RT–11 System Generation Guide

Order Number AA–M240E–TC

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This guide describes how to generate a customized RT–11 operating system for those RT–11 users who need to build special monitors and handlers.

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Preface

Document Structure

This manual is divided into the following three chapters and three appendixes:

Part	Title	Description
Chapter 1	Preparing for a System Generation	Explains what a system generation is and describes how to prepare for it.
Chapter 2	The SYSGEN Program Dialog	Lists the SYSGEN program dialog questions and help text and explains how to answer each question.
Chapter 3	Performing a System Generation on a Disk System	Describes how to generate an RT–11 operating system on a disk system.
Appendix A	Example SYSGEN Program Sessions	Lists answers to the system generation questions that duplicate the distributed monitors, that create an MSCP error-logging system, and that create a multi-terminal system.
Appendix B	RT–11 Conditionals	Lists conditionals that RT–11 uses and that you can define in a system generation.
Appendix C	Customizations for Specially Generated Monitors	Lists customizations required for specially generated monitors.

Audience

This manual is written for experienced users of the RT–11 operating system who want to generate their own customized monitors and handlers.

The RT–11 software kit contains six generic operating systems that are designed to meet the needs of most RT–11 users. However, you need not be limited to the use of any one of these systems if they do not meet your needs. This manual provides you with the information you need to generate a system tailored to your specific needs.

Before you perform the procedures in this manual, you should understand the RT–11 operating system. See the RT–11 software product description for a brief description

of all RT–11 features, the *Introduction to RT–11* for a general explanation of how to use RT–11, the *RT–11 Installation Guide* for installation specific information, and the RT–11 documentation set for further information.

If you are a FORTRAN, BASIC–11, CTS–300, or other layered product user, you build your FORTRAN, BASIC–11, CTS–300, or other system after building the RT–11 system. A layered product is software that is sold separately but requires the RT–11 operating system environment to run. See the appropriate installation manual for instructions on installing such products.

Conventions

The following conventions are used in this guide.

Convention	Meaning

Black print	In examples, black print indicates output lines or prompting characters that the system displays. For example:
	`.BACKUP/INITIALIZE DL0:F*.FOR DU1:WRK`
	`Mount output volume in DU1:; continue? Y`

Red print	In examples, red print indicates user input.
Braces ({ })	In command syntax examples, braces enclose options that are mutually exclusive. You can choose only one option from the group of options that appears in braces.
Brackets ([ ])	Square brackets in a format line represent optional parameters, qualifiers, or values, unless specified otherwise.
lowercase characters	In command syntax examples, lowercase characters represent elements of a command for which you supply a value. For example: `DELETE filespec`
UPPERCASE characters	In command syntax examples, uppercase characters represent elements of a command that should be entered exactly as given.
number.	A number followed by a period indicates a decimal number. A number without a decimal point (period) is an octal number, unless otherwise indicated. For example, 128. is 128_{10} or 128 (decimal) and 126 is 126_8 or 126 (octal).
RET	RET in examples represents the RETURN key. Unless the manual indicates otherwise, terminate all commands or command strings by pressing RET.
RETURN	RETURN in the text represents the RETURN key.

Convention	Meaning
CTRL/*x*	CTRL/*x* indicates a control key sequence. While pressing the CTRL key, press another key. For example: CTRL/C.

Associated Documents

Basic Books

- *Introduction to RT–11*
- *Guide to RT–11 Documentation*
- *PDP–11 Keypad Editor User's Guide*
- *PDP–11 Keypad Editor Reference Card*
- *RT–11 Commands Manual*
- *RT–11 Mini-Reference Manual*
- *RT–11 Master Index*
- *RT–11 System Message Manual*
- *RT–11 System Release Notes*

Installation Specific Books

- *RT–11 Automatic Installation Guide*
- *RT–11 Installation Guide*

Programmer Oriented Books

- *RT–11 IND Control Files Manual*
- *RT–11 System Utilities Manual*
- *RT–11 System Macro Library Manual*
- *RT–11 System Subroutine Library Manual*
- *RT–11 System Internals Manual*
- *RT–11 Device Handlers Manual*
- *RT–11 Volume and File Formats Manual*
- *DBG–11 Symbolic Debugger User's Guide*

New and Changed Features

New Features

- Support for the V5.6 monitors (FB, SB, XB, XM, ZB, and ZM).
- Three new distributed answer files (SBFB.ANS, XBXM.ANS, and ZBZM.ANS).
- One updated answer file (XMEL.ANS).
- Support for a removable message handler (MQ). Support for MQ is included with all distributed multi-job monitors, but can be removed at SYSGEN, if desired.
- Support for the DH family interfaces in the multiterminal environment.
- New DZ operation with multiterminal support.

  Before V5.6, if a multiterminal monitor included support for DZ lines, all lines on the DZ controller would have DTR set, regardless of whether the line is local or remote or if the line is in use or not.

  In V5.6, only those remote lines that have been attached by a job (or by a handler using the new handler hooks facility) will have DTR set.
- Support for terminal hooks in the multiterminal environment, allowing any serial line to function as a printer port under LS, or as a communication port using XL.
- Support for compiling and linking the build files in a completely virtual environment.
- Changed convention for naming the distributed system startup command files and monitors to adapt to the new distributed versions of the monitor.
- Two new conditionals for naming the distributed monitors: SB and SUP$Y.
- New system conditionals

```
DHLE$N
DH11$L
DH11$M
DH11$N
DHCS$n
DHVC$n
DHSZ$n
DHUS$0
DHUS$1
DHSP$D
DHST$P
DH$B0n
DH$B1n
```

```
LS$LUN
LS$MTY
MTY$HK
```

See Appendix B for an explanation of these conditionals.

Changed Features

- The manual has been updated, rewritten, and reorganized in content, format, and style.
- The SYSGEN questions are renumbered in the following way:

Old Question Number	New Question Number
1	5
2	10
3	15
	20 *
	25 *
	30 *
4	35
5	40
6	45
7	50
8	55
9	60
10	65
11	70
12	75
13	80
14	85
15	90
16	95
20	100
21	105
22	110
26	115
27	120
30	125
31	130
32	135
33	140
34	145
35	150
36	155
37	160
38	165
39	170
40	175
	180 *
68	185
69	190

100		200
101		205
102		210
103		215
106		220
108		225
109		230
110		235
112		245
113		250
114		255
120		260
121		265
122		270
123		275
130		280
131		285
132		290
133		295
134		300
135		305
		306 *
		307 *
136	(CTS only)	310
137	(CTS only)	315
140		320
151		325
152		330
		331 *
		332 *
153		335
154		340
155		345
156		350
160		355
180		360
181		365
182		370
183		375
184		380
185		385
186		390
187		395
188		400
189		405
190		410
191		415

```
200             420
201             425
202             430
203             435
204             440
205             445
206             450
207             455
208             460
209             465
210             470

* New V5.6 question.
```

See Chapter 2 for an explanation of the questions.

- The following SYSGEN questions have been deleted:

```
104
105
107
111
170
171
172
173
```

Chapter 1

Preparing for a System Generation

System Generation Defined

Generating your own RT–11 operating system means taking the RT–11 monitor and device handler source files and compiling and linking them to produce a monitor(s) and device handlers specifically designed for your purposes. This is generally a three-step process:

1. Gathering the information you need.
2. Entering your requirements into the SYSGEN control-file procedure.
3. Running the command files the SYSGEN control file creates.

You can generate one or more monitors and whatever device handlers you need to work with those monitors. The other system files (utility programs or other nonexecutive system components) remain as distributed.

Digital distributes six standard monitors in the distribution kit and recommends that you undertake the system generation process only if none of these standard monitors fully meets your needs.

Minimal Memory and Space Requirements

Digital supports automatic system generation (under license) only on a system with at least 19K words of memory and 2000 contiguous free blocks of disk storage.

You need to run the IND control file SYSGEN.COM as part of the system generation process. Note that IND requires at least 12K contiguous words of low memory.

The minimum configuration that Digital recommends for system generation is a system with at least two disk drives and 24K words of memory.

Optimal Memory Requirements

You can greatly increase the speed of the assembly and link process if you use virtual memory when assembling and linking your SYSGENed system. To do so, you need a mapped monitor, the VM device, and the VBGEXE utility.

Note, however, that while you can assemble and link files in a virtual environment, you cannot run the SYSGEN IND control-file procedure in such an environment. See *Step 3: Preparing VM and a Virtual Environment* in Chapter 3 for more information on using VM, VBGEXE, and running a build file in a virtual environment.

Before a System Generation

Before you do a system generation:

1. Make sure you understand the distributed RT–11 operating systems. This means:
   - Install and test your working system.
   - Determine whether the features you need are available only through system generation. Check the *RT–11 Installation Guide*, which lists all the files and features RT–11 distributes, to assess whether or not you need to perform a system generation.
   - Become familiar with the RT–11 documentation, especially the *Introduction to RT–11*, the *RT–11 Commands Manual*, and the *RT–11 System Utilities Manual*.
   - Become comfortable with the keyboard monitor commands and RT–11 operating characteristics.
   - Read the installation guide for any layered products you have. (Some of these products require specific answers to SYSGEN questions.)
2. Make sure you understand how to generate an RT–11 operating system.

Procedure for Generating an RT–11 Operating System

1. Plan what you want in your generated monitor(s) and device handlers. Decide the following:

   - Monitor services you require
   - Devices to be supported in the system you are generating
   - Interrupt vector and control-status register (CSR) addresses for the system's physical devices
   - Additional system conditionals you want defined
   - Device assignments for the build procedure

   The *Selecting Monitor Services* section through the *Selecting Input and Output Devices* section in this chapter identify these items.

   As you gather the information, answer the questions on the worksheet at the end of this chapter. The worksheet has the same questions and is arranged in the same order as the questions in the SYSGEN control-file procedure, which requires this information.

   Use Appendix A, Chapter 2, and the Dialog Summary at the end of that chapter as a guide to understanding the questions.

2. Enter the information from the worksheet into the SYSGEN control-file procedure. You do that by running the control file SYSGEN.COM and answering the dialog questions displayed on the terminal. The following section (*Running SYSGEN.COM*) explains how to run the SYSGEN control file.

   SYSGEN uses your information to create command files that will assemble and link (build) the system you want.

3. Make sure you have the needed system files on your system device and source files on your source input device for the commands in the SYSGEN-created command files to work.

   See the *RT–11 Installation Guide* for a list of the distributed files. Copy any needed source files from your distribution kit to the source input device.

4. If you can use virtual memory, assign the MACRO work file and cross-reference file to the virtual device (ASSIGN VM0 WF and ASSIGN VM0 CF). Also issue the SET RUN VBGEXE command. *Step 3: Preparing VM and a Virtual Environment* in Chapter 3 explains this step.

5. Make sure your binary output and map output devices are ready for the MACRO-assembled and linked files.

   See the *Arranging Your Files* section in this chapter for a summary explanation of where all your files should go when you assemble and link a system.

6. Assemble and link the source files with the conditional files and commands produced by the SYSGEN control file.

   You can use SYSGEN.BLD alone, or SYSGEN.MON and SYSGEN.DEV. Or, you can enter the commands individually. Digital does not recommend this last procedure because you need the space of a disk system to assemble and link the files, whether you are issuing the commands separately outside a command file or together in a command file.

   Chapter 3 describes the procedure for assembling and linking the files.

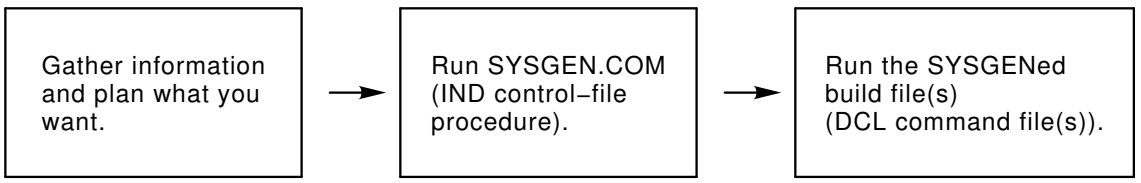
7. Back up and save the SYG files you have generated (assembled and linked) and install your new system. See the section *What to Do After You Build Your System* in Chapter 3 for a summary of what this involves.

NOTE

The procedure for generating an operating system involves the preceding seven steps. However, the SYSGEN procedure involves only step two.

The SYSGEN procedure is the SYSGEN.COM control-file procedure that gathers information from you through a dialog and then creates command files based on that information so that you can build the system you want.

Figure 1–1: Summary of the System Generation Procedure



Running SYSGEN.COM

You can run SYSGEN.COM either interactively or semiautomatically.

- **Interactively**

  Most people should run SYSGEN interactively, that is, by responding to all the SYSGEN dialog questions. This is how you should run SYSGEN if you do not have a SYSGEN answer file setting your system parameters as you want them.

  To run SYSGEN interactively, issue the following command:

  ```
  IND dd:SYSGEN RET
  ```

  where *dd:* is the device SYSGEN.COM is located on. If SYSGEN.COM is on the default storage (DK) device, you do not need to specify the device.

  IND requires at least 12K contiguous words of low memory space. See the *RT–11 IND Control Files Manual* for an explanation of how to use the IND processor.

  SYSGEN asks you questions in the form of a dialog. Based on your responses to the questions, SYSGEN tests and sets monitor conditionals which it places in two conditional files and one answer file named by you (but created by SYSGEN).

  After you have answered all the questions, SYSGEN uses your input to create monitor and handler build files.

- **Semiautomatically**

  You will want to run SYSGEN semiautomatically if you already have an answer file containing answers you want to the SYSGEN questions. For example, you may want to use the distributed answer file XMEL.ANS to create error-logging support for any device. In this case, you first run the SYSGEN.COM file interactively:

  ```
  IND dd:SYSGEN RET
  ```

  When SYSGEN asks if you want to use a previously created answer file, you respond YES; and when SYSGEN asks for the name of your answer file, you name the file you want to use.

  When you use a previously created answer file, SYSGEN does not ask all the dialog questions; rather it gets all the necessary information for the attributes of the system to be generated from the answer file. However, after executing the file, SYSGEN allows you to alter the output files to reflect any changes you wish to make; for example, to add monitor options, to support additional devices, or to change device addresses.

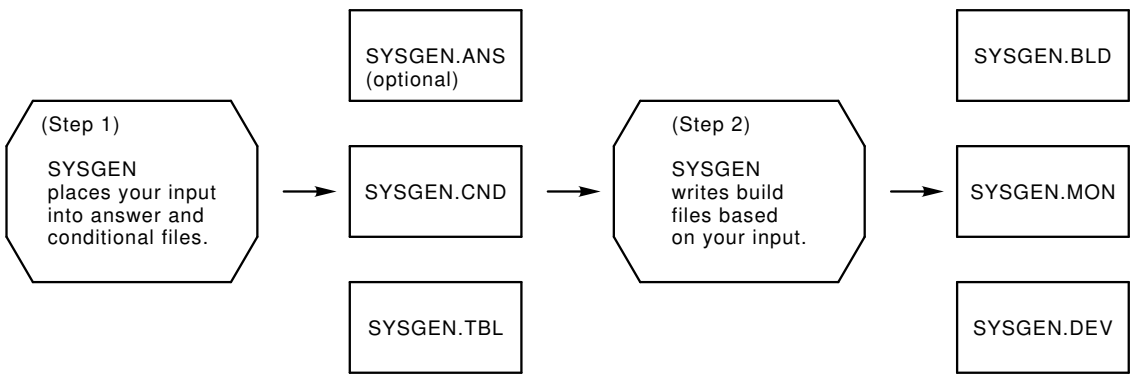
The Files SYSGEN.COM Produces

Whether you run SYSGEN.COM interactively or semiautomatically, SYSGEN produces the following six default output files. SYSGEN allows you to choose your own names for them (other than SYSGEN). The default file name is SYSGEN.

File	Description
SYSGEN.CND	Conditional file containing conditionals SYSGEN writes based on your responses to the dialog. The SYSGEN.BLD files use SYSGEN.CND to build your SYSGENed system.
SYSGEN.TBL	Conditional file that sets up device table entries for each device you specify and defines device handlers. The SYSGEN.BLD files use SYSGEN.TBL to build your SYSGENed system.
SYSGEN.BLD	DCL command file that executes SYSGEN.MON and SYSGEN.DEV.
SYSGEN.MON	DCL command file that builds the monitor or monitors you define.
SYSGEN.DEV	DCL command file that builds the device handlers you define.
SYSGEN.ANS	Optional user-defined answer file that reflects all the responses made during the SYSGEN dialog. This answer file can be used as input during a later system generation session to generate a new system without running the entire SYSGEN dialog. See the preceding description of the semiautomatic method of running SYSGEN for further information on using previously created answer files in a SYSGEN dialog.

Figure 1–2 shows the files created by the SYSGEN control file: first the answer and conditional files and then the build files.

Figure 1–2: Files the SYSGEN Control File Creates



Building Your System

SYSGEN Command Files

The SYSGEN procedure creates the command files SYSGEN.MON, SYSGEN.DEV, and SYSGEN.BLD that issue all the commands necessary to assemble and link the monitors and handlers you want to generate.

Use these command files to generate your monitors and device handlers. This is called automatic generation since the command files issue all the commands. Chapter 3 describes this procedure.

SYSGEN Conditional Files

The SYSGEN procedure creates the conditional files SYSGEN.CND and SYSGEN.TBL. These files are needed to assemble your monitor(s) and handlers; the SYSGEN command files use the conditional files as source files in the assembly process.

Selecting Monitor Services

Most SYSGEN dialog questions specify a SYSGEN option. Some options enable support for monitor services, while other options enable support for devices and device interfaces.

Monitor Services

The options that enable monitor services are:

Asynchronous terminal status
BATCH support
Device ownership support
Device timeout support
Error logging
Error messages on system I/O errors
Extended device-unit support
.FETCH request under XM/XB, ZM/ZB (mapped monitors)
Floating point support
Global SCCA support
50 Hz clock rather than 60 Hz
High-speed ring buffer
Input ring buffer size
Keyboard monitor command subsets
Memory parity
Message handler resident in the monitor
Month and year date rollover
Multiterminal handler hooks
Multiterminal support
Multiterminal timeout
Terminal output ring buffer size
Power failure messages
Programmable clock as system clock
SB timer support
.SPCPS programmed request
Startup command file
System jobs
TMSCP error-logging support for TMSCP devices
User command linkage

Standard Monitor Services

Digital has generated the distributed (standard) monitors through the system generation process, and you will probably need to select support for some of the same sevices that the distributed monitors support. So, many SYSGEN questions offer services you will recognize as standard features in the distributed monitors.

Special Monitor Services

Table 1–1 summarizes special monitor services that are available only through the system generation process.

Table 1–1: Features Available Only Through a System Generation

Feature	Function
Asynchronous terminal status	Provides a program with the updated status of terminals in multiterminal systems.
BATCH	Allows RT–11 to operate unattended. All monitors support BATCH.
Device I/O timeout	Permits device handlers to issue a mark-time programmed request. DECnet applications require this support.
Disable .FETCH request under a mapped monitor	Disables the use of the .FETCH request under a mapped monitor, requiring device handlers to be resident in memory.
Double-density only RX02	Permits you to use only double-density RX02 diskettes on the system. This feature makes the RX02 handler smaller.
DZ11 up to 9600 baud	Permits you to initialize lines at specific baud rates up to 9600.
Error logging	Keeps a statistical record of I/O device operations and detects I/O, memory-parity, and memory-cache errors. An error-logging job is created when you select this support for a multi-job monitor; a handler is created for a single-job monitor. You can select (T)MSCP error logging for all monitors, but a SYSGEN answer file XMEL.ANS is distributed for MSCP (DU) and TMSCP (MU) error logging on mapped monitors. See the *RT–11 System Utilities Manual* for a complete description of error logging.
Extended device-unit support	Permits you to extend the number of units you can select for a DU or LD device handler. For DU, you can extend the number of separate units from 8 to 64_{10}. For LD, you can extend the number from 8 to 32_{10}. This feature is available for all monitors.
Extra device slots	Permit you to add devices to the system after it is built. The number of logical assignments you can make is equal to the number of devices plus empty device slots in the system.
Global SCCA	When global SCCA is turned on (enabled), all CTRL/C characters sent from the terminal to a background job are ignored, protecting the program from being aborted with double CTRL/Cs. You need this support to use the IND directives .ENABLE ABORT and .DISABLE ABORT.

Table 1–1 (Cont.): Features Available Only Through a System Generation

Feature	Function
Hardware magtape handlers	If you generate the hardware magtape handlers (MMHD-.SYS, MSHD.SYS, MTHD.SYS, and MUHD.SYS), after system generation you can create your own directory structure by combining the hardware magtape handler with an FSM (file structure module) you supply.
High-speed ring buffer	Causes character processing and interpretation to be performed at fork level. This allows short bursts of characters transmitted at very high rates to be received. Use of this feature is recommended with PDTs.
Keyboard monitor command subsets	Allow you to choose one, two, or three subsets of the keyboard monitor commands instead of all the commands.
Memory parity	Causes the system to print an error message when a memory parity error occurs if your configuration includes memory parity hardware. If you have this hardware but do not select this support, the system halts when memory errors occur.
Month and year rollover	Adds support that automatically rolls over the date at the end of the month and the end of the year. Normally, you must reset the date and time. This support is useful for applications that run continuously and over a long period of time.
Multiterminal support	Permits you to use two or more terminals with all the monitors.
Multiterminal timeout	Causes the monitor to reset at regular intervals any terminal that goes off line. This support minimizes the impact of static in multiterminal systems.
Programmable clock as system clock	Allows you to substitute as system clock the KW11–P programmable clock for the usual line clock. However, the programmable clock would not then be available for program use.
Ring buffer size	Allows you to change the size of the input and output ring buffers. The input ring is a buffer in the monitor that holds characters you type at a terminal until a program requests them. The output ring is a buffer in the monitor that holds characters until the terminal can print them. The default input ring buffer size is 134_{10} characters, and the default output ring buffer size is 40_{10} characters.
Second RX01 or RX02 controller	Adds support for a second RX01 or RX02 controller, allowing a total of four units in the configuration instead of the usual two.
SB message on system I/O errors	Causes the SB monitor to issue an error message instead of simply halting. This feature helps to reduce confusion when an error occurs. The multi-job and mapped monitors always issue error messages.

Table 1–1 (Cont.): Features Available Only Through a System Generation

Feature	Function
SB timer	Configures the SB monitor to support mark-time and cancel mark-time programmed requests. Otherwise, only the multi-job and mapped monitors support these requests, which provide timer capabilities.
.SPCPS programmed request	Changes the flow of control of main-line code by saving the PC and PS and changing the main-line PC to a new value. This support can be generated for all monitors. .SPCPS is especially useful for controlling switching among users in multiuser applications.
System jobs	Assemble multi-job monitors to support as many as eight simultaneously active jobs instead of two. The error-logging subsystem, SPOOL, VTCOM, and the device queue program (QUEUE) can run as system jobs. This feature is available in the distributed multi-job mapped monitors.
User command linkage	Permits users to create their own commands.

Chapter 2 describes each dialog question in detail. As you study the dialog, check off on the worksheet any options you want to select when you run SYSGEN.

Selecting Devices, Vectors, and CSRs

You should know what devices you want and the vector and CSR addresses of your physical devices.

Devices

Identify all the physical and pseudo devices that you want your generated system configuration to include. List the device mnemonic for each device on the worksheet at the end of this chapter (for example, DU for an MSCP disk/diskette or VM for the virtual memory device). The worksheet lists the devices with their mnemonics.

NOTE

You may need to include some empty device slots to make sure that your system has enough device slots for your application's requirements. The number of logical device assignments you will be able to make in the working system is equal to the number of device slots available in the system.

Vectors and CSRs

Identify the interrupt vector addresses and CSR addresses at which the Digital customer services technician installed each peripheral device in your configuration. When installing the hardware, the customer services technician is responsible for leaving a written record of this address information at your location, usually on a sticker attached to the processor. List each address on the worksheet at the end of this chapter.

Although most peripherals have standard interrupt vector and CSR addresses, some have floating addresses. The presence or absence of such floating-address devices affects the addresses at which the other floating-address devices in the system are installed. (Floating-address devices must be installed in a standard sequence.)

Even devices with standard vectors may have been installed at nonstandard addresses.

Defining Additional System Conditionals

A system conditional is a symbol you can define/set to determine a feature of a monitor or device handler you want to generate. Answers you give during the SYSGEN dialog define system conditionals, which SYSGEN stores both in an ANS file and a CND file.

Some system conditionals, however, are not defined as a result of the system generation dialog. For example, there is no system generation question that asks if you want idle-loop light support (for older systems); therefore, the LIGH$T conditional is not defined by a response to a system generation question.

Nevertheless, you can define system conditionals that the system generation dialog does not automatically define. You define these conditionals either by editing a system generation ANS or CND file or by defining the conditionals (when asked) during the system generation dialog. You may want to do this, especially if you are generating your own handler.

You can define your own system conditionals or redefine RT–11 system conditionals. See Appendix B for listings of RT–11 conditionals.

Defining Additional System Conditionals in the SYSGEN Dialog

The system generation dialog lets you define system conditionals during the system generation session and includes your definitions in the SYSGEN ANS and CND files. This feature saves you from having to edit a SYSGEN ANS or CND file, if the SYSGEN dialog does not define a conditional you need to define.

Questions 185 and 190 of the system generation dialog let you define system conditionals. The following example shows how to define a system conditional in response to the SYSGEN dialog:

```
185. Do you want to define any other system conditionals (N)?
```

Respond NO, if you have no system conditionals to define. Respond YES, if you want to define other system conditionals. If you respond YES, the dialog prompts you to define the conditionals:

```
190.  Enter the system conditional and value:
```

Type the conditional and value in this format:

CONDITIONAL = VALUE

Press RETURN after defining each conditional. For example, the following definition enables idle-loop light support:

```
LIGH$T = 1 RET
```

Type the ? RETURN key sequence to list all the conditionals you have defined in this manner. Type the . RETURN key sequence when you are finished defining conditionals.

