M P    W O R K S !


*** EOF ***


>REMOVE ...DMP
>TIME
13:13:24 06-FEB-79
>;
>;          * DMP  VERIFICATION  COMPLETE *
>;
>;          * CREF, PMD, AND PRT VERIFICATION *
>;
>;          THIS ROUTINE OPERATES THE FOLLOWING UTILITIES:
>;          MAC,TKB,CREF,PMD,PRT
>;
>;          IF ALL ARE FUNCTIONAL, AN EXAMPLE OF A MACRO LISTING WITH SYMBOL
>;          AND MACRO CROSS-REFERENCE LISTINGS ATTACHED ARE SPOOLED TO
>;          THE LINE PRINTER, A TASK ARE RUN AND IT CRASHES AND A
>;          POST-MORTEM DUMP LISTING OF THE CRASHED TASK IS SPOOLED.
>;
>TIM
13:13:44 06-FEB-79
>INS [1,54]CRF/TASK=...CRF
>;
>MAC CRTEST,CRTEST/CR/-SP=CRTEST
>TKB CRTEST/PM=CRTEST
>;
>PIP CRTEST.LST/SP
PIP -- FAILED TO SPOOL FILE FOR PRINTING
DB3:[2,300]CRTEST.LST;4
>;
RUN CRTEST
>;
>REM CRF
 TASK "TT0    " TERMINATED
ODD ADDRESS OR OTHER TRAP FOUR
PC=001236
PS=170001
R0=000000
R1=111111
R2=022222
R3=033333
```

```
R4=044444
R5=055555
SP=001172
POST MORTEM DUMP WILL BE GENERATED

>TIM
13:14:10 06-FEB-79
>;
>;        * CREF, PMD AND PRT VERIFICATION COMPLETE *
>;
>;
>RUN DEFINE
>
>;
>;
>;        * DSC VERIFICATION *
>;
>TIM
13:14:38 06-FEB-79
>SET /UIC=[2,300]
>;
>; BECAUSE YOU DO NOT HAVE A FLOPPY DRIVE OR DEC TAPE,
>; AN AUTOMATIC VERIFICATION OF DSC OPERATION IS DEEMED
>; IMPRACTICAL.
>; THE DSC TEST IS BEING SKIPPED.
>;
>PIP *.TMP;*/DE
PIP -- NO SUCH FILE(S)
SY0:[2,300]*.TMP;*
>;
>;        * LBR VERIFICATION *
>;
>TIME
13:14:52 06-FEB-79
>INSTALL SY:[1,54]LBR/TASK=...LBR
>; Create an object module library.
>LBR OBJLIB/CR::::OBJ
>! Insert three object modules into the library.
>LBR OBJLIB/IN=OBJCT1,OBJCT2,OBJCT3
>! Insert an existing module into the library (error expected).
>LBR OBJLIB/IN=OBJCT2
LBR -- *FATAL*-DUPLICATE MODULE NAME "OBJ2      " IN OBJCT2.OBJ;1

>! Replace two existing modules.
>LBR OBJLIB/RP=OBJCT1,OBJCT2
MODULE "OBJ1    " REPLACED

MODULE "OBJ2    " REPLACED

>! Display the contents of the object module library.
>LBR OBJLIB/LE/FU
DIRECTORY OF FILE OBJLIB.OLB;1
OBJECT MODULE LIBRARY CREATED BY: LBR V06.00
LAST INSERT OCCURRED 6-FEB-79 AT 13:15:27
MNT ENTRIES ALLOCATED: 256; AVAILABLE: 253
EPT ENTRIES ALLOCATED: 512; AVAILABLE: 506
FILE SPACE AVAILABLE: 21897 WORDS
RECOVERABLE DELETED SPACE: 00150 WORDS

** MODULE:OBJ1    SIZE:00075  INSERTED:6-FEB-79   IDENT:ID 1


   ENT$A1   ENT$B1
```

```
** MODULE:OBJ2     SIZE:00075  INSERTED:6-FEB-79  IDENT:ID 2


   ENT$A2   ENT$B2


** MODULE:OBJ3     SIZE:00075 INSERTED:6-FEB-79   IDENT:ID 3


   ENT$A3   ENT$B3



>PIP OBJLIB.*;*/DE
>REMOVE ...LBR
>TIME
13:15:59 06-FEB-79
>;        * LBR VERIFICATION COMPLETE *
>;
>;        * PAT VERIFICATION *
>;
>TIME
13:16:04 06-FEB-79
>INSTALL [1,54]PAT/TASK=...PAT
>! Create an updated object file.
>PATCH PATCHD.PAT=OBJCT1,PATCH1
>! Compare the updated object file with one of known quality.
>CMP TI:=PATCHD.PAT,PATCHD.XXX
   1)   PATCHD.PAT;1
   2)   PATCHD.XXX;1

   NO DIFFERENCES FOUND
TI:=PATCHD.PAT,PATCHD.XXX
>PIP *.PAT;*/DE
>REMOVE ...PAT
>TIME
13:16:22 06-FEB-79
>;        * PAT VERIFICATION COMPLETE *
>;
>;        * SLP VERIFICATION *
>;
>TIME
13:16:27 06-FEB-79
>INSTALL [1,54]SLP/TASK=...SLP
>! Invoke the SLP Editor to edit a data file.
>SLP @SLPCMD    ! "SLP OUTPUT.SLP,LIST.SLP/-SP=SLPDAT.XXX"
>! Verify that the editing was properly performed.
>CMP TI:=OUTPUT.SLP,SLPOUT.XXX
   1) OUTPUT.SLP;1
   2) SLPOUT.XXX;1

   NO DIFFERENCES FOUND
TI:=OUTPUT.SLP,SLPOUT.XXX
>PIP *.SLP;*/DE
>REMOVE ...SLP
>TIME
13:16:46 06-FEB-79
>;        * SLP VERIFICATION COMPLETE *
>;
>;        * INTERACTIVE UTILITIES VERIFICATION *
>;
>;        ENTER A CHARACTER TO CONTINUE FROM EACH
>;        EDITOR SUCCESSFULLY INVOKED AND CTRL Z TO EXIT FROM ACNT.
```

```
>TIM
13:16:57 06-FEB-79
>EDI QQQQ.XXX
[CREATING NEW FILE]
INPUT

>ABO EDI

 TASK "...EDI" TERMINATED
ABORTED VIA DIRECTIVE OR MCR
>;
>PIP QQQQ.XXX;*/DE
>;
>INS [1,54]EDT
>EDT
EDT>
>ABO EDT

TASK "...EDT" TERMINATED
ABORTED VIA DIRECTIVE OR  MCR
>;
>REM EDT
>ZAP
ZAP>
>ABO ZAP
TASK "...ZAP" TERMINATED
 ABORTED VIA DIRECTIVE OR MCR
>INS [1,54]ACNT/TASK=ACNT
>RUN ACNT
 * ACCOUNT FILE MAINTENANCE PROCEDURE *
OPTIONS ARE: A - ADD, C - CREATE, D - DELETE, E - EXAMINE,
L - LIST, M - MODIFY, S - SORT, CTRL/Z - EXIT
ENTER OPTION: ^Z
OPERATION COMPLETE

>
>REM ACNT
>TIM
13:17:22 06-FEB-79
>;
>;       * INTERACTIVE UTILITIES VERIFICATION COMPLETE *
>;
>UNL MM:
UNL -- DRIVER NOT LOADED
>PIP *.DAT;*/DE
>;
>; IF ANY ERRORS HAVE BEEN LOGGED BY ERROR LOGGER, WHEN THE COMMAND FILE EXITS
>; YOU SHOULD PRINT SY:[2,300]ERRLOG.LST AND INVESTIGATE THE ERRORS.
>;
>ERF
ERF -- REQUESTED "ERRLOG" TO STOP LOGGING
ERL -- LOGGING ENDED AFTER 9 ERRORS
>INS LB:$PSE
>INS LB:$SYE
INS -- PARTITION PAR14K NOT IN SYSTEM, DEFAULTING TO GEN
>
>PSE SY:=SY:
>SYE SY:=SY:/-SP
>;
>RUN ERRLOG
ERL -- ERROR LOG INITIALIZED
>
>;
>REM PSE
```