Selecting Input and Output Devices

The last questions of the SYSGEN dialog ask you to identify the devices that the command files should use for input, binary output, and map output during the assembly and link processes. When you answer the dialog questions and SYSGEN completes, SYSGEN has tailored the command files so that they make the logical assignments SRC:, BIN:, and MAP: according to your instructions. The command files then expect to find the correct files on each device. Therefore, before you answer these questions, you must know which files you want and how much free space you need for the build procedure. Then you must plan the organization of files so that you can choose the appropriate devices for SRC:, BIN:, and MAP:.

If you have sufficient space, everything can be done on one device, but then you may want to use logical disks to separate your input and output files so that they are conveniently organized.

NOTE

If you answer NO to the SYSGEN question *Do you want to retain the system OBJs?*, the command files include deletion commands to remove the OBJ files.

In most cases, you can use the command files to build your system, but you may want to make minor alterations to the command files themselves. For example, you might need to change the devices on which individual source or binary files reside to optimize mass storage usage. Organize files on volumes according to:

- Available hardware
- Available device storage space
- Storage requirements for building each component

If possible, you will want to use the largest and fastest storage devices included in your configuration. The following is a list of your device requirements.

System Device

When you perform the system build procedures, you must run RT–11 from a system device that contains at least the following:

- Monitor
- SWAP.SYS
- System device handler
- Handlers for SRC:, BIN:, and MAP:
- MACRO
- LINK
- PIP

- MONMRG.SAV
- SYSMAC.SML

Default Storage Device and Virtual Memory Device

During the MACRO assembly procedure, the work file (WF) that MACRO uses needs approximately 260 free blocks. By default, the MACRO work file is stored on DK. However, Digital suggests that you assign the MACRO work file and cross-reference file to the VM device:

```
ASSIGN  VM0 WF
ASSIGN  VM0 CF
```

This should save you storage space and increase the speed of your processor. This also means that you should have the VM handler on your system device.

Source Input Device

The source input device must contain:

- SYSGEN.CND and SYSGEN.TBL, the conditional files that result from a SYSGEN session
- EDTL.MLB and SYSTEM.MLB, libraries for building the monitors
- TRMTBL.MAC, multiterminal table source file (only if you plan multiterminal support)
- Sources for any user-supplied device handlers
- System source files to build the system you are generating

The system source files are included in the distribution kit. If you did not include them in your working system, you will need to copy the appropriate source files from your customized distribution backup volume(s).

All the distributed source files are listed and briefly described in the *RT–11 Installation Guide*. See this guide to establish which source files you need and then write the file names on the worksheet.

Object Output Device

The object output device receives the OBJ output files created by the MACRO–11 assembler. These files are used as input for the linker that produces the SYG files.

The command files that SYSGEN produces assign the logical name OBJ: to the object output device and the logical name BIN: to the binary output device. However, the command files also assign the BIN: and the OBJ: devices to the same physical device. If you are short of space, you can edit those command files to assign the OBJ: and the BIN: devices to different physical devices.

Binary Output Device

The binary output device receives the output files created by the build process. These are the built system files with a SYG file type.

Identify all the monitors and device handlers you must build. Then check the output device(s) you have available for the amount of free space you need. You should have at least 2000 contiguous free blocks.

Note that when a device is initialized, some space is used for the boot and directory blocks. The following table shows the approximate number of free blocks remaining on various devices, after being initialized. In the table, K = 1024.

Approximate Free Blocks on Devices After Initialization

Device	Device Name	Size in Blocks
RA80 disk	DU	220K
RC25 disk	DU	43K
RD50 disk	DW	9.7K
RD51 disk	DU	19.6K
RD52 disk	DU, DW	65.5K
RD53 disk	DU	138.7K
RK05 disk	RK	4.8K
RK06/07 disk	DM	27.1/53.7K
RL01/02 disk	DL	10.2/20.4K
RX01 diskette	DX	486
RX02 diskette	DY	974
RX33 diskette	DU	2.362K
RX50 diskette	DU,DZ	786
Logical disk	LD	Variable
Virtual memory	VM	Variable, depending on physical memory available

Map Output Device

The map output device receives the link maps that result from the linking process. It is sometimes useful to list the link maps on the terminal or a printer, specifying TT: or LP:, respectively, for the map output device.

If you specify the name of a block-replaceable device, such as a disk, you can send the link maps as files to that device. Send the link maps to a disk (instead of a terminal or line printer) to be sure they are saved. Digital requires that you include

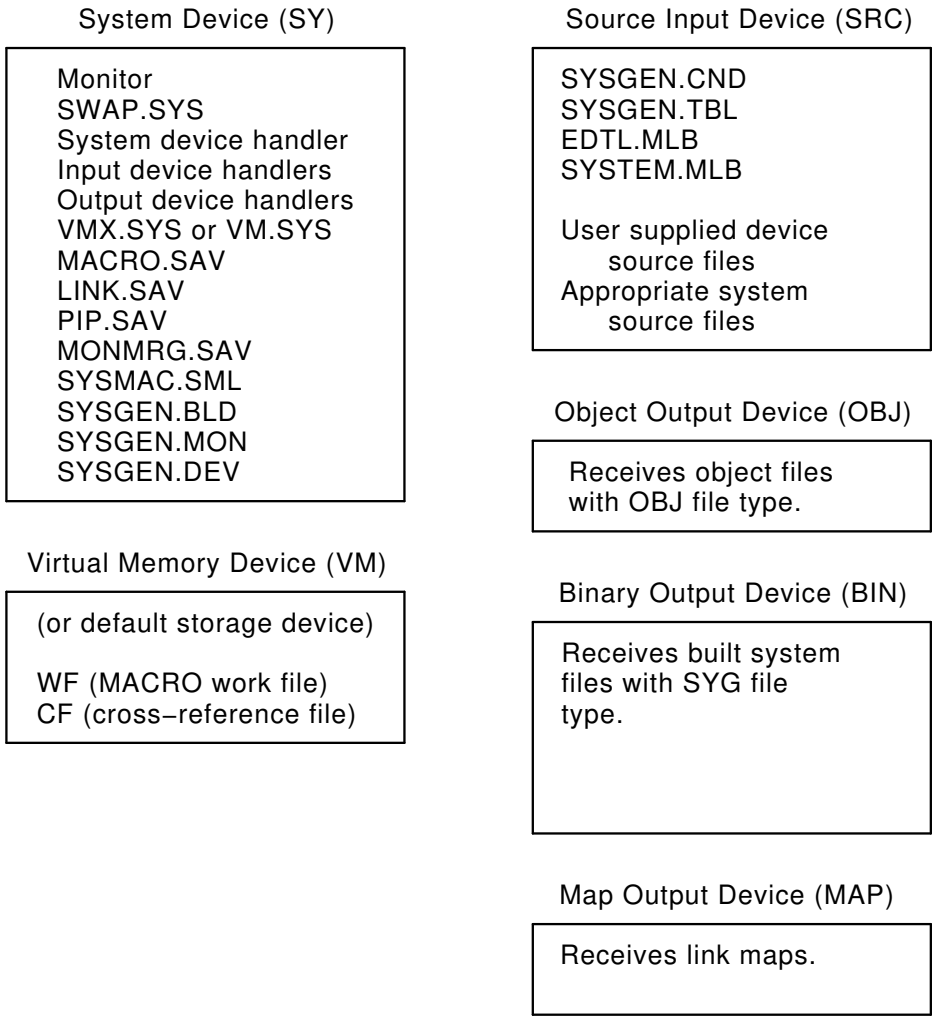
a link map and answer file listing whenever you submit a Software Performance Report (SPR) for a monitor created by SYSGEN.

You can suppress the link maps altogether by sending the output to the null (answer NL to the SYSGEN question *What is the name of the map output device?*). However, Digital strongly recommends saving the link maps.

Arranging Your Files

Figure 1–3 shows how to arrange your files on different devices when building your system.

Figure 1–3: Devices for Building Your System



Selecting Input and Output Devices

Worksheet for Preparing a System Generation

Use the following worksheet pages as a guide to prepare yourself for answering the questions in the SYSGEN control-file dialog.

Answer File

```
_____ Use a previously created answer file (N)
_____ Name of your answer file (SYSGEN.ANS)
_____ Create an answer file (N)
_____ Name of answer file to create (SYSGEN.ANS)
_____ Create a new SYSGEN.ANS file (N)
```

Monitor Type

```
_____   5.  SB monitor (Y)
_____  10.  FB monitor (Y)
_____  15.  XM monitor (N)
_____  20.  XB monitor (N)
_____  25.  ZM monitor (N)
_____  30.  ZB monitor (N)
```

Monitor Options

```
_____  35.  SB timer support (N)
_____  40.  Device timeout support (N)
_____  45.  Message on system I/O errors (Y)
_____  50.  System job support (N)
_____  55.  .SPCPS programmed request (N)
_____  60.  Global SCCA support (N)
_____  65.  Multiterminal support (N)
_____  70.  Asynchronous terminal status (Y)
_____  75.  Multiterminal timeout (Y)
_____  76.  Multiterminal handler hooks support (N)
_____  80.  Output ring buffer size: _______ (40)
_____  85.  Input ring buffer size:  _______ (134)
_____  90.  .FETCH request under XM/XB, ZM/ZB (Y)
_____  95.  Month and year date rollover (N)
_____ 100.  User command linkage (Y)
_____ 105.  High-speed ring buffer (N)
_____ 110.  All keyboard monitor commands (Y)
            _____ Utility subset (Y)
            _____ Language subset (Y)
            _____ Minimal subset (Y)
_____ 115.  50 Hz clock (N)
_____ 120.  Programmable clock as system clock (N)
_____ 125.  Start-up command file (Y)
_____ 130.  Floating point support (N)
_____ 135.  Memory parity support (N)
_____ 140.  Power failure messages (N)
_____ 145.  BATCH support (N)
_____ 150.  Error logging (N)
_____ 155.  Number of units supported by error logging (10)
_____ 160.  Error logging support for MSCP devices (N)
_____ 165.  Error logging support for TMSCP devices (N)
_____ 170.  Extended device-unit support (N)
_____ 175.  Device ownership support (Y)
```

_____ 180. Message handler resident in the monitor (Y)
_____ 185. Define other system conditionals (N)
_____ 190. Enter system conditional and value:

symbol = value

_____ = _____
_____ = _____
_____ = _____
_____ = _____
_____ = _____

Device Options

_____ DL RL01/RL02 Cartridge Disk
_____ DM RK06/RK07 Cartridge Disk
_____ DU MSCP Disk-Class Handler
RA60/RA80/RA81/RA82 Disk
RC25 Disk
RD31/RD32/RD50/RD51/RD52/RD53/RD54 Disk
RX33 Diskette
RX50 Diskette
_____ DW RD31/RD32/50/RD51/RD52/RD53 Disk
_____ DX RX01 Single-Density Diskette
_____ DY RX02 Double-Density Diskette
_____ DZ RX50 Diskette (Professional 300)
_____ LD Logical Disk Handler
_____ LP Line Printer
_____ LS Serial Line Printer
_____ MM TJU16 (MASSBUS) Magtape
_____ MS TS11 (UNIBUS) Magtape
TU80/TSU05/TSV05
TK25 Magtape
_____ MT TM11 (UNIBUS) Magtape
_____ MU TMSCP Magtape Class Handler
TK50 Magtape
TU81+ Magtape
_____ NC Ethernet Handler for Professional 300 Series Processors
_____ NL Null Handler
_____ NQ Ethernet Handler for Q-bus Processors
_____ NU Ethernet Handler for UNIBUS Processors
_____ RK RK05 Cartridge Disk
_____ SP Transparent Spooler Package Handler
_____ VM Virtual Memory Handler
_____ XC Professional Communication Port
_____ XL DL(V)-11 Communication Ports

_____ 200. Second device controllers:
_____ RX11 (N)
_____ RX02 (N)

_____ 205. Double-density only RX02 support (N)

Addresses for Peripheral Device Controllers
(Questions 210 and 215)

Controller	CSR	Vector
1st RX11	_____ (177170)	___ (264)
2nd RX11	_____ (177174)	___ (270)
1st RX211	_____ (177170)	___ (264)
2nd RX211	_____ (177150)	___ (270)

_____ 220. No. of RL01/RL02 units: ___ (2)
_____ 225. No. of MSCP ports supported: ___ (1)

Addresses for Peripheral Device Controllers
(Questions 230 and 235)

Port	CSR	Vector
0	_____(172150)	___(154)
1	_____(172144)	___(150)
2	_____(172140)	___(144)
3	_____(172134)	___(140)

_____ 245. DU initiated bad block replacement (Y)
_____ 250. Extended device-unit support (Y/N)
_____ for DU
_____ for LD
_____ 255. How many device units (16)
_____ for DU
_____ for LD
_____ 260. File-structured magtape handlers (Y)
_____ TM11 (Y)
_____ TJU16 (Y)
_____ TS11 (Y)
_____ TMSCP (Y)
_____ 265. No. of magtape units supported:

TM11	___ (2)
TJU16	___ (2)
TS11	___ (2)
TMSCP	___ (4)

Addresses for TS11 Units
(Questions 270 and 275)

Unit	CSR	Vector
1	_____ (172522)	___ (224)
2	_____ (172526)	___ (300)
3	_____ (172532)	___ (304)
4	_____ (172536)	___ (310)
5	_____ (172542)	___ (314)
6	_____ (172546)	___ (320)
7	_____ (172552)	___ (324)
8	_____ (172556)	___ (330)

_____ 280. Printer has nonstandard CSR/vector addresses (N)
_____ 285. Nonstandard CSR address for printer: _____ (177514)
_____ 290. Nonstandard vector address for printer: ___ (200)
_____ 295. Professional 300 printer port support (N)
_____ 305. CSR address for serial line printer: _____ (176500)
_____ 306. Multiterminal hooks feature for LS (N)
_____ 307. Which multiterminal line do you want LS to use: _____ (1)
_____ 310. Vector address for serial line printer: ___ (300)
_____ 320. Support for banner pages (Y)
_____ 325. CSR address for XL: _____ (176500)
_____ 330. Vector address for XL: ___ (300)
_____ 331. Multiterminal hooks feature for XL (N)
_____ 332. Which multiterminal line do you want XL to use: _____ (1)
_____ 335. CSR address for NQX: _____ (174440)
_____ 340. Vector address for NQX: ___ (120)
_____ 345. CSR address for NUX: _____ (174510)
_____ 350. Vector address for NUX: ___ (120)

_____ Support for your own devices (N)
Device name for which you want support:
_____
_____
_____
_____

_____ Does your device contain RT-11 style set option overlay (N)
_____ 355. No. of extra device slots: ___ (0)

Terminal Interface Options

_____ 360. No. of local DL11 lines: ___ (1)
_____ 365. No. of remote DL11 lines: ___ (0)

CSR and Vector Addresses for Local and Remote DL11
(Questions 370 and 375)

Local DL11 Addresses			**Remote DL11 Addresses**		
Lines	**CSR**	**Vector**		**CSR**	**Vector**
1	_____ (177560)	___ (60)	(console)		
2	_____ (176500)	___ (300)	_____ (175610)		___ (310)
3	_____ (176510)	___ (310)	_____ (175620)		___ (320)
4	_____ (176520)	___ (320)	_____ (175630)		___ (330)
5	_____ (176530)	___ (330)	_____ (175640)		___ (340)
6	_____ (176540)	___ (340)	_____ (175650)		___ (350)
7	_____ (176550)	___ (350)	_____ (175660)		___ (360)
8	_____ (176560)	___ (360)	_____ (175670)		___ (370)

_____ 380. DZ11 or DZV11/DZQ11 multiplexer support (N)
_____ 385. DZ11 multiplexer support (Y)
_____ 390. No. of DZ multiplexers: ___ (1)
_____ 395. No. of local DZ lines: ___ (1)
_____ 400. No. of remote DZ lines: ___ (0)

Addresses for DZ Multiplexers
(Questions 405 and 410)

Unit	CSR	Vector
1	_____ (160010)	___ (300)
2	_____ (160020)	___ (310)
3	_____ (160030)	___ (320)
4	_____ (160040)	___ (330)

_____ 415. Baud rate of lines: ___ (300)
_____ 420. DH multiplexer support (N)
_____ 425. No. of DH multiplexers: ___ (1)
_____ 430. No. of local DH lines: ___ (1)
_____ 435. No. of remote DZ lines: ___ (0)

Addresses for DH Multiplexers
(Questions 440 and 450)

Unit	CSR	Vector	Type
1	_____ (160440)	___ (300)	_____
2	_____ (160460)	___ (310)	_____
3	_____ (160500)	___ (320)	_____
4	_____ (160520)	___ (330)	_____

Physical Device Selection and SYSGEN Cleanup

_____ Source input device: _____ (ddn)
_____ Binary output device: _____ (ddn)
_____ Map output device: _____ (ddn)
_____ Retain system OBJs (Y)
_____ Retain work files (Y)

Source Files Required

_____
_____
_____
_____
_____
_____
_____
_____

Worksheet for Preparing a System Generation

Chapter 2
SYSGEN Program Dialog

This chapter reproduces the SYSGEN dialog so that you can study it. Included with the dialog are both the online explanations that go with each question and further explanations where appropriate. The chapter concludes with a summary of the dialog.

Some points regarding the dialog:

- The dialog consists of numbered questions, unnumbered questions, instructions, and on-line explanatory help text.
  - — The numbered questions are for determining the characteristics of the monitor(s) and device handlers you want your SYSGEN build files to generate.
  - — The unnumbered questions and explanatory text are additional information to help you in the system generation process; for example, you are offered the choice of using a previously created answer file or of creating a new one.
- The text in the monospaced font is the SYSGEN dialog text. Questions and instructions are in italics to distinguish them from explanatory text.
- The indented monospaced explanatory text shown under most questions is displayed on your terminal only if you press the ESCAPE RETURN key sequence at a question's prompt.
- The dialog has eight parts; the large-font section headers are not part of the dialog, but only show how the dialog is organized.
- The dialog is displayed on your terminal according to the way you respond to the program's questions. That is, some dialog questions appear only if you answered a previous question in a specific way. So, SYSGEN may not ask you all the questions shown in this version of the dialog.

  To generate different systems, SYSGEN must change some of the default responses, and add or remove some questions.
- Default answers in the SYSGEN dialog are shown in parentheses. However, depending on your responses, some defaults can change. To use a default answer, respond to a question by pressing only RETURN.

  In the questions that ask for CSR and vector addresses, the default values are displayed in parentheses. These values are determined by the CSR and vector addresses that you entered in response to previous questions. The standard defaults are displayed, if you accepted the defaults in response to previous questions.

Introductory Text

The SYSGEN program begins by offering you an explanation of what it does.

```
************************************************************
              RT-11 SYSTEM GENERATION PROGRAM V5.6
************************************************************

Do you want an introduction to system generation (N)?

Type "Y" for a detailed explanation of the system generation
process.
```

Respond YES if you want to read an introductory explanation of the SYSGEN program and its procedures.

```
The System Generation (SYSGEN) program functions as an inter-
active dialog in which the program asks you a series of
questions. Your answers establish the characteristics and
features of the monitor(s) and device handlers that the program
generates. SYSGEN prints each question and waits for your
response. You can reply immediately with a valid response, or
you can obtain a detailed explanation of the question by typing
the ESCAPE key followed by the RETURN key. You can prevent
SYSGEN from printing the entire explanation by typing <CTRL/O>
at any time during the explanation. SYSGEN then stops printing
the explanation, prints the question, and waits for your
response.

SYSGEN can generate one or more monitors from the output of one
dialog session, depending on the responses you give. However,
your responses during a session apply to all the monitors
generated during that session.

The system generation process produces two conditional files and
three indirect command files as output. To produce these files,
the SYSGEN dialog asks you questions about the target system
configuration and about monitor and device support options you
want. To be able to respond effectively, you should read the
RT-11 SYSTEM GENERATION GUIDE before proceeding.

The dialog simply asks a question and waits for your response.
Although the dialog questions are sequentially numbered, certain
responses cause SYSGEN to skip some questions which do not apply
for the system you are generating.

Dialog questions require one of several types of responses.
Responses may be in the form of a character string, a number, or
YES/NO (Y/N). SYSGEN expects a decimal number for all numeric
answers except for CSR and vector addresses; in these cases it
expects an octal number. A default response, in parentheses,
follows each question. If you choose to use the default
response, type only RETURN in response to the question.

To terminate SYSGEN at any time, type <CTRL/C>.
```

Selecting an Answer File

The SYSGEN program uses the answers you give to its questions to determine the monitors and device handlers you want to generate. These answers can be in:

- A previously created answer file
- No answer file, if you do NOT want to save a record of what you chose for future SYSGENs (Digital does not recommend this choice)
- A new answer file that the SYSGEN program creates to record your responses during the dialog
- A new answer file made from a combination of a previously created answer file and changes you make to it during the SYSGEN session

Do you want to use a previously created answer file (N)?

SYSGEN can use commands and responses contained in an answer file to determine the characteristics of the monitors and device handlers for your target system. If you choose to use an answer file, SYSGEN uses the responses in the answer file instead of printing the interactive dialog to obtain your responses.

Answer files that create the distributed monitors and handlers are included on the RT-11 distribution kit. You can also use answer files that you have created during earlier system generation sessions.

If you reply YES, SYSGEN asks for the name of the answer file you want.

What answer file do you want to use (SYSGEN.ANS)?

Type the device, filename and filetype of the answer file you want to create. Use the following format for your response:

ddn:filnam.typ

The variable ddn is the device name and unit number where the answer file is to reside, and filnam.typ is the filename and filetype of the answer file you are creating.

If the specified answer file cannot be found, has an invalid file name, or cannot be accessed, SYSGEN issues an appropriate error message.

SYSGEN asks you if you want to create your own answer file, even if you said you wanted to use a previously created answer file.

Do you want to create an answer file (N)?

Type Y to create an answer file that reflects the responses you make during this session. This answer file can be used during a later SYSGEN session.

If you want to use a previously created answer file, this question gives you the option of creating a new answer file from the old one. The new one would include the

answers already in the file plus any changes you make to them during the SYSGEN dialog.

If you reply NO, SYSGEN skips the next question and does not write or check for an answer file. Instead, SYSGEN continues with the procedure by checking for other protected output files. If you reply YES, SYSGEN asks the next question.

```
What answer file do you want to create (SYSGEN.ANS)?

 Type the device, filename and  filetype  of  the  answer file you
 want to create.  Use the following format for your response:

 ddn:filnam.typ

 The variable  ddn is  the device  name and unit number where  the
 answer  file  is  to  reside, and  filnam.typ is the filename and
 filetype of the answer file you are creating.
```

If the specified answer file already exists or is invalid, SYSGEN displays a warning message and question similar to the following:

```
?SYSGEN-W-File already exists ddn:filnam.typ

Do you want to create a new SYSGEN.ANS file (N)?

 A file already exists with the  same  name as the answer file you
 have  chosen  to  create.  If you still want to use this name for
 your  output  answer  file, the  data  contained  in  the already
 existing file of the same name will be lost.
```

SYSGEN next checks for protected output files and displays the message:

```
...checking for protected output files.
```

The *output* files are the five files the SYSGEN procedure produces. These all have the same file name, that is, the answer-file name you gave in response to the SYSGEN prompt for an answer file. If you chose not to use an answer file, the four other files are still produced, but with the default name SYSGEN. The files differ by file type: BLD, CND, DEV, MON, and TBL.

If any output files are protected, SYSGEN displays the following message and aborts the SYSGEN program:

```
?SYSGEN-F-Protected file already exists <filename>
```

The program is aborted since SYSGEN cannot rewrite a protected file.

If your SYSGEN program aborts, check the files you want to keep and the files you want to delete. If you no longer need past SYSGEN output files, you can either rename them for safekeeping or unprotect them for deletion.

Choosing Your Monitor(s)

This series of questions begins the numbered ones. The answers to these questions, starting with question 5, are placed in a conditional file and the answer file you choose.

You must respond YES to at least one of questions 5 through 30. Each SYSGEN procedure must create at least one monitor build file. You cannot build device support without building a monitor.

See the *RT–11 Installation Guide* to compare the advantages of the various monitors. See Appendix A for the answers to the SYSGEN questions that duplicate the distributed monitors.

```
*****************************************************************
                MONITOR TYPE
*****************************************************************
```

5. Do you want the single-background (SB) monitor (Y)?

```
SINGLE-BACKGROUND MONITOR:
The single-job (SB) monitor provides an environment  suitable for
developing  simple FORTRAN, PDP-11 "C", or BASIC applications.
The SB monitor includes  many  of the same features as the
foreground/background (FB) monitor--it supports all hardware
devices (except the memory management  unit),  all  programmed
requests  (except  .MRKT and .CMKT), and all the utility programs.
It offers the most features in the smallest size.  You can add
features during SYSGEN, but at the cost of increased monitor size.
```

10. Do you want the foreground/background (FB) monitor (Y)?

```
FOREGROUND/BACKGROUND MONITOR:
The foreground/background (FB) monitor  offers an extended set of
features that aid real-time or data acquisition applications.  In
addition to the foreground job capability, this  monitor supports
serialized  asynchronous  I/O  and additional programmed requests
(including .MRKT and .CMKT).
```

15. Do you want the extended memory (XM) monitor (N)?

```
EXTENDED MEMORY MONITOR:
The extended memory (XM) monitor, which supports up to 2M words
of  memory,  is  a  version  of  the FB monitor.  It requires KT11
hardware  (the memory management unit) and  the extended instruc-
tion  set  (EIS).  The  XM  monitor supports additional programmed
requests  that allow you to extend a program's logical addressing
space.  However, the XM monitor is larger than the FB monitor and
requires that the user service routine (USR) be resident.
```

Choosing Your Monitor(s)

20. Do you want the extended background (XB) monitor (N)?

EXTENDED BACKGROUND MONITOR:
The extended background (XB) monitor, which supports up to 2M words of memory, is a single job version of the XM monitor. It requires KT11 hardware (the memory management unit) and the extended instruction set (EIS). The XB monitor supports additional programmed requests that allow you to extend a program's logical addressing space. However, the XB monitor is larger than the FB monitor and requires that the user service routine (USR) be resident.

25. Do you want the Supervisor and I-D (ZM) monitor (N)?

SUPERVISOR and I-D MONITOR:
The supervisor and I-D (ZM) monitor, which supports up to 2M words of memory, is a version of the XM monitor. It requires KT11 hardware (the memory management unit) and the extended instruction set (EIS). The ZM monitor supports additional programmed requests that allow you to extend a program's logical addressing space into User and Supervisor modes and separated Instruction and Data spaces. However, the ZM monitor is larger than the XM monitor and requires that the user service routine (USR) be resident.

30. Do you want the Supervisor and I-D background (ZB) monitor (N)?

SUPERVISOR and I-D BACKGROUND MONITOR:
The supervisor and I-D background (ZB) monitor, which supports up to 2M words of memory, is a single job version of the ZM monitor. It requires KT11 hardware (the memory management unit) and the extended instruction set (EIS). The ZB monitor supports additional programmed requests that allow you to extend a program's logical addressing into User and Supervisor modes and separated Instruction and Data space. However, the ZB monitor is larger than the FB monitor and requires that the user service routine (USR) be resident.

Choosing Monitor Options

When you select certain options, SYSGEN automatically enables other options, even if you respond NO to the questions about those other options. For example, if you respond NO to SB timer support and device timeout support but YES to multiterminal support, SYSGEN enables SB timer support and device timeout support anyway.

```
*****************************************************************
                MONITOR OPTIONS
*****************************************************************
```

35. Do you want timer support in the SB monitor (N)?

```
SB TIMER SUPPORT OPTION:
The SB monitor normally does not include timer support.  You  can
include  this  support, which  enables you to use the .MRKT (mark
time) and .CMKT (cancel mark time) programmed requests.
```

Respond YES to question 35 if you want to use the .MRKT and .CMKT programmed requests with the SB monitor. The other monitors support these programmed requests, which provide timer capability. However, you must specifically select this support for SB, since it adds approximately 360_{10} words to the resident monitor. Timer support reduces response time slightly because of the additional interrupt-level overhead. If your application requires timer support, you must select it. Note also that the SB monitor increments the date at midnight only if you specified that support. RT–11 does not require it.

40. Do you want device time-out support (N)?

```
DEVICE TIME-OUT SUPPORT OPTION:
The device time-out option permits device handlers to issue .MRKT
(mark time)  programmed  requests.  DECNET support requires this
option.
```

Respond YES to question 40 if you are a DECnet user or if your application uses device timeout support. RT–11 does not use this support. This support adds approximately 360_{10} words to the resident SB monitor, since enabling this support automatically enables SB timer support. This support adds about 40_{10} words to the multi-job and mapped monitors.

45. Do you want an error message on system I/O errors (Y)?

```
ERROR MESSAGE ON SYSTEM I/O ERRORS OPTION:
The SB monitor normally halts if a fatal system I/O error occurs.
You  can  replace this halt with a system error message.  Digital
highly  recommends  this  option  if  the  system will be used by
anyone but the most experienced individuals.
```

Respond YES to question 45 if you want an error message instead of a system halt when the SB monitor detects a fatal I/O error. Although this option adds approximately 30_{10} words to the resident monitor, Digital strongly recommends this option for all but the most space-conscious applications. The confusion this option

saves is well worth the small amount of additional memory it requires. The other monitors include this support.

50. Do you want system job support (N)?

```
SYSTEM JOB OPTION:
The system job option allows you to run up to eight simultane-
ously active jobs. The error logger, the SPOOL program, VTCOM,
and the QUEUE program can be either foreground jobs or system
jobs. If you want to run more than one simultaneously, or if you
want to run any one along with a foreground job, you need system
job support.
```

You need system job support if you use the error logger, SPOOL, VTCOM, or the device queue program (QUEUE) as well as a foreground job, or if you use the error logger, SPOOL, VTCOM, or QUEUE together. (Note that you need not select system job support if you intend to run the error logger only under the SB monitor.) You can also use system job support to create application-specific system jobs. This support adds approximately 300_{10} words to the resident monitor. You need a multi-job monitor to be able to use system job support.

55. Do you want to use the .SPCPS request (N)?

```
SAVE/SET MAIN-LINE PC AND PS OPTION:
The save/set main-line PC and PS option is a conditionally
assembled programmed request for the FB, XM, ZM and ZB
monitors. The .SPCPS request changes the flow of control of
main-line code by saving the main-line code PC and PS and changing
the main-line PC to a new value. This request may be useful
in multi-user applications to control switching among users.
```

See the *RT–11 System Macro Library Manual* for more information about the .SPCPS programmed request.

60. Do you want global SCCA support (N)?

```
GLOBAL SCCA SUPPORT OPTION:
The SCCA programmed request inhibits control/c's until the
currently running program exits. Global SCCA support allows you
to issue a programmed request that will inhibit control/c's even
after a program exits. Control/c's will remain inhibited until
a global SCCA programmed request is issued to explicitly turn it
off.
```

If you want to run several interrelated programs, while preventing a user from terminating them with CTRL/C, select global SCCA support.

65. Do you want multiterminal support (N)?

```
MULTITERMINAL SUPPORT OPTION:
The multiterminal option lets you use special programmed
requests to do I/O to more than one terminal. RT-11 normally
supports only one terminal interfaced through the console (DL11)
which is shared by both background and foreground jobs. You can
select multiterminal support for up to 16 terminals interfaced
through a choice of DL11, DZ11 and DH series interfaces.
Subsequent questions will establish the number and type of
interfaces.
```

This option selects monitor support for up to 16 terminals including the console. However, if the application itself provides support for additional terminals and if you require only console support in the monitor, you should not select this support.

Note that multiterminal support allows you to use multiterminal features on one or more terminals. Multiterminal support does not require you to use multiple terminals.

You need not select multiterminal support to use a hard-copy terminal as a line printer. You need only the serial line printer handler, LS.SYS, which is included in the software kit.

Multiterminal support adds considerably to the space requirements of the resident monitor. It adds a minimum of 750_{10} words for the first additional terminal and approximately 100_{10} words for each additional terminal. However, the exact number of words added depends on the interfaces, the configuration, and the other options you select.

70. Do you want asynchronous terminal status (Y)?

```
ASYNCHRONOUS TERMINAL STATUS OPTION:
The asynchronous terminal status option provides a program with
the updated status of a terminal and modem. When a program
attaches a terminal, the program can supply a status word that
the monitor updates as changes occur in the terminal status
(double CTRL/C, input available, output buffer empty, carrier
present). This support is required for MU BASIC applications.
```

SYSGEN asks question 70 if you selected multiterminal support (Question 65). Respond YES to question 70 if you are an MU BASIC user or if your application uses asynchronous terminal status information. If you are in doubt about this option, respond YES.

75. Do you want multiterminal time-out support (Y)?

```
MULTITERMINAL TIME-OUT OPTION:
Multiterminal time-out support causes the monitor to reset (at
regular intervals) any terminal that may have gone off-line.
This action helps to minimize the impact of static and similar
problems. Digital recommends selecting this option if your
application requires maximum terminal availability.
```

SYSGEN asks question 75 if you selected multiterminal support (Question 65). Respond YES to question 75 to get multiple terminal availability. Digital recommends that you select this option unless you have space problems.

```
76. Do you want multiterminal handler hooks support (N)?

MULTITERMINAL HANDLER HOOKS OPTION:
The RT-11 multiterminal service can include optional data
structures and code that allow device handlers to communicate
over multiterminal serial lines.
```

SYSGEN asks you this question if you selected multiterminal support (Question 65). Respond YES to question 76 if you plan to use any handlers that need this feature. For example, respond YES if you want to use LS and XL with multiterminals. The terminal hooks feature in the multiterminal environment allows any serial line to function as a printer port under LS, or as a communication port using XL.

```
80. Enter the size of the output buffers (40):

OUTPUT RING BUFFER SIZE OPTION:
The RT-11 terminal service requires a set of output ring buffers
for each supported terminal. The output ring is a buffer in the
monitor that holds characters until the terminal can print them.
(A program can send characters faster than a terminal can print
them.) The range for valid responses is from 10 to 134.
```

Respond to question 80 with the decimal number of characters that you want the monitor to hold in the output ring buffers. Each character adds n bytes to the resident monitor size, where n is the total number of terminal lines. Note that you must count the return and line feed combination as two characters. The range for valid responses is from 10 to 134.

```
85. Enter the size of the input buffers (134):

INPUT RING BUFFER SIZE OPTION:
The RT-11 terminal service requires a set of input ring buffers
for each terminal supported. The input ring is a buffer in the
monitor that holds the characters that you type at a terminal
until a program requests them. You may want to change the input
ring size, in particular, since the size you need depends on the
terminal's width and the amount of type-ahead you expect. The
range for valid responses is from 74 to 254.
```

Respond to question 85 with the decimal number of characters that you want the monitor to hold in the input ring buffers. If you specify an odd number of characters, SYSGEN rounds the number down. Each character adds n bytes to the resident monitor size, where n is the total number of terminal lines.

You should make the input ring buffers large enough to hold at least one line of input. If the largest line accepted by an application is greater than 134 characters, you can adjust the size of the input buffers.

The minimum acceptable input buffer size is 74 characters. If you specify less than 74, an error occurs at monitor assembly time. The monitors require 82-character

buffers for efficient command operation. Buffers larger than 82 characters are useful if you anticipate using the type-ahead feature.

The RT–11 keyboard monitor and the .GTLIN programmed request accept up to 80 characters. However, if your program uses the VT100 132-character mode, you should select support for an input ring buffer of 134 characters.

The range for valid responses is from 74 to 254.

90. Do you want to use the .FETCH request under XM/XB, ZM/ZB (Y)?

```
.FETCH REQUEST OPTION:
If  you  choose .FETCH support under XM/XB or ZM/ZB, then
device handlers can be  fetched  by  user  background  programs.
.FETCH adds approximately 400. words to the resident monitor.
```

You can choose the .FETCH request only with a mapped monitor.

95. Do you want end of month and year date rollover (N)?

```
MONTH ROLLOVER OPTION:
When  you  run a system continuously, over a long period of time,
you  normally have to reset the date and time at the beginning of
each month.  You can select a feature that automatically sets the
correct date and time. However, this option greatly increases the
size of the monitor.
```

Respond YES to question 95 if you want the date automatically reset at the beginning of a month or year and if space is not a serious concern. This option adds approximately 50_{10} words to the resident monitor.

100. Do you want the user command linkage (Y)?

```
USER COMMAND LINKAGE OPTION:
The  user  command linkage allows you to define your own commands
which  can  be issued  in  a  format  similar to the standard DCL
commands.
```

This option allows you to redefine DCL commands. You might want to do that for a "customized" application. However, you do not need this option to define commands that are different from DCL commands. See the *Introduction to RT–11* for an explanation of how to define your own commands.

Choosing Monitor Options

105. Do you want high speed ring buffer support (N)?

```
HIGH SPEED RING BUFFER OPTION:
When the high speed ring buffer is present, all character
processing and interpretation is performed at fork level.  The
advantage of having the high speed ring buffer is that it allows
short bursts of characters coming in at a very high rate. This is
useful for systems with VT100 or other terminals that report
their status by sending a burst of information to the host
computer. Use of the high speed ring buffer is especially
recommended with a PDT.
```

110. Do you want all the keyboard monitor commands (Y)?

```
KEYBOARD MONITOR COMMANDS OPTION:
The keyboard monitor commands option lets you choose the keyboard
monitor commands your generated monitor will support. You will
probably find all of the commands useful. However, you can
reduce KMON size and assembly time if you select support for a
subset of the available commands. You have a choice of three
subsets (or any combination of subsets). The three command
subsets you can choose are: the UTILITY PROGRAM COMMANDS, the
LANGUAGE COMMANDS, and the MINIMAL COMMANDS. If you do not
choose the complete set of commands or any of the subsets, you
will be able to use only the RUN command.
```

If you choose the complete set of keyboard commands, the disk (or other device) file image of the monitor is increased by about 18 blocks. If you choose one of the subsets, the monitor disk file images will be smaller. All the commands available with RT–11 for a mapped, multi-job monitor are in the following 4-column list:

ABORT	ASSIGN	B	BACKUP
BOOT	CLOSE	COMPILE	COPY
CREATE	D	DATE	DEASSIGN
DELETE	DIBOL	DIFFERENCES	DIRECTORY
DISMOUNT	DUMP	E	EDIT
EXECUTE	FORMAT	FORTRAN	FRUN
GET	HELP	INITIALIZE	INSTALL
LIBRARY	LINK	LOAD	MACRO
MOUNT	PRINT	PROTECT	R
REENTER	REMOVE	RENAME	RESET
RESUME	RUN	SAVE	SET
SHOW	SQUEEZE	SRUN	START
SUSPEND	TIME	TYPE	UNLOAD
UNPROTECT	V	VRUN	

Note

- The R and RUN commands cannot be removed; they are included in all the sets of commands.
- The V and VRUN command cannot be removed from mapped monitors; they are included in all sets of commands for mapped monitors.
- If you want just one or several commands, select the appropriate conditionals in Appendix B.
- When you select all the keyboard monitor commands, you are not given commands incompatible with the monitor you choose. For example, the FRUN, RESUME, SUSPEND, and SRUN commands are valid only for monitors that have system-job support, and both the V and VRUN commands are valid only for mapped monitors. See the *RT–11 Commands Manual* for complete descriptions of all the RT–11 keyboard commands.

If you reply YES to Question 110 (want all the keyboard monitor commands), you are not asked if you want the subsets. If you reply NO to Question 110, you are asked each of the subset questions. You can select more than one subset.

```
Do you want the UTILITY subset (Y)?

 The following commands are included when the UTILITY commands
 are chosen:

 BACKUP         BOOT           COPY           CREATE
 DELETE         DIFFERENCES    DIRECTORY      DUMP
 EDIT           FORMAT         INITIALIZE     PRINT
 PROTECT        RENAME         SHOW           SQUEEZE
 TYPE           UNPROTECT

 Type Y if you want support for the UTILITY subset of the
 keyboard monitor commands.  Type N if you do  not want the subset
 or if you wish to specify individual commands by
 setting system conditionals.
```

Choosing the utility commands subset increases the size of the monitor file by only six blocks (rather than the 14 to 18 blocks for all the commands).

```
Do you want the LANGUAGE subset (Y)?

 The following commands are included when the LANGUAGE commands
 are chosen:

 COMPILE        DIBOL          EXECUTE        FORTRAN
 LIBRARY        LINK           MACRO

 Type Y if you want support for the LANGUAGE subset of the
 keyboard monitor commands.  Type N if you do  not want the subset
 or if you wish to specify individual commands by defining
 system conditionals later during this SYSGEN session.
```

Choosing Monitor Options

Choosing the language subset increases the size of the monitor file by only four blocks (rather than the 14 to 18 blocks for all the commands). Note that you can select more than one subset. The default response to this question is YES.

```
Do you want the MINIMAL subset (Y)?

 The following commands are included when the MINIMAL commands
 are chosen:

 ABORT          ASSIGN         B              CLOSE
 D              DATE           DEASSIGN       DISMOUNT
 E              FRUN           GET            HELP
 INSTALL        LOAD           MOUNT          R
 REENTER        REMOVE         RESET          RESUME
 RUN            SAVE           SET            SRUN
 START          SUSPEND        TIME           UNLOAD
 V              VRUN

 Type  Y  if  you  want  support  for  the  MINIMAL subset of the
 keyboard monitor commands.  Type N if you do  not want the subset
 or  if  you  wish  to  specify  individual  commands  by defining
 system conditionals later during this SYSGEN session.
```

The execution code for all the commands in the MINIMAL subset is resident in KMON. Note that if you select this option but:

- Do not select the FB, XM, or ZM monitor (a multi-job monitor) support, SYSGEN does not include the commands FRUN, RESUME, and SUSPEND.
- Do not select system-job support, SYSGEN does not include the SRUN command.
- Do not select ZB, ZM, XB, or XM (a mapped monitor), SYSGEN does not include the V or VRUN command.

Choosing this subset increases the size of the SB monitor file by only six blocks and the FB or XM monitor file by only 10 blocks (rather than the 14 to 18 blocks for all the commands).

```
115. Do you want the optional 50 Hz clock support (N)?

 50 HZ CLOCK OPTION:
 A line clock generates periodic interrupts to allow the system to
 keep track of the time. The number of ticks per second depends on
 the  power line frequency, 60 Hz or 50 Hz.  RT-11 assumes a 60 Hz
 line frequency, but you can select support for a 50 Hz clock. The
 50 Hz  frequency has specialized uses and is the common frequency
 in Europe.
```

Respond YES to question 115 if your computer's line frequency is 50 Hz.

120. Do you want to use the KW11-P clock as the system clock (N)?

```
PROGRAMMABLE CLOCK AS SYSTEM CLOCK OPTION:
RT-11 normally  uses  a line clock for the system clock.  You can
substitute the KW11-P programmable clock as the system clock, but
the  KW11-P  will  not  then  be  available for program use.  The
programmable  clock  normally allows you to program interrupts at
preset intervals.
```

Respond YES to question 120 if your configuration includes the KW11–P clock that you want to use as the system clock. The monitor uses the system clock for certain functions (time-of-day calculations, timer requests, and multi-job monitor scheduling). If the system clock is the programmable clock, your application cannot access the programmable clock or change its rate without affecting monitor function. Therefore, Digital recommends that you use a line clock, if available, for the system clock.

125. Do you want the startup indirect file (Y)?

```
STARTUP INDIRECT COMMAND FILE OPTION:
This  option  causes the bootstrap to execute an indirect command
file  (with  the name STRTxx.COM, where xx identifies the monitor)
when  starting  the  system.  An  indirect  command file contains
monitor  commands  that  the  monitor  processes (in the order in
which they appear) when the file is executed.  A startup indirect
command  file  is  particularly  useful  for  setting  up initial
conditions (for example, assigning the default device to the data
device, installing  a  device  into  the  system  tables when the
device  was  not  originally  built into the system, or running a
specific program).
```

Respond YES to question 125 if you want the monitor bootstrap to execute a start-up command file every time you boot the system. If you select this support, the bootstrap looks for a file STRTxx.COM to execute. The xx identifies the monitor and can be SB, XB, ZB, FB, XM, or ZM (for the six types of monitors you can choose). You create this file with commands to perform whatever operations you choose. If no STRTxx.COM file resides on a volume, the monitor displays an error message when you boot that volume. This option requires no additional resident monitor space.

130. Do you want floating point support (N)?

```
FLOATING POINT OPTION:
If  your  configuration includes floating point hardware and your
application requires this feature, you should enable this option.
Floating  point hardware is available for many PDP-11 and Profes-
sional  300  series  processors.  This  is especially useful for
FORTRAN and BASIC users whose applications perform data manipula-
tions.
```

Respond YES to question 130 if your configuration includes the appropriate hardware and your application uses floating point manipulations. If you try to perform floating point manipulations but have not selected this support, system failure results.

If you select this support, the monitor intercepts all floating point traps. If your program has not set up an exception handler, the monitor displays an informative message and aborts the program. If your program has set up an exception handler, that routine is entered with the FPU status (if appropriate) on the stack. The monitor makes sure that the correct job's context is set up.

In addition, if you select floating point support, the .SFPA programmed request is enabled (see the *RT–11 System Subroutine Library Manual*). If you do not choose floating point support, none of the functions of .SFPA is performed; for example, the floating point registers are never context switched.

If you do not include floating point support, all programs that use the floating point instructions must set up and .PROTECT or .CNTXSW the vector. FORTRAN IV, FORTRAN–77, and C require monitor floating point support if you use one of the floating point libraries.

Floating point support adds approximately 200_{10} words to the resident unmapped monitors and approximately 300_{10} words to the resident mapped monitor.

```
135. Do you want memory parity support (N)?

MEMORY PARITY SUPPORT OPTION:
If your configuration includes memory parity hardware, you should
select this option. Memory parity hardware checks for memory
errors and this option enables RT-11 support for the hardware.
RT-11 issues an error message and supplies the location of access
when a memory error occurs. If you have this hardware but do not
enable this support, the system halts when memory errors occur.
If you select error logging as well as memory parity support, the
error logger logs parity errors as well as device errors.
```

Respond YES to question 135 if your configuration includes memory parity hardware. Memory parity support adds approximately 8_{10} words to a resident single-job monitor and approximately 25_{10} words to a resident multi-job monitor. If you have this hardware, you need RT–11 memory parity support both to make use of the hardware's capabilities and to avoid unwanted system halts.

```
140. Do you want power failure messages (N)?

POWER FAILURE MESSAGE OPTION:
The monitor normally halts on power recovery startup after a
power failure. You can elect to have the monitor print a message
explaining that power failure caused the halt. However, you must
not select this option if you have semiconductor memory, which is
volatile.
```

Respond YES to question 140 if you want an error message on start-up after a system halt to report the cause of the halt. Select this option only if your hardware configuration includes core memory or battery backed up semiconductor memory. This option adds approximately 90_{10} words to the resident monitor. However, Digital strongly recommends this option, since it quickly identifies the cause of failure. Frequently, system halts are caused by power failures too brief to detect visually.

145. Do you want BATCH support (N)?

```
BATCH SUPPORT OPTION:
You can select support for the BATCH job control  language, which
allows  RT-11  to  operate  unattended.  Once you prepare a BATCH
stream, you  can  leave  it for an operator to start and run, and
the  BATCH  stream  will  execute  programs  or  monitor commands
without  your intervention.  Indirect command file support, which
offers  similar  capabilities, is  separately  available  in  all
monitors.  You  need  not select BATCH support to obtain indirect
command file support.
```

RT–11 BATCH support is similar to control file support, but it offers certain advantages. BATCH produces a log file, allows job-stream programmability, and permits the operator to interact with the job during execution.

You need this support only if you need the features not provided by command file support.

150. Do you want error logging (N)?

```
ERROR LOGGING OPTION:
The  error  logging  option creates the error logging (EL) system
job,  and  incorporates  error  logging  support  in  the  device
handlers.  Error  logging  reports  device,  memory  parity  (if
selected),  and  memory  cache  errors.  When  error  logging  is
enabled, most device handlers call EL on each successful transfer
and  on  each  error. The  EL  job retrieves information from the
handlers that is later available to you in summary report format.
```

Respond YES to question 150 if you want to use the error logging system job; you can have this support on a multi-job monitor. This option adds approximately 2000_{10} words to the resident monitor and 50_{10} words to each device handler you generate. However, error logging is useful in monitoring system reliability. See the *RT–11 System Utilities Manual* for a complete description of error logging support.

If you respond NO to this question, questions 155 through 165 are skipped.

155. How many device units does error log job support (10)?

```
NUMBER OF UNITS SUPPORTED BY ERROR LOGGING OPTION:
The  error  logger  can  handle up to 22 individual device units.
You can conserve space by reducing the number of units the logger
can  handle  to  the  specific  number  of supported units in the
target configuration.
```

Respond with the decimal number of supported device units in the system you are generating. For example, if the target system has three RK05 drives and a dual diskette drive, the response is 5. Each unit adds seven words to the error logger. The range for valid responses is from 1 to 22.

160. Do you want MSCP error logging support for MSCP devices (N)?

```
MSCP Error Logging Support enables full support of MSCP
error logging packets, which are returned by MSCP controllers.
```

165. Do you want TMSCP error logging support for TMSCP devices (N)?

```
TMSCP Error Logging Support enables full support of TMSCP
error logging packets, which are returned by TMSCP controllers.
```

Question 160 gives you MSCP (disk) error logging support. Question 165 gives you TMSCP (tape) error logging support. See the *RT–11 System Utilities Manual* for a description of (T)MSCP error logging.

170. Do you want extended device-unit support (N)?

```
EXTENDED DEVICE-UNIT SUPPORT OPTION:
The extended device-unit support option adds monitor support for
extended-unit device handlers.  In addition to user written
extended-unit device handlers, the RT-11 handlers DU and LD may
each have up to 64 device-units.
```

If you respond NO to question 170, questions 250 and 255 are skipped.

This option has no effect on the SB, XB, and ZB monitors. Even if you do not select extended device-unit support in the monitor, you can build the 'dd' handler with extended device-unit support. However, this support will become active only when the 'dd' handler is running under a monitor that has been built with extended device-unit support.

175. Do you want device ownership support (Y)?

```
DEVICE OWNERSHIP SUPPORT OPTION:
The device ownership support option controls the presence (or
absence) of the $OWNER table and support for it in the FB, XM
and ZM monitors.   If this option is selected, jobs may be assigned
exclusive use of a device's unit(s), using the "LOAD
devname=jobname" KMON command. This option has no effect on
the SB, XB or the ZB monitors.
```

Respond YES to question 175 if you also chose a multi-job monitor.

The device ownership option controls the presence (or absence) of the $OWNER table and support for it in a multi-job unmapped or mapped monitor. If this option is selected, jobs may be assigned exclusive use of a device's unit(s), using the "LOAD devname=jobname" KMON command.

180. Do you want the message handler resident in the monitor (Y)?

```
MESSAGE HANDLER RESIDENT/NONRESIDENT OPTION:
The Message Handler resident/nonresident option controls
whether the Message Handler is present or not present in
a multiple job monitor. It is normally resident in all
multiple job monitors. It is never resident in a single
job monitor.
```

```
185.  Do you want to define any other system conditionals (N)?

 Some  of  the conditionals which the monitors and device handlers
 use  are not set as a result of the SYSGEN questions.  An example
 is PDT$OP, which causes the system to be built with code which is
 optimal  for  a  PDT.  Respond  with  Y  if  you  want any system
 conditionals to be included in your system conditional file which
 are not normally defined through SYSGEN.

 Enter system conditional definition in the form

         symbol = value

 Type <ESCAPE><RETURN> for help.
 Type ?<RETURN> to list user system conditional definitions.
 Type .<RETURN> when all user system conditionals have been defined.
```

See Appendix B for a list of RT–11 system conditionals.

```
190.  Enter the system conditional and value:

 Enter  the system conditional definition as you want it to appear
 in the system conditional (.CND) file.  For example:
 PDT$OP = 1              ; Generate PDT optimal code
```

You can enter as many system conditionals as you need.