```
>REM SYE
>;
>; IF YOU WANT TO REMOVE FROM THE SYSTEM ALL FILES ASSOCIATED
>; WITH THIS PROCEDURE, ANSWER THE FOLLOWING QUESTION WITH N.
>; THE ANSWER Y (FOR "YES, SAVE") LEAVES THE TASK, DEFINE,
>; INSTALLED.  ALL NECESSARY FILES REMAIN ON THE SYSTEM DISK TO
>; ENABLE A REPEAT RUN.
>* DO YOU WISH TO SAVE THE PROCEDURE TO RUN AGAIN? [Y/N]:Y
>;
>; *************************************************************
>;
>TIM
13:18:07 06-FEB-79
>;
>;      *** END OF RSX-11M V3.2 INSTALLATION VERIFICATION ***
>;
>; *************************************************************
>/
>@ <EOF>
>
```

10.5 ERROR CODES

The following text is a compilation of the error codes produced by the various modules in the RSX-11M Installation Verification Procedure. All the modules print an error number that is either the contents of F.ERR(R0) for I/O errors or $DSW for Executive directive status codes.

DEFINE.TSK - System Configuration Module

When an error occurs, DEFINE.TSK prints "DEFINE ERROR # nn ccc", where nn is the number of the error and ccc is the contents of F.ERR(R0) for I/O errors or $DSW for Executive directive status. Both F.ERR and $DSW appear in octal word format. Therefore, when the high-order byte shows as a minus one, it indicates that the error is from an Executive directive. The number of the error refers to the instruction that caused it. Below is a list of possible error numbers and their meanings.

ERROR #		DEFINITION
1	OPEN$W	- OPEN TO CREATE CONFIG.CMD FILE FAILED
2	OPEN$R	- OPEN FILE TAILOR.DAT FOR READ (FDB=FDTAIL) FAILED
3	READ$	- READ OF FILE TAILOR.DAT FAILED (FDB=FDTAIL)
4	WAIT$	- WAIT FOR FILE TAILOR.DAT (FDB=FDTAIL) FAILED
5	CLOSE$	- CLOSE OF FILE TAILOR.DAT (FDB=FDTAIL) FAILED
6	CLOSE$	- CLOSE FAILED FOR CONFIG.CMD FILE
8	PUT$	- OUTPUT TO CONFIG.CMD FILE FAILED
19	EXIT$S	- EXIT FAILED

LOGGER.TSK - Monitoring Task for QT Load Tasks

When an error occurs, LOGGER.TSK prints "LOGGER ERROR # nn ccc", where nn is the number of the error and ccc is the contents of F.ERR(R0) for I/O errors or of $DSW for Executive directive status. Both F.ERR and $DSW appear in octal word format. Therefore, when the high-order byte

shows as a minus one, it indicates that the error is from an Executive directive. The number of the error refers to the instruction that caused it. Below is a list of possible error numbers and their meanings.

ERROR #		DEFINITION
1	OPEN$W	– Failure of open for write to RUNLOG.DAT file.
2	OPEN$W	– Failure of open for write to ERRLOG.DAT file.
3	PUT$	– Failure of write to ERRLOG.DAT or RUNLOG.DAT file.
4	PUT$	– Failure of write to ERRLOG.DAT file.
5	PUT$	– Failure of write to ERRLOG.DAT or RUNLOG.DAT file.
6	PUT$R	– Failure of write to RUNLOG.DAT or ERRLOG.DAT file.
7	WSIG$S	– Wait for significant event directive failure.
10	RCVD$C	– Receive data directive failure.
11	ALUN$S	– Assign LUN directive failure.
12	WTSE$C	– Wait for significant event directive failure.
13	SETF$S	– Set event flag directive error.
14	SDAT$S	– Send data directive failure.
15	CLOSE$	– Close failure of RUNLOG.DAT or ERRLOG.DAT file.
16	GTIM$C	– Get time directive failure.
17	CLEF$S	– Clear event flag directive failure.

NUL1.TSK - One Form of the QT Load Tasks

When a directive error occurs, the QT load task prints "TASK QTnn ABORTING", where nn is the task number that identifies the specific task. The module then displays an error identifying number as "ERROR # n". It then displays the octal error code found in $DSW. The error codes in $DSW are defined in the RSX-11M/M-PLUS Executive Reference Manual or the RSX-11M Mini-Reference. Below is a list of possible error numbers and their meanings.

ERROR #		DEFINITION
0	SPND$S	– Suspend directive issued by QT task failed.
1	RCVD$C	– Receive Data directive failed (receive from CONFIG).
3	ALUN$S	– Assign Logical Unit Number directive failure to use TT# received from CONFIG.TSK
4	MRKT$C	– Mark Time directive failure.
5	EXIF$S	– Exit directive failure.
6	DSCP$S	– Disable Checkpointing directive failure.
7	SDAT$S	– Send Data directive failure (send to LOGGER before exiting). Insufficient dynamic memory can cause this error.
8	ASTX$S	– AST Service Exit directive failure.
12	CLEF$C	– Clear Event Flag directive failure.

QTRUN.TSK - Start Up the QT Load Tasks

When an error occurs, QTRUN.TSK prints "QTRUN ERROR # nn ccc", where nn is the number of the error and ccc is the contents of F.ERR(R0) for I/O errors or of $DSW for Executive directive status. Both F.ERR and

$DSW appear in octal word format. Therefore, when the high-order byte shows as a minus one, it indicates that the error is from an Executive directive.   The number of the error refers to the instruction that caused it. Below is a list of possible error numbers and their meanings.

ERROR #		DEFINITION
1	OPEN$W	– Open failure on DVLREM.CMD or DVLSET.CMD file.
2	OPEN$R	– Open failure on TAILOR.DAT file.
3	READ$	– Read failure on TAILOR.DAT file.
4	WAIT$	– Wait failure on TAILOR.DAT file.
5	CLOSE$	– Close failure on TAILOR.DAT file.
6	CLOSE$	– Close failure on DVLSET.CMD file or DVLREM.CMD file.
7	GPRT$C	– Get Partition Parameters Executive directive failure.
8	PUT$	– Write failure for .CMD files created by QTRUN.
9	RSUM$S	– Resume Executive directive failure for DUMMY task.
10	RQST$S	– Request Executive directive failure for LOGGER task.
13	WSIG$S	– Wait for Significant Event Executive directive failure.
14	RSUM$S	– Resume Executive directive failure.
15	RQST$S	– Request Executive directive failure.
16	SDAT$S	– Send Data Executive directive failure (failure of Send Data to QT task).
17	SDAT$S	– Send Data Executive directive failure (failure of Send Data to Logger task).
18	RSUM$S	– Resume Executive directive failure.
19	EXIT$S	– Exit Executive directive failure.
20	GTIM$C	– Get Time Executive directive failure.
21	ALTP$C	– Alter Priority Executive directive failure (alteration of indirect command file processor failed).
22	MRKT$C	– Mark Time Executive directive failure.

CHAPTER 11

SYSGEN ERROR MESSAGES

All messages from SYSGEN appear in this chapter in alphabetical order. The descriptions that follow each message explain the possible cause and, as necessary, suggest remedial action.

SGN -- Attempt to use non-existent default for parameter parm -- RETRY

> **Explanation:** A required parameter (number "parm") was missing from the response to the current peripheral question. Reenter the entire response. Note that the [L/R] parameter does not count.

SGN -- Baseline terminal driver not valid option with multiuser protection selected.

> **Explanation:** The half duplex baseline terminal driver includes no SYSGEN options and cannot execute in a multiuser protection system (for example, breakthrough write is required but not included). Choose a different terminal driver.

SGN -- CO driver not valid on RSX-11S systems -- SUPPRESSED

> **Explanation:** RSX-11S systems cannot include the console driver (CO). SYSGEN ignores this entry.

SGN -- CO driver not valid on unmapped system -- SUPPRESSED

> **Explanation:** Unmapped systems cannot include the console driver (CO). SYSGEN ignores this entry.

SGN -- Correct problems and reassemble the bad modules SYSGEN will continue when done.

> **Explanation:** This message indicates that you detected an error in assembling the Executive or the device drivers (you responded No at either the Executive or driver EOX breakpoint). After you correct the error, reassemble the bad modules and SYSGEN will continue.

SGN -- Correct problems -- SYSGEN will restart assemblies when done

> **Explanation:** This message indicates that you detected an error in assembling the laboratory peripheral devices. After you correct the error, SYSGEN will attempt to re-assemble the laboratory peripherals common area(s).

SGN -- DM11-BB CSR address must be greater than 157777 if specified -- RETRY

    Explanation: If the system includes a DM11-BB, the CSR address must be greater than or equal to 160000. If not included, the CSR address must be zero.

SGN -- DM11-BB vector address must be greater than 277 if specified -- RETRY

    Explanation: If the system includes a DM11-BB, the interrupt vector address must be greater than or equal to 300. If not included, the vector address must be zero.

SGN -- Dynamic storage space must be in multiples of two words -- RETRY

    Explanation: The system allocates pool in 4-byte sections. Thus, the amount of pool must be a multiple of 4 bytes.

SGN -- GR not valid on system with more than 124K -- SUPPRESSED

    Explanation: The graphics display driver (GR) does not execute on 22-bit processors. If your system includes a GR, the maximum amount of memory is 124K. If you have a GR and wish to use it, type CTRL/Z and restart specifying 124K or less for memory size.

SGN -- Illegal character in numeric response -- RETRY

    Explanation: A character other than 0-7 for an octal response or 0-9 for a decimal response was entered. Note that the use of special characters (# or .) to indicate an explicit octal or decimal response is forbidden.

SGN -- Illegal device mnemonic

    Explanation: This message applies only to dual RK05 kit users that answered Y to question 9 (skip end of disk (EOD) breakpoints). If you wish to ignore EOD breakpoints, you must enter the device that contains the driver source files. The message indicates that you incorrectly specified the driver source device; enter a minimum of two characters.

SGN -- Illegal device mnemonic -- RETRY

    Explanation: You specified a drive type that the device does not support (such as RP06 for a DL device).

SGN -- Illegal numeric answer -- RETRY

    Explanation: See the description of Illegal character in numeric response.

SGN -- Illegal printer specification -- Valid types are LP11-C, D, F, H, J, K, R, S, V, W, Y, Z, LS11, LA180, and LV11 -- RETRY

Explanation: SYSGEN only supports the above named line printer controllers. If you have a different controller, refer to the peripheral question concerning LP: to match your printer characteristics with a DEC standard printer.

SGN -- Illegal trailing characters or extra parameters "parm" -- RETRY

Explanation: You have specified more parameters than allowed for this response. Remember that parameters in brackets can only be specified for the first controller of this type.

SGN -- Invalid directive code "direc-code"

Explanation: You have entered other than A, B, C, D, E, F, G, H, I, or %. The line is discarded.

SGN -- Invalid system device -- RETRY

Explanation: The device specification for the Executive source disk was improperly or incorrectly entered.

Big disk kits: The default response is SY:; enter either Y or carriage return. Otherwise, you must enter at least two characters to identify the device that contains the Executive sources.

Dual RK or RL01 kits: There is no default response to this question. Enter the device (minimum two characters) that contains the Executive sources.

SGN -- Listing files cannot be sent directly to LP: -- RETRY

Explanation: Spooled listings must go to a real device. Also, for online SYSGENs, maps cannot go directly to the line printer. If you want to print at LP:, specify LP0:.

SGN -- Loadable driver support was not selected in the Executive section of SYSGEN. Device cannot be made loadable -- RETRY

Explanation: You did not include loadable driver support in the system. All device drivers must be resident.

SGN -- Loadable/Resident indication not valid for this device -- RETRY

Explanation: Loadable or resident is not an option for this device.

SGN -- Maps cannot be sent directly to line printer -- RETRY

Explanation: Spooled maps must first go to a spool device. Also, for online SYSGENs, the maps cannot go directly to the line printer (specify LP0:).

SGN -- Maximum of 1 CRT monitor possible with VT11 -- RETRY

   Explanation: A VS60 can support two CRT monitors, but a VT11 supports only one.

SGN -- Maximum of 8 printers allowed on a system with a KMC -- RETRY

   Explanation: The KMC-11 supports up to eight line printers.

SGN -- Maximum of nn. controllers allowed for device dd -- RETRY

   Explanation: The specified device supports nn controllers. Note that pseudo devices can only indicate one controller. Terminal driver hardware controllers are specified later.

SGN -- Memory size inconsistent with mapping option

   Explanation: The maximum memory size for an unmapped system is 28K-words. The minimum memory size for a mapped system is 24K-words. You have either specified (in question 4, Memory size) more than 28K-words of memory for an unmapped system (question 5) or less than 24K-words of memory for a mapped system.

SGN -- Memory not multiple of 4K

   Explanation: When you specify memory size, it must be an even multiple of 4.

SGN -- More than 252. modules specified -- RETRY

   Explanation: The UDC-11 supports a maximum of 252 modules. You have specified more than the maximum.

SGN -- Number of interrupts must be divisible into 10,000.

   Explanation: The number of interrupts per second for the KW11-P clock was not 1, 2, 4, 5, 8, 10, 16, 20, 25, 40, 50, 80, 100, 125, 200, 250, 400, 500, 625, 1000, 1250, 2000, 2500, or 5000.

   Note that more than 100(10) clock interrupts per second significantly increases system overhead.

SGN -- Number of samples must be evenly divisible into 10000. -- RETRY

   Explanation: Sampling rate must be evenly divisible into 10000.

SGN -- Overlapping modules -- RETRY

   Explanation: The last module specified attempts to use slots that you have indicated occupied by other modules. Review your configuration and try again.

SGN -- Parameter (#N) "parm" out of range n to n -- RETRY

    Explanation: The indicated parameter (excluding Loadable/Resident) is not within the acceptable range.

SGN -- Pausing to allow copying of [ggg,10] files to baseline disk

    Explanation: This message applies to RL01 kit users only.

SGN -- Pausing to allow editing of Executive source

    Explanation: This is not an error message; the message is informative. It indicates that you wish to edit Executive files.

SGN -- Pausing to allow loading of EXCSRC disk

    Explanation: This message applies to dual RK05 kit users only. The message indicates that SYSGEN will pause while you load the EXCSRC disk into the proper drive.

SGN -- The full duplex terminal driver requires memory management and loadable driver support. If you desire the full duplex driver, you must repeat the Executive questions and select these options.

    Explanation: As the message states, you must include memory management directives (PLAS) and loadable driver support to select the full duplex terminal driver.

SGN -- Unable to determine system type -- assuming unmapped

    Explanation: This message applies to RL01 kit users only. When you generate a mapped system, you must use a mapped system. Likewise, when generating an unmapped system, use an unmapped system. This message indicates that the system UIC has been changed and does not end in 0 or 4; SYSGEN must choose.

SGN -- Unit number must be an integer in the range 0 to 7

    Explanation: The crash device must be unit number 0-7 inclusive.

SGN -- Unrecognizable string "ddn" -- Ignored

    Explanation: SYSGEN could not parse the indicated string. Perhaps you omitted a comma.

SGN -- Valid char detec expan unit indics. are "C" (yes) and "NO" (no) -- RETRY

    Explanation: Valid responses for this paramter are C, to indicate that controller includes character unit, and NO, to indicate it does not.

SGN -- Valid D/A present indicators or "D" (yes) and "NO" (no) -- RETRY

Explanation: Valid responses for this parameter are D, to indicate that controller includes D/A converter, and NO, to indicate that it does not.

SGN -- Valid devices: DT, DK, MT, MS, MM, DB, DM, DL, DD, & DR -- RETRY

Explanation: The CDA routine does not support the device you entered as a dump device.

SGN -- Valid DR11-K present indicators are "DRK" (yes) and "NO" (no) -- RETRY

Explanation: Valid responses for this parameter are DRK, to indicate that DR11-K is present, and NO, to indicate that it is not.

SGN -- Valid duplex indicators are "H" and "F" -- RETRY

Explanation: Valid responses for this parameter are H, to indicate a half duplex line, and F, to indicate a full duplex line.

SGN -- Valid err detec expand unit indics. are "E" (yes) and NO (no) -- RETRY .

Explanation: Valid responses for this parameter are E, to indicate that error detection expander unit is present, and NO, to indicate that it is not present.

SGN -- Valid indicators are "H", "F", and "P" -- RETRY

Explanation: Valid responses for this parameter are H, to indicate half duplex line, P, to indicate primary station of line, and F, to indicate full duplex line.

SGN -- Valid graphic device indicators are "VT11" and "VS60" -- RETRY

Explanation: Valid responses for this parameter are VT11, to indicate a VT11 graphics display device, and VS60, to indicate VS60 graphics display device.

SGN -- Valid line speeds are 50, 75, 110, 134.5, 150, 200, 300, 600, 1200, 2400, 4800, and 9600 -- RETRY

Explanation: The controller does not support the specified line speed.

SGN -- Valid listing devices are: SY:, TI:, and "None" (default) -- RETRY

Explanation: When performing an RSX-11S system generation using an IAS host system, the listing device must be SY: or TI:.

SGN -- Valid map devices are: SY:, TI:, and "None" (default SY:) -- RETRY

Explanation: When performing an RSX-11S system generation using an IAS host system, the map device must be SY: or TI:.

SGN -- Valid offset recovery indicators are "O" (yes) and "NO" (no) -- RETRY

Explanation: Valid responses for this parameter are O, to indicate that all of this controller type support offset recovery, and No, to indicate that none of the controllers of this type support it.

SGN -- WARNING -- CPU does not have switch register -- Get sense switch directive not included

Explanation: The processor you specified does not have a switch register. Thus, you cannot use the get sense switch directive. If you wish to include the directive, edit RSXMC.MAC and add the line G$$TSS=0.

SGN -- WARNING -- Null device forced into system

Explanation: This message indicates that SYSGEN has forced the null device into your configuration. The null device is required to redirect data normally sent to either the system disk or the terminal driver (both of which your system does not include).

SGN -- WARNING -- Terminal driver forced into configuration

Explanation: RSX-11M requires a terminal driver for operation. You forgot to specify a terminal driver so SYSGEN put one in for you. Later, SYSGEN will ask which terminal driver you want to use.

APPENDIX A

SYMBOLS FOR SAVED ANSWER FILES

Symbol		Definition
$TPR	.SETS	Processor type (for example "11/60")
$SWR	.SETT .SETF	Processor has a switch register Processor does not have a switch register
$11S	.SETT .SETF	Generating RSX-11S Generating RSX-11M
$TME	.SETN	Memory size in K-word blocks
$MAP	.SETT .SETF	Generating mapped system Generating unmapped system
$KSR	.SETT .SETF	System includes K-series laboratory peripherals System does not include K-series laboratory peripherals
$EAE	.SETT .SETF	System includes extended arithmetic element System does not include extended arithmetic element
$FPP	.SETT .SETF	System includes floating point processor System does not include floating point processor
$FIS	.SETT .SETF	System includes floating instruction set System does not include floating instruction set
$PRO	.SETN	Number of KW11-P clock interrupts/second (0 excludes KW11-P)
$LIN	.SETS	Line frequency (A=60Hz, B=50Hz)
$WAT	.SETT .SETF	System includes KW11-Y watchdog timer System excludes KW11-Y watchdog timer
$MPR	.SETT .SETF	System includes memory parity support System excludes memory parity support
$CAH	.SETT .SETF	System contains cache memory System does not contain cache memory
$HIV	.SETN	Highest interrupt vector address (if highest vector specified or less than 400, SYSGEN recalculates; $HIV not saved until peripheral section is complete)
$DEV	.SETS	Peripheral devices and number of controllers

SYMBOLS FOR SAVED ANSWER FILES

Symbol		Definition
$DV2	.SETS	Peripheral devices and number of controllers
$DV3	.SETS	Peripheral devices and number of controllers
$ONL	.SETT	Online SYSGEN
	.SETF	Standalone SYSGEN
$LPR	.SETT	Host includes a line printer
	.SETF	Line printer not available on host
$SPL	.SETS	"/SP" spool listings and maps, "/-SP" do not spool
$PWI	.SETT	Printer width at least 120 columns
	.SETF	Printer width less than 120 columns
$ALD	.SETS	Device mnemonic for assembly listing files no trailing ":", SY: is ""
$MPD	.SETS	Device mnemonic for Executive and device driver maps
$DBM	.SETT	DBMS-11 support
	.SETF	No DBMS-11 support
$F11	.SETT	Files-11 ACP support
	.SETF	No Files-11 ACP support
$RMS	.SETT	Record Management System support
	.SETF	No RMS support
$NRT	.SETT	Non-resident task support
	.SETF	No task loader support
$LLR	.SETT	Loadable task loader
	.SETF	Resident task loader
$MMD	.SETT	Memory management directives support
	.SETF	No PLAS support
$SRR	.SETT	Send/receive by reference support
	.SETF	No send/receive by reference directives
$GMC	.SETT	Get mapping context support
	.SETF	No get mapping context directive
$ACK	.SETT	Address checking support
	.SETF	No support
$IOR	.SETT	I/O rundown support
	.SETF	No support
$MUP	.SETT	Multiuser protection support
	.SETF	No support
$ANM	.SETT	ANSI magtape support
	.SETF	No support
$OUD	.SETT	Online formatting and user-mode diagnostic support
	.SETF	No support
$LOD	.SETT	Loadable driver support
	.SETF	Resident drivers only

SYMBOLS FOR SAVED ANSWER FILES

Symbol		Definition
$LLD	.SETT	All loadable drivers loadable
	.SETF	All loadable drivers (except full duplex TTDRV) built as resident
$AST	.SETT	AST support
	.SETF	No support
$TKT	.SETT	TKTN support
	.SETF	No support
$PRF	.SETT	Power fail recovery support
	.SETF	No support
$IRR	.SETT	Install-run-remove on exit support
	.SETF	No support
$20K	.SETT	20K Executive
	.SETF	16K Executive
$LGD	.SETT	Logical device assignment support
	.SETF	No support
$DTO	.SETT	Log device errors and interrupt timeouts
	.SETF	No logging
$UNI	.SETT	Log undefined interrupts
	.SETF	No logging
$PAR	.SETT	Log memory parity errors
	.SETF	No logging
$UWD	.SETT	System to include user-written driver
	.SETF	No user-written drivers
$GTW	.SETT	System includes get word Executive routine
	.SETF	System excludes get word Executive routine
$PTW	.SETT	System includes put word Executive routine
	.SETF	System excludes put word Executive routine
$WCH	.SETT	System supports disk writecheck
	.SETF	No support
$XDT	.SETT	System supports Executive Debugging Tool
	.SETF	No XDT
$ROT	.SETT	Rotating data lights
	.SETF	No rotating lights
$NET	.SETT	Industrial network and DECnet support
	.SETF	No network support
$PRN	.SETT	System supports queue manager
	.SETF	No queue manager
$GGE	.SETT	Group global event flag support
	.SETF	No support

SYMBOLS FOR SAVED ANSWER FILES

Symbol		Definition
$DRR	.SETS	Executive directives code: "ABCDEFGHI" (A= get partition parameters, B= get task parameters, C= send/receive, D= alter priority, E= extend task, F= connect to interrupt vector, G= get sense switch, H= parent/offspring tasking, I= stop bit)
$NPK	.SETN	Number of pre-allocated QIO packets (0= no QIO speed optimizations)
$DTV	.SETN	Size of data transfer vector in words (if $NPK=0, $DTV=0)
$RRS	.SETN	Round-robin scheduling interval (0 excludes round-robin scheduler)
$HIC	.SETN	Highest priority class for round-robin scheduling (if $RRS=0, $HIC=0)
$LOC	.SETN	Lowest priority class for round-robin scheduling (if $RRS=0, $LOC=0)
$DKS	.SETN	Swapping interval for Executive level disk swapping (0 excludes Executive level disk swapping support)
$SWP	.SETN	Executive level disk swapping range (swapping priority) (if $DKS=0, $SWP=0)
$DSA	.SETN	Size of dynamic storage region (pool space)
$PNR	.SETN	Seconds between line printer not ready messages (0 suppresses messages)
$CRR	.SETN	Seconds between card reader not ready messages (0 suppresses messages)
$RSD	.SETN	CSR address for register and stack dump device (0 excludes stack and register dump following crash)
$CKP	.SETS	Checkpointing (A= checkpointing, B= checkpointing with system checkpoint file, empty string = no checkpointing support)
$MEM	.SETS	System controlled partitions (A= system controlled, B= with the shuffler, empty string = no system controlled partitions)
$CRA	.SETS	Dump routine (A= PANIC, B= CDA, empty string = no memory dump routine)
$NOT	.SETN	CSR address for CDA crash notification device (if $CRA not equal B, $NOT not in file)
$MDD	.SETS	Device mnemonic for CDA memory dump (if $CRA not equal B, $MDD not in file)
$MDC	.SETN	CSR address of CDA dump device (if $CRA not equal B, $MDC not in file)
$PDD	.SETN	CSR address of PANIC dump device (if $CRA not equal A, $PDD not in file)

SYMBOLS FOR SAVED ANSWER FILES

Symbol		Definition
$TTY	.SETS	Terminal driver (A= tailorable half duplex, B= user oriented half duplex, C= full duplex, D= baseline half duplex)
$TMN	.SETN	Timeout value (if $TTY not equal C, $TMN not in file) (0 excludes support for unsolicited input timeout feature)
$FRM	.SETT .SETF	Pass form feeds directly to terminal Convert form feeds into 8 line feeds
$ACR	.SETT .SETF	Support automatic carriage return/line feed No support
$TCK	.SETT .SETF	Task checkpointable during terminal input support No support
$USC	.SETT .SETF	AST on unsolicited input character No support
$CNO	.SETT .SETF	CTRL/O cancellation support No support
$BWS	.SETT .SETF	Breakthrough write support No support
$CNR	.SETT .SETF	CTRL/R support No support
$ESC	.SETT .SETF	Process escape sequences No support
$MLC	.SETT .SETF	Get multiple characteristics support No support
$SMC	.SETT .SETF	Set multiple characteristics support No support
$GTD	.SETT .SETF	Get terminal driver options support No support
$HSM	.SETT .SETF	Hold screen mode support No support
$TRW	.SETT .SETF	Transparent read write support No support
$SCC	.SETT .SETF	Settable case conversion support No lower to upper case conversion
$RAP	.SETT .SETF	Read after prompt support No support
$RNE	.SETT .SETF	Read with no echo support No support
$RST	.SETT .SETF	Read with special terminator support No support
$RUB	.SETT .SETF	CRT rubout support No backspace deletion

SYMBOLS FOR SAVED ANSWER FILES

Symbol		Definition
$THS	.SETT	CTRL/S and CTRL/Q support
	.SETF	No support
$TIB	.SETT	User terminal input buffer support
	.SETF	No support
$VTB	.SETT	Variable length terminal input buffer support
	.SETF	No support
$L30	.SETT	System includes LA30P
	.SETF	No LA30P
$HRE	.SETT	Hardware unrecoverable input error support
	.SETF	No support
$DIC	.SETT	Device independent cursor positioning support
	.SETF	No support
$EDX	.SETT	Pause to allow editing Executive files
	.SETF	Do not pause
$ADR	.SETT	Assembly listing device ready
	.SETF	Assembly listing device not ready
$INI	.SETT	Assembly listing device must be initialized
	.SETF	Device is initialized
$ADL	.SETS	Assembly listing device label
$MOU	.SETT	Mount assembly listing device
	.SETF	Need not mount device
$UFD	.SETT	Create listing UFD
	.SETF	Do not create listing UFD
$IPE	.SETT	Allow direct access to IP11/IP300 device registers
	.SETF	Do not allow direct access
$CDB	.SETT	Allow direct access to ICS/ICR modules
	.SETF	Do not allow direct access
$DUC	.SETT	Allow direct access to UDC11 modules
	.SETF	Do not allow direct access
$EXT	.SETT	Edit RSXMC to allow FORTRAN access to laboratory device registers
	.SETF	Do not edit

Format of Saved Answers for Devices

Controller:

        $$[device-mnemonic][controller number]

For example:

        .SETS $$MM0   ",,2"

Unit modifiers:

        $[controller number][device-mnemonic][unit number]

For example:

        .SETN $0MM0   0
        .SETS $0DY1   "DOUBLE"

APPENDIX B

RMDEMO

B.1 INTRODUCTION

RMDEMO is a privileged task that displays information concerning task activity in an RSX-11M system. The display usually runs continuously on a video terminal, such as the VT05B or the VT52. A single "snapshot" display can be run on a hard-copy terminal, such as an LA36. The display format adapts automatically to the type of terminal on which it runs.

Typically, RMDEMO is set running on a slaved terminal near the computer as part of the system boot procedure. Individual users can also display RMDEMO on their terminals using the MCR command >RMD.

RMDEMO should be installed under the name ...RMD for these commands to work.

The display features include:

1. Current date and time;

2. The currently active task;

3. All tasks, loaded drivers, and common blocks currently in memory, displayed in a graphic fashion to show their individual memory requirements and locations relative to other tasks;

4. The number of active tasks currently in memory, the number not currently resident, and the total amount of memory occupied by each group;

5. The current amount of available system dynamic memory (pool space), including the largest available block and the number of fragments; and the worst case of pool space since bringing up RMDEMO;

6. A graphic display of partition information;

7. The number of free blocks available on the system device and three or more additional mounted FILES-11 volumes;

8. The system error count sequence.

RMDEMO scales the display to the memory size of the computer on which it is executed. The amount of memory displayed on the screen will always be the next largest multiple of 32 words. (In certain instances, this may cause an inaccurate amount of total memory to appear. For example, a 28K system running RMDEMO on an LA36 will display somewhat over 29K of total memory. This anomaly in a rare case was considered preferable to the alternative, which was to reduce resolution in the display.)

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

B.2 HARDWARE REQUIREMENTS

RMDEMO runs on RSX-11M and RSX-11S. It is non-overlaid and requires approximately 5K.

B.3 BENEFITS OF USING RMDEMO

In general, RMDEMO is a useful task designed to allow either an operator or user to view the current state of the operating system. The information is presented in a graphic, easily comprehensible form.

There are a number of specific instances in which RMDEMO can help to locate certain system lockout problems or bugs in application and/or system-level software.

1. Bugs and other situations that cause exhaustion of system dynamic memory (resulting in unexplained system hangs) may be detected and more easily reproduced and diagnosed.

2. Task checkpointing and swapping may be monitored -- and in systems with limited memory, deadlock conditions may often be more easily diagnosed.

3. Free space on a number of FILES-11 devices may be monitored in real time, which may help in situations where online storage is at a premium or where some program is running wild.

B.4 RMDEMO DISPLAY FIELDS

```
RSX-11M V3.2 BL26        512K                     21-JUN-79 11:52:42
*IDLE*  POOL=1386.:2686.:49.      FREE=SY0:35056.  DB1:178960.
           1386.:2686.:49.                DB2:68928.  DB3:30857.      PARS
IN:    TMDMB PC M F.   D    D Q L  R T               .
13     TCBMA 00 T 1.   B    B M P  M T               .            TTPAR :T
110K   :R::S OT A 1.   O    2 G P  D 7               .            SYSPAR:T
OUT:    . I L. A AD    F    F . O  E                 T            TKNPAR:T
0       . C . C CM     C    C .    M                 E            DRVPAR:D
OK      . 2 . P PP     P    P .    O                 C            LDRPAR:T
       ()>))-!>->><>-><-->  <->->->->->                           BASIC2:C
0*******32******64******96******128*****160*****192*****224*****  GEN   :D
E-P---T-TDC-D----------------------------------------------------
-----------------------------------------------------------------
256*****288*****320*****352*****384*****416*****448*****480*****
```

ERRSEQ
32.

>

Figure B-1 Example of RMDEMO Display

1. The version number of the current system, base level, and
    memory size.

2. The current date and time.

3. The currently executing task; *IDLE* indicates that no task
    is executing (the Executive is executing the idle loop).

4. Pool information in the format POOL=X:Y:Z where the first
    line is:

        X = size in words of the largest free block in pool;
        Y = total number of free words in the pool;
        Z = number of fragments in the pool free list.

    and the second line records the worst case of pool since the
    current execution of RMDEMO began. (This second line will be
    most useful on a slaved terminal that is started displaying
    RMDEMO when the system is booted. Otherwise, this second
    line gives worst-case pool information from the time you
    initiate the RMDEMO display on a terminal.)

5. The number of free blocks on SY0: and up to 3 more selected
    FILES-11 devices.

6. Number of active tasks in memory and the amount of memory
    they occupy, plus the number of active tasks checkpointed out
    (not in memory) and the total memory they would require.

7. The name of each task in memory and a representation of other
    information about the task, including size.

        <   > active task
        [   ] task not active, yet occupies memory
        !   ! named common

```
+    +    unnamed common, name displayed is first
              attached task
( )       loaded loadable driver, name displayed is
              device mnemonic (see next entry)
-----     task is not fixed in memory
=====     task is fixed in memory
```

The hyphens (-) or equals (=) display (very roughly) the
amount and area of memory occupied by each task or driver.
Where the display shows only one delimiter (<, !, +, [, (,
etc.), the opening delimiter should be considered to appear
in the same position as the closing delimiter of the
preceding task.

8. Loadable drivers loaded in memory, identified by device
   mnemonic. Although drivers are not tasks, they require
   memory, and thus are displayed with tasks.

9. Partitions in the system. Partition name comes first,
   followed by a letter identifying the partition type.
   (Partition size is indicated in next entry.) The letters are
   defined as follows:

```
T = task partition
S = subpartition
D = system-controlled (dynamic) partition
C = common partition
```

10. Partition size and location. The beginning of each partition
    is marked by a letter in the same code as above, with the
    following additions:

```
E = Executive
P = Pool (dynamic storage region)
```

The lines of asterisks (*) represent (very roughly) the
proportional amount and area of memory occupied by each
partition.

11. The system error count sequence as recorded by the error
    logger. If error logging is not included in the system,
    ERRSEQ will always equal zero.

B.5 DISPLAY CONFIGURATION OPTIONS

Certain parameters can be altered by the user who wants to develop
special versions of RMDEMO. The source file, located in UFD[14,10] on
your distribution kit, contains extensive comments that should enable
you to alter the code to move or delete fields in the existing
display, or design additional display pages. These are two parameters
that can be changed on-line, from a running RMDEMO display:

- the display rate (interval at which information is updated)

- the names of the FILES-11 devices in the free-space display area.

Type ESC (ALT MODE or SEL) to display the command formats for changing
these parameters.

APPENDIX C

CONSOLE DRIVER AND CONSOLE OUTPUT TASK

Two facilities in RSX-11M -- the Console Driver and the Console Output Task (COT) -- handle messages sent to the console device (CO:). COT is a privileged task usually installed and maintained by the System Manager. You can use COT to direct messages to:

- The default console output device (usually TT0:)

- Any other terminal that you assign as the console device with the COT SET commands

- A console message logging file

COT SET commands allow you to assign the destination of the messages to alternate devices or to terminate messages to the console device or logging device. The Console Driver sends all messages to COT, which forwards them to the terminal or logging device that you have selected.

COT permits you to specify any terminal as a console terminal and to change that specification, using privileged MCR SET commands. You are not restricted to using TT0: as the console terminal. You can also change the name of the file to which COT writes. (Any part of the command file specification can be changed independently.) If COT is aborted or the system crashes, you can recover the information in the log file by using the Peripheral Interchange Program (PIP) to unlock the file. You can then print its contents. (PIP is described in the RSX-11 Utilities Manual.)

The Console Driver and COT are supported on mapped RSX-11M systems. They are not supported on RSX-11S systems, because RSX-11S does not support the disk volumes you need to use the Console Driver's write-to-a-file feature.

C.1 OPERATING COT

The COT commands control the selection and operation of the console terminal or the log file either separately or together. You can start, control, and terminate console, log file, or COT operation by using one of the following privileged MCR SET commands:

```
>SET /COTERM[=ttn:]
>SET /NOCOTERM
>SET /LOGFILE[=ddnn:][uic][filename.filetype]
>SET /NOLOGFILE
>SET /COLOG[=TTn:][ddnn:][uic][filename.filetype]
>SET /NOCOLOG
```

NOTE

The brackets indicate optional entries.
However, brackets must be entered when
specifying the UIC, as [UIC]

Once COT is running, COT processes all messages directed to CO: (in a
QIO operation, for example). COT gets the time, prints the message
and time on the console terminal, and writes the information in a
file. The default terminal is TT0: and the default file is
SY0:[1,4]CONSOLE.LOG, unless you specify another terminal or file.

COT also uses the MCR SET commands to change or stop output to a
terminal or file. You can change any COT option without stopping and
restarting the entire task.

C.1.1 Task Interfacing with COT

Task interfacing with COT deals with the task's attempts to send
messages, attach to, or read from the console terminal.

Tasks can write messages to CO:. The buffer in COT accepts messages
up to 256(10) bytes long. Therefore, any task sending longer messages
must include carriage-returns/line-feeds in the text. Setting the
buffer size to something other than 256(10) bytes can cause
unpredictable results.

When you have a task that must send a message to the console terminal,
start the message with a CTRL/G. This message prints on the terminal
regardless of the effect of a previously entered SET /NOCOTERM
command. The CTRL/G causes COT to send the message to TT0: if no
terminal is currently designated as the console terminal. The message
goes to the current console terminal if one is designated.

A task may not attach to CO:. If a task attempts to attach to CO:, an
invalid function code error occurs.

Only a task with the name COT... may read from CO:. If another task
attempts to read from CO:, an invalid function code error occurs.

C.1.2 Using the REDIRECT Command with COT

When COT is not running, the system data structure (UCB) for CO: is
directed to TT0:. Messages directed to CO: therefore go to the
terminal driver (TTDRV) and then to TT0:. When COT starts, however,
it directs CO: to CO: by adjusting the redirect pointer in the data
structure. COT then receives messages directed to CO: and sends them
to CODRV, which is the driver for console output. Therefore, to
change the console terminal while COT is running, use the SET /COTERM
command. When you use this command, COT changes the console terminal
by issuing an Assign LUN Executive directive. If you use the REDIRECT
command to affect the console terminal assignment while COT is
running, device assignment problems or a system loop may occur as a
result.

You may encounter two conditions when using the REDIRECT command to affect the console terminal assignment while COT is running.

1. If you redirect CO: to another device, the device handler for the device at the end of the redirect chain receives the message meant for CO:. This means that you bypassed COT entirely. Therefore, messages do not go to CO: and they are not written on the logging device.

   The console driver (CODRV) must receive messages sent to CO: for COT to work properly. CODRV receives the messages only if CO: is directed to CO:.

2. You can use SET /COTERM to specify a different terminal for output. If you do this, do not use REDIRECT to redirect that terminal back to CO:. Using REDIRECT in this way causes a system loop that prevents any other processing on the system.

C.2 COMMAND DESCRIPTIONS

COT commands fall into three categories:

1. Commands that control the console

2. Commands that control the log file

3. Commands that control both the console and the log file

In the commands in which you specify all the options, the options must be specified in the order shown. Left and right brackets indicate that the enclosed specification is optional. However, brackets must be entered when specifying the UIC as [UIC].

In the commands that have optional file specifications (ddnn:[UIC]filename.filetype), the default file specification is SY0:[1,4]CONSOLE.LOG. Leaving out the device causes SY0: to be used and leaving out the filename.filetype causes CONSOLE.LOG to be used.

C.2.1 Commands that Control the Console

The following commands either start (or stop) COT or assign the console terminal.

```
>SET /COTERM[=TTn:]
>SET /NOCOTERM
```

Description

>SET /COTERM

   If COT is running, this command (without the TTn: option) assigns the default (TT0:) as the console terminal.

   If COT is not running, this command starts COT and assigns the default (TT0:) as the console terminal without a log file.

Option

TTn:

>   Specifies the terminal to be assigned as the console terminal.

>   If COT is running, using the command with this option reassigns the console terminal.

>   If COT is not running, the command starts COT and assigns the specified TTn: as the console terminal without a log file.

>   In either case, you cannot designate a log file with this command.

Description

>SET /NOCOTERM

>   This command terminates the output of messages to the console terminal. You can restart the logging of messages on the console terminal by using the appropriate SET command.

C.2.2 Commands that Control the Log File

The following commands control both the log file and the device on which it is written.

>   >SET /LOGFILE[=ddnn:][[UIC]][filename.filetype]

>   >SET /NOLOGFILE

Description

>SET /LOGFILE[=ddnn:] (The default is SY:)

>   If COT is running, this command terminates output to the current log file and opens a new log file on the specified device. The new log file is one version higher than the version of the current file.

>   If COT is not running, this command starts COT with the default log file (if you do not use a file specification) on the specified device. This command does not assign a console terminal.

>   The device-unit specification is ddnn:.

Options

[uic]

>   Specifies the UIC to which the log file is written. The brackets must be used.

filename.filetype

Specifies the file name and file type of the new log file.

If COT is running, the command with this option specified terminates the current log file and opens a new log file with the name and type you specify.

If COT is not running, the command with this option specified starts COT with a log file of the specified name and type.

No console terminal is assigned.

Description

>SET /NOLOGFILE

This command terminates writing to the log file. It does not open a new log file. To start writing to a new log file, use the appropriate SET command.

C.2.3 Commands that Control Both the Console and the Log File

The following commands control both the console and the log file to which messages are sent.

>SET /COLOG=[TTn:][ddnn:][[uic]][filename.filetype]

>SET /NOCOLOG

Description

SET /COLOG

If COT is not running, this command (without options) starts COT using the defaults terminal, device, UIC, and file specifications. You can use the options to specify the terminal, device, UIC, and log file that you want to use.

If COT is running, this command (without options) displays the names of the log file and console terminal.

If you enter any options with this command, while COT is running, you will get an error message.

Options

TTn:

Specifies the console terminal. If you do not specify TTn:, COT sets the console terminal to TT0:.

If COT is not running, the command with only this option specified starts COT, assigned to TTn:. The ddnn:, UIC, and filename.filetype options take the default value if you do not specify them.

ddnn:

>   Specifies the device to which COT writes the log file. Use this
>   option to change the device.
>
>   If COT is not running, using the command with only this option
>   specified starts COT using the default file specification of
>   [1,4]CONSOLE.LOG on the ddnn: that you specified. Because only
>   this option is present, COLOG sends messages to TT0:

[uic]

>   Specifies the UIC to which COT writes the log file.   If you do
>   not specify a UIC with the device ddnn: or filename.filetype,
>   COT uses the default value of [1,4]. The brackets must be used.

filename.filetype

>   Specifies the file name and file type for COT to use when writing
>   messages to the log file. If you do not specify the file name
>   and file type, COT uses the default file specification of
>   CONSOLE.LOG.

Description

>SET /NOCOLOG

>   This command terminates COT. Before COT exits, it redirects CO:
>   to TT0:.   However, if it cannot redirect CO: to TT0:, COT sets
>   CO: offline and exits.

C.3 CONSOLE OUTPUT TERMINAL ERROR MESSAGES

The following section lists the error messages COT can return, along
with their causes and user response, where possible. Messages appear
at the last terminal that issued a COT command.

COT -- CONSOLE TERMINAL ASSIGN ERROR

>   **Explanation:** An error occurred when COT attempted to assign a
>   new console terminal. The error may be the result of specifying
>   an incorrect terminal unit number.

>   **User Action:** Reenter the command with a new terminal number.

COT -- UNABLE TO SPECIFY AST, COT EXITING

>   **Explanation:** COT was unable to specify an AST for receiving SET
>   commands from MCR. COT exits after displaying this message.

>   **User Action:** The probable cause of this error is an attempt to
>   run COT on a system that does not include AST support.

COT -- FILE OPEN ERROR, FCS nnn

>   **Explanation:** An error occurred when COT tried to open a log
>   file.   The FCS error code is nnn and is printed as part of the
>   message.

>   **User Action:** Correct the problem designated by the FCS error
>   number and restart the log file.

COT -- FILE WRITE ERROR, FCS nnn

Explanation: An error occurred when COT tried to write to an existing log file. The FCS error code is nnn and is printed as part of the message.

User Action: Correct the problem designated by the FCS error number. If the problem caused output to the log file to be stopped, restart output to a log file with the appropriate SET command.

COT -- NOT LOGGING ON A TERMINAL OR TO A FILE, COT EXITING

Explanation: This message is displayed if a SET /NOCOTERM or SET /NOLOGFILE command causes all message handling to be turned off.

User Action: Because COT exits after printing this message, restart COT with the appropriate SET command.

COT -- UNABLE TO REDIRECT CO: TO TT0:

Explanation: COT was unable to legally redirect CO: to TT0: when exiting. COT sets CO: offline when this occurs.

User Action: None.

COT -- CO READ ERROR

Explanation: An error occurred when COT tried to read from CO:. This is an informational message only.

User Action: None.

COT -- SYNTAX ERROR

Explanation: COT detected a syntax error when parsing a command line.

User Action: Check the syntax and reenter the command.

COT -- DRIVER NOT LOADED, COT EXITING

Explanation: The console driver was not loaded. COT cannot operate properly and exits.

User Action: If console driver support and loadable driver support were requested during system generation, the console driver must be loaded. COT can then be restarted with the appropriate SET command.

COT -- MAX CONSECUTIVE READ ERRORS, COT EXITING

Explanation: An error occurred on 10 consecutive read operations when COT was trying to read from CO:. The probable cause is a system failure external to COT. COT exits after displaying this message.

User Action: Determine the problem that caused the excessive read errors and correct it. Then restart COT.

COT -- MAX CONSECUTIVE WRITE ERRORS, DISABLING LOGFILE

    Explanation: An error occurred on five consecutive write operations to the log file. COT attempts to close the log file and disables logging to the log file.

    User Action: Determine the problem that caused the write errors and correct it. Then restart message logging to the log file.

SET -- INVALID KEYWORD

    Explanation: MCR received an illegal SET command.

    User Action: Check the command syntax and retry the command.

SET -- PRIVILEGED COMMAND

    Explanation: COT can only be run or changed from a privileged terminal.

    User Action: Log in with a privileged account and reenter the command.

SET -- MORE COMMAND PARAMETERS THAN PERMITTED

    Explanation: More parameters are specified on the command line than are allowed for the command.

    User Action: Check the command parameter syntax and reissue the command.

SET -- FILE SPECIFICATION EITHER INVALID OR NOT SPECIFIED

    Explanation: An invalid RSX-11M file specification was found in the command file.

    User Action: Reissue the command with a valid file specification.

SET -- DEVICE NOT IN SYSTEM

    Explanation: The device name specified in the command is not a part of the current system.

    User Action: Check the system device table and reissue the command with the correct device name.

SET -- YOU DO NOT HAVE THE PRIVILEGE TO ISSUE THIS COMMAND

    Explanation: The command you issued can be executed only from a privileged terminal.

    User Action: Log on to a privileged account and reissue the command.

APPENDIX D

THE QUEUE MANAGER

This appendix is directed to the system manager or operator who is
setting up and running the Queue Manager on an RSX-11M system. Except
where noted, all commands described here are privileged.

Most large systems will include the Queue Manager for the convenience
of multistream line printer spooling. If not, the Serial Despooler,
PRT..., can be installed instead. Note that the Queue Manager
includes QMGPRT, which installs as PRT..., to intercept output from
the PIP /SP switch and other utilities and system tasks. See the
RSX-11 Utilities Manual for more detail. This choice is made at
SYSGEN.

This chapter consists of a narrative introduction and review of the
process of setting up the Queue Manager, detailed descriptions of all
commands to the Queue Manager, and a listing of an indirect command
file to be included in the system STARTUP procedure as a reference
example.

D.1 NARRATIVE INTRODUCTION AND REVIEW

Here is the procedure for bringing the Queue Manager into the system.

This can be done interactively, but in most cases it is more
convenient to include it in an indirect command file invoked as part
of the system's STARTUP procedures.

Note that this procedure must be adapted for each installation. The
example is based on the procedure used for the RSX-11M development
system. QUE setup commands allow considerable flexibility in setting
up the Queue Manager system. Dynamic alteration of the Queue Manager
is also permitted.

1-Install the Queue Manager. It is found with the privileged
   utility tasks.

      INS QMG/PRI=70

2-Install the output despooler task (print processor).

      INS LPP/PRI=70

This task installs automatically as LPP0. You must install this task
for each physical device under the direction of the Queue Manager.
This task "owns" the output device and must have a name based on the
name of the device. Thus, the output despooler for LP1: must be
installed under the name LPP1, using the TASK= option. There can be
up to 15 output devices controlled by the Queue Manager.

3-Install PRT...

    INS QMGPRT

This task installs automatically as PRT... and is the interface to
PIP and other tasks that use PRINT$ or .PRINT. The Queue Manager can
then accept jobs from the PIP /SP switch. Although this task has the
same name as the Serial Despooler used on previous versions of RSX-11M
(and available on V3.2), it is not the same task. It replaces this
task.)

4-Install the Print Command Line Interpreter and the Queue Command
  Line Interpreter.

    INS QMGCLI/TASK=...PRI

    INS QMGCLI/TASK=...QUE

The same task parses both the PRI and QUE commands and therefore must
be installed twice, once under each name.

5-Start the Queue Manager.

    QUE /START:QMG

This command starts the Queue Manager and initializes the default
queue PRINT. It creates the queue file QUEUE.SYS on SY:[1,7] if it is
not there. The command also clears all assignments previously
recorded. If the queue file was intact, all queues will still contain
their jobs, but are not assigned to print processors. (Processors
will have to be spooled again.)

5-Spool the processor.

    QUE LP:/SPOOL/FLAG:1/FORM:0

This command creates a queue LPQ0 (if it does not already exist) and
starts the previously installed despool task LPP0. This task attaches
device LP0: for despooling. Queue LPQ0 is assigned to despooler
LPP0. Repeat this step for each output device under control of the
Queue Manager.

The /FORM switch establishes this attribute of the despooler. This
means the despooler accepts jobs initiated by Print commands with the
same /FORM attribute given. Jobs with other /FORM attributes remain
in the queue until a despooler with the proper /FORM attribute is
available.

The /FLAG switch sets the default number of flag pages that precede
each job. If users specify /FLag in their Print commands, each file
in the job will be preceded by this many file flag pages as well.

6-Assign the default queue to processors.

    QUE LP:/ASSIGN:PRINT

This command assigns the default queue PRINT to processor LPP0.
Normally, only the PRINT queue has to be assigned. Device-specific
queues are assigned to their device despoolers by /SPOOL. This
assignment of device-specific queues is a default, however, and not a
requirement. A device-specific queue must exist for every spooled
device, but these queues also can be assigned to other devices.

You can assign a queue to more than one processor and you can assign more than one queue to a processor. You can assign a device-specific queue to another device if necessary. For example, if printer LP0: is temporarily unavailable, you could assign LPQ0 to LP1:.

D.2 REFERENCE EXAMPLE

Here is a listing of SY:[1,2]QMGSTART.CMD from the RSX-11M development system:

```
;
;
INS DB0:QMG/PRI=70
INS DS0:LPP/PRI=70
INS DS0:QMGPRT
INS DS0:QMGCLI/TASK=...PRI
INS DS0:QMGCLI/TASK=...QUE
QUE /START:QMG
QUE LP:/SPOOL/FLAG:1/FORM:0
QUE LP:/ASSIGN:PRINT
;
;
```

D.3 QUEUE MANAGER COMMAND DESCRIPTIONS

Setting up the Queue Manager is controlled through a number of privileged functions applied to the QUE command.

The format of the Queue Manager setup commands is:

>QUE ddnn:/function[:option[s]] [/sw[s]]

Where:

ddnn: is the device name.
/function is the function to be performed.
:option is the option for that function [may be more than one].
/sw is the switch for that option

These commands allow a privileged user to attach or detach devices for spooling, start and stop devices, assign the default queue to devices and start and stop the Queue Manager.

D.3.1 STOP

This function suspends a device or stops the Queue Manager.

>QUE ddnn: /STOp[:option]
                    EOF
                    EOJ

>QUE /STOp:QMG

ddnn:

The device name is required with all options except /STO:QMG. You cannot include a device when stopping the Queue Manager.

option

    If you do not enter an option (null option) the device stops
    immediately. This is a pause.

EOF

    The device stops at the end of the current file.

EOJ

    The device stops at the end of the current job.

/STO:QMG

    The Queue Manager stops at the end of the current job.   All
    assignments of queues to devices are broken (deassigned). All
    despooler tasks are detached from their devices.   The Queue
    Manager exits.

Examples:

        >QUE LP0:/STOP

    This example stops printing on LP0:. No jobs will be taken from
    queues assigned to the device, but jobs can still be added to
    queues.

        >QUE LP2:/STO:EOJ

    This example stops printing on LP2: at the end of the active
    job.

        >QUE /STOP:QMG

    This example stops the Queue Manager. QMG is marked for stop and
    the current jobs are allowed to finish.

D.3.2 **START**

This command starts printing on a previously stopped device or starts
the Queue Manager after a STOP. This command counteracts STOP.

        >QUE ddnn:/STArt[:option]   [/sw]
                        NExt   /FOrm:n
                        TOP   /FLag:n
                        PAge:n
                        BAck:n
                        FOrward:n

        >QUE /STArt:QMG

ddnn:

    A device name is required with all options except /STA:QMG.   You
    cannot include a device when starting the Queue Manager.

option

>
Option and switch are mutually exclusive fields. Use one or the
other.

>
If you enter nothing (null option), the device starts printing
from the point at which printing stopped. This, in effect,
resumes printing after a pause.

NExt

>
Printing starts at the top of the next job.

TOP

>
Printing starts at the top of the current file.

PAge:n

>
Printing starts at page n of the current file.

BAck:n

>
Printing starts n pages back from the point at which it was
stopped.

FOrward:n

>
Printing starts n pages forward from the point at which it was
stopped.

STA:QMG

>
This option is entered without ddnn: as it starts the Queue
Manager and initializes the default queue PRINT. It creates the
file SY:[1,7]QUEUE.SYS if it is not there.   The command also
clears all assignments previously recorded. If the queue file
was intact, all queues still contain their jobs, but are not
assigned to processors. (Processors will have to be spooled
again.)

/sw

>
The switch and option fields are mutually exclusive. Use one or
the other. You can enter more than one switch, however.

/FOrm:n

>
This switch resets the forms type of the despooler task from the
type set with SPOOL.

/FLag:n

>
This switch resets the default number of flag pages set with
SPOOL.   Print jobs have n job flag pages preceding the job. If
users specify /FLA in their print command, each file in the job
will also be preceded by n file flag pages in addition to the job
flag pages. n can be 0, 1,2, or 3.

>
If you are using special forms in your printer, you should set
n=0 so that no flag pages are printed on your special forms.

Examples:

>QUE LP0:/STA

Start LP0:; printing proceeds from where it was stopped.

>QUE LP2:/START:NE

Start printing with the next job queued to LP2:.

>QUE LP:/STA/FO:11

Start printing on LP0: with FORMS attribute reset to 11.

Notes:

Page-related options have no effect unless the user specified a LEngth:n quantity in the Print command.

If restarting a processor to handle special forms types, you may want to set FL to 0 to avoid printing banner pages on your special forms.

D.3.3 **SPOOL**

This function attaches a device for despooling. The command starts a despool task, optionally creates a queue named after it, and assigns the queue to the despool task.

>QUE ddnn:/SPool/sw

SPOOL creates queue ddQn (if it does not already exist) and starts the despool task ddPn which must be installed previously for device ddn. This attaches device ddnn: for despooling by the despool task ddPn open to jobs from queue ddQn.

/sw

More than one switch can be used with this function.

/FOrm:n

Sets the device despooler to accept jobs with forms type n.

You can set a despooler to accept more than one forms type, but the forms definition nust be duplicated.

n

This number can be anything from 0 to 255. The default is 0.

These numbers are to be specified by your users in their Print commands.

If the right forms are not in an available printer, then their jobs will be waiting until the printer has been stopped, the proper forms put in place, and the printer restarted using the /FORMS: qualifier and the proper value for n in the START/ command.

Forms differ by their length and width. Both values can be set in the forms table.

Setting width is simply a matter of how many columns are needed to fill in the form. There are no standard widths for forms, but 80. and 132. are the most common.

Setting length requires you to determine whether your forms are of a standard length.

"Standard length" is any form length that can be set on your printing hardware. If the hardware can handle the form by setting a response to a form-feed character <FF>, then it is a standard length form, and the form-feed is a "real", i.e., hardware, form-feed.

If the form length cannot be set on the hardware, then it is a non-standard length. In this case, the form-feed <FF> must be replaced by an appropriate number of line-feeds <LF>. This is called a "simulated", i.e., software, form-feed.

You should determine which forms are used on your system and assign each a number. This number points to a table of form definitions. The form definitions consist of a single 16-bit word. The length is the low-order byte and the width is the high-order byte. The high bit of the length byte is set when simulated forms (forms whose length cannot be set on your hardware) are needed. This form definition word can be changed by editing the Task Builder command file for the despooler task. You must add a global patch statement of the following form:

    TKB>GBLPAT=INIT:FRMTBL+k:value

where k is the assigned form number multiplied by 2 (n*2) and value is the form definition word (value = width + <200*SIMFF> + <width*400>).

The following table shows the forms requirements for a hypothetical installation. The form names describe different uses that special forms might be put to, but have no significance otherwise.

FORM	ASSIGNED n	WIDTH	LENGTH	SIMFF
Accordion	0	132	66	N
Paychecks	1	40	10	N
Invoices	2	80	66	N
Stationery	3	80	66	N
Moon Diary	4	22	43	Y
Star Log	5	112	113	Y

(As shipped, FORMS:0 is 66 lines long by 132 columns with real form-feeds. FORMS:1 is 1 line long by 132 columns with simulated form-feeds; FORMS:2 is 2 lines long by 132 columns with simulated form-feeds; and so on through FORMS:66 which is 66 lines long by 132 columns with simulated form-feeds. The remaining FORMS:n entries are set to 1 line long by 132 columns with simulated form-feeds. Thus, if you specify FORMS:43, when the printer encounters a form feed, it counts the number of lines on the page and subtracts that number from 43. The printer then reels off a number of line feeds equal to the difference. You may find this arrangement satisfactory if your installation rarely uses forms other than standard line-printer paper, but if you have more than one standard form, you will probably want to make the changes in the forms table entries.)

    /FLag:n

Sets the number of flag pages to precede all jobs printed on the device. Note that if you are using special forms, you may want to

set this attribute to 0 to avoid printing banner pages on your
special forms. This also sets the number of file flag pages to be
printed when users specify the FLAGS switch in their Print commands.

Examples:

>QUE LP0:/SPOOL

Attach LP0: for despooling.

>QUE LP3:/SP/FO:2

Attach LP3: for despooling with forms set to 2.

D.3.4 UNSPOOL

This function removes a device from despooling. The device no
longer is assigned to queue. The despooler task exits. The
associated device-specific queue is not deleted.

>QUE ddnn:/UNSPool

UNSPOOL frees a device used in despooling for general use. The
despool task for the device exits but its entries in queues assigned
to it remain in the queue file.

Example:

>QUE LP0:/UNSP

This example removes the device LP0: from active use by the
despooler LPP0 and the Queue Manager.

D.3.5 ASSIGN

This function creates a path between a queue and a despooler.

>QUE ddnn:/ASsign:queuename

ASSIGN is normally used to assign the default queue PRINT to one or
more despooler tasks, but you can assign any queue to any despooler.

Example:

>QUE LP0:/AS:PRINT

Assign PRINT queue to LP0:.

Notes:

Remember that SPOOL automatically assigns a device-specific
queue to its related device. For example, LPQ1 is
automatically assigned to LP1:.

D.3.6 DEASSIGN

This function breaks the assignment of a queue to a despooler.

>QUE ddnn:/DEAssign:queuename

DEASSIGN eliminates the path between a queue and a despooler, but the queue still exists with all its jobs. Jobs can be added to the queue, but none will be dequeued while the queue is not assigned.

APPENDIX E

THE RSX-11M I/O EXERCISER

E.1 INTRODUCTION

The RSX-11M I/O Exerciser (IOX) is a software tool that you can use to diagnose hardware and software I/O problems. IOX is intended for use by system managers, system operators, and system programmers who want to test units in a hardware configuration to determine whether these units are correctly executing I/O operations. In addition, IOX allows you to measure system activity.

IOX provides a command language for executing test functions. IOX output consists of detailed error reporting and general information describing system activity.

You should be familiar with information in the following publications to effectively use IOX:

- _RSX-11M/M-PLUS Error Logging Reference Manual_

- _RSX-11M/M-PLUS MCR Operations Manual_

- _RSX-11 Utilities Manual_

E.1.1 What IOX Does

The I/O Exerciser (IOX) tests the I/O units in your configuration to ensure that they correctly execute I/O functions.

IOX exercises I/O units on your system by writing a data pattern to a volume on a unit and reading the data that was written. IOX then checks to ensure that the pattern read matches the pattern written. A mismatch between the written pattern and the pattern being read indicates an error. IOX reports errors when they are encountered. IOX also displays activity reports at specifed intervals and at the completion of an I/O exercise.

IOX has a command language that you can use to direct I/O exercise functions. IOX provides commands to:

- Set up units in a test configuration

- Select specific units to be tested

- Set I/O exercise execution conditions

- Control I/O exercise execution

- Direct command lines to RSX-11M for execution during an exercise

- Measure system activity using the IOX idle loop

Section E.2 summarizes, in alphabetical order, the IOX commands. For complete command descriptions, including formats and usage rules see Section E.10.

E.1.2 Setting Execution Conditions

IOX execution-time parameters allow you to set conditions under which an I/O exercise executes. You set these parameters using commands to:

- Specify the number of I/O errors IOX tolerates before deselecting a unit

- Set the length of time between interval summary reports

- Direct summary reports to the log file IOX.LOG

- Specify the size of the temporary file IOX uses when it exercises a unit containing a Files-11-formatted volume

- Specify the size of the buffer IOX uses when it exercises units containing non-file-structured volumes

For more information on how to use the IOX execution-time parameters, see Sections E.3.4 and E.5.

E.1.3 Controlling the I/O Exercise

IOX commands allow you to control execution of an I/O exercise. Using execution control commands you can:

- Interrupt execution of an I/O exercise to enter IOX commands interactively

- Abort execution of an I/O exercise or a task

- Deselect units from the test configuration

- Display current execution status, parameter settings, and summary information

- Modify execution parameters

- Restart IOX

E.1.4 Devices Supported by IOX

The following is a list of devices supported for IOX:

Device	Abbreviation
RP04/RP05/RP06	DB:
TU58	DD:
RF11	DF:
RK05/RK05F	DK:
RL01/RL02	DL:
RK06/RK07	DM:
RP02/RPR02/RP03	DP:
RM02/03	DR:
RS03/RS04	DS:
RX01	DX:
RX02	DY:
TU60	CT:
TU56	DT:
TU16/TE16/TU45/TU77	MM:
TS04	MS:
TU10/TE10/TS03	MT:

E.2 SUMMARY OF IOX COMMANDS

Table E-1 is an alphabetical list of IOX commands with a summary of the functions each provides.

Table E-1
Summary of IOX Commands

Command	Description
ABORT	Terminates execution of an I/O exercise before normal completion
ABORT taskname	Terminates execution of a task initiated by the EXECUTE command
ABORT /ALL	Terminates execution of all tasks initiated by the EXECUTE command
BADBLOCKS	Enters the numbers of bad blocks in the IOX bad block list; displays the blocks in the bad block list
BUFFERSIZE	Sets the default size of the buffer IOX uses to write and read when exercising a unit with a non-file-structured volume
CONFIGURE	Adds a unit to your test configuration; displays the units in your test configuration
CONTROL_C	Enables or disables the interruption of an IOX exercise to enter a command interactively

Table E-1 (Cont.)
Summary of IOX Commands

Command	Description
DENSITY	Sets the tape density for magnetic tape testing; displays the current or default density and characteristics word
DESELECT	Terminates testing on a unit
ERRORLIMIT	Sets the number of errors tolerated before IOX deselects a unit
EXECUTE	Directs a command line to the operating system for execution
EXIT	Exits from IOX to the operating system monitor
FILES11	Selects a unit with a Files-11 volume mounted; directs IOX to protect the volume data structure during an I/O exercise
HELP	Displays a summary description of IOX commands at your terminal
INTERLEAVE	Sets the block interleave factor for disk testing
ITERATIONS	Sets the number of times through the IOX idle loop for the idle loop iteration count
LOGFILE	Directs activity reports and error reports to either your terminal or the log file IOX.LOG
PARAMETERLIST	Displays the current settings for IOX parameters
PATTERN	Sets the test pattern IOX writes and reads during testing; display all test patterns
PRINTSUMMARY	Displays a summary report of IOX activity at your terminal
PROCEED	Resumes IOX test execution after it has been interrupted by CTRL/C in interactive mode
RANDOM	Enables or disables testing of random blocks rather than sequential blocks during testing
REPORTERRORS	Enables or disables error reports directed to your terminal
RESTART	Reinitializes IOX: stops testing, deconfigures all units except default units, deselects all units, and resets all parameters to their default values
RETRIES	Enables or disables retries of I/O operations by I/O drivers detecting I/O errors
RUNTIME	Sets the length of time IOX is to test units

Table E-1 (Cont.)
Summary of IOX Commands

Command	Description
SELECT	Selects a unit with a non-file-structured volume for an I/O exercise
SPY	Displays execution-time information for a specific unit or for all selected units
START	Begins an I/O exercise on selected units in your configuration
SUMMARYTIME	Sets the time interval between interval summary reports
TEMPORARYFILE	Sets the size of the temporary file IOX uses to exercise units with Files-11 volumes mounted
VERIFY	Ensures that data can be read from a unit
VOLUMECHECK	Checks to determine whether a unit to be tested has a Files-11 volume mounted
WAIT	Specifies the algorithm IOX executes in its idle loop
WRITECHECK	Enables or disables write checks to disks

E.3 INSTALLING, INVOKING, AND RUNNING IOX IN AN EXERCISE EXAMPLE

This section uses an example of a terminal session to show you how to install and invoke IOX, set up your test configuration, set up execution-time parameters, select units you want to exercise, and start the I/O exercise on those units.

E.3.1 Installing IOX

If IOX is not installed on your system, install IOX by using the MCR INSTALL command:

```
>INS $IOX/INC=nn
```

where:

nn is 1.2K words per device to be tested.

If your Executive was built with the Extend Task directive included in it, you need not specify the INC keyword.

The Task Builder command file for IOX built IOX as a nonprivileged task that is checkpointable and that runs at a priority of 50(10) in the GEN partition.

E.3.2 Invoking IOX

If IOX is installed on your system, invoke it with the command:

>IOX

IOX responds by prompting you with the task name assigned by the operating system:

IOX>

When you receive this prompt, you can enter IOX commands.

If IOX is not installed on your system, you can invoke it with the MCR RUN command:

>RUN $IOX/INC=nn

where:

nn is 1.2K bytes per device to be tested.

If your Executive was built with the Extend Task directive included in it, you need not specify the INC keyword.

In this case, IOX names the task using your terminal number and prompts you using this task name. For example:

TT36>

When you receive this prompt you can enter IOX commands.

E.3.3 Setting Up Your Test Configuration

All units have unit number 0 included in the IOX test configuration by default. You must explicitly configure any other units you want to exercise. For example:

IOX>CONFIGURE DK1:
IOX>CONFIGURE DK2:
IOX>CONFIGURE MM5:

E.3.4 Setting Up Execution-Time Parameters

You can set conditions that affect the execution of the I/O exercise. For example, you can specify the length of exercise execution time, how often you want a report of exerciser activity, and whether you want the activity reports directed to the log file SY0:IOX.LOG. You can also request IOX to determine whether the units being tested have Files-11 volumes mounted.

The following commands are an example of how to set up execution-time parameters for an I/O exercise:

IOX>RUNTIME 10
IOX>SUMMARYTIME 4
IOX>LOGFILE YES

These commands direct IOX to execute the I/O exercise for 10 minutes, generate an interval report every four minutes, and direct all reports to the log file.

E.3.5 Selecting Units for an I/O Exercise

Once you have set up your test configuration, you can select units to be tested. Only units you explicitly select are exercised For example:

        IOX>FILES11 DK1:

This command selects unit DK1: for exercising. When IOX executes, only DK1: is exercised. You can use either the SELECT command or the FILES11 command to select a unit for exercising. The FILES11 command is used in this example because it protects the file structure on a Files-11 volume during an I/O exercise.

E.3.6 Starting an IOX Exercise Execution

After setting up your configuration and selecting the units you want exercised, begin the I/O exercise by entering the START command:

        IOX>START

IOX then performs pattern checking on DK1: for the length of time you specified with the RUNTIME command (10 minutes). When IOX completes execution, it generates a summary report and the interval reports, and directs them to the log file IOX.LOG. You can gain access to and examine the log file after you exit from IOX by entering the command:

        >PIP TI:=IOX.LOG

This command directs the PIP utility to display the file at your terminal.

E.3.7 Exiting from IOX

You can exit from IOX and return control to the operating system monitor by using the EXIT command:

        IOX>EXIT

E.4 IOX OPERATIONAL MODES

IOX operates in three modes: command, execution, and interactive. Operational modes are controlled by means of CTRL/C and carriage return on your terminal keyboard.

In most cases, CTRL/C causes RSX-11M to interrupt a task and give control to MCR, the keyboard monitor. You then receive the MCR prompt (>) at your terminal.

However, by entering the CONTROL_C command, IOX allows you to use CTRL/C in an alternate way: you can use CTRL/C to interrupt an IOX I/O exercise and give control to IOX rather than to MCR.

This section describes the operational modes and how to use the IOX CONTROL_C command to control them.

E.4.1 Command Mode

When you invoke IOX by entering the command line described in Section E.3.2, "Invoking IOX," IOX is in command mode waiting for you to enter a command. When you press carriage return in command mode, IOX prompts you:

    IOX>

When you enter CTRL/C in command mode, RSX-11M issues the MCR prompt and the normal rules for entering commands to MCR apply.

In command mode, you can use the CONTROL_C command to enable or disable interruptions to an I/O exercise. CONTROL_C YES enables interruptions, allowing you to enter commands interactively; CONTROL_C NO disables interruptions to an I/O exercise.

E.4.2 Execution Mode

When you begin an I/O exercise (by means of the START command), IOX enters execution mode.

If you have enabled interruptions to the I/O exercise by means of CONTROL_C YES, IOX will not accept any input from your terminal except CTRL/C. If you try to enter any other input, IOX responds with the message:

    IOX -- ONLY ^C ALLOWED

If you have disabled interruptions to the I/O exercise by means of CONTROL_C NO, CTRL/C causes RSX-11M to issue the MCR prompt and execution of the I/O exercise continues. In this case, execution of the I/O exercise cannot be interrupted.

E.4.3 Interactive Mode

When CONTROL_C YES is set, you can interrupt an I/O exercise to enter commands interactively. When you enter CTRL/C, IOX prompts you:

    IOX>

When you receive this prompt, you can enter any IOX command except the following:

    BUFFERSIZE
    PATTERN (PATTERN with no arguments is permitted)
    RUNTIME
    RESTART
    START

These five commands must be entered in command mode.

CTRL/C places IOX in interactive mode until you enter PROCEED. In interactive mode, the I/O exercise continues to execute, but error reports and activity reports directed to your terminal (if LOGFILE NO is set) are suspended until you enter PROCEED. If you set LOGFILE YES, error reports and activity reports are generated normally.

CTRL/C halts the IOX clock so that even though the I/O exercise is continuing, it is not being timed by the IOX clock. Consequently, the exercise may run longer than you specify in the RUNTIME command.

E.5 SETTING EXECUTION-TIME PARAMETERS

Many IOX commands set IOX execution-time conditions, such as how long IOX executes, time between summary reports, and so forth. The PARAMETERLIST command displays all execution-time parameters and the value of their current setting. For example:

```
IOX>PARAMETERLIST

BUFFERSIZE= 1024.            CONTROL_C=YES
ERRORLIMIT= 10.             LOGFILE= NO
INTERLEAVE= 4.              RANDOM= YES
ITERATIONS= 10.             REPORTERRORS= YES
PATTERN= 4.                 RETRIES= NO
RUNTIME= 5.                 VOLUMECHECK= YES
SUMMARYTIME= 1.             WAIT= YES
TEMPORARYFILE= 500.         WRITECHECK= NO