Choosing Devices

This set of questions lets you select the physical and pseudo devices that your generated system will support.

```
*****************************************************************
               DEVICE OPTIONS
*****************************************************************

Type <ESCAPE> <RETURN> for help.
Type ?<RETURN> to list all devices.
Type .<RETURN> when device selection is complete.

Enter the device name you want support for [dd]:

The device options let you select the peripheral devices that the
generated system will support. By selecting support for a
specific device, you make the device known to the monitor's
device tables, and SYSGEN generates a device handler named
xx.SYG, (where xx is the physical device name) for the device.
If you do not select a specific device at this time, you will
have to create the device handler separately and use the monitor
INSTALL command before you can access the device.

The following is a list of the valid RT-11 devices and their
associated device names. SYSGEN will display the device name
list each time you type a question mark (?) followed by a
carriage return in response to the device name question. An
asterisk (*) will precede the device name if selected. Type a dot
when you have entered all the device names you want support for.

Do you want a list of available devices (Y)?
```

A YES response causes SYSGEN to list all valid RT–11 devices and their associated device names. An asterisk (*) precedes those devices for which support has already been selected. Valid RT–11 devices are:

DL	RL01/RL02 Cartridge Disk	DM	RK06/RK07 Cartridge Disk
DU	MSCP Disk Class Handler	DW	RD50/RD51/RD52 PRO Series
DX	RX01 Single-Density Diskette	DY	RX02 Double-Density Diskette
DZ	RX50 PRO Series	LD	Logical Disk Handler
LP	Line Printer	LS	Serial Line Printer
MM	TJU16 (MASSBUS) Magtape	MS	TS11/TU80/TSV05/TSU05 Tape
MT	TM11 (UNIBUS) Magtape	MU	TMSCP Magtape Class Handler
NC	Ethernet Handler PRO Series	NL	Null Handler
NQ	Ethernet Handler for Q-bus	NU	Ethernet Handler for UNIBUS
RK	RK05 Cartridge Disk	SP	Transparent Spooling Handler
VM	Virtual Memory Handler	XC	VTCOM Handler PRO Series
XL	VTCOM Communication Handler		

The questions in this part of the SYSGEN dialog are asked only if you first request support for the device specified in the questions.

Question 200 is asked if you request RX01 (DX) support.

```
200.  Do you want support for a second <device> controller (N)?

 The RX01 single-density flexible diskette subsystem supports  only
 two  drives  for  each  controller.  If your system contains four
 drives, a second controller governs the third and fourth
 units, and you must select RT-11 support for it.
```

Respond YES to question 200 if your target configuration includes four device drives. Note that you can boot RT–11 only from Unit 0 or Unit 1.

Question 205 is asked if you request RX02 (DY) support.

```
205. Do you want RX02 double density only support (N)?

 The  RX02  double-density  diskette  subsystem supports  only two
 drives for each controller.  If your system contains four drives,
 a  second  controller governs the third and fourth units, and you
 must select RT-11 support for it.
```

Respond YES to question 205 if you plan to use only double-density diskettes.

Questions 210 and 215 are asked if you request RX01 (DX) or RX02 (DY) support.

```
210. What is the CSR  address for the <nth> <device> (nnnnnn)?

 The valid range for the CSR address is from 160000 to 177570.

215. What is the vector address for the <nth> <device> (nnn)?

 The valid range for the vector address is from 100 to 474.
```

Respond to questions 210 and 215 with the appropriate CSR and vector address(es) for the device controller(s). The Digital customer services representative who installs your hardware system is responsible for supplying you with a written record of addresses at which he or she installs each device. The default (octal) addresses appear in parentheses. The valid range listed is for the first and second RX01 and RX02 controllers.

Question 220 is asked if you request RL01/RL02 cartridge disk support.

```
220. How many RL01/RL02 units are to be supported (2)?

 Enter the  number  (decimal)  of RL01/RL02 units included in your
 RL01/RL02 subsystem. The range of valid responses is from 1 to 4.
```

Question 225 is asked if you request support for the DU handler.

```
225. How many ports are to be supported (1)?

 Enter  the  number  of ports you want the MSCP disk class handler
 to support.  The range of valid responses is from 1 to 4.
```

Choosing Devices

If you wish to access devices on more than one controller through the MSCP (DU) handler, you must generate the handler to recognize more than one port. Support for multiple MSCP (DU) ports includes support for bootstrapping RT–11 from anyone of those ports. However, see the *RT–11 Device Handlers Manual* for how to enable multiport booting with DU.

Questions 230, and 235 are asked if you request multiple port support for DU. The questions are asked once for each port you wish to support.

```
230. What is the CSR (register) address for the <nth> port (nnnnnn)?

 Enter the CSR address (octal) of the <nth> port. The valid range
 for CSR address is 160000 to 177570. The standard address is 172150.

235. What is the vector address for the <nth> port (nnn)?

 Enter the vector address (octal) of the <nth> unit. The range for
 valid responses is from 100 to 474.
```

The default (octal) addresses appear in parentheses. If your system includes nonstandard addresses, respond with the address of each DU port. RT–11 can support up to four DU controllers (ports).

The following table shows the default CSR addresses and vector addresses that correspond to each port:

DU Port	CSR Address	Vector Address
0	172150	154
1	172144	150
2	172140	144
3	172134	140

Question 245 is asked if you request DU support.

```
245. Do you want support for DU initiated bad block replacement (Y)?

 Bad block replacement is a technique in which substitute blocks
 are provided for blocks that have caused a read or write error.
 If your system includes an RC25, or RA series device, you should
 request support for DU initiated bad blocks. Enter YES if you want
 DU to perform the bad block replacement.
```

The default answer for question 245 is YES, if you are building a mapped monitor. The default is NO, if you are building an unmapped monitor.

DU initiated bad-block replacement is supported in the distributed mapped monitors, but must be generated, if required, in the unmapped monitors.

Digital recommends that you request DU bad-block replacement support if you are using an RC25 or the RA series MSCP disks. Failing to provide support for bad-block replacement for those devices can cause the loss of data or excessive bad blocks on those devices.

This type of bad-block replacement, however, is not necessary if your DU controller is of the RQDX series.

Questions 250 and 255 are asked if you selected extended device-unit support (Question 170).

250. Do you want extended device-unit support for handler 'dd' (Y/N)?

```
Whether or not you have selected extended device-unit support in
the monitor, the 'dd' handler may be built with extended device-unit
support.  However, this support will only become active when the 'dd'
handler is running under a monitor which has been built with extended
device-unit support.
```

255. How many device-units should 'dd' support (16)?

```
Whether or not you have selected extended device-unit support for
the monitor, the 'dd' handler is being built with extended device-
unit support.  The 'dd' handler may be built to manage up to 64
device-units.  Enter the number of device-units you wish 'dd' to
support.  The minimum is 8. The default for 'dd' is 16. The
maximum is 64.  Note that this support will only become active when
the 'dd' handler is running under a monitor which has been built
with extended device-unit support.
```

Both the monitor and the device handlers have to be separately SYSGENed to support extended device units. So, if you responded YES to question 170, questions 250 and 255 may be asked twice as a pair, once with DU as dd (if you requested DU support) and once with LD as dd (if you requested LD support).

Questions 260 and 265 are asked if you request a magtape handler.

260. Do you want the file-structured magtape handler (Y)?

```
FILE-STRUCTURED MAGTAPE OPTION:
RT-11  magtape  support  is available in two forms.  The standard
form  is  file-structured magtape support, which uses a subset of
ANSI   file  format.   The  file-structured  handler  stores  and
retrieves  data  in  a  file format usable with most RT-11 system
programs.  The second form of magtape  support, hardware  handler
support,  omits  file  structuring  and  reads  and  writes  data
directly in variable length records.  While this handler is sig-
nificantly  smaller  than the file-structured handler, you cannot
use it with any system programs.  The file-structured handler can
also perform direct hardware functions.
```

Respond YES to question 260 if you intend to use the system programs, RT–11 commands, or FORTRAN or C programs with magtape.

```
265. How many magtape units are to be supported (2)?

 NUMBER OF MAGTAPE UNITS OPTION:
 The magtape  handler requires table space for each magtape  unit.
 You can minimize the size of the magtape handler by limiting  the
 number  of  units  it  can  simultaneously  handle  to the number
 actually present on the target machine.
```

Respond to question 265 with the decimal number of magtape drives included in your magtape subsystem. The range for valid responses is from 1 to 8, and the default is 2.

Questions 270 and 275 are asked if you request support for the MS or the MU handler. The questions are asked once for each tape unit you wish to support. SYSGEN asks you for the addresses of as many units as you specified.

```
270. What is the address of the <nth> unit (nnnnnn)?

 Each  unit  requires  two  contiguous  bus addresses for status
 registers.  Enter  the  address (octal) of the <nth>  unit.  The
 range of valid responses is from 160000 to 177570.

275. What is the vector address of the <nth> unit (nnn)?

 Enter the vector address (octal) of the <nth>  unit. The range for
 valid responses is from 100 to 474.
```

Respond with the address (octal) of each magtape unit. The Digital customer services representative who installs your hardware system is responsible for supplying you with a written record of addresses at which he or she installs each device.

Up to eight controllers can be supported. Default status register addresses and vector addresses are as follows:

Magtape Unit	Register Address	Vector Address
1	172522	224
2	172526	300
3	172532	304
4	172536	310
5	172542	314
6	172546	320
7	172552	324
8	172556	330

Question 280 is asked if you request support for a parallel-line (LP) printer.

280. Does your printer have a nonstandard vector or CSR (N)?

```
The standard line printer vector address is 200 and  the standard
CSR  address  is 177514.  If your printer is installed at another
vector or CSR address, specify the correct values.
```

Respond YES to question 280 if the printer control register address is not 177514 or the vector address is not 200. These addresses usually are nonstandard only if the printer is an LA180S.

Questions 285 and 290 are asked if the answer to question 280 is YES.

285. What is the CSR address for the printer (177514)?

```
Respond  with  the  address  of the control register for the line
printer. The range for valid responses is from  160000 to 177570.
```

290. What is the vector address for the printer (200)?

```
Respond with the vector address for  the line printer.  The range
for valid responses is from 100 to 474.
```

The Digital customer services representative who installs your hardware system is responsible for supplying you with a written record of addresses at which he or she installs each device.

Questions 295, 300, and 305 are asked if you request support for the serial-line (LS) printer handler.

295. Do you want support for the PC300 printer port (N)?

```
Type  Y if you will be using the LS handler with the PC300 series
of personal computers.
```

Respond YES to question 295 if you want to connect a printer to a Professional 300 series computer.

300. What is the CSR for the serial line printer (nnnnnn)?

```
Respond with the address of  the  control register for the serial
line  printer.   The  range for valid responses is from 160000 to
177570.
```

The Digital customer services representative who installs your hardware system is responsible for supplying you with a written record of addresses at which he or she installs each device.

305. What is the vector for the serial line printer (nnn)?

```
Respond with the vector address for the serial line printer.  The
range for valid responses is from 100 to 474.
```

If you selected PC300 printer support (Question 295), the default vector is 220. If you did not select PC300 printer support, the default vector is 300.

Questions 306 and 307 are asked if you request LS support and you had also requested multiterminal handler hooks support (Question 76).

306. Do you want LS to use the multiterminal hooks feature (N)?

If you select YES, code will be included in LS to allow the use of a line in a multiterminal system.

307. Which multiterminal line do you want LS to use (1)?

Enter the line number of your multiterminal configuration that you want LS to use for input/output operations. The range of valid responses is 1 to 16.

Questions 310 and 315 are for CTS users only.

310. What is the CSR address for this printer (nnnnnn)?

Respond with the CSR address for the line printer. The range for valid responses is from 160000 to 177570. The default response is nnnnnn.

315. What is the vector address for this printer (nnnnnn)?

Respond with the vector address for the line printer. The range for valid responses is from 100 to 474. The default response is nnnnnn.

Question 320 is asked if you request support for the SPOOL (SP) device.

320. Do you want support for banner pages (Y)?

Type Y if you want banner page support to be included with the spool handler.

Respond YES to question 320 if you want support for a title/banner page prefixed to spooled output.

Questions 325 and 330 are asked if you request support for the XL communication port handler.

325. What is the CSR address for XL (176500)?

Enter the CSR address (octal) of XL.

330. What is the vector address for XL (300)?

Enter the vector address (octal) of XL.

Questions 331 and 332 are asked if you request XL support and you had also requested multiterminal handler hooks support (Question 76).

331. Do you want XL to use the multiterminal hooks feature (N)?

If you select YES, code will be included in XL to allow the use of a line in a multiterminal system.

332. Which multiterminal line do you want XL to use (1)?

```
Enter the line number of your multiterminal configuration that
you want XL to use for input/output operations. The range of
valid responses is 1 to 16.
```

Questions 335, 340, 345, and 350 are asked if you selected a mapped monitor. If you request the Q-bus Ethernet handler (NQ), you are asked questions 335 and 340. If you request the UNIBUS Ethernet handler (NU), you are asked questions 345 and 350.

```
335. What is the CSR address for NQX (174440)?

 Enter the CSR address (octal) of NQX.

340. What is the vector address for NQX (120)?

 Enter the vector address (octal) of NQX.

345. What is the CSR address for NUX (174510)?

 Enter the CSR address (octal) of NUX.

350. What is the vector address for NUX (120)?

 Enter the vector address (octal) of NUX.
```

When your selection of distributed devices is complete, type period (.) RETURN. Then SYSGEN allows you to add support for your own devices.

```
Do you want to add support for any of your own devices (N)?

 SYSGEN will generate commands to assemble and link any user
 supplied device handlers. SYSGEN also adds the device names to
 the system device tables in DEVTBL.MAC.

 Type <ESCAPE><RETURN> for help.
 Type ?<RETURN> to list all devices.
 Type .<RETURN> when device specification is complete.

Enter the device name you want support for [dd]:

 Enter the 2 character device name for the device for which you
 are supplying a device handler. The name must be alphabetic.
```

SYSGEN asks the next question if you have indicated you want support for a nondistributed device handler and you have given the name for that handler.

```
Does your device contain RT-11 style set option overlay (N)?

 Type Y if you want your device linked with SETOVR at /BOUND:512.
```

If you override the default and respond YES, RT–11 links your device handler to place the SETOVR program section at a block boundary.

Choosing Devices

With question 355, SYSGEN allows you to allocate space in the monitor for adding devices to it after you SYSGEN it.

355. How many extra device slots do you want (0)?

```
EXTRA DEVICE SLOT OPTION:
SYSGEN allocates space in the monitor for only the devices
specified.  You can allocate additional space by requesting
empty device slots.  Allocate one empty slot for each device you
intend to add to the system after it is built. Also keep in mind
that the number of logical device assignments you will be able
to make in the running system is equal to the number of devices
plus empty device slots in the system you have generated.  You
may need to allocate extra device slots for logical device
assignment purposes.  The range of valid responses is from 0 to
32.
```

Choosing Terminal Interfaces

The terminal interface questions are asked if you requested multiterminal support (question 65).

```
*****************************************************************
              TERMINAL INTERFACE OPTIONS
*****************************************************************
```

Do you want an introduction to terminal interface options (N)?

The introduction explains the DL interfaces supported by RT-11 and how SYSGEN assigns the terminal numbers.

The terminal interface options section allows you to select RT-11 support for up to 17 (decimal) serial asynchronous lines selected from the interfaces installed in your system. Interfaces supported include those from the DL, DZ and DH series.

DL interfaces supported by RT-11 include the DLV11, DLV11-E, DLV11-F, DLV11-J, and the DL11 series. RT-11 also supports DL11-E and DLV11-E interfaces, with modem capabilities.

The dialog asks first for the number of local DL11 lines, then the number of remote DL11 lines. The total number of DL lines supported may not exceed 8 lines. Subsequent sections request the number of local and remote DZ and DH lines. The total of all local and all remote lines may not exceed 17 (decimal).

SYSGEN assigns logical unit numbers (LUNs) beginning with local DL11 lines, then remote DL11 lines. It then proceeds with any local DZ and remote DZ lines. It finishes with any local DH and remote DH lines. This order of assignment is permanent and you cannot change its order.

After SYSGEN has established the number of lines of each type, it must establish the CSR and vector addresses for each line. The first such question corresponds to the first local line (the console), the second to the second local line, etc., until all local lines are accounted for. At that point, the next question applies to the first remote line, the second to the second remote line, etc., until all remote lines are accounted for.

If your interfaces are DL11-W interfaces, they should be at REV E or higher. If they are not, an Engineering Change Order (ECO DEC -O-LOG M7856-S0002) must be applied to the M7856 module. The field service representative who installs your hardware should apply the ECO, if necessary.

360. Support for how many local DL11 lines, including the console (1)?

Enter the total number of LOCAL DL11 terminals included in the target configuration. Since the console is always a local DL11, the response is never less than 1. Do not include REMOTE DL11 lines in this number. Remote DL11 lines are specified in the next question. The range for valid responses is from 1 to 8.

```
365. How many remote DL11 lines are to be supported (0)?

 Enter the total number of REMOTE  DL11  terminals included in the
 target configuration.  Do not include LOCAL  DL11  lines  in this
 number.  The range for valid responses is from 0 to 8.
```

This response must not be greater than 7, and the sum of this response and the response to question 360 (local DL11 lines) must be less than or equal to 8. If the total exceeds this number, SYSGEN displays the following message:

```
?SYSGEN-W-Exceeded total number of valid DL11 lines
```

SYSGEN repeats questions 370 and 375, asking for the CSR and vector addresses for as many local interfaces as you specified in question 360 and for as many remote interfaces as you specified in question 365.

```
370. What is the CSR for the <nth> DL11 (nnnnnn)?

 Enter the  address (octal)  of the DL11 interface.  The range for
 valid responses is from 160000 to 177570.

375. What is the vector for the <nth> DL11 (nnn)?

 Enter  the vector address (octal) of the DL11 interface for the
 console terminal.  The range for valid responses is from
 60 to 474.
```

The customer services representative who installs your hardware system is responsible for supplying you with a written record of addresses at which he or she installs each device.

Respond with the addresses for all the local interfaces before supplying the addresses for all the remote interfaces. Remember that the default response is in parentheses after the question.

Default CSR and vector addresses for the next local DL11 interfaces are as follows:

CSR Address	Vector Address
176500	300
176510	310
176520	320
176530	330
176540	340
176550	350
176560	360

Default CSR and vector addresses for the next remote DL11 interfaces are as follows:

CSR Address	Vector Address
175610	310
175620	320
175630	330
175640	340
175650	350
175660	360
175670	370

380. Do you want DZ11 series multiplexor support (N)?

```
You can select RT-11 support for one DZ11-A or DZ11-C eight-line
multiplexor with an additional DZ11-B or DZ11-D eight-line
multiplexor, for a maximum of 16 lines. Or you can select one
to four DZV11 or DZQ11 four-line multiplexors. Modem support is
available on remote lines, but is limited to Bell 103 type modems
or equivalent. RT-11 support for modems requires the modems to
operate in auto-answer mode. Therefore, the "common carrier" and
"clear to send" options must have been installed (during
manufacture or installation). Type Y if your configuration
includes a DZ11 or DZV11/DZQ11 multiplexor.
```

If you respond NO to Question 380, the following series of DZ questions (Questions 385 through 415) are skipped.

385. Do you want DZ11 multiplexor support (Y)?

```
Type Y if your configuration includes a DZ11 multiplexor.
```

If you respond NO to question 385, SYSGEN displays the message:

```
DZV11 or DZQ11 four-line multiplexor support is assumed.
```

390. How many DZ multiplexors are to be supported (1)?

```
Enter the number of DZ multiplexors in the target configuration.
```

The following dialog asks first for the number of local DZ11 or DZV11 lines, then the number of remote lines. The total number of lines is the sum of local and remote lines. SYSGEN assigns physical unit numbers of the DZ11 or DZV11 lines first to local lines and then to remote lines. This assignment is permanent and cannot be changed.

```
395. How many local DZ lines are to be supported altogether (1)?

 Enter the total number (decimal) of DZ lines that are local
 terminals.  The range for valid responses is from 0 to 16.

400. How many remote DZ lines are to be supported altogether (0)?

 Enter the total number (decimal) of DZ lines that are remote
 terminals.  The range for valid responses is from 0 to 13.
```

The interface vectors and CSR addresses are assigned to the floating device region and vary with each installation.

If you requested more than one DZ multiplexor (Question 390), SYSGEN requests the CSR and vector addresses for the second through fourth DZ multiplexors.

```
405. What is the CSR for the <nth> DZ multiplexor (nnnnnn)?

 Enter the CSR address for the <nth> DZ multiplexor.  The valid
 range is 160000-177570.

410. What is the vector for the <nth> DZ multiplexor (nnn)?

 Enter the vector address for the <nth> DZ multiplexor.  The valid
 range is from 60 to 474.
```

Default values for these addresses are as follows:

DZ Multiplexor	CSR Address	Vector Address
2	160020	310
3	160030	320
4	160040	340

The Digital customer services representative who installs your hardware system is responsible for supplying you with a written record of addresses at which he or she installs each device.

```
415. What baud rate do you want your lines initialized to (300)?

 The lines must be initialized to a specific baud rate.  You can
 select 9600, 4800, 2400, 1200, 300, 150, or 110 baud.
```

Respond with the specific baud rate at which you want your lines initialized. All DZ11 or DZV11 lines must be initialized to the same baud rate. The default response to this question is 300. A response other than those listed above produces the message:

```
?SYSGEN-E-Invalid baud rate
```

420. Do you want DH series multiplexor support (N)?

You can select RT-11 support for one CXA16, CXB16, CXF32, or DHF11, or up to two CXY08, DHQ11, DHV11, or DHU11 multiplexors.

Type Y if your configuration includes one of the above-listed interfaces.

If your response is NO, the following series of DH questions (questions 425 through 470) are skipped.

425. How many DH series multiplexors are to be supported (1)?

Enter the number of DH series multiplexors in the target configuration. The range of valid responses is from 1 to 2.

430. How many local DH lines are to be supported (1)?

Enter the total number (decimal) of DH lines that are to be local terminals. The range of valid responses is from 0 to 16.

SYSGEN assigns physical unit numbers of the DH lines first to local lines and then to remote lines. No remote lines may be defined when using only the CXA16 interface.

435. How many remote DH lines are to be supported (0)?

Enter the total number (decimal) of DH lines that are to be remote terminals. The range of valid responses is from 0 to 14.

Questions 440 through 455 are asked for each DH series interface.

440. What is the CSR for the <nth> DH multiplexor (nnnnnn)?

Enter the CSR address for the <nth> DH multiplexor. The valid range is 160000-177570.

445. What is the vector for the <nth> DH multiplexor (nnn)?

Enter the vector address for the <nth> DH multiplexor. The valid range is from 60-474.

450. What type is the <nth> DH series multiplexor?

Enter the type of DH multiplexor. Valid responses are from the following list:

```
CXA16  CXB16  CXF32  CXY08
DHF11  DHQ11  DHV11  DHU11
```

The CXF32 and DHF11 interfaces provide 32 lines, but RT-11 will only support the first 16 (decimal) lines on these interfaces.

Choosing Terminal Interfaces

The following list further explains the interfaces:

Interface	Description
DHU11	8-line interface with modem control for UNIBUS systems
DHV11	8-line interface with modem control for Q-bus systems
DHQ11	8-line interface with modem control for Q-bus systems
CXY08	8-line interface with modem control for BA200 series
CXA16	16-line interface for BA200 series
DHF11	16/32 *-line interface for Q-bus
CXB16	16-line interface for BA200 series
CXF32	16/32*-line interface for Q-bus

*RT–11 supports only 16 lines.

455. How many lines are to be supported on the <nth> DH multiplexor (2)?

```
Enter  the  number  of lines to be used on the <nth> multiplexor.
Valid range of responses is from 0 to <n>.
```

The valid range of responses changes depending on your answers to the previous DH questions.

460. Do you want to set initial baud rates on a line-by-line basis (N)?

```
You  may  select  an initial baud rate for all lines on DH-series
interfaces,  or  specify  initial  baud  rates  on a line-by-line
basis.

Enter  YES if  you  wish  to  specify  the default baud rate on a
line-by-line basis.
```

465. To what baud rate do you want your DH lines initialized (9600)?

470. Baud rate for the <nth> line of the <nth> multiplexor (9600)?

```
The  lines  must be initialized to a specific baud rate.  You can
select a rate from the following list:

      50     75     110     134.5*    150    300
     600   1200    1800    2000      2400   4800
    7200   9600   19200   38400

* For 134.5 baud, specify 134 in response to the question.
```

Changing Your Answers

At this point, SYSGEN allows you to change some of your previous responses. However, you cannot change the type of monitor(s) you chose and your answers concerning multiterminal support. You must rerun the SYSGEN procedure if you want to make those changes.

Do you want to change any of your responses (N)?

```
Responses have been obtained for all of the SYSGEN questions.
You are now given an opportunity to make minor changes to the
monitor options which you have selected or to remove support for a
device or add support for a device. If you have made a large
number of errors in this SYSGEN session it is recommended that you
restart the SYSGEN dialog.
```

If you are satisfied with your previous responses, press RETURN and SYSGEN processing will continue with the creation of the SYSGEN.CND file.

If you wish to change one or more dialog responses, answer YES. If you respond YES, SYSGEN continues by asking the following questions.