DYNAMIC MEMORY USAGE= 3278.:2248.:2248.:1.
```

There are five categories of execution-time parameters. These parameters are controlled by commands that:

- Set general execution-time conditions

- Set execution-time conditions for units with Files-11 volumes

- Set execution-time conditions for units with non-file-structured volumes

- Set execution-time conditions for measuring system activity

- Direct the operating system to execute non-IOX tasks

The following sections describe the commands in each of these categories.

E.5.1 Setting General Execution-Time Conditions

General execution-time commands affect the execution of all I/O exercises. You are likely to want to set these commands each time you run IOX; therefore, you may want to put them in an indirect file.

| LOGFILE | Allows you to direct IOX activity reports to a log file, IOX.LOG |

| RUNTIME | Allows you to set the length of time an I/O exercise is to execute |

| SUMMARYTIME | Sets the time interval between interval summary reports |

| ERRORLIMIT | Sets the number of I/O errors IOX tolerates before it deselects a unit from the test configuration |

| REPORTERRORS | Enables or disables error reporting |

CONTROL_C   Enables or disables interruptions to an I/O exercise

PATTERN   Sets the test pattern IOX writes and reads when
                   exercising a unit

E.5.2 Setting Execution Conditions for Units with Files-11 Volumes

To set execution conditions for units with Files-11 volumes. Use the
FILES-11 and TEMPORARYFILE commands. The FILES11 command selects a
unit to be exercised; the TEMPORARYFILE command specifies the default
size of temporary file IOX uses when it exercises the unit. You can
override this default with the FILES11 command.

Files-11 volumes are volumes formatted for use by the RSX-11M file
system, Files-11.   These volumes have data structures such as home
blocks, directories, and boot blocks on them.   The FILES11 command
selects a unit with a Files-11 volume and allows you to exercise the
unit without destroying the data structures or files on the volume.

IOX uses a temporary file when it exercises a unit with a Files-11
volume.   IOX creates the temporary file on the volume to be tested and
marks the file for deletion. IOX then selects a random block in the
temporary file to exercise. Because the temporary file is marked for
deletion, it is erased from the disk's file structure when the
exercise completes or IOX terminates.

E.5.3 Setting Execution Conditions for Non-File-Structured Volumes

To exercise units with non-file-structured volumes, use the SELECT
command.   The SELECT command does not check for any of the Files-11
data structures; it exercises the entire volume, destroying all data
on the volume.

Use the VOLUMECHECK command (VOLUMECHECK YES) to ensure that the
volume on the unit you select does not contain any Files-11 data
structures. VOLUMECHECK directs IOX to warn you if it finds such
structures on what you think is a non-file-structured volume.

You may set four execution conditions when you exercise units with
nonfile-structured volumes: the default buffer size, the pattern
checking method, the bad block locations, and whether IOX performs
certain I/O operations during the exercise.

E.5.3.1 **Setting the Default Buffer Size** - Use the BUFFERSIZE command
to change the default size for the buffer IOX uses when it does
pattern checking. When you invoke IOX, the default buffer size is
1024. You can override any default you set when you enter SELECT with
another buffer size.

E.5.3.2 **Choosing a Pattern-Checking Method** - IOX can exercise a unit
by writing to and reading from either random blocks or sequential
blocks on a volume. You can control the pattern-checking method with
the RANDOM and INTERLEAVE commands.

If you specify RANDOM YES, IOX exercises randomly selected blocks on
the volume.

If you specify RANDOM NO, IOX exercises sequential blocks on the volume, beginning with block 0. IOX adds the interleave factor to the location of the last block exercised and uses the result of the addition to determine the next block to exercise. For example:

```
RANDOM NO
INTERLEAVE 1000.
```

These commands direct IOX to begin at block 0 and perform pattern checks on blocks 0, 1000, 2000, and 3000.

E.5.3.3 Entering Bad Block Locations - Use the BAD BLOCKS command to enter the locations of known bad blocks (that is, bad blocks located by the RSX-11M BAD utility) on a volume. IOX maintains a list of bad blocks and ignores them during an I/O exercise. IOX allows you to enter the locations of bad blocks manually; you must know where such blocks are on the disk to use this command effectively. See the description of the BAD BLOCKS command in Section E.10 for information on how to enter the locations of bad blocks.

E.5.3.4 Controlling I/O Operations During the I/O Exercise - Use the RETRIES and WRITECHECK commands to disable certain I/O operations during an I/O exercise. RETRIES NO directs an I/O driver to not retry an I/O operation when it receives an error. WRITECHECK NO directs an I/O driver to not perform write checks on WRITE I/O operations.

E.5.4 Setting Execution Conditions for Measuring System Activity

IOX provides two commands for measuring system activity: WAIT and ITERATIONS.

IOX executes an idle loop while it waits for units to complete I/O operations. It can execute either one of the following in this loop:

    1. The wait-for-event-flag algorithm

    2. The instruction

        BICB -(SP),(SP)+

The BICB instruction takes a large amount of CPU time and can be used to measure I/O throughout.

The wait-for-event-flag algorithm is the default, but you can disable it and execute the BICB instruction by entering the command:

    WAIT NO

You can determine the exact execution speed of the BICB instruction on your processor by referring to the appropriate PDP-11 Processor Handbook. Using this information, along with the number of times IOX executes the instruction, as set by the ITERATIONS command, you can estimate the level of system I/O throughput.

See the ITERATIONS command description in Section E.10.

E.5.4.1 The IOX Idle Loop Algorithm - The following code is provided for you to measure the instruction times in the IOX idle loop. This listing is the actual code in the IOX idle loop.

```
BCKGND::TST    STOPFG        ;TIME FOR INTERVAL REPORT?
        BMI    30$           ;IF MI YES
1$:     TST    ASTCFG        ;STAY IN INTERACTIVE MODE?
        BEQ    5$            ;IF EQ NO
        CLR    ASTCFG        ;YES, ASSUME WE WILL LEAVE IT
        CALL   $DEQUE        ;DEQUEUE ALL PENDING DESELECTS
        CALL   CMDAST        ;CALL INTERACTIVE COMMAND INTERPRETER
        BR     BCKGND        ;LOOP AGAIN
5$:     TST    RUNFLG        ;ARE WE RUNNING?
        BMI    40$           ;IF MI NO, ABORT
10$:    MOV    $ITCNT,CNTI   ;SETUP ITERATION COUNT
15$:    CALL   $DEQUE        ;DEQUEUE ANY PENDING DESELECTS
        TST    $WAIT         ;USE "WTSE$S" INSTRUCTION?
        BEQ    20$           ;IF EQ NO
        WTSE$S #WAIEFN       ;WAIT FOR IOX TO DO SOMETHING
        `.EF$S #WAIEFN       ;NOW CLEAR THE EVENT FLAG
          ;T   STOPFG        ;TIME FOR INTERVAL REPORT?
        BMI    30$           ;IF MI YES
        TST    TTACTV        ;^C ACTIVE?
        BNE    1$            ;IF NE YES
        BR     25$           ;GO COUNT ITERATIONS
20$:    BICB   -(SP),(SP)+   ;WAIT
25$:    DEC    CNTI          ;ALL FINISHED?
        BGT    15$           ;IF GT NO
        ADD    #1,CNTA       ;UPDATE IDLE LOOP COUNT
        ADC    CNTB          ;RIPPLE CARRY
        ADC    CNTC
        BR     BCKGND        ;LOOP AGAIN
```

E.5.5 Directing the Operating System to Execute Non-IOX Tasks

Use the EXECUTE command to direct commands to the operating system for execution. These tasks execute concurrently with an I/O exercise. For example:

    EXECUTE ...BAD DK1:/LI

This command specifies that you want the operating system to execute the BAD utility.

You can use the PARAMETERLIST command to display the status of tasks you initiate using EXECUTE. See Section E.7, "Displaying I/O Status Information," for details on these status reports. You can use the ABORT command to terminate one (ABORT taskname) or all (ABORT /ALL) tasks initiated by EXECUTE.

E.6 I/O EXERCISE OUTPUT

IOX generates two types of output: activity reports and error reports. Activity reports are summaries of IOX processing information, such as how long an I/O exercise has run and how much time remains for the I/O exercise to complete. Error reports show such information as the block where an I/O error was encountered.

E.6.1 Activity Reports

There are three types of activity reports:

- Summary report -- an activity report summarizing IOX activity for the entire I/O exercise

- Interval report -- an activity report summarizing IOX activity in the time intervals set by the SUMMARYTIME command

- Print summary -- a report displayed at your terminal summarizing the IOX activity in the interval between the last summary report and the time you entered the PRINTSUMMARY command.

Using the LOGFILE command, you can direct IOX to display summary reports, interval reports, and error reports at your terminal or you can direct them to the log file IOX.LOG. The following lines show the general format of IOX activity reports.

```
18-SEP-78    15:44:42 ******** EXERCISER STARTED ********
   TIME -- RUN: 1 MIN.    ELAPSED: 1 MIN.  REMAINING:  0 MIN.
   DK0: -- 1,183.  REQUESTS TOTALING 1,183.  BLOCKS WITH NO ERRORS
IDLE-LOOP COUNT:   724.  ITERATIONS

18-SEP-78    15:45:56 ******** EXERCISER TERMINATED ********
```

As shown above, the output of activity reports consists of lines telling when exerciser events occured and lines containing status information.

The exerciser event lines tell you when the exerciser began execution, terminated execution, aborted execution, started a log file, and terminated entries to the log file. The following line is an example of a line describing an exerciser event:

```
18-SEP-78    15:45:56 ******** EXERCISER STARTED ********
```

There are five types of status information lines:

- General user information: date and time of report

- Timing information: time between reports, total execution time (to the nearest minute), and remaining execution time

- Unit information: number of I/O requests to the unit, number of blocks exercised, and number of errors encountered on the unit

- Idle loop information: number of iterations through the idle loop

- Error reports: see Section E.6.2

Both summary reports and interval reports can be directed to either your terminal or the log file by means of the LOGFILE command. LOGFILE YES specifies that the summary information is directed to the log file; LOGFILE NO specifies that the summary information is displayed at your terminal. LOGFILE NO is the default.

To generate a print summary, use the PRINTSUMMARY command. This report cannot be directed to the log file. The print summary shows the amount of IOX exercise activity in the interval between the last interval report and the time you entered the PRINTSUMMARY command.

E.6.2 Error Reports

The following lines show the form of an IOX error report. At the same time IOX is reporting this information, if error logging is enabled, the RSX-11M error logging program is also logging the error. For information on how the error logger handles the errors, refer to the RSX-11M/M-PLUS Error Logging Reference Manual.

```
DK1: -- UNRECOVERABLE ERROR AT BLOCK 358 (DECIMAL) 546 (OCTAL)
DK1: -- DATA ERROR AT BLOCK 358 (DECIMAL) 546 (OCTAL)
       GOOD DATA:  165555   BAD DATA:  167155 (OCTAL)
       WORD POSITION:  308 (DECIMAL) 464 (OCTAL)
```

The error report comprises up to three lines. The first line tells you the block number (in decimal and octal) where the error was encountered. The second line tells "good data" and "bad data." The third line indicates the position of the word within the block (in decimal and octal) where the error was encountered. Only the first error encountered in the block is reported.

E.7 DISPLAYING IOX STATUS INFORMATION

IOX provides four commands for displaying status information:

- PARAMETERLIST - displays parameter settings

- SPY - displays the status of a unit being tested

- CONFIGURE - displays all devices in your configuration

- PATTERN - displays all 11 IOX patterns

E.7.1 Displaying Parameter Settings

The PARAMETERLIST command displays the settings of IOX exercise parameters at the time you enter the command. The following lines show format of a PARAMETERLIST display.

TASK	STATUS	COMMAND LINE
...BAD	QUEUED	DK0:/LI

DEVICE	LUN	BUFSIZE	TYPE	FILESIZE
DB1:	5.	512.	F11	500.
DB2:	6.	512.	F11	500.
MM1:	7.	1024.	NFS	

```
BUFFERSIZE= 1024.              CONTROL_C= YES
ERRORLIMIT= 10.                LOGFILE= NO
INTERLEAVE= 4.                 RANDOM= YES
ITERATIONS= 10.                REPORTERRORS= YES
PATTERN= 4.                    RETRIES= NO
RUNTIME= 5.                    VOLUMECHECK= YES
SUMMARYTIME= 1.                WAIT= YES
TEMPORARYFILE= 500.            WRITECHECK= NO
```

DYNAMIC MEMORY USAGE= 3278.:2248.:2248.:1.

For tasks initiated by the EXECUTE command, the PARAMETERLIST command displays:

- The installed task name (...BAD)

- The execution status (QUEUED, ACTIVE, SUCCESS, WARNING, ERROR, SV ERROR)

- The command line elements you entered (DK0:/LI)

ACTIVE indicates that IOX is being executed. The remaining status indications relate to the Exit with Status (EXST$) Executive directive. For more information on these status indications, refer to the RSX-11M/M-PLUS Executive Reference Manual.

For selected units, PARAMETERLIST displays the following information:

- Device specifications (DB1:, DB2:, and MM1:)

- Logical Unit Number (LUN) (5, 6, and 7)

- Buffer size IOX uses for reads and writes (512(10) for units with Files-11 volumes; 1024(10) for units with non-file-structured volumes)

- Type of volume mounted on unit (F11 for Files-11; NFS for non-file-structured volumes; VFY for units being verified)

- File size of the temporary file IOX uses for processing units with Files-11 volumes mounted

The line describing dynamic memory usage is in the form:

    totalmemory:freeblock:freebytes:fragments

totalmemory
    Indicates the size of IOX dynamic memory in bytes.

freeblock
    Indicates the size of the largest free block of IOX dynamic memory in bytes.

bytes
    Indicates total free bytes available in IOX dynamic memory.

fragments
    Indicates the number of memory fragments in IOX dynamic memory.

E.7.2 Displaying Unit Status

The SPY command displays the status of the unit or units you are exercising. The following line is an example of a SPY command display line:

    DB0: -- TYPE=F11 VBN=305. I/O=AST QUEUED   FUNCTION=WRITE

This line indicates:

- The unit being exercised (DB0:)

- The current virtual block being exercised (305(10))

- The type of volume mounted on the unit (Files-11)

- I/O request status: AST QUEUED, IN PROGRESS, or IDLE

- The type of I/O function being performed (write)

E.7.3 Displaying the Units in Your Configuration

The CONFIGURE command displays all devices that are part of your
system's configuration.

For example:

    IOX>CONFIGURE

This command produces the following display:

    DB0 DD0 DF0 DK0 DL0 DM0 DP0 DR0 DS0 DX0
    DY0 CT0 DT0 MF0 MM0 MS0 MT0

E.7.4 Displaying the Pattern Setting

The PATTERN command displays all 11 possible patterns that IOX writes
and reads during testing.

For example:

    IOX>PATTERN

This command produces the following display:

     1 = 000000,000000
     2 = 177777,177777
     3 = 125252,052525
     4 = 165555,133333*
     5 = 163126,163126
     6 = 055555,155555
     7 = 022222,122222
     8 = 111111,111111
     9 = 007417,007417
    10 = 021042,021042
    11 = 104210,104210

The asterisk indicates the default pattern that the system builds into
IOX.

E.8 STARTING AND CONTROLLING IOX EXECUTION

The START command begins execution of an I/O exercise on units
selected by the FILES11 command and the SELECT command. Section E.3.6
describes how to use the START command.

The CONTROL_C command enables or disables the use of CTRL/C to
interrupt an I/O exercise (see Section E.4). CONTROL_C YES enables
interruptions to an I/O exercise; CONTROL_C NO disables interruptions
to an I/O exercise.

E.8.1 Disabling Interruptions to an I/O Exercise

When you set CONTROL_C NO the I/O exercise cannot be interrupted. That is, when you enter CTRL/C, MCR prompts you and the rules for entering commands to MCR apply. The only way to terminate the I/O exercise in this case is to use the MCR ABORT command:

>ABORT IOX

E.8.2 Interrupting IOX to Enter Commands

When you set CONTROL_C YES, you can interrupt IOX to enter commands interactively by entering CTRL/C on your keyboard. For example, you can execute other tasks with the EXECUTE command or abort the I/O exercise with the IOX ABORT command. During this interactive session, however, IOX suspends display of error reports and activity reports to your terminal.

PROCEED directs IOX to resume displays of error reports and activity reports at your terminal. When IOX is in interactive mode, these reports are discontinued even though the exercise continues to execute.

E.8.3 Terminating an I/O Exercise and Restarting IOX

The ABORT command terminates the execution of an I/O exercise and of a task or tasks initiated by the EXECUTE command.

ABORT with no command qualifier terminates the execution of an I/O exercise before normal completion.

ABORT with a task name terminates the execution of a task initiated by the EXECUTE command. For example:

ABORT ...BAD

This command aborts the Bad Block Locator Utility (BAD).

ABORT /ALL terminates all the tasks initiated by the EXECUTE command and removes the tasks from the list of tasks to be executed by IOX.

The RESTART command directs IOX to:

- Deselect and detach all units

- Remove all user-configured units

- Reset all parameters to default values

- Return IOX to its original memory size

E.9 USING INDIRECT COMMAND FILES WITH IOX

You can use indirect command files with IOX in command mode. IOX accepts only one level of indirect command file; nested indirect files are not allowed.

You can use indirect command files to set up execution parameters for exercises. For example, the file RUN10.IOX contains the following IOX commands to set execution parameters:

    LOGFILE YES
    RUNTIME 10
    SUMMARYTIME 1
    CONTROL_C NO

To execute this indirect command file, you enter the command:

    @RUN10.IOX

IOX accesses the file RUN10.IOX and executes the commands, setting the execution-time parameters.

Comments are allowed on command lines.

E.10 **COMMAND DESCRIPTIONS**

This section provides complete descriptions of IOX commands and the rules for entering them on command lines. The commands are arranged in alphabetical order.

Notational Conventions

The paragraphs below describe the notational conventions used in this section to define IOX command elements and how to enter them on command lines.

Command Line Elements

IOX command lines consist of command lines and qualifiers. You can abbreviate both the command name and the qualifier using the rule described below under "Command Abbreviations."

There are two types of command qualifiers: one type requires numeric settings and the other requires YES/NO settings.

Default Values for Command Qualifiers

Where there is a default value for a command qualifier, that value is stated explicitly in the command description.

Use of Uppercase Characters

Where uppercase characters appear in a command line format, the uppercase characters must be entered as they are shown.

Use of Lowercase Characters

Lowercase letters, words, or symbols in command line format specifications represent variables for which values should be substituted. For example:

    dduu:

These letters represent the values that make up a device specification. Values can be substituted for each of these variables as appropriate.

Use of Colons (:)

Colons are used in device specifications as delimiters. In this case, the colon is required. Colons are also used to separate related parts of certain command line elements. For example:

    BADBLOCKS DK2: 70:3

The colon following the device specification is the specification delimiter; the colon in 70:3 is the command element separator; it means enter a sequence of 3 bad blocks beginning at block 70.

Command Abbreviations

Where short forms of commands or qualifiers are allowed, the shortest form acceptable is represented by uppercase letters. The following example shows the abbreviations allowed for the IOX LOGFILE YES command:

    LOgfile Yes

This notation means that LO, LOG, LOGF, LOGFI, LOGFIL, and LOGFILE and Y, YE, and YES are valid specifications for the LOGFILE command.

Use of Braces ([])

Braces are used to denote optional entries in a command line.

Use of At Sign (@)

The at sign (@) is used to invoke an indirect command file. The at sign precedes the file specification for an indirect command file:

    @filename.filetype;version

All numeric values are entered in decimal, with the exception of device unit numbers and file version numbers.

ABORT