Do you want to change any monitor option responses (N)?

```
You may make changes to most of the dialog questions concerning
the options to be assembled into the monitor. You may not change
the monitor types to be SYSGENed. Also, you may not add or remove
multiterminal or DH support. To make these changes, you must restart
the SYSGEN dialog.
```

If no monitor-related changes are to be made, SYSGEN inquires about changes to device-related answers. If monitor changes are to be made, SYSGEN continues with the following questions:

What question number do you want re-asked?

```
Respond with the number which precedes the question that you wish
to have re-asked.

The monitor option questions which you may change are:

35.  SB timer support                    105.  High speed ring buffer
40.  Device timeout support              110.  Keyboard monitor commands
45.  System I/O error messages           115.  50 Hz clock
50.  System job support                  120.  KW11-P as system clock
55.  .SPCPS request                      125.  Startup command file
60.  Global SCCA support                 130.  Floating point support
70.  Asynchronous terminal status        135.  Memory parity support
75.  Multiterminal timeout support       140.  Power failure message
80.  Output buffer size                  145.  Batch support
85.  Input buffer size                   150.  Error logging
90.  .FETCH request under X, Z mon       170.  Extended device-unit support
95.  Month and year rollover support     175.  Device ownership support
100.  User command linkage               355.  Number of empty device slots

If you do not want to modify any additional monitor option
responses, type <RETURN>.
```

Changing Your Answers

SYSGEN next asks you if you want to change your device support.

```
Do you want to change your device support (N)?

 Type  "Y"  if  you want to remove, add, or modify support for any
 devices.
```

If you respond YES, SYSGEN displays the next question.

```
Do you want to remove support for any device (N)?

 You are now given an opportunity to remove support for any device
 for which support was requested.
```

If you respond YES, SYSGEN continues with the following:

```
What device do you NOT want supported?
```

If you type the ESC RETURN key sequence for the help text, you get the following help text and question:

```
 If  you  previously asked to have a device supported, but you now
 do  not  want  support for a device, type the two letter name for
 that device.

Do you want a list of available devices (Y)?
```

If you respond YES to the help text question, SYSGEN displays a list of all the available distributed devices with an asterisk next to each of those you chose. After the list, SYSGEN asks if you want to remove support for any devices. If you reply YES, SYSGEN repeats the question:

```
What device do you NOT want supported?
```

After you enter the two-letter device mnemonic for the device you do not want, SYSGEN displays the message:

```
<device> will not be supported.

Do you want to remove support for any more devices?
```

If you reply YES, you are asked to name the device. If you reply NO, you are asked the next question.

```
Do you want to add support for any device or have the questions
for any device re-asked (N)?

 SYSGEN  will  give  you  an  opportunity  to add support for both
 Digital supported  devices and your own devices.  Type "Y" if you
 want  to add support for any device or change your response to  a
 question relating to a device.
```

If you respond YES, SYSGEN asks the following question:

Do you want to add/modify a Digital supported device (Y)?

```
Type "Y" if you want  to  add  support  for any Digital supported
device or have questions related to any  such  device re-asked.
```

If you respond YES, SYSGEN displays the following instructions:

```
Type <ESCAPE><RETURN> for help.
Type ?<RETURN> to list all devices.
Type .<RETURN> when device specification is complete.
```

Enter the device name to add/modify [dd]:

When you type period (.) RETURN, SYSGEN asks you about system conditionals.

Do you want to define or redefine any system conditionals (N)?

```
Type "Y" if you want to define additional system conditionals.  If
you want to change the value of a conditional, redefine it, and it
will assume the new value.
```

Assigning Input and Output Devices and Deleting/Keeping Work Files

When all responses have been given and no further changes are to be made, SYSGEN finishes the dialog with the following questions. If you have any questions, review the *Selecting Input and Output Devices* section in Chapter 1.

```
************************************************************
              DEVICE ASSIGNMENTS AND SYSGEN CLEANUP
************************************************************
```

What is the name of the source input device [xxn] (ddn)?

```
SYSTEM BUILD:
The SYSGEN assembling and linking process requires a source input
device  and  a  binary output device, as well as an output device
for monitor link maps.  The name  you  specify  can  be  either a
physical or logical name (for example, RK1, DU4, BLD, etc.).  For
more explanation, see the RT-11 SYSTEM GENERATION GUIDE.
```

The default input device *ddn* SYSGEN gets from your current configuration.

Respond with the device and unit number for the device on which you want the system sources to reside during system generation. SYSGEN assigns the logical device name SRC: to the device you specify. Then, the SYSGEN command files use SRC: for source input.

NOTE

Respond to device questions with only the device and unit number. SYSGEN repeats the question if you add the colon.

What is the name of the binary output device [xxn] (ddn)?

```
SYSTEM BUILD:
The SYSGEN assembling and linking process requires a source input
device  and  a  binary output device, as well as an output device
for  monitor link maps.  The name you specify  can  be  either  a
physical or logical name (for example, RK1, DU4, BLD, etc.).  For
more explanation, see the RT-11 SYSTEM GENERATION GUIDE.
```

Respond with the device and unit number for the device on which you want to receive binary and system output from both the MACRO assembler and the MACRO linker.

SYSGEN assigns the logical device names BIN: and OBJ: to the device you specify. Then, the SYSGEN command files send to OBJ: the OBJ files and to BIN: the BIN files during the system generation process. This device can be the same as the source input device; it can also be an independent output device or a system device. In any case, there must be sufficient space for all the files.

What is the name of the map output device [xxn] (ddn)?

```
SYSTEM BUILD:
The SYSGEN assembling and linking process requires a source input
device and a binary output device, as well as an output device
for monitor link maps. The name you specify can be either a
physical or logical name (for example, RK1, DU4, BLD, etc.). For
more explanation, see the RT-11 SYSTEM GENERATION GUIDE.
```

Respond with the device and unit number for the device where you want the link maps that result when you assemble and link the system components. SYSGEN assigns the logical device name MAP: to the device you specify.

Do you want to retain the system OBJs (Y)?

```
RETAIN SYSTEM OBJS:
The indirect command files that the SYSGEN program generates
delete the object modules (from which the system is built) when
the object modules are no longer needed. This measure serves to
conserve disk space while the system is being built. However, the
object modules are often useful later when you patch the system.
If your output device has sufficient free space, you may elect to
retain all system object modules for future use.
```

Respond YES if you have abundant mass storage and if you want to retain the system OBJ files for later updating purposes. If in doubt, respond NO. The default response to this question is YES.

Do you want to retain the work files (Y)?

```
RETAIN SYSGEN WORK FILES:
SYSGEN creates five files which are used for the system builds.
These are the 3 indirect command files (SYSGEN.BLD, SYSGEN.MON,
and SYSGEN.DEV) and the 2 source conditional files (SYSGEN.CND
and SYSGEN.TBL). If you wish to have these files deleted after
the system build procedure, SYSGEN.BLD, is run, type "N" and
these work files will not be retained.
```

SYSGEN then displays the message:

```
... writing build files.
```

When the files have been written, SYSGEN concludes with the following:

```
To build an entire system, mount the source and binary volumes,
copy the files SYSGEN.CND, SYSGEN.TBL, EDTL.MLB, SYSTEM.MLB, and
the sources for any user supplied device handlers to the source
volume. The RT-11 utility program MONMRG.SAV must be present
on the system disk, in order to build the monitors. To build
both the monitors and the device handlers, type $@SYSGEN.BLD.
To build just the monitors, type $@SYSGEN.MON. To build just
the device handlers, type $@SYSGEN.DEV. For more information,
read the RT-11 SYSTEM GENERATION GUIDE.

END OF SYSGEN PROGRAM --
```

Assigning Input and Output Devices

To build your SYSGENed system files, you must have the following on your SRC device:

- Two conditional files (SYSGEN.CND and SYSGEN.TBL) created by SYSGEN

  These files set the parameters for your system.

- Two MACRO definition libraries: EDTL.MLB (monitor definitions) and SYSTEM.MLB (system component definitions)

  These two libraries are assembled with other source modules to generate RT–11 monitors and device handlers.

- MONMRG.SAV utility

  The procedure to build monitors links the monitor bootstrap (BSTRAP) and resident monitor (RMON) in two separate stages. This operation is transparent and embedded within the SYSGEN build procedure. However, you should be aware of the following:

  — SYSGEN links the monitor in two separate stages, creating five temporary files (monitr.TM1 through monitr.TM5).

  — SYSGEN uses the MONMRG.SAV utility to merge temporary monitor-build files into the monitor and link map and then deletes the monitor temporary files. Therefore, MONMRG.SAV must reside on the system (SY) device when a system generation is performed that builds the monitor.

SYSGEN Dialog Summary

This section summarizes the SYSGEN dialog by listing the dialog questions.

```
 ****************************************************************
                RT-11 SYSTEM GENERATION PROGRAM V5.6
 ****************************************************************

Do you want an introduction to system generation (N)?
Do you want to use a previously created answer file (N)?
What answer file do you want to use (SYSGEN.ANS)?
Do you want to create an answer file (N)?
What answer file do you want to create (SYSGEN.ANS)?
Do you want to create a new SYSGEN.ANS file (N)?

 ****************************************************************
                MONITOR TYPE
 ****************************************************************

5.   Do you want the single-background (SB) monitor (Y)?
10.  Do you want the foreground/background (FB) monitor (Y)?
15.  Do you want the extended memory (XM) monitor (N)?
20.  Do you want the extended background (XB) monitor (N)?
25.  Do you want the Supervisor and I-D (ZM) monitor (N)?
30.  Do you want the Supervisor and I-D background (ZB) monitor (N)?

 ****************************************************************
                MONITOR OPTIONS
 ****************************************************************

35.  Do you want timer support in the SB monitor (N)?
40.  Do you want device time-out support (N)?
45.  Do you want an error message on system I/O errors (Y)?
50.  Do you want system job support (N)?
55.  Do you want to use the .SPCPS request (N)?
60.  Do you want global SCCA support (N)?
65.  Do you want multiterminal support (N)?
70.  Do you want asynchronous terminal status (Y)?
75.  Do you want multiterminal time-out support (Y)?
76.  Do you want multiterminal handler hooks support (N)?
80.  Enter the size of the output buffers (40):
85.  Enter the size of the input buffers (134):
90.  Do you want to use the .FETCH request under XM/XB, ZM/ZB (Y)?
95.  Do you want end of month and year date rollover (N)?
100. Do you want the user command linkage (Y)?
105. Do you want high speed ring buffer support (N)?
110. Do you want all the keyboard monitor commands (Y)?
     Do you want the UTILITY subset (Y)?
     Do you want the LANGUAGE subset (Y)?
     Do you want the MINIMAL subset (Y)?
115. Do you want the optional 50 Hz clock support (N)?
120. Do you want to use the KW11-P clock as the system clock (N)?
125. Do you want the startup indirect file (Y)?
130. Do you want floating point support (N)?
135. Do you want memory parity support (N)?
140. Do you want power failure messages (N)?
145. Do you want BATCH support (N)?
150. Do you want error logging (N)?
```

```
155. How many device units does error log job support (10)?
160. Do you want MSCP error logging support for MSCP devices (N)?
165. Do you want TMSCP error logging support for TMSCP devices (N)?
170. Do you want extended device-unit support (N)?
175. Do you want device ownership support (Y)?
180. Do you want the message handler resident in the monitor (Y)?
185. Do you want to define any other system conditionals (N)?
190. Enter the system conditional and value:

 ****************************************************************
                DEVICE OPTIONS
 ****************************************************************

     Do you want a list of available devices (Y)?

200. Do you want support for a second <device> controller (N)?
205. Do you want RX02 double density only support (N)?
210. What is the CSR  address for the <nth> <device> (nnnnnn)?
215. What is the vector address for the <nth> <device> (nnn)?
220. How many RL01/RL02 units are to be supported (2)?
225. How many ports are to be supported (1)?
230. What is the CSR (register) address for the <nth> port (nnnnnn)?
235. What is the vector address for the <nth> port (nnn)?
245. Do you want support for DU initiated bad block replacement (Y)?
250. Do you want extended device-unit support for handler 'dd' (Y/N)?
255. How many device-units should 'dd' support (16)?
260. Do you want the file-structured magtape handler (Y)?
265. How many magtape units are to be supported (2)?
270. What is the address of the <nth> unit (nnnnnn)?
275. What is the vector address of the <nth> unit (nnn)?
280. Does your printer have a nonstandard vector or CSR (N)?
285. What is the CSR address for the printer (177514)?
290. What is the vector address for the printer (200)?
295. Do you want support for the PC300 printer port (N)?
300. What is the CSR for the serial line printer (nnnnnn)?
305. What is the vector for the serial line printer (nnn)?
306. Do you want LS to use the multiterminal hooks feature (N)?
307. Which multiterminal line do you want LS to use (1)?
310. What is the CSR address for this printer (nnnnnn)?
315. What is the vector address for this printer (nnnnnn)?
320. Do you want support for banner pages (Y)?
325. What is the CSR address for XL (176500)?
330. What is the vector address for XL (300)?
331. Do you want XL to use the multiterminal hooks feature (N)?
332. Which multiterminal line do you want XL to use (1)?
335. What is the CSR address for NQX (174440)?
340. What is the vector address for NQX (120)?
345. What is the CSR address for NUX (174510)?
350. What is the vector address for NUX (120)?

Do you want to add support for any of your own devices (N)?
Enter the device name you want support for [dd]:
Does your device contain RT-11 style set option overlay (N)?

355. How many extra device slots do you want (0)?
```

```
 ****************************************************************
                  TERMINAL INTERFACE OPTIONS
 ****************************************************************

Do you want an introduction to terminal interface options (N)?

360. Support for how many local DL11 lines, including the console (1)?
365. How many remote DL11 lines are to be supported (0)?
370. What is the CSR for the <nth> DL11 (nnnnnn)?
375. What is the vector for the <nth> DL11 (nnn)?
380. Do you want DZ11 or DZV11/DZQ11 multiplexor support (N)?
385. Do you want DZ11 multiplexor support (Y)?
390. How many DZ multiplexors are to be supported (1)?
395. How many local DZ lines are to be supported altogether (1)?
400. How many remote DZ lines are to be supported altogether (0)?
405. What is the CSR for the <nth> DZ multiplexor (nnnnnn)?
410. What is the vector for the <nth> DZ multiplexor (nnn)?
415. What baud rate do you want your lines initialized to (300)?
420. Do you want DH series multiplexor support (N)?
425. How many DH series multiplexors are to be supported (1)?
430. How many local DH lines are to be supported (1)?
435. How many remote DH lines are to be supported (0)?
440. What is the CSR for the <nth> DH multiplexor (nnnnnn)?
445. What is the vector for the <nth> DH multiplexor (nnn)?
450. What type is the <nth> DH series multiplexor?
455. How many lines are to be supported on the <nth> DH multiplexor (2)?
460. Do you want to set initial baud rates on a line-by-line basis (N)?
465. To what baud rate do you want your DH lines initialized (9600)?
470. Baud rate for the <nth> line of the <nth>  multiplexor (9600)?

Do you want to change any of your responses (N)?
Do you want to change any monitor option responses (N)?
What question number do you want re-asked?
Do you want to change your device support (N)?
Do you want to remove support for any device (N)?
What device do you NOT want supported?
Do you want a list of available devices (Y)?
Do you want to add support for any device or have the questions
  for any device re-asked (N)?
Do you want to add/modify a Digital supported device (Y)?
Enter the device name to add/modify [dd]:
Do you want to define or redefine any system conditionals (N)?

 ****************************************************************
                  DEVICE ASSIGNMENTS AND SYSGEN CLEANUP
 ****************************************************************

What is the name of the source input device [xxn] (ddn)?
What is the name of the binary output device [xxn] (ddn)?
What is the name of the map output device [xxn] (ddn)?
Do you want to retain the system OBJs (Y)?
Do you want to retain the work files (Y)?
```

SYSGEN Dialog Summary

Chapter 3
Performing a System Generation on a Disk System

To perform a system generation on a disk system, do the following:

1. Run the IND control file SYSGEN.COM, specifying what you want in your SYSGENed system.
2. Collect the appropriate files on the appropriate media.
3. Prepare VM and a virtual environment
4. Assemble the monitor(s) and device handler(s).
5. Link the monitor(s) and device handler(s).

The following sections describe these five steps.

Step 1: Running SYSGEN.COM

The first step in the system generation process is to run the IND control file SYSGEN.COM and to answer the SYSGEN dialog questions according to your plans on your worksheet. Use the worksheet (*Worksheet for Preparing a System Generation*) you compiled when you read Chapter 1.

Required Files

To run the SYSGEN program, make sure that the file IND.SAV is on your system (SY) device and the file SYSGEN.COM is on your default storage (DK) device.

SYSGEN.COM can reside on another volume (except magtape) as long as you specify that volume when you issue the IND SYSGEN command.

Command Format

Use the following command format to run SYSGEN:

```
.IND dd:SYSGEN
```

where

dd: is the device on which SYSGEN.COM is located. The device specification (dd:) is required if SYSGEN.COM is not on the default storage device.

Dialog Questions

After you enter the preceding command, the SYSGEN dialog is displayed on the terminal screen. Use your worksheet to respond to each dialog question as you had planned.

The SYSGEN dialog asks a question, waits for your response, and resumes at the appropriate point. Press RETURN to terminate each response.

SYSGEN may skip some questions, depending on the responses you give. If you are not familiar with a SYSGEN question, type ESC RETURN at the question prompt to display an explanation.

Default Responses

Parentheses at the end of each question contain the default response. To select that default response, press RETURN.

Aborting SYSGEN

To abort SYSGEN at a SYSGEN dialog prompt, type CTRL/C.

Redisplaying a Question

If you type CTRL/O whenever an explanation is being displayed, SYSGEN stops displaying the explanation, redisplays the question, and waits for your response. Note, however, that you should not type CTRL/O while SYSGEN is displaying a question; in this case, the end of the question is truncated, and you will be unable to read the question, though SYSGEN waits for a response.

Making Mistakes and Changing Responses

If you give an inappropriate response to a dialog question, SYSGEN displays an error message and repeats the question.

If you want to change a response to a question, make a note of it, and continue through the dialog. After you have answered all questions, SYSGEN will give you the opportunity to change your responses. Most responses can be changed; however, you cannot change what monitor(s) are being built, nor can you add or remove multiterminal support. To make these major changes, you must rerun SYSGEN.

Defining System Conditionals of Your Own

There is no need to edit the file SYSGEN.CND to include system conditionals not addressed in the SYSGEN dialog. Questions 185 and 190 in the SYSGEN dialog let you define system conditionals. These can be the RT–11 conditionals listed in Appendix B or any conditionals of your own. See the *Defining Additional System Conditionals* section in Chapter 1 for a description of how to define conditionals.

Concluding the SYSGEN Dialog

After you respond to the final SYSGEN question, the end message displays on the terminal and control returns to the monitor.

Step 2: Collecting Needed Source Files

Get the distribution backup volume(s) containing the source files you need. Copy the files you need from the backup volume(s) to the devices you intend to use for the SYSGEN. Also, make sure the command files SYSGEN.MON and SYSGEN.DEV (and SYSGEN.BLD, if you can use it) are on device DK.

Use the worksheet in Chapter 1 as a guide.

Step 3: Preparing VM and a Virtual Environment

Digital recommends that you use VM and the VBGEXE utility when building your SYSGENed system for a more efficient use of memory and a much faster assembly and linking of your source files.

This step is optional since you do not have to use either of these components to successfully build a system.

When you use the VM device for a work area (see the following ASSIGN command example), the assembler and linker are no longer limited to small work buffers in low memory.

When you SET RUN VBGEXE, the MACRO–11 assembler, the LINKER, and the MONMRG utility run in a *completely* virtual environment. This procedure increases the speed of the build process.

See the *Introduction to RT–11* on how to use the virtual device (VM) and the *RT–11 Commands Manual* for an explanation of the SET RUN command.

Note that IND cannot run in a completely virtual environment. You must run the IND control-file procedure SYSGEN.COM without VBGEXE.

Requirements

To use VM, you need:

- Memory management unit
- Mapped monitor running the system on which you will do the build
- VMx.SYS on the system device

To use VBGEXE, you need:

- Memory management unit
- Mapped monitor running the system on which you will do the build
- VBGEXE.SAV on the system device

Procedure

To increase the efficiency and speed of the build process:

1. Load the VM device:

   ```
   LOAD VM
   ```

2. Initialize the VM device:

   ```
   INITIALIZE VM:
   ```

   Note that you need the colon delimiter for the INITIALIZE command to recognize a device. The other commands do not require the colon.

Step 3: Preparing VM and a Virtual Environment

3. Assign the MACRO work file and the LINK cross-reference file to VM:

```
ASSIGN VM WF
ASSIGN VM CF
```

4. Enable VBGEXE (the virtual run utility) to automatically run and execute programs in a completely virtual environment:

```
SET RUN VBGEXE
```

5. Run the SYSGEN build command file of your choice (see Steps 3 and 4).

Steps 4 and 5: Assembling and Linking

SYSGEN creates DCL command files to assemble and link the monitor(s) and device handlers you are generating. These command files consist of assembly and link commands (plus file deletion commands if you chose not to retain the OBJ files). These files are SYSGEN.BLD, SYSGEN.MON, and SYSGEN.DEV.

Choosing the Build Files

You can choose which DCL command file(s) you want to build the system.

- If you want to build both the handlers and the monitors in the same operation and you have sufficient free storage, use SYSGEN.BLD, a SYSGEN command file that invokes SYSGEN.MON and SYSGEN.DEV.
- If you want to build the handlers separately from the monitors, use SYSGEN.MON to build the monitors and SYSGEN.DEV to build the handlers.

Listing the Contents of the Build Files

To see the files you need for a system build, list the SYSGEN build files SYSGEN.MON and SYSGEN.DEV on the terminal or printer. These files contain the names of all the source files you need to perform the assemblies to build your SYSGENed system. They also contain all the monitor commands that assemble and link the system:

On terminal

```
.TYPE SYSGEN.MON RET
.TYPE SYSGEN.DEV RET
```

On printer

```
.PRINT SYSGEN.MON RET
.PRINT SYSGEN.DEV RET
```

Editing the Build Files

You can execute the command files as they are, or you can alter them, as long as the final commands perform the required functions. For example, you might want to alter the command files as follows:

- You can suppress the link maps by sending the map output to the null device, NL. However, Digital recommends saving the link maps in a file on a disk, if possible, so they will not be misplaced. You will need to include a link map and answer file listing with any SPR you might submit to Digital for a monitor created by SYSGEN. You will also need the link maps if you wish to apply software customizations.
- You can change the devices on which individual source or binary files are to reside to optimize mass storage use.

Steps 4 and 5: Assembling and Linking

Building Your System

Edit the command files, if necessary. Then, proceed to the section that describes the procedure you need to use to build your system. The sections are:

- *Using SYSGEN.BLD to Build the System*

  Generally, if you have sufficient space on the BIN device (approximately 2000 free blocks), you should use SYSGEN.BLD to build the system.

- *Using SYSGEN.MON to Build a Monitor*
- *Using SYSGEN.DEV to Build Handlers*

Understanding Any System Build Errors

See the *PDP–11 MACRO–11 Language Reference Manual* for explanations of *?MACRO* errors that may occur during the build procedure. See the *RT–11 System Message Manual* for explanations of any other errors.

Using SYSGEN.BLD to Build the System

To build a system using SYSGEN.BLD, do the following:

1. Make sure that the disks to be used as SRC and BIN are mounted. Check your worksheet to review your plans for the system build procedure.