```
Abort[taskname]
     [  /ALL  ]
```

The ABORT command terminates the execution of an I/O exercise and any tasks initiated by the EXECUTE command.

ABORT with no command qualifier terminates the execution of an I/O exercise before normal completion.

ABORT with a task name terminates the execution of a task initiated by the EXECUTE command. For example:

    ABORT ...BAD

This command aborts the bad block locator utility.

ABORT /ALL terminates the execution of all the tasks initiated by the EXECUTE command and removes the tasks from the list of tasks to be executed by IOX.

BADBLOCKS

BAdblocks ddnn: [blocknum:number,...[number,...]...]

The BADBLOCKS command allows you to enter the block numbers of bad blocks on the unit IOX is to test. In the format above, number specifies the number of sequential bad blocks beginning at the specified block number (blocknum in the format). The colon is required when you specify a sequence of bad blocks in this form. For example:

    BADBLOCKS DK2: 70:3

This command enters the block numbers 70, 71, and 72 in the IOX bad block list.

You can also specify the address of a single bad block. For example:

    BADBLOCKS DK2: 3

This command enters block 3 in the IOX bad block list.

You can use both of these forms on the same command line, for example:

    BADBLOCKS DK2: 100:2,3,300:100

This command enters blocks 100, 101, 3, and 300 through 399 in the IOX bad block list.

When you enter only the device name, IOX displays the bad blocks in its bad block list. For example:

    BADBLOCKS DK2:

This command causes IOX to display:

            00070:003
            00100:002
            00003:001
            00300:100

The first number in the display represents the beginning of the sequence of bad blocks; the second number in the display represents total bad blocks in a sequence of bad blocks.

Bad block numbers entered with the IOX BADBLOCKS command are temporary and are used only by IOX in its testing. That is, IOX ignores the bad blocks recorded by the manufacturer or such utilities as BAD; IOX uses only the blocks you enter with the BADBLOCKS command.

BUFFERSIZE

BUffersize bytes

> The BUFFERSIZE command changes the size of the buffer IOX uses when exercising units with non-file-structured volumes. IOX stores the specified buffer size in byte form (rounded up to the next 4-byte boundary) and IOX requests buffers of that size dynamically, as necessary.
>
> This command is not valid if units are currently selected.

CONFIGURE

CONFigure [dduu:]

> The CONFIGURE command enters a unit in the test configuration. (Units must be configured before they can be selected for testing by the SELECT or FILES11 commands.) The CONFIGURE command also displays the units in the test configuration.
>
> CONFIGURE with a qualifier adds a unit to the test configuration. For example:
>
>   CONFIGURE DK20:
>
> This command adds device DK20: to the test configuration.
>
> CONFIGURE with no qualifiers lists all the devices in the test configuration:
>
>   IOX>CONFIGURE
>
>   DB0: DB1: DB2: DD0: DF0: DK0: DK20: DL0: DM0: DP0:
>   DR0: DS0: DX0: DY0: CT0: DT0: MF0:   MM0: MS0: MT0:
>
> Unit 0 is configured by default.

CONTROL_C

CONTrol_C [Yes]
         [No]

       The CONTROL_C command enables or disables the use of CTRL/C to interrupt an I/O exercise.

       CONTROL_C YES enables interruptions to an I/O exercise; CONTROL_C NO disables interruptions to an I/O exercise.

       When you set CONTROL_C YES you can interrupt an I/O exercise to enter IOX commands interactively. For example, you can execute other tasks by means of the EXECUTE command or abort the I/O exercise by means of the IOX ABORT command.

       When you interrupt an exercise with CTRL/C, the exercise continues to execute, but error reports and activity reports are not displayed at your terminal. Further, CTRL/C causes the IOX clock to stop at the next summary interval, even though the exercise continues to execute. Therefore, the execution times shown in activity reports may not show how long the I/O exercise actually executes.

       When you set CONTROL_C NO, the I/O exercise cannot be interrupted. When you enter CTRL/C, MCR prompts you and the rules for entering commands to MCR apply. The only way to terminate the I/O exercise in this case is to use the MCR ABORT command:

       MCR>ABORT IOX

DENSITY

DENSity dduu: [nnnn]

The DENSITY command sets the tape density and characteristics word for IOX to use while testing magnetic tape units.

Three densities are legal for MT: devices:

200, 556, and 800 BPI

Two densities are legal for MM: devices:

800 and 1600 BPI

One density is legal for MS: devices:

1600 BPI

The device must be specified when setting the density. For example:

IOX>DENS MT: 556

This command sets the tape density for MT: testing to 556 BPI.

If you do not specify the density, [nnnn], but specify the device unit, as follows

IOX>DENS MM:

IOX displays the current tape density setting and characteristics word for MM: devices. For example:

DENSITY = 800 BPI CHARACTERISTICS WORD = 04004 (OCTAL)

DESELECT

DESelect dduu:

> The DESELECT command terminates testing on the specified device. DESELECT terminates I/O operations to the specified unit, deletes the bad block list associated with the unit, deassigns the LUN for the unit, and detaches the unit from the test configuration.
>
> The unit remains in the configuration.

ERRORLIMIT

ERrorlimit number

> The ERRORLIMIT command sets the number of errors tolerated between interval reports before IOX deselects a device because of too many errors. For example:
>
>   SUMMARYTIME 2
>   ERRORLIMIT 10
>
> If you request summary reports every two minutes and an error limit of 10 errors, IOX allows up to 10 errors on a unit in that 2-minute interval before deselecting the unit.

EXECUTE

EXEcute taskname commandstring

> The EXECUTE command directs a command line to RSX-11M for execution. You can enter the EXECUTE command while IOX is in command mode or when IOX is in interactive mode. In both cases, output directed to your terminal from the spawned task is displayed at your terminal whether or not an exercise is executing.
>
> All the rules for entering RSX-11M command lines and the use of the SPWN$ directive apply to the parameters you enter on the EXECUTE command line.
>
> A practical example of the use of EXECUTE is to run the BAD utility to list the bad blocks on a volume at your terminal:
>
>   EXE ...BAD DK0:/LI
>
> This command line invokes the BAD utility, which then lists any bad blocks on a volume at your terminal.

EXIT

EXIt

> The EXIT command terminates IOX processing and exits from IOX to the operating system monitor.

FILES11

Files11 dduu: filesize

The FILES11 command selects a unit with a Files-11 volume for an
I/O exercise.   The unit must first be entered in the test
configuration with the CONFIGURE command.

The FILES11 command performs the same function as the SELECT
command.   FILES11 is used to select units with Files-11 volumes;
SELECT is used to select units with non-file-structured volumes.

An example of the FILES11 command is:

        FILES11 DK1:   1000

This command selects the unit DK1:   for I/O exercising.   The
number 1000 overrides the file size of the temporary file IOX
uses to process units with Files-11 volumes mounted.

IOX uses a temporary file when it processes units with Files-11
volumes.   `You   can   set   the   size   of this file with the
TEMPORARYFILE command.

HELP

Help

The HELP command displays a summary description of IOX   commands
at your terminal.

INTERLEAVE

INterleave number

The INTERLEAVE command specifies the interleave factor (in number
of blocks) for exercising units.

When IOX writes the test pattern to disk, it can write the
pattern to either random blocks or to a specified sequence of
blocks. You can direct IOX to write to random blocks by entering
the RANDOM command:

        RANDOM YES

When you direct IOX to write to a sequence of blocks (RANDOM NO
is set), use INTERLEAVE to specify the number of blocks to be
skipped before the next pattern is written. For example:

        RANDOM NO
        INTERLEAVE 2

In this example, the interleave factor is set to two and IOX
writes to and reads from every second block on the disk (block 0,
block 2, block 4, and so forth) beginning at block 0.   For
DECtapes, the only interleave factor allowed is 4.

ITERATIONS

ITerations number

The ITERATIONS command specifies the number of times IOX executes its idle loop before it counts an iteration through the idle loop. For example:

ITERATIONS 10

IOX counts one iteration for every 10 times it executes its idle loop.

The ITERATIONS command is used with the WAIT command to measure system activity.

LOGFILE

Logfile [Yes]
[No]

The LOGFILE command enables you to direct activity reports and error reports to either your terminal or to a log file called SY0:IOX.LOG. LOGFILE YES directs reports to the log file; LOGFILE NO directs reports to your terminal. LOGFILE NO is the default.

Other types of output (from the PRINTSUMMARY command or SPY command, for example) are always directed to your terminal.

IOX notes the time you started the log file and the time you completed entering data to it in the activity reports. Once IOX.LOG is created, IOX appends data to the end of the file without creating new versions of the file.

Refer to Section E.6, "I/O Exercise Output," for more information on how to use the LOGFILE command.

PARAMETERLIST

PARameterlist

The PARAMETERLIST command displays the settings of the IOX
execution parameters at the time you entered the command. It
also, displays information on currently selected devices, active
tasks, and the amount of dynamic memory in use.

When you enter the PARAMETERLIST command, IOX displays
information in the following form:

```
IOX>PARAMETERLIST

TASK      STATUS          COMMAND LINE
----      ------          ------------
...BAD    QUEUED          DK0:/LI

DEVICE   LUN     BUFSIZE         TYPE    FILESIZE
------   ---     -------         ----    --------
  DB1:   5.        512.          F11      500.
  DB2:   6.        512.          F11      500.
  MM1:   7.       1024.          NFS

BUFFERSIZE= 1024.               CONTROL_C= YES
ERRORLIMIT= 10.                 LOGFILE= NO
INTERLEAVE= 4.                  RANDOM= YES
ITERATIONS= 10.                 REPORTERRORS= YES
PATTERN= 4.                     RETRIES= NO
RUNTIME= 5.                     VOLUMECHECK= YES
SUMMARYTIME= 1.                 WAIT= YES
TEMPORARYFILE= 500.             WRITECHECK= NO