2. Copy the appropriate source files to the device that is to serve as SRC. In the following command, xxn: is your distribution backup device, unless you put source files on one of your working system volumes when you installed RT–11, and yyn: is SRC.

```
.COPY xxn:filnam.MAC yyn:filnam.MAC RET
```

3. Copy SYSGEN.CND, SYSGEN.TBL, EDTL.MLB, and SYSTEM.MLB to the source disk, if necessary. In the following command, xxn is the device that contains SYSGEN.CND and SYSGEN.TBL, and yyn is the device you specified as SRC near the end of the SYSGEN dialog:

```
.COPY xxn:SYSGEN.CND yyn:SYSGEN.CND RET
.COPY xxn:SYSGEN.TBL yyn:SYSGEN.TBL RET
.COPY xxn:EDTL.MLB yyn:EDTL.MLB RET
.COPY xxn:SYSTEM.MLB yyn:SYSTEM.MLB RET
```

4. Consolidate the free space on the binary disk. This step is very important if you have space problems. In this command, zzn is the device you specified as BIN near the end of the SYSGEN dialog:

```
.SQUEEZE zzn: RET
zzn:/Squeeze; Are you sure? Y RET
```

5. Invoke the DCL command file SYSGEN.BLD. Each command line in SYSGEN.BLD, SYSGEN.MON, and SYSGEN.DEV is displayed on the terminal as RT–11 executes the command. The following example shows terminal output similar to the output that will display on your terminal when you invoke SYSGEN.BLD for the SB/FB monitors. The output for building other monitors will also be similar. Note, however, that this command file assembles and links two monitors (SB and FB).

```
.$@SYSGEN.BLD RET
$@SYSGEN.MON
ASSIGN DU1 SRC
ASSIGN DU0 BIN
ASSIGN DU0 MAP
ASSIGN DU0 OBJ
MACRO/OB:OBJ:KMSB SRC:(SB+SBFB.CND+EDTG+KMON+KMOVLY)
MACRO/OB:OBJ:USSB SRC:(SB+SBFB.CND+EDTG+USR)
MACRO/OB:OBJ:RMSB SRC:(SB+SBFB.CND+EDTG+RMON)
MACRO/OB:OBJ:TBSB SRC:(SB+SBFB.CND+EDTG+SBFB.TBL)
MACRO/OB:OBJ:BTSB SRC:(SB+SBFB.CND+EDTG+BSTRAP)
LINK/EXE:BIN:RT11SB.TM2/BOU:1000/MAP:BIN:RT11SB.TM5/SYM:BIN:RT11SB.TM3/PRO
OBJ:USSB
OBJ:RMSB
OBJ:KMSB,TBSB//
OVLY0
LINK/EXE:BIN:RT11SB.TM1/MAP:BIN:RT11SB.TM4 OBJ:BTSB,BIN:RT11SB.TM3
R MONMRG
```

```
BIN:RT11SB.SYG,MAP:RT11SB.MAP=BIN:RT11SB.TM1,RT11SB.TM2,RT11SB.TM4,RT11SB.TM5
^C
DEL BIN:RT11SB.TM(1,2,3,4,5)
MACRO/OB:OBJ:KMFB SRC:(FB+SBFB.CND+EDTG+KMON+KMOVLY)
MACRO/OB:OBJ:USFB SRC:(FB+SBFB.CND+EDTG+USR)
MACRO/OB:OBJ:RMFB SRC:(FB+SBFB.CND+EDTG+RMON)
MACRO/OB:OBJ:TBFB SRC:(FB+SBFB.CND+EDTG+SBFB.TBL)
MACRO/OB:OBJ:BTFB SRC:(FB+SBFB.CND+EDTG+BSTRAP)
LINK/EXE:BIN:RT11FB.TM2/BOU:1000/MAP:BIN:RT11FB.TM5/SYM:BIN:RT11FB.TM3/PRO
OBJ:USFB
OBJ:RMFB
OBJ:KMFB,TBFB//
OVLY0
LINK/EXE:BIN:RT11FB.TM1/MAP:BIN:RT11FB.TM4 OBJ:BTFB,BIN:RT11FB.TM3
R MONMRG
BIN:RT11FB.SYG,MAP:RT11FB.MAP=BIN:RT11FB.TM1,RT11FB.TM2,RT11FB.TM4,RT11FB.TM5
^C
DEL BIN:RT11FB.TM(1,2,3,4,5)
$@SYSGEN.DEV
ASSIGN DU1 SRC
ASSIGN DU0 BIN
ASSIGN DU0 OBJ
MAC/OB:OBJ:LD/CR/LIS:LST:LD SRC:(SBFB.CND+LD)
LINK/NOBITMAP/EXE:BIN:LD.SYG/MAP:LST:/BOUNDARY:512. OBJ:LD
SETOVR
MAC/OB:OBJ:DX/CR/LIS:LST:DX SRC:(SBFB.CND+DX)
LINK/NOBITMAP/EXE:BIN:DX.SYG/MAP:LST: OBJ:DX
MAC/OB:OBJ:DY/CR/LIS:LST:DY SRC:(SBFB.CND+DY)
LINK/NOBITMAP/EXE:BIN:DY.SYG/MAP:LST: OBJ:DY
MAC/OB:OBJ:VM/CR/LIS:LST:VM SRC:(SBFB.CND+VM)
LINK/NOBITMAP/EXE:BIN:VM.SYG/MAP:LST: OBJ:VM
MAC/OB:OBJ:SP/CR/LIS:LST:SP SRC:(SBFB.CND+SP)
LINK/NOBITMAP/EXE:BIN:SP.SYG/MAP:LST:/BOUNDARY:512. OBJ:SP
SETOVR
MAC/OB:OBJ:XL/CR/LIS:LST:XL SRC:(SBFB.CND+XL)
LINK/NOBITMAP/EXE:BIN:XL.SYG/MAP:LST: OBJ:XL
MAC/OB:OBJ:RK/CR/LIS:LST:RK SRC:(SBFB.CND+RK)
LINK/NOBITMAP/EXE:BIN:RK.SYG/MAP:LST: OBJ:RK
MAC/OB:OBJ:DL/CR/LIS:LST:DL SRC:(SBFB.CND+DL)
LINK/NOBITMAP/EXE:BIN:DL.SYG/MAP:LST: OBJ:DL
MAC/OB:OBJ:DU/CR/LIS:LST:DU SRC:(SBFB.CND+DU)
LINK/NOBITMAP/EXE:BIN:DU.SYG/MAP:LST:/BOUNDARY:512. OBJ:DU
SETOVR
MAC/OB:OBJ:DM/CR/LIS:LST:DM SRC:(SBFB.CND+DM)
LINK/NOBITMAP/EXE:BIN:DM.SYG/MAP:LST: OBJ:DM
MAC/OB:OBJ:FSM/CR/LIS:LST:FSM SRC:(SBFB.CND+FSM)
MAC/OB:OBJ:MT/CR/LIS:LST:MT SRC:(SBFB.CND+TM)
LINK/NOBITMAP/EXE:BIN:MT.SYG/MAP:LST: OBJ:(MT,FSM)
MAC/OB:OBJ:MM/CR/LIS:LST:MM SRC:(SBFB.CND+TJ)
LINK/NOBITMAP/EXE:BIN:MM.SYG/MAP:LST: OBJ:(MM,FSM)
MAC/OB:OBJ:MS/CR/LIS:LST:MS SRC:(SBFB.CND+TS)
LINK/NOBITMAP/EXE:BIN:MS.SYG/MAP:LST: OBJ:(MS,FSM)
MAC/OB:OBJ:MU/CR/LIS:LST:MU SRC:(SBFB.CND+TU)
LINK/NOBITMAP/EXE:BIN:MU.SYG/MAP:LST:/BOUNDARY:512. OBJ:(MU,FSM)
SETOVR
MAC/OB:OBJ:LP/CR/LIS:LST:LP SRC:(SBFB.CND+LP)
LINK/NOBITMAP/EXE:BIN:LP.SYG/MAP:LST: OBJ:LP
MAC/OB:OBJ:LS/CR/LIS:LST:LS SRC:(SBFB.CND+LS)
LINK/NOBITMAP/EXE:BIN:LS.SYG/MAP:LST:/BOUNDARY:512. OBJ:LS
SETOVR
MAC/OB:OBJ:NL/CR/LIS:LST:NL SRC:(SBFB.CND+NL)
LINK/NOBITMAP/EXE:BIN:NL.SYG/MAP:LST: OBJ:NL
```

Using SYSGEN.MON to Build a Monitor

To build a monitor, do the following:

1. Make sure that the disks to be used as SRC and BIN are mounted. See your worksheet to review your plans for the system build procedure.

2. Copy the appropriate source files for building the monitor(s) to the device that is to serve as SRC. In the following command, `xxn` is your distribution backup device, unless you included the source files in your working system, and `yyn` is SRC:

   ```
   .COPY xxn:filnam.MAC yyn:filnam.MAC RET
   ```

3. Copy SYSGEN.CND, SYSGEN.TBL, EDTL.MLB, and SYSTEM.MLB to the source disk, if necessary. In the following command, `xxn` is the device that contains SYSGEN.CND and SYSGEN.TBL, and `yyn` is the device you specified as SRC near the end of the SYSGEN dialog:

   ```
   .COPY xxn:SYSGEN.CND yyn:SYSGEN.CND RET
   .COPY xxn:SYSGEN.TBL yyn:SYSGEN.TBL RET
   .COPY xxn:EDTL.MLB yyn:EDTL.MLB RET
   .COPY xxn:SYSTEM.MLB yyn:SYSTEM.MLB RET
   ```

4. Consolidate the free space on the binary disk. This step is very important if you have space problems. In this command, `zzn` is the device you specified as BIN near the end of the SYSGEN dialog:

   ```
   .SQUEEZE zzn: RET
   zzn:/Squeeze; Are you sure? Y RET
   ```

5. Invoke the DCL command file SYSGEN.MON to build the monitor(s). Each command line in SYSGEN.MON is displayed on the terminal as RT–11 executes the command.

   The following example shows terminal output similar to the output that will display on your terminal when you invoke SYSGEN.BLD for the SB/FB monitors. The output for building other monitors would also be similar. Note, however, that this command file assembles and links two monitors (SB and FB):

   ```
   .$@SYSGEN.MON RET
   ASSIGN DU1 SRC
   ASSIGN DU0 BIN
   ASSIGN DU0 MAP
   ASSIGN DU0 OBJ
   MACRO/OB:OBJ:KMSB SRC:(SB+SBFB.CND+EDTG+KMON+KMOVLY)
   MACRO/OB:OBJ:USSB SRC:(SB+SBFB.CND+EDTG+USR)
   MACRO/OB:OBJ:RMSB SRC:(SB+SBFB.CND+EDTG+RMON)
   MACRO/OB:OBJ:TBSB SRC:(SB+SBFB.CND+EDTG+SBFB.TBL)
   MACRO/OB:OBJ:BTSB SRC:(SB+SBFB.CND+EDTG+BSTRAP)
   LINK/EXE:BIN:RT11SB.TM2/BOU:1000/MAP:BIN:RT11SB.TM5/SYM:BIN:RT11SB.TM3/PRO
   OBJ:USSB
   OBJ:RMSB
   OBJ:KMSB,TBSB//
   OVLY0
   LINK/EXE:BIN:RT11SB.TM1/MAP:BIN:RT11SB.TM4 OBJ:BTSB,BIN:RT11SB.TM3
   R MONMRG
   ```

```
BIN:RT11SB.SYG,MAP:RT11SB.MAP=BIN:RT11SB.TM1,RT11SB.TM2,RT11SB.TM4,RT11SB.TM5
^C
DEL BIN:RT11SB.TM(1,2,3,4,5)
MACRO/OB:OBJ:KMFB SRC:(FB+SBFB.CND+EDTG+KMON+KMOVLY)
MACRO/OB:OBJ:USFB SRC:(FB+SBFB.CND+EDTG+USR)
MACRO/OB:OBJ:RMFB SRC:(FB+SBFB.CND+EDTG+RMON)
MACRO/OB:OBJ:TBFB SRC:(FB+SBFB.CND+EDTG+SBFB.TBL)
MACRO/OB:OBJ:BTFB SRC:(FB+SBFB.CND+EDTG+BSTRAP)
LINK/EXE:BIN:RT11FB.TM2/BOU:1000/MAP:BIN:RT11FB.TM5/SYM:BIN:RT11FB.TM3/PRO
OBJ:USFB
OBJ:RMFB
OBJ:KMFB,TBFB//
OVLY0
LINK/EXE:BIN:RT11FB.TM1/MAP:BIN:RT11FB.TM4 OBJ:BTFB,BIN:RT11FB.TM3
R MONMRG
BIN:RT11FB.SYG,MAP:RT11FB.MAP=BIN:RT11FB.TM1,RT11FB.TM2,RT11FB.TM4,RT11FB.TM5
^C
DEL BIN:RT11FB.TM(1,2,3,4,5)
```

Sample SYSGEN.MON Build File for the XM Monitor

```
ASSIGN DL1 SRC ❶
ASSIGN DL0 BIN ❷
ASSIGN DL0 MAP
ASSIGN DL0 OBJ ❷
MACRO/OB:OBJ:KMXM SRC:(XM+XM.CND+EDTG+KMON+KMOVLY) ❸
MACRO/OB:OBJ:USXM SRC:(XM+XM.CND+EDTG+USR)
MACRO/OB:OBJ:RMXM SRC:(XM+XM.CND+EDTG+RMON)
MACRO/OB:OBJ:SBXM SRC:(XM+XM.CND+EDTG+XMSUBS)
MACRO/OB:OBJ:TBXM SRC:(XM+XM.CND+EDTG+XM.TBL)
MACRO/OB:OBJ:BTXM SRC:(XM+XM.CND+EDTG+BSTRAP)
LINK/EXE:BIN:RT11XM.TM2/BOU:1000/MAP:BIN:RT11XM.TM5/SYM:BIN:RT11XM.TM3/PROMPT ❹
OBJ:USXM
OBJ:RMXM
OBJ:SBXM,KMXM,TBXM//
OVLY0
LINK/EXE:BIN:RT11XM.TM1/MAP:BIN:RT11XM.TM4 OBJ:BTXM,BIN:RT11XM.TM3 ❹
R MONMRG ❺
BIN:RT11XM.SYG,MAP:RT11XM.MAP=BIN:RT11XM.TM1,RT11XM.TM2,RT11XM.TM4,RT11XM.TM5
^C ❻
DEL BIN:RT11XM.TM(1,2,3,4,5) ❼
```

❶ DL1 is assigned to SRC, the input device.

❷ DL0 is assigned to OBJ (the MACRO object-file output device) and to BIN (the LINK binary output device).

❸ This command assembles the keyboard monitor.

First Part of Command

The first part of the command line, MACRO/OB:OBJ:KMXM, invokes the MACRO–11 assembler and specifies the output device and file name for the object file that results from this operation. /OB is an abbreviation of the /OBJECT option to the MACRO command. OBJ: is a logical for the object file output device, which the code has assigned to DL0. KMXM is the output file name. The output file type is OBJ, since MACRO creates object files by default.

Second Part of Command

On the input side of the command line is SRC:(XM+XM.CND+EDTG+KMON+ KMOVLY). SRC: is the input device. The parentheses contain the source files to be assembled. The source input files in this command line are XM.MAC, XM.CND, EDTG.MAC, KMON.MAC, and KMOVLY.MAC. The source file XM.CND is a conditional file that the SYSGEN.COM procedure creates. The file type of the other source files is not specified in the command line since they have a MAC file type, the default file type for the MACRO assembler. RT–11 assumes MAC files as input to MACRO when a file type is not specified.

Because the input files are separated by plus signs (rather than commas), one object file (KMXM.OBJ) results from this assembly.

❹ Note that there are two LINK commands, invoking the linker twice. The procedure to build monitors links the monitor bootstrap (BSTRAP) and

resident monitor (RMON) in two separate stages, creating five temporary files (monitr.TM1 through monitr.TM5).

Temporary Files

All the TM files are temporary files that you need until the last line of the sample command-file procedure, where they are deleted. Though they are on the MAP: device, they cannot go to the printer since they are input as files to the MONMRG utility which merges the temporary files.

Linking Monitor Object Modules

The LINK command links the monitor object modules. In the first LINK command line, the option /EXE:BIN:RT11XM.TM2 specifies a device (BIN:) and file specification (RT11XM.TM2) for the first executable file that results from this operation.

/BOU:1000 Option

The /BOU:1000 option specifies the octal address boundary on which LINK should start a program section to be named when LINK asks for its name. The decimal equivalent of 1000_8 is 512. This is the default boundary address.

/PROMPT Option

The /PROMPT option allows additional lines to be entered when the command string is too long to fit on one line. If you were to execute these commands separately (apart from this command file), RT–11 would prompt with an asterisk (*) at this point.

Input to Command

The OBJ: following the LINK command is the beginning of the input to the command. OBJ: specifies the input device; note also that the default LINK input file type is OBJ. USXM.OBJ, RMXM.OBJ, SBXM.OBJ, KMXM.OBJ, and TBXM.OBJ are the input files for the first LINK command.

End of Command String

The double slashes (//) indicate the end of the first LINK command string.

Program Section

OVLY0 is the name of the program section whose address boundary the /BOU:1000 option specifies. This line responds to the RT–11 prompt *Boundary section?*, which would appear if you were to execute these commands separately (rather than as a command file).

❺ The MONMRG.SAV utility merges the temporary files linked separately into the monitor and link map. The monitor file name is RT11X.SYG. SYG is the default file type given to monitors created through the SYSGEN command procedure.

❻ The ^C is issued to clear the command buffer. The monitor stores commands from a command file in a buffer. The ^C clears the buffer so you have more space for your next set of command-file commands.

❼ The monitor temporary files are deleted.

The command lines in the versions of SYSGEN.MON and SYSGEN.DEV that result from your SYSGEN session are variations of the commands of the following sample monitor and device build files. You can identify all the source files you need for your assemblies by studying the command files you created during your SYSGEN session.

Once you know your source files, you can copy them to your system disk and assemble and link them separately by typing each command line in the command file, one at a time.

The device assignments can be whatever is appropriate for your situation. You can substitute specific devices; for example, DX0:, DY0:, or DU0: for SRC:, and DX1:, DY1:, or DU1: for OBJ: and BIN:.

Using SYSGEN.DEV to Build Handlers

To build handlers do the following:

1. Copy to SRC the source files that were used for building the handlers. In the following command, *xxn* is your distribution backup device, *yyn* is SRC, and *aa* is the file name of the device handler source file:

```
.COPY xxn:aa.MAC yyn:aa.MAC RET
    .
    .
    .
.COPY xxn:zz.MAC yyn:zz.MAC RET
```

2. Invoke the DCL command file SYSGEN.DEV to build the device handlers. The monitor displays the commands on the terminal as it executes them. For example, the commands in the sample build file in the following section would be displayed on your terminal if you invoked that command file to build your devices.

```
.$@SYSGEN.DEV RET
```

Sample SYSGEN.DEV Build File for the XM Monitor

```
ASSIGN DL1 SRC
ASSIGN DL0 BIN
ASSIGN DL0 OBJ
MACRO/OB:OBJ:LDX/CR/LIS:LST:LDX SRC:(XM+XM.CND+LD)
LINK/NOBITMAP/EXE:BIN:LDX.SYG/MAP:LST:/BOUNDARY:512. OBJ:LDX
SETOVR
MACRO/OB:OBJ:DXX/CR/LIS:LST:DXX SRC:(XM+XM.CND+DX)
LINK/NOBITMAP/EXE:BIN:DXX.SYG/MAP:LST: OBJ:DXX
MACRO/OB:OBJ:DYX/CR/LIS:LST:DYX SRC:(XM+XM.CND+DY)
LINK/NOBITMAP/EXE:BIN:DYX.SYG/MAP:LST: OBJ:DYX
MACRO/OB:OBJ:VMX/CR/LIS:LST:VMX SRC:(XM+XM.CND+VM)
LINK/NOBITMAP/EXE:BIN:VMX.SYG/MAP:LST: OBJ:VMX
MACRO/OB:OBJ:DZX/CR/LIS:LST:DZX SRC:(XM+XM.CND+DZ)
LINK/NOBITMAP/EXE:BIN:DZX.SYG/MAP:LST: OBJ:DZX
MACRO/OB:OBJ:DWX/CR/LIS:LST:DWX SRC:(XM+XM.CND+DW)
LINK/NOBITMAP/EXE:BIN:DWX.SYG/MAP:LST:/BOUNDARY:512. OBJ:DWX
SETOVR
MACRO/OB:OBJ:SPX/CR/LIS:LST:SPX SRC:(XM+XM.CND+SP)
LINK/NOBITMAP/EXE:BIN:SPX.SYG/MAP:LST:/BOUNDARY:512. OBJ:SPX
SETOVR
MACRO/OB:OBJ:XLX/CR/LIS:LST:XLX SRC:(XM+XM.CND+XL)
LINK/NOBITMAP/EXE:BIN:XLX.SYG/MAP:LST: OBJ:XLX
MACRO/OB:OBJ:XCX/CR/LIS:LST:XCX SRC:(XM+XM.CND+XC)
LINK/NOBITMAP/EXE:BIN:XCX.SYG/MAP:LST: OBJ:XCX
MACRO/OB:OBJ:RKX/CR/LIS:LST:RKX SRC:(XM+XM.CND+RK)
LINK/NOBITMAP/EXE:BIN:RKX.SYG/MAP:LST: OBJ:RKX
MACRO/OB:OBJ:DLX/CR/LIS:LST:DLX SRC:(XM+XM.CND+DL)
LINK/NOBITMAP/EXE:BIN:DLX.SYG/MAP:LST: OBJ:DLX
MACRO/OB:OBJ:DUX/CR/LIS:LST:DUX SRC:(XM+XM.CND+DU)
LINK/NOBITMAP/EXE:BIN:DUX.SYG/MAP:LST:/BOUNDARY:512. OBJ:DUX
SETOVR
MACRO/OB:OBJ:DMX/CR/LIS:LST:DMX SRC:(XM+XM.CND+DM)
LINK/NOBITMAP/EXE:BIN:DMX.SYG/MAP:LST: OBJ:DMX
MACRO/OB:OBJ:NQX/CR/LIS:LST:NQX SRC:(XM+XM.CND+NQ)
LINK/NOBITMAP/EXE:BIN:NQX.SYG/MAP:LST: OBJ:NQX
MACRO/OB:OBJ:NCX/CR/LIS:LST:NCX SRC:(XM+XM.CND+NC)
LINK/NOBITMAP/EXE:BIN:NCX.SYG/MAP:LST: OBJ:NCX
MACRO/OB:OBJ:NUX/CR/LIS:LST:NUX SRC:(XM+XM.CND+NU)
LINK/NOBITMAP/EXE:BIN:NUX.SYG/MAP:LST:/BOUNDARY:512. OBJ:NUX
SETOVR
MACRO/OB:OBJ:FSMX/CR/LIS:LST:FSMX SRC:(XM+XM.CND+FSM)
MACRO/OB:OBJ:MTX/CR/LIS:LST:MTX SRC:(XM+XM.CND+TM)
LINK/NOBITMAP/EXE:BIN:MTX.SYG/MAP:LST: OBJ:(MTX,FSMX)
MACRO/OB:OBJ:MMX/CR/LIS:LST:MMX SRC:(XM+XM.CND+TJ)
LINK/NOBITMAP/EXE:BIN:MMX.SYG/MAP:LST: OBJ:(MMX,FSMX)
MACRO/OB:OBJ:MSX/CR/LIS:LST:MSX SRC:(XM+XM.CND+TS)
LINK/NOBITMAP/EXE:BIN:MSX.SYG/MAP:LST: OBJ:(MSX,FSMX)
MACRO/OB:OBJ:MUX/CR/LIS:LST:MUX SRC:(XM+XM.CND+TU)
LINK/NOBITMAP/EXE:BIN:MUX.SYG/MAP:LST:/BOUNDARY:512. OBJ:(MUX,FSMX)
SETOVR
MACRO/OB:OBJ:LPX/CR/LIS:LST:LPX SRC:(XM+XM.CND+LP)
LINK/NOBITMAP/EXE:BIN:LPX.SYG/MAP:LST: OBJ:LPX
MACRO/OB:OBJ:LSX/CR/LIS:LST:LSX SRC:(XM+XM.CND+LS)
LINK/NOBITMAP/EXE:BIN:LSX.SYG/MAP:LST:/BOUNDARY:512. OBJ:LSX
SETOVR
MACRO/OB:OBJ:NLX/CR/LIS:LST:NLX SRC:(XM+XM.CND+NL)
LINK/NOBITMAP/EXE:BIN:NLX.SYG/MAP:LST: OBJ:NLX
```

What to Do After You Build Your System

Once you have built your generated system, do the following:

- Copy and store the answer files and, if possible, the conditional, command, and output files from the generation process. You should retain at least the answer files, if you use a generated monitor, since all SPRs must be accompanied by a listing of these files (as well as link maps). If you keep the object files, you can reassemble a particular component and relink manually, if necessary.
- Save a copy of the SYG files that result from the system build. They are masters for your generated system and you should preserve them.

  Then rename the SYG files (monitors and handlers) to SYS. You can also rename the monitor to distinguish it from standard monitors.
- See the appropriate installation chapter in the *RT–11 Installation Guide* and perform the procedures to install the generated system.
- Copy the bootstrap for the generated monitor to your system device, if you want that monitor to boot. Note that you can always identify a user-generated monitor by the (S) (for SYSGENed) that displays in the boot message.
- After you boot your SYSGENed system, you may want to issue the SHOW CONFIG or the SHOW ALL command to see a display of your SYSGENed system's characteristics.

Appendix A
Example SYSGEN Program Sessions

This appendix lists:

- Three example SYSGEN sessions that duplicate the standard (distributed) RT–11 monitors.
  - — Answers for the SB and FB Monitors
  - — Answers for the XB and XM Monitors
  - — Answers for the ZB and ZM Monitors

  The distributed answer files for these monitors are SBFB.ANS, XBXM.ANS, and ZBZM.ANS.
- An example SYSGEN session that duplicates the error-logging system created by the distributed answer file XMEL.ANS.
- An example SYSGEN session producing a multiterminal system.

In the first example, the SYSGEN introductory and concluding dialog are shown. However, in all the other examples, the introductory and concluding dialog are omitted.

In all the examples, the use of the RETURN key is presumed and is not shown. In most cases, the default answers to questions are chosen.

Answers for the SB and FB Monitors

The following example SYSGEN session (with one exception) contains the answers Digital gave to produce the distributed SB and FB monitors. The exception is the first answer to question 130. However, to show you how you can correct a mistake, the first answer to that question is changed later in the SYSGEN session.

Note that the name of the distributed answer file SBFB is given in this example since that is the distributed answer file containing the answers in this sample session. However, Digital suggests you use different names for your answer files to prevent confusion.

```
.IND SYSGEN

 ************************************************************
                RT-11 SYSTEM GENERATION PROGRAM V05.6
 ************************************************************

Do you want an introduction to system generation (N)?

Do you want to use a previously created answer file (N)?
```

Answers for the SB and FB Monitors

```
Do you want to create an answer file (N)? Y
What answer file do you want to create (SYSGEN.ANS)? SBFB
        ...checking for protected output files.

 ****************************************************************
                MONITOR TYPE
 ****************************************************************
5.    Do you want the single-background (SB) monitor (Y)?
10.   Do you want the foreground/background (FB) monitor (Y)?
15.   Do you want the extended memory (XM) monitor (N)?
20.   Do you want the extended background (XB) monitor (N)?
25.   Do you want the Supervisor and I-D (ZM) monitor (N)?
30.   Do you want the Supervisor and I-D background (ZB) monitor (N)?

 ****************************************************************
                 MONITOR OPTIONS
 ****************************************************************
35.   Do you want timer support in the SB monitor (N)?
40.   Do you want device time-out support (N)?
45.   Do you want an error message on system I/O errors (Y)?
50.   Do you want system job support (N)?
55.   Do you want to use the .SPCPS request (N)?
60.   Do you want global SCCA support (N)?
65.   Do you want multiterminal support (N)?
80.   Enter the size of the output buffers (40):
85.   Enter the size of the input buffers (134):
95.   Do you want end of month and year date rollover (N)?
100.  Do you want the user command linkage (Y)?
105.  Do you want high speed ring buffer support (N)?
110.  Do you want all the keyboard monitor commands (Y)?
115.  Do you want the optional 50 Hz clock support (N)?
120.  Do you want to use the KW11-P clock as the system clock (N)?
125.  Do you want the startup indirect file (Y)?
130.  Do you want floating point support (N)?
135.  Do you want memory parity support (N)?
140.  Do you want power failure messages (N)?
145.  Do you want BATCH support (N)?
150.  Do you want error logging (N)?
170.  Do you want extended device-unit support (N)?
175.  Do you want device ownership support (Y)?
```

```
180.  Do you want the message handler resident in the monitor (Y)?
185.  Do you want to define any other system conditionals (N)?

 ****************************************************************
                DEVICE OPTIONS
 ****************************************************************

 Type <ESCAPE><RETURN> for help.
 Type ?<RETURN> to list all devices.
 Type .<RETURN> when device selection is complete.

Enter the device name you want support for [dd]: DX
200.  Do you want support for a second RX01 controller (N)?
210.  What is the CSR  address for the first RX01 (177170)?
215.  What is the vector address for the first RX01 (264)?
Enter the next device name [dd]: DY
200.  Do you want support for a second RX02 controller (N)?
205.  Do you want RX02 double density only support (N)?
210.  What is the CSR  address for the first RX02 (177170)?
215.  What is the vector address for the first RX02 (264)?
Enter the next device name [dd]: RK
Enter the next device name [dd]: DL
220.  How many RL01/RL02 units are to be supported (2)?
Enter the next device name [dd]: DM
Enter the next device name [dd]: MT
260.  Do you want the file-structured magtape handler (Y)?
265.  How many magtape units are to be supported (2)?
Enter the next device name [dd]: MS
260.  Do you want the file-structured magtape handler (Y)?
265.  How many magtape units are to be supported (2)?
270.  What is the address of the first unit (172522)?
275.  What is the vector address of the first unit (224)?
270.  What is the address of the second unit (172526)?
275.  What is the vector address of the second unit (300)?
Enter the next device name [dd]: MM
260.  Do you want the file-structured magtape handler (Y)?
265.  How many magtape units are to be supported (2)?
Enter the next device name [dd]: MU
260.  Do you want the file-structured magtape handler (Y)?
265.  How many magtape units are to be supported (1)?
270.  What is the address of the first unit (174500)?
```

Answers for the SB and FB Monitors

```
275.  What is the vector address of the first unit (260)?
Enter the next device name [dd]: XL
325.  What is the CSR address for XL (176500)?
330.  What is the vector address for XL (300)?
Enter the next device name [dd]: LS
295.  Do you want support for the PC300 printer port (N)?
300.  What is the CSR for the serial line printer (176500)?
305.  What is the vector for the serial line printer (300)?
Enter the next device name [dd]: LD
250.  Do you want extended device-unit support for handler LD (N)?
Enter the next device name [dd]: NL
Enter the next device name [dd]: LP
280.  Does your printer have a nonstandard vector or CSR (N)?
Enter the next device name [dd]: DU
225.  How many ports are to be supported (1)?
230.  What is the CSR (register) address for the first port (172150)?
235.  What is the vector address for the first port (154)?
245.  Do you want support for DU initiated bad block replacement (N)?
250.  Do you want extended device-unit support for handler DU (N)?
Enter the next device name [dd]: VM
Enter the next device name [dd]: DW
Enter the next device name [dd]: SP
320.  Do you want support for banner pages (Y)?
Enter the next device name [dd]: XC
 ?SYSGEN-E-Ethernet handler support available for XM/XB, ZM/ZB only
Enter the next device name [dd]: NC
 ?SYSGEN-E-Ethernet handler support available for XM/XB, ZM/ZB only
Enter the next device name [dd]: NQ
 ?SYSGEN-E-Ethernet handler support available for XM/XB, ZM/ZB only
Enter the next device name [dd]: NU
 ?SYSGEN-E-Ethernet handler support available for XM/XB, ZM/ZB only
Enter the next device name [dd]: LS
295.  Do you want support for the PC300 printer port (N)?
300.  What is the CSR for the serial line printer (176500)?
305.  What is the vector for the serial line printer (300)?
Enter the next device name [dd]: .
Do you want to add support for any of your own devices (N)?
```

```
355.  How many extra device slots do you want (0)?
Do you want to change any of your responses (N)? Y
Do you want to change monitor option responses (N)? Y
What question number do you want re-asked? 130
130.  Do you want floating point support (N)? Y
Do you want to change more monitor option responses (N)?
Do you want to change your device support (N)?
Do you want to define or redefine any system conditionals (N)?
        ...writing system conditional and answer files.

 ****************************************************************
                DEVICE ASSIGNMENTS AND SYSGEN CLEANUP
 ****************************************************************
What is the name of the source input device [xxn] (DU0)?
What is the name of the binary output device [xxn] (DU0)?
What is the name of the map output device [xxn] (DU0)?
Do you want to retain the system OBJs (Y)?
Do you want to retain the work files (Y)?
        ...writing build files.

 To  build  an entire system, mount the source and binary volumes,
 copy the files Y.CND, Y.TBL, EDTL.MLB, SYSTEM.MLB, and
 the sources for any user supplied device handlers to the source
 volume.  The RT-11 utility program MONMRG.SAV must be present
 on the system disk, in order to build the monitors.  To build
 both the monitors and the device handlers, type $@Y.BLD.
 To build just the monitors, type $@Y.MON.  To build just
 the device handlers, type $@Y.DEV. For more information,
 read the RT-11 SYSTEM GENERATION GUIDE.

 END OF SYSGEN PROGRAM --
@ <EOF>
.
```

Answers for the XB and XM Monitors

The following example SYSGEN session contains the answers Digital gave to produce the distributed XB and XM monitors.

```
 ****************************************************************
                  MONITOR TYPE
 ****************************************************************
5.    Do you want the single-background (SB) monitor (Y)? N
10.   Do you want the foreground/background (FB) monitor (Y)? N
15.   Do you want the extended memory (XM) monitor (N)? Y
20.   Do you want the extended background (XB) monitor (N)? Y
```

Answers for the XB and XM Monitors

```
25.   Do you want the Supervisor and I-D (ZM) monitor (N)?
30.   Do you want the Supervisor and I-D background (ZB) monitor (N)?
 ****************************************************************
                  MONITOR OPTIONS
 ****************************************************************
40.   Do you want device time-out support (N)? Y
50.   Do you want system job support (N)? Y
55.   Do you want to use the .SPCPS request (N)? Y
60.   Do you want global SCCA support (N)?
65.   Do you want multiterminal support (N)?
80.   Enter the size of the output buffers (40):
85.   Enter the size of the input buffers (134):
90.   Do you want to use the .FETCH request under XM/XB, ZM/ZB (Y)?
95.   Do you want end of month and year date rollover (N)?
100.  Do you want the user command linkage (Y)?
105.  Do you want high speed ring buffer support (N)?
110.  Do you want all the keyboard monitor commands (Y)?
115.  Do you want the optional 50 Hz clock support (N)?
120.  Do you want to use the KW11-P clock as the system clock (N)?
125.  Do you want the startup indirect file (Y)?
130.  Do you want floating point support (N)? Y
135.  Do you want memory parity support (N)?
140.  Do you want power failure messages (N)?
145.  Do you want BATCH support (N)?
150.  Do you want error logging (N)?
170.  Do you want extended device-unit support (N)?
175.  Do you want device ownership support (Y)?
180.  Do you want the message handler resident in the monitor (Y)?
185.  Do you want to define any other system conditionals (N)?

 ****************************************************************
                 DEVICE OPTIONS
 ****************************************************************
 Type <ESCAPE><RETURN> for help.
 Type ?<RETURN> to list all devices.
 Type .<RETURN> when device selection is complete.

Enter the device name you want support for [dd]: DX
200.  Do you want support for a second RX01 controller (N)?
210.  What is the CSR  address for the first RX01 (177170)?
```

```
215.  What is the vector address for the first RX01 (264)?
Enter the next device name [dd]: DY
200.  Do you want support for a second RX02 controller (N)?
205.  Do you want RX02 double density only support (N)?
210.  What is the CSR  address for the first RX02 (177170)?
215.  What is the vector address for the first RX02 (264)?
Enter the next device name [dd]: RK
Enter the next device name [dd]: DL
220.  How many RL01/RL02 units are to be supported (2)?
Enter the next device name [dd]: DM
Enter the next device name [dd]: MT
260.  Do you want the file-structured magtape handler (Y)?
265.  How many magtape units are to be supported (2)?
Enter the next device name [dd]: MS
260.  Do you want the file-structured magtape handler (Y)?
265.  How many magtape units are to be supported (2)?
270.  What is the address of the first unit (172522)?
275.  What is the vector address of the first unit (224)?
270.  What is the address of the second unit (172526)?
275.  What is the vector address of the second unit (300)?
Enter the next device name [dd]: MM
260.  Do you want the file-structured magtape handler (Y)?
265.  How many magtape units are to be supported (2)?
Enter the next device name [dd]: NL
Enter the next device name [dd]: LP
280.  Does your printer have a nonstandard vector or CSR (N)?
Enter the next device name [dd]: DU
225.  How many ports are to be supported (1)?
230.  What is the CSR (register) address for the first port (172150)?
235.  What is the vector address for the first port (154)?
245.  Do you want support for DU initiated bad block replacement (Y)? N
250.  Do you want extended device-unit support for handler DU (N)?
Enter the next device name [dd]: LD
250.  Do you want extended device-unit support for handler LD (N)?
Enter the next device name [dd]: VM
Enter the next device name [dd]: DW
Enter the next device name [dd]: SP
```

```
320.  Do you want support for banner pages (Y)?
Enter the next device name [dd]: XL
325.  What is the CSR address for XL (176500)?
330.  What is the vector address for XL (300)?
Enter the next device name [dd]: XC
Enter the next device name [dd]: MU
260.  Do you want the file-structured magtape handler (Y)?
265.  How many magtape units are to be supported (1)?
270.  What is the address of the first unit (174500)?
275.  What is the vector address of the first unit (260)?
Enter the next device name [dd]: NC
Enter the next device name [dd]: NQ
335.  What is the CSR address for NQX (174440)?
340.  What is the vector address for NQX (120)?
Enter the next device name [dd]: NU
345.  What is the CSR address for NUX (174510)?
350.  What is the vector address for NUX (120)?
Enter the next device name [dd]: LS
295.  Do you want support for the PC300 printer port (N)?
300.  What is the CSR for the serial line printer (176500)?
305.  What is the vector for the serial line printer (300)?
Enter the next device name [dd]: .
Do you want to add support for any of your own devices (N)?
355.  How many extra device slots do you want (0)?
Do you want to change any of your responses (N)?
        ...writing system conditional and answer files.
```

Answers for the ZB and ZM Monitors

The following example SYSGEN session contains the answers Digital gave to produce the distributed ZB and ZM monitors.

```
*****************************************************************
                MONITOR TYPE
*****************************************************************
5.    Do you want the single-background (SB) monitor (Y)? N
10.   Do you want the foreground/background (FB) monitor (Y)? N
15.   Do you want the extended memory (XM) monitor (N)?
20.   Do you want the extended background (XB) monitor (N)?
```

```
25.   Do you want the Supervisor and I-D (ZM) monitor (N)? Y
30.   Do you want the Supervisor and I-D background (ZB) monitor (N)? Y

 ****************************************************************
                  MONITOR OPTIONS
 ****************************************************************
40.   Do you want device time-out support (N)? Y
50.   Do you want system job support (N)? Y
55.   Do you want to use the .SPCPS request (N)? Y
60.   Do you want global SCCA support (N)?
65.   Do you want multiterminal support (N)?
80.   Enter the size of the output buffers (40):
85.   Enter the size of the input buffers (134):
90.   Do you want to use the .FETCH request under XM/XB, ZM/ZB (Y)?
95.   Do you want end of month and year date rollover (N)?
100.  Do you want the user command linkage (Y)?
105.  Do you want high speed ring buffer support (N)?
110.  Do you want all the keyboard monitor commands (Y)?
115.  Do you want the optional 50 Hz clock support (N)?
120.  Do you want to use the KW11-P clock as the system clock (N)?
125.  Do you want the startup indirect file (Y)?
130.  Do you want floating point support (N)? Y
135.  Do you want memory parity support (N)?
140.  Do you want power failure messages (N)?
145.  Do you want BATCH support (N)?
150.  Do you want error logging (N)?
170.  Do you want extended device-unit support (N)?
175.  Do you want device ownership support (Y)?
180.  Do you want the message handler resident in the monitor (Y)?
185.  Do you want to define any other system conditionals (N)?

 ****************************************************************
                 DEVICE OPTIONS
 ****************************************************************
 Type <ESCAPE><RETURN> for help.
 Type ?<RETURN> to list all devices.
 Type .<RETURN> when device selection is complete.

Enter the device name you want support for [dd]: DX
200.  Do you want support for a second RX01 controller (N)?
210.  What is the CSR  address for the first RX01 (177170)?
```

Answers for the ZB and ZM Monitors

```
215.  What is the vector address for the first RX01 (264)?
Enter the next device name [dd]: DY
200.  Do you want support for a second RX02 controller (N)?
205.  Do you want RX02 double density only support (N)?
210.  What is the CSR  address for the first RX02 (177170)?
215.  What is the vector address for the first RX02 (264)?
Enter the next device name [dd]: RK
Enter the next device name [dd]: DL
220.  How many RL01/RL02 units are to be supported (2)?
Enter the next device name [dd]: DM
Enter the next device name [dd]: MT
260.  Do you want the file-structured magtape handler (Y)?
265.  How many magtape units are to be supported (2)?
Enter the next device name [dd]: MS
260.  Do you want the file-structured magtape handler (Y)?
265.  How many magtape units are to be supported (2)?
270.  What is the address of the first unit (172522)?
275.  What is the vector address of the first unit (224)?
270.  What is the address of the second unit (172526)?
275.  What is the vector address of the second unit (300)?
Enter the next device name [dd]: MM
260.  Do you want the file-structured magtape handler (Y)?
265.  How many magtape units are to be supported (2)?
Enter the next device name [dd]: NL
Enter the next device name [dd]: LP
280.  Does your printer have a nonstandard vector or CSR (N)?
Enter the next device name [dd]: DU
225.  How many ports are to be supported (1)?
230.  What is the CSR (register) address for the first port (172150)?
235.  What is the vector address for the first port (154)?
245.  Do you want support for DU initiated bad block replacement (N)?
250.  Do you want extended device-unit support for handler DU (N)?
Enter the next device name [dd]: LD
250.  Do you want extended device-unit support for handler LD (N)?
Enter the next device name [dd]: VM
Enter the next device name [dd]: DW
Enter the next device name [dd]: SP
```

```
320.  Do you want support for banner pages (Y)?
Enter the next device name [dd]: XL
325.  What is the CSR address for XL (176500)?
330.  What is the vector address for XL (300)?
Enter the next device name [dd]: XC
Enter the next device name [dd]: MU
260.  Do you want the file-structured magtape handler (Y)?
265.  How many magtape units are to be supported (1)?
270.  What is the address of the first unit (174500)?
275.  What is the vector address of the first unit (260)?
Enter the next device name [dd]: NC
Enter the next device name [dd]: NQ
335.  What is the CSR address for NQX (174440)?
340.  What is the vector address for NQX (120)?
Enter the next device name [dd]: NU
345.  What is the CSR address for NUX (174510)?
350.  What is the vector address for NUX (120)?
Enter the next device name [dd]: LS
295.  Do you want support for the PC300 printer port (N)? Y
300.  What is the CSR for the serial line printer (176500)?
305.  What is the vector for the serial line printer (300)?
Enter the next device name [dd]: LP
280.  Does your printer have a nonstandard vector or CSR (N)?
Enter the next device name [dd]: .
Do you want to add support for any of your own devices (N)?
355.  How many extra device slots do you want (0)?
Do you want to change any of your responses (N)?
        ...writing system conditional and answer files.
```

Answers for a Monitor with TMSCP Error Logging

The following example SYSGEN session contains the answers Digital gave to produce the distributed SYSGEN answer file XMEL.ANS, which creates an XM monitor with TMSCP error logging.

```
 ****************************************************************
                 MONITOR TYPE
 ****************************************************************
5.    Do you want the single-background (SB) monitor (Y)? N
```

Answers for a Monitor with TMSCP Error Logging

```
10.   Do you want the foreground/background (FB) monitor (Y)? N
15.   Do you want the extended memory (XM) monitor (N)? Y
20.   Do you want the extended background (XB) monitor (N)?
25.   Do you want the Supervisor and I-D (ZM) monitor (N)?
30.   Do you want the Supervisor and I-D background (ZB) monitor (N)?

 ****************************************************************
                   MONITOR OPTIONS
 ****************************************************************
40.   Do you want device time-out support (N)? Y
50.   Do you want system job support (N)? Y
55.   Do you want to use the .SPCPS request (N)? Y
60.   Do you want global SCCA support (N)?
65.   Do you want multiterminal support (N)?
80.   Enter the size of the output buffers (40):
85.   Enter the size of the input buffers (134):
90.   Do you want to use the .FETCH request under XM/XB, ZM/ZB (Y)?
95.   Do you want end of month and year date rollover (N)?
100.  Do you want the user command linkage (Y)?
105.  Do you want high speed ring buffer support (N)?
110.  Do you want all the keyboard monitor commands (Y)?
115.  Do you want the optional 50 Hz clock support (N)?
120.  Do you want to use the KW11-P clock as the system clock (N)?
125.  Do you want the startup indirect file (Y)?
130.  Do you want floating point support (N)? Y
135.  Do you want memory parity support (N)?
140.  Do you want power failure messages (N)?
145.  Do you want BATCH support (N)?
150.  Do you want error logging (N)? Y
155.  How many device units does error log job support (10)?
160.  Do you want MSCP error logging support for MSCP devices (N)? Y
165.  Do you want TMSCP error logging support for TMSCP devices (N)? Y
170.  Do you want extended device-unit support (N)?
175.  Do you want device ownership support (Y)?
180.  Do you want the message handler resident in the monitor (Y)?
185.  Do you want to define any other system conditionals (N)?
```

```
 ****************************************************************
                DEVICE OPTIONS
 ****************************************************************

 Type <ESCAPE><RETURN> for help.
 Type ?<RETURN> to list all devices.
 Type .<RETURN> when device selection is complete.

Enter the device name you want support for [dd]: DX
200.  Do you want support for a second RX01 controller (N)?
210.  What is the CSR  address for the first RX01 (177170)?
215.  What is the vector address for the first RX01 (264)?
Enter the next device name [dd]: DY
200.  Do you want support for a second RX02 controller (N)?
205.  Do you want RX02 double density only support (N)?
210.  What is the CSR  address for the first RX02 (177170)?
215.  What is the vector address for the first RX02 (264)?
Enter the next device name [dd]: RK
Enter the next device name [dd]: DL
220.  How many RL01/RL02 units are to be supported (2)?
Enter the next device name [dd]: DM
Enter the next device name [dd]: DU
225.  How many ports are to be supported (1)?
230.  What is the CSR (register) address for the first port (172150)?
235.  What is the vector address for the first port (154)?
245.  Do you want support for DU initiated bad block replacement (Y)? N
250.  Do you want extended device-unit support for handler DU (N)?
Enter the next device name [dd]: SP
320.  Do you want support for banner pages (Y)?
Enter the next device name [dd]: MT
260.  Do you want the file-structured magtape handler (Y)?
265.  How many magtape units are to be supported (2)?
Enter the next device name [dd]: MM
260.  Do you want the file-structured magtape handler (Y)?
265.  How many magtape units are to be supported (2)?
Enter the next device name [dd]: MS
260.  Do you want the file-structured magtape handler (Y)?
265.  How many magtape units are to be supported (2)?
270.  What is the address of the first unit (172522)?
275.  What is the vector address of the first unit (224)?
```

Answers for a Monitor with TMSCP Error Logging

```
270.  What is the address of the second unit (172526)?
275.  What is the vector address of the second unit (300)?
Enter the next device name [dd]: MU
260.  Do you want the file-structured magtape handler (Y)?
265.  How many magtape units are to be supported (1)?
270.  What is the address of the first unit (174500)?
275.  What is the vector address of the first unit (260)?
Enter the next device name [dd]: NL
Enter the next device name [dd]: LP
280.  Does your printer have a nonstandard vector or CSR (N)?
Enter the next device name [dd]: LS
295.  Do you want support for the PC300 printer port (N)?
300.  What is the CSR for the serial line printer (176500)?
305.  What is the vector for the serial line printer (300)?
Enter the next device name [dd]: LD
250.  Do you want extended device-unit support for handler LD (N)?
Enter the next device name [dd]: XL
325.  What is the CSR address for XL (176500)?
330.  What is the vector address for XL (300)?
Enter the next device name [dd]: NC
Enter the next device name [dd]: NQ
335.  What is the CSR address for NQX (174440)?
340.  What is the vector address for NQX (120)?
Enter the next device name [dd]: NU
345.  What is the CSR address for NUX (174510)?
350.  What is the vector address for NUX (120)?
Enter the next device name [dd]: VM
Enter the next device name [dd]: DW
Enter the next device name [dd]: SP
320.  Do you want support for banner pages (Y)?
Enter the next device name [dd]: XC
Enter the next device name [dd]: .
Do you want to add support for any of your own devices (N)?
355.  How many extra device slots do you want (0)?
Do you want to change any of your responses (N)?
        ...writing system conditional and answer files.
```

Answers for a Multiterminal FB Monitor

This section lists SYSGEN answers that create an example of a multiterminal system. This is only an example. It is highly improbable that the example will exactly meet your needs or that the CSR and vector addresses in the example will be the same for your hardware configuration. Digital does not recommend using this example as is.

This example creates a foreground/background multiterminal system. It includes support for MSCP devices, 2 bootable ports, 16 DU device units, 2 local DL11 lines, 1 remote DL11 line, 1 DHV11 multiplexer with 7 local and 1 remote line, 1 local DH line, LS, and XL with terminal hooks support.

```
 ****************************************************************
                  MONITOR TYPE
 ****************************************************************
5.    Do you want the single-background (SB) monitor (Y)? N
10.   Do you want the foreground/background (FB) monitor (Y)? Y
15.   Do you want the extended memory (XM) monitor (N)?
20.   Do you want the extended background (XB) monitor (N)?
25.   Do you want the Supervisor and I-D (ZM) monitor (N)?
30.   Do you want the Supervisor and I-D background (ZB) monitor (N)?

 ****************************************************************
                  MONITOR OPTIONS
 ****************************************************************
40.   Do you want device time-out support (N)?
50.   Do you want system job support (N)? Y
55.   Do you want to use the .SPCPS request (N)?
60.   Do you want global SCCA support (N)?
65.   Do you want multiterminal support (N)? Y
70.   Do you want asynchronous terminal status (Y)?
75.   Do you want multiterminal time-out support (Y)?
 ?SYSGEN-I-Device time-out support set on
76.   Do you want multiterminal handler hooks support (N)? Y
80.   Enter the size of the output buffers (40):
85.   Enter the size of the input buffers (134):
95.   Do you want end of month and year date rollover (N)?
100.  Do you want the user command linkage (Y)?
105.  Do you want high speed ring buffer support (N)?
110.  Do you want all the keyboard monitor commands (Y)?
115.  Do you want the optional 50 Hz clock support (N)?
```

Answers for a Multiterminal FB Monitor

```
120.  Do you want to use the KW11-P clock as the system clock (N)?
125.  Do you want the startup indirect file (Y)?
130.  Do you want floating point support (N)?
135.  Do you want memory parity support (N)?
140.  Do you want power failure messages (N)?
145.  Do you want BATCH support (N)?
150.  Do you want error logging (N)?
170.  Do you want extended device-unit support (N)? Y
175.  Do you want device ownership support (Y)?
180.  Do you want the message handler resident in the monitor (Y)?
185.  Do you want to define any other system conditionals (N)?

 ****************************************************************
                 DEVICE OPTIONS
 ****************************************************************

 Type <ESCAPE><RETURN> for help.
 Type ?<RETURN> to list all devices.
 Type .<RETURN> when device selection is complete.

Enter the device name you want support for [dd]: DU
225.  How many ports are to be supported (1)? 2
230.  What is the CSR (register) address for the first port (172150)?
235.  What is the vector address for the first port (154)?
230.  What is the CSR (register) address for the second port (172144)?
235.  What is the vector address for the second port (150)?
245.  Do you want support for DU initiated bad block replacement (N)?
250.  Do you want extended device-unit support for handler DU (Y)?
255.  How many device-units should DU support (16)?
Enter the next device name [dd]: DY
200.  Do you want support for a second RX02 controller (N)?
205.  Do you want RX02 double density only support (N)?
210.  What is the CSR  address for the first RX02 (177170)?
215.  What is the vector address for the first RX02 (264)?
Enter the next device name [dd]: RK
Enter the next device name [dd]: LP
280.  Does your printer have a nonstandard vector or CSR (N)?
Enter the next device name [dd]: LS
295.  Do you want support for the PC300 printer port (N)?
300.  What is the CSR for the serial line printer (176500)?
305.  What is the vector for the serial line printer (300)?
```

```
306.  Do you want LS to use the multiterminal hooks feature (N)? Y
307.  Which multiterminal line do you want LS to use (1)?
Enter the next device name [dd]: XL
325.  What is the CSR address for XL (176500)?
330.  What is the vector address for XL (300)?
331.  Do you want XL to use the multiterminal hooks feature (N)? Y
332.  Which multiterminal line do you want XL to use (1)?
Enter the next device name [dd]: DL
220.  How many RL01/RL02 units are to be supported (2)?
Enter the next device name [dd]: NU
 ?SYSGEN-E-Ethernet handler support available for XM/XB, ZM/ZB only
Enter the next device name [dd]: VM
Enter the next device name [dd]: SP
320.  Do you want support for banner pages (Y)?
Enter the next device name [dd]: NL
Enter the next device name [dd]: .
Do you want to add support for any of your own devices (N)?
355.  How many extra device slots do you want (0)?

 ****************************************************************
                  TERMINAL INTERFACE OPTIONS
 ****************************************************************
Do you want an introduction to terminal interface options (N)?
360.  Support for how many local DL11 lines, including the console (1)? 2
365.  How many remote DL11 lines are to be supported (0)? 1
370.  What is the CSR for the first (console) DL11 (177560)?
375.  What is the vector for the first (console) DL11 (60)?
370.  What is the CSR for the next (local) DL11 (176500)?
375.  What is the vector for the next (local) DL11 (300)?
370.  What is the CSR for the next (remote) DL11 (175610)?
375.  What is the vector for the next (remote) DL11 (310)?
380.  Do you want DZ series multiplexor support (N)?
420.  Do you want DH series multiplexor support (N)? Y
425.  How many DH series multiplexors are to be supported (1)?
430.  How many local DH lines are to be supported (1)? 7
435.  How many remote DH lines are to be supported (0)? 1
440.  What is the CSR for the first DH multiplexor (160440)?
445.  What is the vector for the first DH multiplexor (320)?
```

Answers for a Multiterminal FB Monitor

```
450.  What type is the first DH series multiplexor? DHV11
455.  How many lines are to be supported on the first DH multiplexor (8)?
460.  Do you want to set initial baud rates on a line-by-line basis (N)?
465.  To what baud rate do you want your DH lines initialized (9600)?
Do you want to change any of your responses (N)?
        ...writing system conditional and answer files.
```

Appendix B
RT–11 Conditionals

The following sections list the conditionals that the RT–11 operating system uses, with a brief explanation of each conditional. The following lowercase symbols in these listings are numeric symbols for which you supply the indicated value.