DYNAMIC MEMORY USAGE= 3278.:2248.:2248.:1.
```

For tasks initiated by the EXECUTE command, the
PARAMETERLIST command displays:

● The installed task name (...BAD)

● The execution status (QUEUED, ACTIVE, SUCCESS, WARNING,
  ERROR, SV ERROR)

● The command line elements you entered (DK0:/LI)

ACTIVE indicates that IOX is being executed. The remaining
status indications relate to Exit with Status (EXST$) Executive
directive. For more information on these status indications,
refer to the RSX-11M/M-PLUS Executive Reference Manual.

For selected units, PARAMETERLIST displays the following
information:

● Device specifications (DB1:, DB2:, and MM1:)

● Logical Unit Number (LUN) (5, 6, and 7)

● Buffer size IOX uses for reads and writes (512(10) for
  units with Files-11 volumes mounted; 1024(10) for units
  with non-file-structured volumes)

● Type of volume mounted on unit (F11 for Files-11; NFS
  for non-file-structured volumes; VFY for units being
  verified)

● File size of the temporary file IOX uses for processing units with Files-11 volumes mounted

The line describing dynamic memory usage is in the form:

totalmemory:freeblock:freebytes:fragments

totalmemory
  Indicates the size of IOX dynamic memory in bytes.

freeblock
  Indicates the size of the largest free block of IOX dynamic memory in bytes.

bytes
  Indicates total free bytes available in IOX dynamic memory.

fragments
  Indicates the number of memory fragments in IOX dynamic memory.

PATTERN

PATtern [patternnumber]

The PATTERN command sets the pattern IOX writes and reads during testing. There are 11 patterns, each specified by one of the following numbers:

Pattern Number	Pattern
1	000000,000000
2	177777,177777
3	125252,052525
4	165555,133333 *
5	163126,163126
6	055555,155555
7	022222,122222
8	111111,111111
9	007417,007417
10	021042,021042
11	104210,104210

For example:

PATTERN 3

This command directs IOX to use the pattern 125252,052525 when it writes to units for testing. IOX places an asterisk (*) next to the selected pattern when you display the patterns.

Pattern 4 is the default pattern.

PRINTSUMMARY

PRIntsummary

The PRINTSUMMARY command prints the totals for I/O exercise activity between the time of the last interval summary report and the time you entered the PRINTSUMMARY command. These totals are printed in the form of a summary report displayed at your terminal. Section E.6, "I/O Exercise Output," shows the form of a print summary report.

PROCEED

PROceed

The PROCEED command is used to resume display of IOX activity reports and error reports at your terminal and to restart the IOX clock after these functions have been suspended by CTRL/C.

CTRL/C suspends activity and error reporting and stops the IOX clock. PROCEED resumes reporting to your terminal and restarts the IOX clock.

RANDOM

RAndom [Yes]
**   [No]**

> The RANDOM command directs IOX to use a random number generator
> to choose the blocks on the disk being exercised. RANDOM YES
> directs IOX to use the random number generator;   RANDOM NO
> directs IOX to use the number of sequential blocks specified in
> the INTERLEAVE command.
>
> Refer to the command description of the INTERLEAVE command for
> information on how to use INTERLEAVE.

REPORTERRORS

REPorterrors [Yes]
**   [No]**

> The REPORTERRORS command enables or disables IOX error reports.
> REPORTERRORS YES directs IOX to report errors; REPORTERRORS NO
> disables error reports. REPORTERRORS YES is the default.
>
> When you direct IOX to report errors, IOX directs the error
> reports either to your terminal or to the log file IOX.LOG,
> depending on how you have set the LOGFILE command.   (See the
> command description of LOGFILE for information on how to use
> LOGFILE.)
>
> IOX error reports have the following form:
>
>   DK1: -- UNRECOVERABLE ERROR AT BLOCK 358 (DECIMAL) (OCTAL)
>   DK1: -- DATA ERROR AT BLOCK 358 (DECIMAL) (OCTAL)
>   GOOD DATA: 165555   BAD DATA: 167155 (OCTAL)
>   WORD POSITION: 308 (DECIMAL) 464 (OCTAL)

RESTART

REStart

> The RESTART command directs IOX to deselect and detach all units,
> remove all user-configured units, reset all parameters to their
> default values, and return the exerciser task to its original
> memory size.

RETRIES

RETries [Yes]
**   [No]**

> The RETRIES command directs an I/O driver to either retry or not
> retry an I/O operation after it receives an error on the first
> attempt at the operation. RETRIES is used when exercising units
> with non-file-structured volumes.

RUNTIME

RUntime minutes

The RUNTIME command specifies the amount of time in minutes that IOX is to test a unit or units. For example:

RUNTIME 2

This command directs IOX to exercise selected devices for two minutes. If you specify RUNTIME 0, IOX tests units continuously.

The default run time is five minutes.

SELECT

SElect dduu: [buffsize]

The SELECT command selects a unit with a non-file-structured volume for an I/O exercise. An example of the SELECT command is:

SELECT DK1: 2000.

This command selects unit DK1: for an I/O exercise and specifies a buffer size of 2000(10) bytes for IOX processing.

The unit must be configured with the CONFIGURE command before you can select it.

The SELECT command allows an I/O exercise to destroy all the data structures on the mounted volume. To ensure that the mounted volume is not a Files-11 volume, enter:

VOLUMECHECK YES

If you do not specify the buffsize parameter, the size specified in the last BUFFERSIZE command applies.

The default buffer size is 1024 bytes.

SPY

SPy [dduu:]

The SPY command displays information describing the current status of a unit or units. When you specify no device on the command line, the status of all units is displayed.

SPY displays status information in the following form:

DB0: -- TYPE=F11 VBN=305. I/O=AST QUEUED FUNCTION=WRITE

This line indicates:

- The unit being exercised (DB0:)

- The type of volume mounted on the unit (Files-11)

- The Virtual Block Number being tested 305(10). (This would be the Logical Block Number (LBN) for an unformatted volume)

- I/O request status: AST QUEUED, IN PROGRESS, or IDLE

- The type of I/O function being performed (WRITE)

START

STart

The START command starts execution of an I/O exercise on units selected by the FILES11 command and the SELECT command. Refer to Section E.3, "Installing, Invoking, and Running IOX in an Exercise Example," for information on how to use the START command.

SUMMARYTIME

SUmmarytime [minutes]

The SUMMARYTIME command specifies the time interval in minutes between interval summary reports. For example:

SUMMARYTIME 15

This command specifies that you want a summary report generated every 15 minutes.

A value of 0 specifies that you want no summary reports.

The default for the interval between summary reports is 1 minute.

TEMPORARYFILE

TEmporaryfile [filesize]

> The TEMPORARYFILE command is used when you want to exercise a unit with a Files-11 volume mounted. TEMPORARYFILE specifies the size in blocks of the temporary file IOX uses when it tests file-structured devices. This file is marked for deletion when IOX exits. Thus, if IOX terminates prematurely, your file structure is not corrupted with temporary files used by IOX.

VERIFY

VErify dduu: [blocks]

> The VERIFY command is used with units that have non-file-structured volumes mounted. VERIFY ensures that a device is performing I/O correctly by reading the number of blocks (specified by the blocks parameter) from the specified unit.

> IOX performs no pattern checking with VERIFY; that is, no I/O exercise is performed.

VOLUMECHECK

VOlumecheck [Yes]
           [No]

> The VOLUMECHECK command enables or disables a check by IOX to determine whether or not a unit being tested as non-file-structured has a home block. If you check for the home block and IOX finds a home block on the unit, IOX issues a message warning you that the unit has a Files-11 volume mounted and you may be destroying vital information.

> The default is VOLUMECHECK YES.

WAIT

WAit [Yes]
     [No]

The WAIT command is used with the ITERATIONS command to measure
system activity.   IOX executes an idle loop while it waits for
you to enter a command.   It can execute either one of the
following in this loop:

1.   The wait-for-event-flag algorithm

2.   The instruction

     BICB -(SP),(SP)+

The BICB instruction takes up a large amount of CPU time and can
be used to measure I/O throughput.

The wait-for-event-flag algorithm is the default, but you can
disable it and execute the BICB instruction by entering the
command

     WAIT NO

Refer to Section E.5.4, "Setting Execution Conditions   for
Measuring System Activity," for information on how to use the
WAIT command.

WRITECHECK

WRitecheck [Yes]
           [NO]

THE WRITECHECK command enables or disables write checks by I/O
drivers when they perform I/O during an I/O exercise. WRITECHECK
is used to exercise units with non-file-structured volumes.
WRITECHECK YES directs the I/O driver to perform write checks;
WRITECHECK NO directs the I/O driver to disable write checks.

When an I/O driver performs an I/O operation, it issues three
instructions: WRITE, WRITE CHECK, and READ. By eliminating one
of these I/O operations, you can increase the speed of the I/O
exercise.

The default is WRITECHECK NO.

E.11 IOX MESSAGES

IOX displays the following messages. When it can determine that a specific device unit is involved, IOX also displays the device unit.

dduu: -- BAD BLOCK, XXX (DECIMAL) XXX (OCTAL)

   Explanation: The error code returned to IOX was IE.BBE (bad block error).

   User Action: Use the BADBLOCKS command to enter that bad block into the IOX bad block list.

dduu: -- DATA ERROR AT BLOCK XXX (DECIMAL) XXX (OCTAL)
        GOOD DATA: XXXXXX BAD DATA: XXXXXX (OCTAL)
        WORD POSITION: XXX (DECIMAL) XXX (OCTAL)

   Explanation: IOX found an error when comparing the read data with the written data. The position of the word within the IOX data buffer is shown along with the good and bad data.

   User Action: None. If the error persists, enter that block in the bad block list by using the BADBLOCKS command (for non-file-structured devices only.)

dduu: -- DATA OVERRUN AT BLOCK XXX (DECIMAL) XXX (OCTAL)

   Explanation: IOX received an error return of IE.DAO. The record size given was greater than that read. This error occurs on tape devices only.

   User Action: None.

dduu: -- END OF VOLUME SEEN

   Explanation: IOX attempted to write a record past the end of tape marker.

   User Action: None.

dduu: -- ERROR THRESHOLD EXCEEDED

   Explanation: The number of errors set with the ERRORLIMIT command has been exceeded.

   User Action: None. This is an information message only. IOX deselects the unit and continues testing the other devices.

dduu: -- FAILED TO DETACH UNIT

   Explanation: This error is extremely rare because IOX detaches all units that it has attached and only those units.

   User Action: None. This is a possible operating system problem.

dduu: -- FATAL HARDWARE ERROR

    Explanation: The IE.FHE (fatal hardware error) I/O error code was returned to IOX. IOX could not recover from the error.

    User Action: Check the hardware.

dduu: -- I/O REQUEST ABORTED

    Explanation: The IE.ABO I/O error code was returned to IOX. The QIO to the device failed.

    User Action: None. If the problem persists, check the system code (Executive or driver).

dduu: -- I/O UNSATISFIED AT TIMEOUT - FUNCTION: XXXX

    Explanation: When IOX finishes processing, it waits five seconds for I/O to stop. If a long tape is rewinding, this message may occur. XXXX is the function that timed out: READ, WRITE, or REWIND.

    User Action: None.

dduu: -- NO RESPONSE

    Explanation: Unit did not respond to IOX command within one minute. The device may have been accidentally put offline or a tape drive may have lost its column vacuum.

    User Action: Check the device.

dduu: -- NOT READY

    Explanation: The unit is not ready.

    User Action: Check the device.

dduu: -- OFF-LINE

    Explanation: The unit is offline.

    User Action: Check the unit.

dduu: -- PRIVILEGE VIOLATION

    Explanation: The device was not allocated or was mounted by someone else.

    User Action: Check the ownership of the device.

dduu: -- UNIT CONTAINS FILE STRUCTURED VOLUME

Explanation: The VOLUMECHECK command found that the unit is file structured because the file contains a home block. You are not allowed to use the SELECT command on this unit.

User Action: IOX destroys information on non-file-structured volumes. Make certain that you really want this unit tested as a non-file-structured volume.

dduu: -- UNIT NOT MOUNTED FOR NFS OPERATIONS

Explanation: You tried to issue a command for a non-file-structured device to a file-structured device.

User Action: Check the device configuration and reissue the command.

dduu: -- UNEXPECTED ERROR XX

Explanation: IOX received an error code that it could not process. XX is the error code.

User Action: None.

dduu: -- UNEXPECTED REQUEST TO QUEUE I/O - REQUEST ABORTED

Explanation: IOX receives an AST from a device after it has deselected the device.

User Action: Check the device.

dduu: -- UNRECOVERABLE ERROR AT BLOCK XXX (DECIMAL) XXX (OCTAL)

Explanation: IOX received an IE.VER code from the driver. This code indicates an unrecoverable error.

User Action: Check the device and the media.

dduu: -- VERIFICATION COMPLETE

Explanation: This is an information message. The operation of the VERIFY command has completed.

User Action: None.

dduu: -- WRITE-LOCKED

Explanation: The device is write-locked.

User Action: Check the device write-lock/write-enable switch.

dduu: -- WRITECHECK ERROR AT BLOCK XXX (DECIMAL) XXX (OCTAL)

Explanation: The write check operation failed at block XXX.

User Action: None.

IOX -- "@" SYNTAX ERROR

> **Explanation:** There is an error in the indirect command file.

> **User Action:** Check the indirect command file.

IOX -- "@" NESTING LEVEL EXCEEDED

> **Explanation:** Only one level of nesting is allowed in an indirect command file.

> **User Action:** Check that the indirect command file has only one level of nesting.

IOX -- ABORTING DUE TO MCR/PDS COMMAND OR DIRECTIVE

> **Explanation:** IOX was aborted from an external source, but did the necessary housekeeping before exiting.

> **User Action:** Restart IOX.

IOX -- BUFFER SIZE GREATER THAN DEFAULT

> **Explanation:** The buffer size used in the SELECT command is greater than the default buffer size in the BUFFERSIZE command.

> **User Action:** Respecify the SELECT command.

IOX -- COMMAND NOT SUPPORTED

> **Explanation:** This error indicates an attempted execution of the EXECUTE command on a system that did not have the SPAWN directive in the Executive.

> **User Action:** You may have to do another system generation to get the SPAWN directive into your Executive.

IOX -- COMMAND I/O ERROR

> **Explanation:** IOX detected an error when it tried to read the command that you were typing in at the terminal.

> **User Action:** Retype the command.

IOX -- COMMAND VALID ONLY AFTER ABORT

> **Explanation:** You tried to enter a command that cannot be entered while IOX is running. These commands are: RUNTIME, BUFFERSIZE, PATTERN, RESTART, and START.

> **User Action:** Enter these commands in command mode.

IOX -- COMMAND NOT UNIQUE

Explanation: The command abbreviation that you entered was not sufficient to distinguish it from another command.

User Action: Reenter the command with more letters.

IOX -- DRIVER NOT LOADED

Explanation: IOX tried to attach a device which had an unloaded driver.

User Action: Load the driver.

IOX -- DUPLICATE BLOCK NUMBER

Explanation: The block number that you entered with the BADBLOCKS command is already in the bad blocks list.

User Action: Reenter the command.

IOX -- ERROR ATTEMPTING TO READ HOME BLOCK

Explanation: When the VOLUMECHECK command has been given, this error occurs if IOX reads a home block or has an error trying to read a home block. The error indicates that IOX has found a file-structured volume and may destroy the information on it.

User Action: Stop IOX and check the disk that you have mounted on that device unit.

IOX -- FAILED TO OPEN TEMPORARY FILE ON dduu:

Explanation: IOX could not find the necessary number of blocks on the disk as specified in the FILES11 command or the TEMPORARYFILE command.

User Action: Specify a smaller file size.

IOX -- FAILED TO OPEN "@" FILE

Explanation: GCML failed to open the indirect command file.

User Action: Make sure that the file exists and reenter the indirect command file.

IOX -- FAILED TO OPEN LOG FILE

Explanation: IOX could not open the log file.

User Action: The disk may be write protected or may not have enough blocks.

IOX -- FAILED TO CLOSE LOG FILE

   Explanation: IOX could not close the log file.

   User Action: Check the device.

IOX -- FAILED TO ATTACH dduu:

   Explanation: IOX could not attach unit.

   User Action: The device may be mounted or someone else attached
   the unit. Make sure that you have allocated the device and that
   it is mounted foreign for RSX-11M-PLUS. For RSX-11M it does not
   have to be mounted.

IOX -- FATAL FILES ERROR. F.ERR= XXX PC+2= XXX

   Explanation: An error occurred while IOX was trying to issue a
   READ$ or a WRITE$ command. F.ERR is the error code in the FDB.
   PC+2 is the location of the error in IOX. IOX immediately exits.

   User Action: Investigate the source of the error in the code.

IOX -- FATAL ERROR. DSW= XXX PC+2= XXX

   Explanation: A directive issued by IOX did not work. DSW is the
   directive status word. PC+2 is the location of the failure in
   IOX. IOX immediately exits.

   User Action: Investigate the source of the error in the code.

IOX -- FILES OPERATIONS NOT SUPPORTED ON dduu:

   Explanation: You entered a FILES11 command to a volume that is
   not a Files-11 volume.

   User Action: Reenter the command for the correct device or use a
   different command.

IOX -- ILLEGAL DENSITY

   Explanation: The density that you specified for the device is
   incorrect. The device does not support that density.

   User Action: Reenter the command using a different density or
   device.

IOX -- ILLEGAL UNIT SPECIFICATION

   Explanation: The syntax of the unit specification is incorrect.

   User Action: Reenter the command.

IOX -- INVALID BLOCK NUMBER

    Explanation: The block number that you entered for the BADBLOCKS command was not a valid block number for that device.

    User Action: Reenter the command using a different block number.

IOX -- INVALID TASK NAME

    Explanation: The task name that you entered is invalid. That is, the task name is incorrect, the task does not exist, or the task is not installed.

    User Action: Reenter the task name or determine whether the task exists or is installed.

IOX -- INVALID PATTERN NUMBER

    Explanation: You tried to set a data pattern for IOX to use for I/O testing that IOX did not recognize.

    User Action: Check the PATTERN command and reenter the correct data pattern.

IOX -- INVALID COMMAND - TYPE H FOR HELP

    Explanation: You entered a command that IOX did not recognize.

    User Action: Enter H (for help) and IOX displays all of its commands.

IOX -- NO BUFFER SPACE

    Explanation: IOX could not extend to make room for a needed larger buffer.

    User Action: Reinstall IOX with a larger increment.

IOX -- NO LUNS AVAILABLE

    Explanation: This is an unlikely message because IOX allows 250 devices. Unless you have more than 250 devices, this message may indicate a system problem.

    User Action: If you have less than 250 devices, call your software specialist.

IOX -- NO ACTIVITY REMAINS - ABORTING

    Explanation: All disk testing and all tasks are finished before the run time has expired.

    User Action: None.

IOX -- NO ACTIVITY TO START

>   **Explanation:** You issued the START command without defining the configuration or units to exercise.

>   **User Action:** Configure and define the devices that you want to exercise.

IOX -- ONLY ^C ALLOWED

>   **Explanation:** You previously entered the CONTROL_C YES command to enable interruptions to IOX. Therefore, IOX does not accept any other input but CTRL/C.

>   **User Action:** Enter CTRL/C then enter the command.

IOX -- SYNTAX ERROR

>   **Explanation:** The command line that you entered contained a syntax error.

>   **User Action:** Reenter the command line.

IOX -- TASK NEVER EXECUTED

>   **Explanation:** The task that you tried to abort is not on the list of tasks initiated by the EXECUTE command.

>   **User Action:** Check your list of tasks to be initiated by the EXECUTE command.

IOX -- TASK "XXXXXX" CURRENTLY ACTIVE

>   **Explanation:** You tried to execute a task that was already active. XXXXXX is the task name.

>   **User Action:** None.

IOX -- TASK "XXXXXX" EXECUTION COMPLETE. STATUS= NNNNNN

>   **Explanation:** The task completed execution. XXXXXX is the task name. NNNNNN is the task status.

>   **User Action:** None.

IOX -- TASK "XXXXXX" NOT INSTALLED

    Explanation: The task name "XXXXXX" is not installed and cannot be executed as requested.

    User Action: Install the task.

IOX -- TASK "XXXXXX" UNABLE TO EXECUTE

    Explanation: IOX could not execute the task within a specified time.

    User Action: Try to reexecute the task.

IOX -- UNABLE TO ASSIGN LUN TO dduu:

    Explanation: You tried to access a unit that is not on the system.

    User Action: Check the system configuration.

IOX -- UNIT NOT A MAGTAPE

    Explanation: You tried to issue a DENSITY command to a device that is not a magnetic tape device.

    User Action: Reissue the command.

IOX -- UNIT NOT SELECTED

    Explanation: You issued a device-dependent command to a device that you have not selected with the SELECT command or the FILES11 command.

    User Action: Determine which device you want to affect and select it with the SELECT or FILES-11 command.

IOX - UNIT IS FILE STRUCTURED

    Explanation: You used the BADBLOCKS command to try to create a bad blocks list on a file-structured volume. The command did not execute.

    User Action: Make certain that you really want IOX to write on this device.

IOX -- UNIT ALREADY CONFIGURED

    Explanation: You tried to configure a unit with the CONFIGURE command that is already in the configuration.

    User Action: Check the IOX device configuration.

IOX -- UNIT NOT CONFIGURED

> **Explanation:** You tried to access a unit that is not in the IOX unit configuration.
>
> **User Action:** Configure the unit using the CONFIGURE command.

IOX -- UNIT ALREADY SELECTED

> **Explanation:** You tried to select a unit that has already been selected.
>
> **User Action:** Check the printout to find which units you have previously selected.

IOX -- UNITS ARE SELECTED - COMMAND IGNORED

> **Explanation:** The BUFFERSIZE command is valid only if no units are selected by either the FILES11 or SELECT command.
>
> **User Action:** Deselect all selected units.

E.11.1 IOX Task Builder Command File

IOX is built with the defaults that it needs to perform its required functions. The Overlay Description Language (ODL) file for IOX resides on UIC [1,20] on the system disk. If you want to rebuild IOX with different defaults, you can create a Task Builder command file like the one the system uses, which is shown below, and put it on UIC [1,24] for a mapped system or UIC [1.20] for an unmapped system. These UICs are RSX-11M-PLUS/RSX-11M system conventions.

The system command file for building IOX puts the IOX task on system UIC [1,54] for a mapped system; the UIC for system tasks on an unmapped system is [1,50]. The command file is shown as inline code with commentary.

(The RSX-11M Task Builder and the ODL are described in the RSX-11M/M-PLUS Task Builder Manual.)

```
;
; BUILD MAPPED I/O EXERCISER V14
;
[1,54]IOX/FU/CP/MM,[1,34]IOX/-SP/CR/MA/-SH=[1,20]IOXBLD/MP
STACK=96
ASG=TI:1:2:4:5:6,SY0:3
PRI=50
TASK=...IOX
PAR=GEN
;
; NOW DEFINE THE MAXIMUM AMOUNT OF UNITS YOU WILL EVER WANT TO
; TEST. THE MAXIMUM IS 250 AND THE DEFAULT IS 32.
;
UNITS=32
;
; INHIBIT USER OF UNUSED FCS READ/WRITE LONG CODE.
;
GBLDEF=..RWLG:0
;
```

```
; THE DEFAULT TEMPORARY FILE STRUCTURED BLOCK SIZE IS
; DEFINED HERE. THE NORMAL DEFAULT IS 500 DECIMAL (764 OCTAL)
;
GBLDEF=F11SIZ:764
;
; NOW WE WILL DEFINE THE DEFAULT 2-WORD PATTERN WHICH WILL BE
; USED TO FILL THE WRITE BUFFER. THE VALUE MUST BE BETWEEN 1 AND 13.
; THE VALUES CORRESPOND TO THE FOLLOWING PATTERNS:
;           1 -- 000000,000000
;           2 -- 177777,177777
;           3 -- 125252,052525
;           4 -- 165555.133333
;           5 -- 163126,163126
;           6 -- 055555,155555
;           7 -- 022222,122222
;          10 -- 111111,111111
;          11 -- 007417,007417
;          12 -- 021042,021042
;          13 -- 104210,104210
;
GBLDEF=PATERN:4
;
; NOW WE WILL DEFINE THE CHARACTERISTICS USED FOR MAGTAPE TESTING.
; THE DEFAULT FOR TU10 IS CORE DUMP MODE; FOR ALL OTHERS IT IS
; 1600 BPI MODE. SEE THE I/O DRIVERS REFERENCE MANUAL FOR FURTHER
; INFORMATION CONCERNING THIS VALUE.
;
GBLDEF=MAGSTC:004004
;
; NOW DEFINE THE DEFAULT TEST RUNTIME.
;
GBLDEF=RUNTIM:5
;
; NOW DEFINE THE DEFAULT INTERVAL BETWEEN SUMMARY REPORTS.
;
GBLDEF=SUMARY:1
;
; NOW DEFINE THE ERROR THRESHOLD. THIS IS THE NUMBER OF ERRORS
; PERMITTED BETWEEN SUMMARY REPORTS BEFORE THE UNIT WILL BE DE-SELECTED.
;
GBLDEF=ERRMAX:12
;
; NOW DEFINE THE NUMBER OF ITERATIONS THAT WILL BE MADE IN THE
; BACKGROUND LOOP BEFORE A ITERATION IS COUNTED.
;
GBLDEF=ITRCNT:12
;
; NOW DEFINE THE INTERLEAVE FACTOR THAT IS USED FOR SEQUENTIAL
; NON-FILE STRUCTURED DISK OPERATIONS.
;
GBLDEF=INTRLV:4
;
; NOW DEFINE THE DEFAULT NAME FOR THE EXERCISER. THIS NAME IS IN
; RAD50 AND IS USUALLY "IOX".
;
GBLDEF=IOXNAM:035260
;
; NOW DEFINE THE DEFAULT NON-FILE STRUCTURED BYTE COUNT. THIS IS USED
; FOR ALL NON-FILE STRUCTURED DEVICES EXCEPT DECTAPE. THE USUAL VALUE
; IS 2 BLOCKS (2000(8) BYTES).
;
GBLDEF=PABCNT:2000
;
; NOW WE WILL DEFINE THE UNSOLICITED AST CHARACTER. THIS IS THE
```

```
; CHARACTER WHICH WILL INTERRUPT THE EXERCISER WHEN THE 'CONTROL_C'
; FEATURE IS ENABLED. THE DEFAULT CHARACTER IS CONTROL/C.
;
GBLDEF=$CC:3
;
; NOW WE WILL DEFINE SOME DEFAULT YES/NO VALUES.
; A VALUE OF "0" SIGNIFIES "NO"; A VALUE OF "1" SIGNIFIES "YES".
;
GBLDEF=REPORT:1                         ;REPORT ERRORS TO CONSOLE
;
GBLDEF=RANDOM:1                         ;USE RANDOM DISK SEEKS
;
GBLDEF=CONTIN:0                         ;DO NOT RUN CONTINUOUS
;
GBLDEF=CTRLC:1                          ;USE UNSOLICITED AST'S
;
GBLDEF=WAITF:1                          ;"WAIT" INSTRUCTION IN BACKGROUND LOOP
;
GBLDEF=VOLCHK:1                         ;FILE STRUCTURED VOLUME CHECKING
;
//
```

APPENDIX F

SYSTEM CONVENTIONS

F.1 RSX-11M UIC CONVENTIONS

The RSX-11M Release 3.2 distribution kits observe a set of UIC conventions for files on disk. The purpose of these conventions is to provide a uniform and consistent means of allocating, locating, and maintaining files on disk.

On a disk, there are many User File Directories (UFDs) in which files are catalogued. A particular UFD is referenced by specifying the correct UIC (User Identification Code). The UIC consists of two numbers separated by a comma and enclosed in brackets (such as UIC [11,20]). The first number (11) is the group number; the second number (20) is the member number, which indicates a specific directory within a group of directories. RSX-11M makes use of the UICs to keep related files in specific directories.

F.1.1 Group Number

The group number is used to identify groups of directories. By convention, group numbers of 1 through 10 are reserved for access by the Executive. At present, only group number 1 is used. It is used to identify UFDs which contain files relevant to an RSX-11M system. Group numbers 11-377(8) may be used for user files. Please note, however, that group numbers 11-27(8) are reserved by DIGITAL for storing files relevant to the Executive and Ancillary Control Processors (ACP).

        Group Number 11 is used for Executive files
                     12 is used for MCR files

In addition, group numbers 30-177(8) are reserved for DEC-supplied software tasks. The distribution kit only uses group numbers 1, 11, 12, 13, 15, 45, and 200.

        Group number   15 is used for privileged utility tasks
                            (PMD, RMDEMO, etc.)
        Group number   45 is used for K-series files
        Group number   200 is used for SYSGEN indirect command files

F.1.2 Member Number

The second number (member number) is used to hold different file types of the group. For example, the UIC [11,10] contains source modules of the Executive. Member numbers currently in use are:

10	–	Source modules.
20	–	Object modules, assembly and task build command files, object module libraries, overlay descriptor files for the Executive and all unmapped privileged and nonprivileged tasks.
24	–	Same as 20 above, except that files are for mapped privileged and nonprivileged tasks, and the Executive.
30	–	Listing and map files for all unmapped privileged and nonprivileged tasks.
34	–	Listing and map files for all mapped privileged and nonprivileged tasks.
40	–	SLP correction files for files located under member number 10.
50	–	Tasks and Executive for RSX-11M unmapped system.
54	–	Tasks and Executive for RSX-11M mapped system.
60	–	Tasks and Executive for RSX-11S unmapped system.
64	–	Tasks and Executive for RSX-11S mapped system.
200	–	SYSGEN indirect command files.

Member numbers 50, 54, 60, and 64 exist only for group number 1. Member numbers 10 and 40 exist only for group numbers above 10. Member numbers 20, 24, 30, and 34 exist for all group numbers. Member number 200 is used exclusively with group number 200.

For example, for MCR:

[12,10]	Source files.
[12,20]	Unmapped object modules, assembly command files and library build command file.
[12,24]	Mapped object modules, assembly command files and library build command file.
[12,30]	Unmapped listing files.
[12,34]	Mapped listing files.
[12,40]	SLP correction files for files under [12,10].

For the unmapped system:

[1,20]   Object module libraries, task build command files,
            and Task Builder overlay description files for all
            tasks.

[1,30]   Area for task maps.

[1,50]   RSX-11M Executive and system tasks.

For the mapped system:

[1,20]   Object module libraries, all task build overlay
            descriptor files for all nonprivileged tasks.

[1,24]   Object module libraries, task build command files
            for all mapped tasks, and overlay description
            files for all privileged tasks.

[1,34]   Executive and task maps.

[1,54]   RSX-11M Executive and system tasks.

Other UICs:

[1,1]   System and macro object module libraries.

[1,2]   System message files.

[1,3]   Directory for lost files found by VFY.

[1,4]   Directory for Post-Mortem and Snapshot Dumps.

[1,6]   Directory for error log files.

[1,51]   Standalone DSC

F.2 NAMING CONVENTIONS

System file names have the following general format:

    pppnnnsss.typ

where:

ppp is an optional prefix used to designate a special version or
     characteristic of the named file.   The designation BIG, for
     example, is sometimes used to designate a task, such as TKB, that
     is built to operate in more than 8K of memory, e.g., BIGTKB.

nnn is the system identification for the task. Table F-1 lists all
     system tasks, together with the identification and group codes.

sss is a suffix for noting the relationship of the file to the task
     specified in the nnn identification. For example, PIPBLD.CMD is
     the command file for building PIP.

     Suffixes:

     ASM -- Assembly command file
     BLD -- Task Builder command or overlay description file

typ is the standard mnemonic for file type, such as MAP, CMD, etc.

Types:

```
CMD  -  Command File
DAT  -  Data files
LST  -  MACRO-11 Listing File
MAC  -  MACRO-11 Source File
MAP  -  Task Map File
MLB  -  User Macro Library File
OBJ  -  MACRO-11 Object Library File
ODL  -  Overlay Description File
OLB  -  Object Library File
PMD  -  Post-Mortem or Snapshot Dump File
SML  -  System Macro Library File
STB  -  Task Symbol Table File
TSK  -  Task/Driver Image File
```

Table F-1
System Identification Codes

System ID	Group Code	Description
RSX	11	RSX-11M/S Executive, drivers, and tables
MCR	12	Monitor Console Routines
FCP	13	Files-11 Ancillary Control Processor (ACP)
RMD	14	RMDEMO
PMD	15	Post-Mortem and Snap-Dump Processor
BMR	16	Basic MCR (RSX-11S)
ERL	17	Error Logger
OTL	20	On-Line Task Loader (RSX-11S)
SIP	21	System Image Preservation Program (RSX-11S)
MTA	22	Magtape ACP
QMG	25	Queue Manager
MAC	30	MACRO-11 Assembler
TKB	31	Task Builder
PIP	32	Peripheral Interchange Program
FLX	33	File Transfer Program
VFY	34	File Structure Verification Program
DMP	35	File Dump Utility

SYSTEM CONVENTIONS

Table F-1 (Cont.)
System Identification Codes

System ID	Group Code	Description
DSC	36	Disk Save and Compress Utility (task version)
EDI	37	Line Text Editor
SLP	40	Source Language Input Program
PRESRV	41	Volume Preservation Program
LBR	42	Librarian
PRT	46	Serial De-spooler
ODT,TRACE	47	Online debugging tool, trace
FCS	50	File Control Services
PSE,SYE	54	Error log formatters
CML	55	Command Line Routing
ZAP	57	File Patch Utility Program
BAD	62	Bad Block Locator Program
DSCS8	63	Disk Save and Compress Utility (stand-alone version)
CRF	65	Cross Reference Utility Program
VMR	70	Virtual MCR Program
BRU	74	Backup/Restore Utility
UMD	101	User Mode Diagnostics
FTB	106	Fast Task Builder
CMP	107	File Compare Utility
PAT	111	Object Module Patch Utility
FMT	112	Online Formatter
IOX	113	System I/O Exerciser
CDA	116	Crash Dump Analyzer
LPP	121	Queue Manager De-spooler

APPENDIX G

BUILDING A 4K FCS RESIDENT LIBRARY

This Appendix documents the method to build a 4K FCS resident library
(FCSRES).

BUILDING A 4K FCS RESIDENT LIBRARY

```
        .TITLE  FCSRES - FCS RESIDENT LIBRARY FILE
        .IDENT  /17.0/
;
; COPYRIGHT   1974,  DIGITAL  EQUIPMENT  CORP.,  MAYNARD,   MASS.
;
; THIS SOFTWARE IS FURNISHED TO PURCHASER UNDER A LICENSE FOR USE
; ON A  SINGLE COMPUTER SYSTEM AND CAN BE  COPIED (WITH INCLUSION
; OF DEC'S COPYRIGHT  NOTICE) ONLY FOR USE IN SUCH SYSTEM, EXCEPT
; AS MAY OTHERWISE BE PROVIDED IN WRITING BY DEC.
;
; THE  INFORMATION  IN THIS DOCUMENT IS SUBJECT TO CHANGE WITHOUT
; NOTICE  AND  SHOULD NOT BE CONSTRUED AS A COMMITMENT BY DIGITAL
; EQUIPMENT CORPORATION.
;
; DEC  ASSUMES NO  RESPONSIBILITY  FOR  THE  USE  OR  RELIABILITY
; OF  ITS  SOFTWARE ON  EQUIPMENT WHICH  IS  NOT SUPPLIED BY DEC.
;
;
;
; MODIFIED:
;
;
;
;               SR017 - COMMENT OUT ENTRY POINTS, TO RESTORE DEFAULT
;                       FCSRES TO BELOW 4K.
;               SR018 - INSERT CALLS OF ARITH AND DARITH ROUTINES TO
;                       CORRECT PSECT PROBLEM.
;
; THIS FILE DOCUMENTS HOW TO BUILD AN FCS RESIDENT LIBRARY,
; AND IT DEFINES ALL OF THE POSSIBLE MODULES THAT MIGHT GO INTO
; SUCH A LIBRARY.
;
; IT SHOULD BE UNDERSTOOD THAT PRECISELY HOW MUCH GOES INTO FCSRES
; IS ACTUALLY DEPENDENT ON WHICH PROGRAMS ARE GOING TO USE IT AND WHAT
; THOSE PROGRAMS REQUIRE.  THE IMPORTANT POINT TO BEAR IN MIND
; IS THAT A PROGRAM LINKING TO FCSRES MAY NOT GET MISSING FCS MODULES
; FROM THE SYSLIB.OLB OBJECT LIBRARY FILE AS WELL. A PROGRAM NEEDING
; FCS MODULES WHICH WERE NOT PLACED IN FCSRES WOULD HAVE NO CHOICE
; BUT TO LINK WITHOUT FCSRES AND USE ALL THE MODULES OUT OF SYSLIB.
;
; FOR THE OBVIOUS REASONS OF SIZE, THE MINIMUM AMOUNT SHOULD BE PUT IN
; FCSRES CONSISTENT WITH THE NEEDS OF THE PROGRAMS USING IT.
;
; THOSE ENTRY POINTS THAT ARE INVOKED BY MACROS ARE DOCUMENTED BELOW
; SO THAT IT IS POSSIBLE TO PICK WHAT SHOULD GO INTO FCSRES.
;
; IT IS INTENDED THAT THIS FILE BE EDITED TO ELIMINATE UNDESIRED
; MODULES FROM FCSRES.
;
;       THE ACTUAL BUILDING OF FCSRES INVOLVES THE FOLLOWING:
;       1) ASSEMBLE THIS MODULE
;
;       MAC> FCSRES,FCSRES=FCSRES
;
;       2) BUILD THE LIBRARY
;
;       SET /UIC=[1,1]
;
; TO BUILD FCSRES FOR A MAPPED SYSTEM:
;
;       TKB>[1,1]FCSRES/-HD/MM/PI,LP:,SY:[1,1]FCSRES=[200,200]FCSRES
;       TKB>/
;       TKB>STACK=0
;       TKB>PAR=FCSRES:0:20000
;       TKB//
;
; TO BUILD AN FCSRES ON AN UNMAPPED SYSTEM:
;
;       TKB>SY:[1,1]FCSRES/-HD/-MM/PI,LP:,SY:[1,1]FCSRES=[200,200]FCSRES
;       TKB>/
;       TKB>STACK=0
;       TKB>PAR=FCSRES:140000:20000
;       TKB>//
;
```

```
        .MCALL  CALLR
        .PSECT  $$RESL
;
; OPENING FILES
;
        .GLOBL  .OPEN           ;OPEN$X, OPNS$X, OPNT$X
.OPFID::CALLR   .OPEN           ;OFID$X CAN USE THE OPEN$X CODE
        .GLOBL  .OPFNB          ;OFNB$X - USED FOR FORTAN RUN TIME
;
; CLOSING FILES
;
        .GLOBL  .CLOSE          ;CLOSE$
;
; RECORD I/O
;
        .GLOBL  .GET,.PUT       ;GET$, AND PUT$, GET$R, AND PUT$R
.PUTS0::CALLR   .PUT            ;PUT$$ CAN USE PUT$ CODE
.GETS0::CALLR   .GET            ;GET$$ CAN USE GET$ CODE
;
; ARITH AND DARITH ROUTINES NECESSARY FOR GET$ AND PUT$
;
        .GLOBL  $DIV,$DMUL,$DDIV ;
;
; BLOCK I/O
;
        .GLOBL  .READ,.WRITE,.WAIT ;READ$, WRITE$, AND WAIT$
;
; DELETE FILES
;
        .GLOBL  .DELET          ;DELET$
        .GLOBL  .MRKDL          ;USED BY OPNT$D
;
; FILE EXTENSION
;
        .GLOBL  .EXTND
;
; DIRECTORY OPERATIONS
;
        .GLOBL  .FIND,.ENTER,.REMOV
;
; FILE POSITIONING
;
        .GLOBL  .POINT,.MARK
;
; ESTABLISH DIRECTORY ID
;
        .GLOBL  .GTDID,.GTDIR
;
; READ AND WRITE FILE STORAGE REGION CELLS
;
        .GLOBL  .RDFDR,.WDFDR,.RFOWN,.WFOWN,.RDFFP,.WDFFP
;
;----------------------------------------------------------------------
;
; THE FOLLOWING MODULES HAVE BEEN COMMENTED OUT TO REDUCE THE SIZE OF
; THE DEFAULT FCSRES TO BELOW 4097.  YOU MAY RESTORE THEM, BUT ONLY IF
; YOU REMOVE OTHER .GLOBL STATEMENTS.
;
; THE FOLLOWING MODULE IS NORMALLY NOT USED, DELET$ IS MUCH MORE COMMON
;
;       .GLOBL  .DLFNB          ;DELETE BY FILE NAME BLOCK
;
; RENAME FILE
;
;       .GLOBL  .RENAM
;
; ISSUE GENERAL QI/O AND SPECIAL MAGTAPE FUNCTION QI/OS
;
;       .GLOBL  .XQIO,.CTRL
;
        .END
```

APPENDIX H

HELP TEXT FILES

Each distribution kit includes a file (HELP.ULB) which consists of text sources for the MCR Help command.

For Big Disk kits, HELP.ULB can be found under the UFD [1,2].

For Dual RK05 kits, HELP.ULB is contained on the Executive source disk (EXCSRC) under the UFD [1,2].

For RL01 kits, HELP.ULB is contained on the utility source disk (RLUTIL) under the UFD [1,2].

The following lists the steps to use the Help support from HELP.ULB:

1. Log on privileged

2. Assign the default system device SY: to the pseudo device LB:. For example:

    >ASN LB:=SY:

3. Establish [1,2] as the default UIC for the terminal. For example:

    >SET /UIC=[1,2]

4. Mount the volume that contains HELP.ULB. For example:

    >MOU DK1:EXCSRC

5. Copy HELP.ULB to the LB: device. For example (continuing the DK1: example):

    >PIP /NV=DK1:HELP.ULB

6. Extract the build module from HELP.ULB and name the file HELPBUILD.CMD. For example:

    >LBR HELPBUILD.CMD=HELP.ULB/EX:BUILD

7. Initiate the Help build command file. For example:

    >@HELPBUILD

    The Help build command file (HELPBUILD.CMD) permits you to build Help support for most of the MCR commands and several of the RSX-11M utilities or you can build a skeletal Help file.

8. When the task build completes, you can delete the files HELPBUILD.CMD and HELP.ULB. For example:

       >PIP HELPBUILD.CMD;*, HELP.ULB;*/DE

9. Then dismount the volume. For example:

       >DMO DK1:

APPENDIX I

HARDWARE BOOTSTRAP PROCEDURES

I.1 HARDWARE BOOTSTRAP ROUTINES

This section describes the procedures for bootstrapping programs into PDP-11 processor memory using the following PDP-11 bootstrap Read-Only Memory programs:

- The BM792-YB Bootstrap ROM

- The MR11-DB Bootstrap ROM

- The BM873-YA Bootstrap ROM

- The BM873-YB Bootstrap ROM

- The M9301-YA and M9301-YB Bootstrap ROM's

- The M9301-YC Bootstrap ROM (PDP-11/70 processors only)

- The M9301-YF Bootstrap ROM

I.1.1 RM792-YB Bootstrap ROM

Follow this procedure to start up the BM792-YB bootstrap ROM:

1. Press HALT

2. Set the console switches to 173100.

3. Press LOAD ADDRESS.

4. Enter the address of the Load device in the console switches:

Device	Code
RK11 Disk	177406
RF11 Disk	177462
RP11 Disk	176716
TC11 DECtape	177344

5. Lift the HALT key.

6. Press START.

The system then displays on the console terminal the start-up sequence.

I-1

I.1.2 **MR11-DB Bootstrap ROM**

Follow this procedure to start up the MR11-DB bootstrap ROM:

1. Press HALT.

2. Enter the address of the load device in the console switches:

Device	Code
RF11 Disk	173100
RK11 Disk	173110
TC11 DECtape	173120
TM11 Magtape	173136
RP11 Disk	173154

3. Press LOAD ADDRESS.

4. Lift the HALT key.

5. Press START.

The system then displays on the console terminal the start-up sequence.

I.1.3 **BM873-YA Bootstrap ROM**

Follow this procedure to start up the BM873-YA bootstrap ROM:

1. Press HALT.

2. Enter the address of the load device in the console switches:

Device	Code
RF11 DISK	173000
RK11 DISK	173010
TC11 DECTAPE	173030
TM11 MAGTAPE	173050
RP11 DISK	173100
RC11 DISK	173144
KL11/ DL11	173210
TA11 CASSETTE	173230
PC11 PAPERTAPE	173312

3. Press LOAD ADDRESS.

4. Lift the HALT key.

5. Press START.

The system then displays on the console terminal the start-up sequence.

I.1.4 BM873-YB Bootstrap ROM

To start up the BM873-YB bootstrap ROM, follow this procedure:

1. Press HALT.

2. Enter the address of the load device in the console switches:

Device	Code
<RH11/RH70/RS03/RS04 Disk (unit 0)	173000
<RH11/RH70/RS03/RS04 Disk (unit in switch register)	173002
RK11 Disk (unit 0)	173030
RK11 Disk (unit in switch register)	173032
TC11 DECtape (unit 0)	173070
TM11 Magtape (unit 0)	173110
RF11 Disk	173136
RH11/RH70/TM02/TU16 Magtape (unit 0)	173150
RH11/RH70 Device Combination (unit zero)	173230
RH11/RH70 Device Combination (unit in switch register)	173232
RH11/RH70/RP04/RP05/RP06 Disk (unit 0)	173320
RH11/RH70/RP04/RP06 Disk (unit in switch register.)	173322
RP11/RP02/RP03 Disk (unit 0)	173350
RP11/RP02/RP03 Disk (unit in switch register)	173352
KL11/DL11 Console Terminal Reader	173510
TA11 Cassette (unit zero)	173524
TA11 Cassette (unit in switch register)	173526
PC11 papertape reader	173620

3. Press LOAD ADDRESS. For units other than zero, enter unit number in switch register.

4. Lift the HALT key.

5. Press START.

The system then displays on the console terminal the start-up sequence.

I.1.5 M9301-YA or M9301-YB Bootstrap ROM

Follow this procedure to start up either the M9301-YA or the M9301-YB
bootstrap ROM:

1. Press the BOOT switch.

2. In response to the $ prompt on the console terminal, enter
    one of the following 2-letter codes:

Code	Device
DB	RP04 05/06 DISK M9301-YB ONLY
DK	RK11 DISK
DP	RP11 (RP02/03) DISK
DS	RS03/04 DISK M9301-YB ONLY
DT	TC11 DECTAPE
DX	RX11 FLOPPY DISK
CT	TA11 CASSETTE TAPE
MC	MIXED MASSBUS DEVICE M9301-YB ONLY
MM	TM02/TU16/TU45 MAGTAPE M9301-YB ONLY
MT	TM11/TMA11/TMB11/TU10 MAGTAPE
PR	PC11/PR11 PAPER TAPE READER
TT	KL11/DL11 CONSOLE TERMINAL READER

    The two alphabetic characters may be followed by an optional
    single octal digit for bootstrapping from units other than
    zero, and terminated by a carriage return.

The system then displays on the console terminal the start-up
sequence.

I.1.6 M9301-YC Bootstrap (PDP-11/70 Only)

The M9301-YC bootstrap operates only on the PDP-11/70.   Perform the
following steps to use this bootstrap.

1. Press the HALT switch and set back to the enable position.

2. Set the START address of 17765000 in the console switches.

3. Press LOAD ADDRESS.

4. Set the device unit number in switches 0 through 2.

5. Set the device code in switches 3 through 6.   The device
    codes are:

Code	Device
1	TM11/TU10/TS03 MAGNETIC TAPE
2	TC11/TU56 DECTAPE
3	RK11/RK05 DECPACK DISK CARTRIDGE
4	RP11/RP02/RP03 DISK PACK
6	RH70/TU16/TU45 MAGNETIC TAPE
7	RH70/RP04/RP05/RP06 DISK PACK
10	RH70/RS04/RS03 FIXED HEAD DISK

6. Ensure that switches 7 through 21 are off (down).

7. Press START.

The system then displays on the console terminal the start-up sequence.

Before the M9301-YC bootstrap actually boots the system, it performs CPU tests, instruction and addressing tests, and memory and cache tests. If a hardware failure is detected, and diagnostic program halts. The lights contain the ROM address of the HALT. If this occurs, call the Digital Field Service Engineer.

It may, however, be possible to continue with the bootstrap operation if the lights contain the address 17773764, which indicates a cache failure. To continue in this case, press cont. This is the only case in which it is possible to continue bootstrapping after the diagnostic detects an error.

I.1.7 M9301-YF Bootstrap ROM

The following instructions bootstrap the system by means of the M9301-YF console emulator. Refer to the <u>M9301 Bootstrap/Terminator Maintenance Manual</u>, for other ways to boot the system with the M9301-YF.

Follow this procedure at the operator's terminal:

1. Press the console BOOT switch.

   If diagnostics are enabled[1], the M9301-YF performs primary CPU diagnostics.

   The terminal then displays the contents of R0, R4, SP, and R5, respectively; the contents appear as four 16-bit octal numbers. Note that pressing the boot switch at this time causes PDP-11 systems without console registers to copy the PC into R5 before the power-up sequence begins.

   The terminal then displays the prompt $ at the beginning of a new line.

2. In response to the prompt $, type the appropriate device code at the terminal, followed by carriage return:

<u>Code</u>	<u>Device</u>
DBN	RP04, RP05, RP06, DISK
DKN	RK05 DISK
DMN	RK06 DISK
DSN	RS03 OR RS04 DISK
DTN	TU56 DECTAPE
DXN	RX01 FLOPPY DISK
MMN	TU16 MAGNETIC TAPE
MTN	TU10 MAGNETIC TAPE
PR	PC11 PAPER TAPE READER
TT	DL11 CONSOLE TERMINAL READER

---

[1] The M9301-YF micro switches must be set to 000 to perform diagnostics when using the console emulator to boot the system. If the switches are set to 002, the M9301-YF console emulator boots the system without performing diagnostics. Consult a Digital Field Service Engineer or see the M9301 <u>Bootstrap/Terminator Maintenance Manual</u>.

In the list of codes above, n represents the device unit number; the only permissible values are 0 through 7. The unit number can be omitted if it is 0.

If diagnostics are enabled, the M9301-YF performs secondary CPU and memory diagnostics before booting the system.

The system then displays on the console terminal the start-up sequence.

READER'S COMMENTS

> NOTE: This form is for document comments only. DIGITAL will
> use comments submitted on this form at the company's
> discretion. If you require a written reply and are
> eligible to receive one under Software Performance
> Report (SPR) service, submit your comments on an SPR
> form.

Did you find this manual understandable, usable, and well-organized?
Please make suggestions for improvement.

_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____

Did you find errors in this manual? If so, specify the error and the
page number.

_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____

Please indicate the type of reader that you most nearly represent.

☐ Assembly language programmer
☐ Higher-level language programmer
☐ Occasional programmer (experienced)
☐ User with little programming experience
☐ Student programmer
☐ Other (please specify)_____

Name_____ Date_____

Organization_____

Street_____

City_____ State_____ Zip Code_____
                                                      or
                                                 Country

Please cut along this line.