Symbol	Meaning
nnnnnn	CSR address
nnn	Vector address
n	Number

System Conditionals

```
BATC$H  = 1         ;Batch support

CLOCK   = 50.       ;Power line frequency (50 cycle)
CLOCK   = 60.       ;Power line frequency (60 cycle)
CONT$N  = 1         ;Continuation indirect file (MINC)
CT$CSR  = nnnnnn    ;Status register for TA11 cassette
CT$VEC  = nnn       ;Vector for TA11 cassette

DHLE$N  = n         ;Number of data bits
DH11$L  = n         ;Total number of LOCAL DH lines
DH11$M  = n         ;Total number of REMOTE DH lines
DH11$N  = n         ;Total number of DH series interfaces
DHCS$n  = nnnnnn    ;CSR(s) for DH interfaces (where n is
                    ;the hexadecimal controller number, starting with 0)
DHVC$n  = nnn       ;VECTOR(s) for DH interfaces (where n is
                    ;the hexadecimal controller number, starting with 0)
DHSZ$n  = n         ;Number of DH lines available (where n is
                    ;the hexadecimal controller number, starting with 0)
DHUS$0  = n         ;Number of lines used on FIRST DH interface
DHUS$1  = n         ;Number of lines used on SECOND DH interface
DHSP$D  = n         ;Initial default baud rate for all DH lines
DHST$P  = n         ;Number of stop bits
DH$B0n  = n         ;Initial baud rate for line <n>
                    ;of first DH interface.  This is a hexadecimal
                    ;number, starting with 0)
DH$B1n  = n         ;Initial baud rate for line <n>
                    ;of second DH interface.  This is a hexadecimal
                    ;number, starting with 0)
DL$UN   = n         ;Number of RL01/RL02 units
DL11$L  = n         ;Number of local DL11 interfaces
DL11$M  = n         ;Number of remote DL11-E lines
DL11$N  = n         ;Total number of DL11 lines
```

System Conditionals

```
DLC$0   = nnnnnn    ;CSR of first DL11 (console)
DLV$0   = nnn       ;Vector of first DL11 (console)
DLC$1   = nnnnnn    ;CSR of second DL11 (local or remote)
DLV$1   = nnn       ;Vector of second DL11 (local or remote)
DLC$2   = nnnnnn    ;CSR of third DL11 (local or remote)
DLV$2   = nnn       ;Vector of third DL11 (local or remote)
DLC$3   = nnnnnn    ;CSR of fourth DL11 (local or remote)
DLV$3   = nnn       ;Vector of fourth DL11 (local or remote)
DLC$4   = nnnnnn    ;CSR of fifth DL11 (local or remote)
DLV$4   = nnn       ;Vector of fifth DL11 (local or remote)
DLC$5   = nnnnnn    ;CSR of sixth DL11 (local or remote)
DLV$5   = nnn       ;Vector of sixth DL11 (local or remote)
DLC$6   = nnnnnn    ;CSR of seventh DL11 (local or remote)
DLV$6   = nnn       ;Vector of seventh DL11 (local or remote)
DLC$7   = nnnnnn    ;CSR of eighth DL11 (local or remote)
DLV$7   = nnn       ;Vector of eighth DL11 (local or remote)
DU$ALT  = nnnnnn    ;Status register for FALCON DU handler support
DU$BBR  = 1         ;DU handler dynamic bad block replacement support
DU$COD  = nn        ;DU handler device code
DU$CSR  = nnnnnn    ;Status register of first MSCP
DU$VEC  = nnn       ;Vector of first MSCP
DU$CS1  = nnnnnn    ;Status register of second MSCP
DU$VC1  = nnn       ;Vector of second MSCP
DU$CS2  = nnnnnn    ;Status register of third MSCP
DU$VC2  = nnn       ;Vector of third MSCP
DU$CS3  = nnnnnn    ;Status register of fourth MSCP
DU$VC3  = nnn       ;Vector of fourth MSCP
DU$ERL  = 0         ;DU with no error logging support
DU$ERL  = 1         ;DU with standard error logging support
DU$ERL  = 2         ;DU with MSCP error logging support
DU$N64  = 1         ;DU handler supports extended device units
DU$NAM  = <^Rdd >   ;DU handler device name (dd)
DU$PN2  = <^Rd  >   ;DU single-letter extended-unit device name (d)
DU$POR  = n         ;Number of MSCP ports
DU$UN   = nn        ;Number of device units supported by DU handler
DX$CSR  = nnnnnn    ;Status register for first RX11
DX$VEC  = nnn       ;Vector for first RX11
DX$CS2  = nnnnnn    ;Status register for second RX11
DX$VC2  = nnn       ;Vector for second RX11
DXT$O   = 1         ;Second RX11 controller is present
DY$DD   = 1         ;RX02 double density only
DY$CSR  = nnnnnn    ;Status register for first RX02
DY$VEC  = nnn       ;Vector for first RX02
DY$CS2  = nnnnnn    ;Status register for second RX02
DY$VC2  = nnn       ;Vector for second RX02
DYT$O   = 1         ;Second RX02 controller is present
DZ11$N  = 0         ;No DZ11 or DZV11 support
DZ11$N  = n         ;Number of DZ11 or DZV11 multiplexers supported
DZV$11  = 0         ;DZ11 multiplexer support
DZV$11  = 1         ;DZV11 multiplexer support
DZCS$0  = nnnnnn    ;CSR for first DZ11
DZVC$0  = nnn       ;Vector for first DZ11
DZCS$1  = nnnnnn    ;CSR for second DZ11
DZVC$1  = nnn       ;Vector for second DZ11
DZCS$2  = nnnnnn    ;CSR for third DZV11
DZVC$2  = nnn       ;Vector for third DZV11
DZCS$3  = nnnnnn    ;CSR for fourth DZV11
```

```
DZVC$3  = nnn       ;Vector for fourth DZV11
DZ11$L  = n         ;Number of local DZ lines
DZ11$M  = n         ;Number of remote lines
DZSP$D  = n         ;DZ baud rate
DZST$P  = n         ;DZ stop unit

EIS$I   = 1         ;Use EIS instructions
EMPTY   = 0         ;No empty device slots
EMPTY   = n         ;Number of empty device slots
ERL$G   = 1         ;Error log support
ERL$S   = 1         ;Error log buffer size in blocks
ERL$U   = n         ;Number of units to be logged

FPU$11  = 1         ;Floating point support

HELP$B  = 1         ;Use large single line editor help display
HSR$B   = 1         ;High speed ring buffer

JOB$    = n         ;Number of jobs supported by single line editor

KW11$P  = 1         ;Use KW11P clock as system clock

L$ANG   = 1         ;Language commands
LD$N64  = 1         ;LD handler supports extended device units
LD$UN   = nn        ;Number of device units supported by LD handler
LET$    = 1         ;Support LET as CCL (single line editor)
LETNO$  = n         ;LET assignment count (single line editor)
LETSZ$  = n         ;LET string length (single line editor)
LINSZ$  = n         ;Default line size (single line editor)
LIGH$T  = 1         ;Lights routine for 11/45 and 11/70
LP.CSZ  = n         ;Default value for "SET LP WIDTH=nn"
LP.PSZ  = n         ;Default value for "SET LP LENGTH=nn"
LS.CSZ  = n         ;Default value for "SET LS WIDTH=nn"
LS.PSZ  = n         ;Default value for "SET LS LENGTH=nn"
LP$CSR  = nnnnnn    ;Non-standard line printer CSR
LP$VEC  = nnn       ;Non-standard line printer VECTOR
LS$CSR  = nnnnnn    ;CSR for serial LP
LS$VEC  = nnn       ;Vector for serial LP
LS$LUN  = n         ;Terminal line to be used by default (multi-
                    ;terminal hooks)
LS$MTY  = 0         ;LS has multiterminal line support (multi-
                    ;terminal hooks)
LS$MTY  = 1         ;LS does not have multiterminal line support
                    ;(no hooks)
LS$PC   = 1         ;LS support for both PRO 300 printer port
                    ;and DL interfaces
LS$PRI  = n         ;Specifies interrupt priority level

M$INI   = 1         ;Minimal commands
MAT$S   = 1         ;Asynchronous terminal status (multiterminal hooks)
MM$FSM  = 1         ;TJU16 file-structure support
MM$UN   = n         ;Number of TJU16 units
MPT$Y   = 1         ;Memory parity support
MQ$RES  = 1         ;Message handler is resident in the monitor
MQ$RES  = 0         ;Message handler is non-resident in the monitor
MQH$P2  = 1         ;Use 2 PARs for MQ: and interrupt forwarding
MS$FSM  = 1         ;TS11 file-structured support
MS$UN   = n         ;NUMBER OF TS11 UNITS
MS$CSR  = nnnnnn    ;Status register of first TS11
MS$VEC  = nnn       ;Vector of first TS11
```

System Conditionals

```
MS$CS1  = nnnnnn    ;Status register of second TS11
MS$VC1  = nnn       ;Vector of second TS11
MS$CS2  = nnnnnn    ;Status register of third TS11
MS$VC2  = nnn       ;Vector of third TS11
MS$CS3  = nnnnnn    ;Status register of fourth TS11
MS$VC3  = nnn       ;Vector of fourth TS11 unit
MS$CS4  = nnnnnn    ;Status register of fifth TS11
MS$VC4  = nnn       ;Vector of fifth TS11
MS$CS5  = nnnnnn    ;Status register of sixth TS11
MS$VC5  = nnn       ;Vector of sixth TS11
MS$CS6  = nnnnnn    ;Status register of seventh TS11
MS$VC6  = nnn       ;Vector of seventh TS11
MS$CS7  = nnnnnn    ;Status register of eighth TS11
MS$VC7  = nnn       ;Vector of eighth TS11
MT$FSM  = 1         ;TM11 file-structure support
MT$UN   = n         ;Number of TM11 units
MTI$M   = 1         ;Terminal time out (multiterminal)
MTT$Y   = 1         ;Multiterminal support
MTY$HK  = 0         ;LS or XL will not use multiterminal lines
MTY$HK  = 1         ;LS or XL will use multiterminal lines
MU$ERL  = 0         ;MU with no error logging support
MU$ERL  = 1         ;MU with standard error logging support
MU$ERL  = 2         ;MU with TMSCP error logging support
MU$FSM  = 1         ;TMSCP magtape file-structured support
MU$POR  = n         ;Number of TMSCP ports
MU$UN   = n         ;Number of TMSCP magtape units to be supported
MU$CSR  = nnnnnn    ;Status register of first TMSCP magtape unit
MU$VEC  = nnn       ;Vector of first TMSCP magtape unit
MU$CS1  = nnnnnn    ;Status register of second TMSCP magtape unit
MU$VC1  = nnn       ;Vector of second TMSCP magtape unit
MU$CS2  = nnnnnn    ;Status register of third TMSCP magtape unit
MU$VC2  = nnn       ;Vector of third TMSCP magtape unit
MU$CS3  = nnnnnn    ;Status register of fourth TMSCP magtape unit
MU$VC3  = nnn       ;Vector of fourth TMSCP magtape unit

NQ$CSR  = nnnnnn    ;Status register of Q-bus ethernet controller
NQ$VEC  = nnn       ;Vector of Q-bus ethernet controller
NQ$WDT  = 1         ;Q-bus ethernet controller watchdog code is enabled
NU$CSR  = nnnnnn    ;Status register of UNIBUS ethernet controller
NU$VEC  = nnn       ;Vector of UNIBUS ethernet controller

OFORM   = 1         ;Form processing (LEN, FF, SKIP) LP: LS:
OWN$ER  = 1         ;FB or XM monitor contains $OWNER table

PWF$L   = 1         ;Power fail message

$RFNUM  = n         ;Number of RF11 platters
RDF$L   = 0         ;No system I/O error message
RDF$L   = 1         ;Add system I/O error message
RJS0$3  = 0         ;RJS disk is RJS04
RJS0$3  = 1         ;RJS disk is RJS03
RK6$B   = 1         ;Bad block support for RK06/07 disk
RK6$S   = 1         ;Special functions for RK06/07 disk
ROL$OV  = 1         ;Month rollover support
RP0$3   = 0         ;RP11 disk is RP02/RPR02
RP0$3   = 1         ;RP11 disk is RP03
RTE$M   = 1         ;Monitor running under RTEM-11
```

```
SCCA$G  = 1         ;Global SCCA support
SILN$T  = 1         ;Boot message not displayed
SPC$PS  = 1         ;SAVE/SET main-line PC and PS support
SP$EPS  = 1         ;Spool utility end page support
SP$FLG  = 1         ;Spool handler flag page support
STAR$T  = 1         ;Startup command file
SYSG$N  = 1         ;Indicate SYSGENed monitor
SYT$K   = 1         ;System job support

TIM$IT  = 1         ;Add device timer support
TIME$R  = 1         ;Add SB timer support
TTYIN   = N         ;Size of input ring buffers
TTYOUT  = N         ;Size of output ring buffers

U.K.    = 1         ;UK modem support
U$CL    = 1         ;User command linkage support
U$TIL   = 1         ;Utility commands
UNI$64  = 1         ;Monitor contains extended device-unit support

VM$BAS  = n         ;VM: lowest address to use (/64.)
VT100$  = 1         ;VT100 support with single line editor
VT102$  = 1         ;VT102 support with single line editor

XL$PC   = 1         ;Support for PRO 300 communications port
XL$CSR  = nnnnnn    ;CSR of DL(V)-11 for XL
XL$DVE  = 1         ;Support for SET SL SPEED command on DLV11-E/F
XL$LUN  = n         ;XL line to be used by default (MTTY hook)
XL$MTY  = 0         ;XL has multiterminal line support (no hooks)
XL$MTY  = 1         ;XL does not have multiterminal line support
                    ;(has hooks)
XL$PDT  = 1         ;Support for PDT lights display
XL$PRI  = n         ;Specifies interrupt priority level
XL$SBC  = 1         ;Support for SBC-11/21 serial line and MXV
                    ;serial-line units (including SET speed)
XL$VEC  = nnn       ;Vector of DL(V)-11 for XL
XM$FET  = 1         ;.FETCH support under XM/XB, ZM/ZB
```

Monitor Prefix-File Conditionals

RT–11 Version 5.6 has six MACRO–11 prefix files, one for each of the distributed monitors. Each prefix file contains and consists of one or more conditionals describing the monitor support for a particular monitor. The following lists the conditionals in each file:

```
FILE          CONDITIONAL           MEANING

SB.MAC        SB     =  1           ;Single-job monitor support

FB.MAC        SB     =  0           ;Multi-job monitor support

XB.MAC        SB     =  1           ;Single-job monitor support
              MMG$T  =  1           ;Memory management support

XM.MAC        SB     =  0           ;Multi-job monitor support
              MMG$T  =  1           ;Memory management support

ZB.MAC        SB     =  1           ;Single-job monitor support
              MMG$T  =  1           ;Memory management support
              SUP$Y  =  1           ;Supervisor mode monitor
```

```
ZM.MAC          SB      =  0            ;Multi-job monitor support
                MMG$T   =  1            ;Memory management support
                SUP$Y   =  1            ;Supervisor mode monitor
```

Keyboard Command Conditionals

To include or exclude individual keyboard commands, insert the particular conditional in SYSGEN.CND and substitute 0 (to exclude the command) or 1 (to include the command) for n.

Utility Program Subset

```
U$TIL    =  n          ;If N is set equal to 0, all
                       ;utility commands default = 0
                       ;If n is set equal to 1, all
                       ;utility commands default = 1

BACK$$   =  n          ;BACKUP
BOOT$$   =  n          ;BOOT
COPY$$   =  n          ;COPY
CREA$$   =  n          ;CREATE
DELE$$   =  n          ;DELETE
DIFF$$   =  n          ;DIFFERENCES
DIRE$$   =  n          ;DIRECTORY
DUMP$$   =  n          ;DUMP
EDIT$$   =  n          ;EDIT
FORM$$   =  n          ;FORMAT
INIT$$   =  n          ;INITIALIZE
PRIN$$   =  n          ;PRINT
PROT$$   =  n          ;PROTECT
RENA$$   =  n          ;RENAME
SHOW$$   =  n          ;SHOW
SQUE$$   =  n          ;SQUEEZE
TYPE$$   =  n          ;TYPE
UNPR$$   =  n          ;UNPROTECT
```

Language Subset

```
L$ANG    =  n          ;If N is set equal to 0, all
                       ;language commands default = 0
                       ;If N is set equal to 1, all
                       ;language commands default = 1

COMP$$   =  n          ;COMPILE
DIBO$$   =  n          ;DIBOL
EXEC$$   =  n          ;EXECUTE
FORT$$   =  n          ;FORTRAN
LIBR$$   =  n          ;LIBRARY
LINK$$   =  n          ;LINK
MACR$$   =  n          ;MACRO
```

Minimal Subset

```
M$INI    =  n          ;If N is set equal to 0, all
                       ;minimal commands default = 0
                       ;If n is set equal to 1, all
                       ;minimal commands default = 1
```

```
ABOR$$  =  n        ;ABORT
ASSI$$  =  n        ;ASSIGN
B$$     =  n        ;BASE
CLOS$$  =  n        ;CLOSE
D$$     =  n        ;DEPOSIT
DATE$$  =  n        ;DATE
DEAS$$  =  n        ;DEASSIGN
DISM$$  =  n        ;DISMOUNT
E$$     =  n        ;EXAMINE
FRUN$$  =  n        ;FRUN
GET$$   =  n        ;GET
HELP$$  =  n        ;HELP
INST$$  =  n        ;INSTALL
LOAD$$  =  n        ;LOAD
MOUN$$  =  n        ;MOUNT
REEN$$  =  n        ;REENTER
REMO$$  =  n        ;REMOVE
RESE$$  =  n        ;RESET
RESU$$  =  n        ;RESUME
SAVE$$  =  n        ;SAVE
SET$$   =  n        ;SET
SRUN$$  =  n        ;SRUN
STAR$$  =  n        ;START
SUSP$$  =  n        ;SUSPEND
TIME$$  =  n        ;TIME
UNLO$$  =  n        ;UNLOAD
```

File Naming Conditionals

The following conditionals control monitor, handler, and start-up command file naming conventions. All characters in the conditionals must be both valid ASCII and Radix–50 characters.

Monitor-File Naming Conventions

A monitor name can be any name greater than two characters but not exceeding six characters. Each distributed monitor file has the name RT11mn.COM, where mn identifies the type of monitor. The last two letters of the standard monitor names are assigned values according to the settings of the following conditionals:

```
SB
MMG$T
SUP$T
```

These conditionals as contained in the monitor prefix files identify the type of monitor. The values in the left column imply the monitors in the right column:

VALUE	MONITOR
SB = 1	SB
	XB
	ZB
SB = 0	FB
	XM
	ZM
MMG$T = 1	XB
	XM
	ZB
	ZM
SUP$Y = 1	ZB
	ZM

See the *Monitor Prefix-File Conditionals* section in this appendix for the conditional combinations that name each monitor.

Handler-File Naming Conventions

The following is the naming convention for the handlers used with the preceding list of monitors. Each handler file has the name xx.SYS, where xx identifies the handler. The uppercase X ending some handler names means those handlers are mapped ones:

MONITOR	HANDLERS
RT11SB.SYS	xx.SYS
RT11FB.SYS	xx.SYS
RT11XB.SYS	xxX.SYS
RT11XM.SYS	xxX.SYS
RT11ZB.SYS	xxX.SYS

```
RT11ZM.SYS        xxX.SYS
```

A handler is mapped if the monitor conditional MMG$T = 1.

Start-Up Command-File Naming Conventions

The following is the naming convention for the start-up files used with the preceding list of monitors. Each start-up file has the name STRTxx.COM, where xx identifies the monitor:

MONITOR	START-UP COMMAND FILE
RT11SB.SYS	strtSB.com
RT11FB.SYS	strtFB.com
RT11XB.SYS	strtXB.com
RT11XM.SYS	strtXM.com
RT11ZB.SYS	strtZB.com
RT11ZM.SYS	strtZM.com

The conditionals that determine the monitor names also determine the start-up command file names, since they are named for the monitors.

File Naming Conditionals

Appendix C

Customizations for Specially Generated Monitors

This appendix respectively describes the following seven software customizations for SYSGENed monitors:

- Installing only the generated handlers
- Suppressing the multiterminal polling routines
- Changing the handler file name suffix
- Changing the default device for SRUN
- Changing the default file type for SRUN
- Assigning a remote line as the console terminal
- Changing the device name of the UCL file

For other customizations, see the *RT–11 Installation Guide*.

Installing Only the Generated Handlers

Normally, when you bootstrap an RT–11 system, the monitor automatically installs any device handlers that are present on the system device, if there are enough device slots for them. Under certain circumstances, you may want the system to include only the handlers that you named during your system generation process. To prevent the system from recognizing handlers that you did not specify during system generation, install the following customization.

NOTE

Do not install this customization on any of the distributed monitors.

In this customization, monitr.SYS is the name of the monitor file that you want to modify, and ..INSA is the value of that symbol from the monitor link map.

```
.RUN SIPP RET
*monitr.SYS RET
Base?     0 RET
Offset?   ..INSA RET
     Base     Offset       Old     New
   000000     ..INSA    010105     240 RET
   000000     ..INSA+2  020200      CTRL/Y RET
* CTRL/C
.
```

If the monitor you want to alter is the hardware bootable monitor, write a new system bootstrap with the COPY/BOOT command.

Suppressing the Multiterminal Polling Routines

If you selected DZ–11 modem support or the multiterminal timeout feature when you performed your system generation, the monitor automatically polls the terminal lines twice every second. This can cause ODT to malfunction. If you make the following modification to the monitor, it will not do this periodic polling. This allows you to use ODT, but defeats the value of the multiterminal timeout feature, and prevents the monitor from recognizing remote DZ–11 or DZV–11 lines.

In the customization, monitr.SYS is the name of the monitor file that you want to modify, and ..DZOD is the value of that symbol from the monitor link map.

```
.RUN SIPP RET
*monitr.SYS RET
Base?     0 RET
Offset?   ..DZOD RET
     Base     Offset        Old     New
   000000     ..DZOD     000000     1 RET
   000000     ..DZOD+2   001002      CTRL/Y RET
* CTRL/C
.
```

If the monitor you want to alter is the hardware bootable monitor, write a new system bootstrap with the COPY/BOOT command.

Changing the Handler File Name Suffix

In an ordinary RT–11 operating system, the monitor recognizes device handlers by the format of their names. Unmapped device handlers are in files named dd.SYS, while mapped device handlers are in files named ddX.SYS. Thus, two sets of handlers can coexist on one system volume.

If you generate one or more monitors with different combinations of the device timeout, error logging, and extended memory features, you can have need of up to eight different sets of device handlers. You can keep such handlers on one system volume by associating one or more monitors with the corresponding handlers. Do this by customizing the monitor so that it recognizes device handler file names of the form ddn.SYS, where n is any alphabetic character that you choose. Then rename the corresponding handler files.

In this customization, monitr.SYS is the name of the monitor file that you want to modify, and z is the one-character suffix that you use when you rename the associated handlers. The old values depend on the system generation options that you chose.

```
.RUN SIPP RET
*monitr.SYS RET
Base?     0 RET
Offset?   4774 RET
     Base     Offset      Old      New
   000000     004774   000030     ;R RET
   000000     004774    <  X>     ;R SP SP z RET
   000000     004776    <nnn>      CTRL/Y RET
* CTRL/C
.
```

If the monitor you want to alter is the hardware bootable monitor, write a new system bootstrap with the COPY/BOOT command.

Changing the Default Device for SRUN

When you start a system job (by typing SRUN filnam), the default device on which the monitor looks for the program file is SY. (You can run system jobs under an FB, XM, or ZM monitor that includes the system job feature.) If you have a special application, you can change this default to any three-character device name.

In this customization, monitr.SYS is the name of the monitor file that you want to modify, ..SRDK is the value of that symbol from the monitor link map, and nnn is the new default device name.

```
.RUN SIPP RET
*monitr.SYS RET
Base?     0 RET
Offset?   ..SRDK RET
     Base     Offset        Old     New
   000000     ..SRDK     015270     ;R RET
   000000     ..SRDK      <SY >     ;Rnnn RET
   000000     ..SRDK+2    <AW1>      CTRL/Y RET
* CTRL/C
.
```

Changing the Default File Type for SRUN

When you start a system job, the default file type for the program file is REL. If you have a special application, you can change this default to any three-character file type.

In this customization, monitr.SYS is the name of the monitor file that you want to modify, ..SRUX is the value of that symbol from the monitor link map, and nnn is the new default file type.

```
.RUN SIPP RET
*monitr.SYS RET
Base?     0 RET
Offset?   ..SRUX RET
     Base     Offset       Old     New
   000000     ..SRUX    075273    ;R RET
   000000     ..SRUX     <REL>    ;Rnnn RET
   000000     ..SRUX+2   <xxx>     CTRL/Y RET
* CTRL/C
.
```

Assigning a Remote Line as the Console Terminal

You can customize your FB, XM, and ZM monitors to allow a terminal connected through a dial-up line to be used as the console terminal. The multiterminal software will answer the line when called (provided appropriate modem hardware is in place) and connect the remote terminal to the system as the console terminal.

In this customization, monitr.SYS is the name of the multiterminal monitor file that you wish to modify, and ..CRMT is the value of that symbol from the monitor link map.

```
.RUN SIPP RET
*monitr.SYS RET
Base?     0 RET
Offset?   ..CRMT RET
     Base     Offset       Old     New?
      000000  ..CRMT    020000     0 RET
      000000  ..CRMT+2  xxxxxx      CTRL/Y RET
* CTRL/C
.
```

Changing the Device Name of the UCL File

If you selected user command linkage (UCL) support when you performed your system generation, you can customize the monitor to change the device name from where the UCL file is run (by default SY:). Use the following alteration to change the contents of location ..UCLF to the RAD50 device name.

In the customization, monitr.SYS is the name of the monitor file that you wish to modify, ..UCLF is the value of that symbol from the monitor link map, and yyy is the name of the device from which the UCL file will be run.

```
.RUN SIPP RET
*monitr.SYS RET
Base?     0 RET
Offset?   ..UCLF RET
     Base     Offset       Old     New?
      000000  ..UCLF    xxxxxx     ;Ryyy0 RET
      000000  ..UCLF+2  xxxxxx      CTRL/Y RET
* CTRL/C
.
```

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