

IAS Version 3.4 Installation and System Generation Guide

Order Number: AA-2519F-TC

This document contains detailed installation and system generation instructions and examples.

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Operating System Version: IAS Version 3.4

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Preface

This manual is divided into two logical parts. The first part, Chapters 1 through 7, takes you through a simple system installation. The second part, Chapters 8 through 11, explains how to tailor your system. The appendixes contain printouts of files that you might need to modify and examples of actual terminal sessions.

Intended Audience

This manual is intended for general users and system managers who are interested in installing and using IAS Version 3.4.

Document Structure

This manual consists of the following chapters:

Part 1

- Chapter 1—Introduction
- Chapter 2—Installing IAS Version 3.4
- Chapter 3—Copying the Distribution Files
- Chapter 4—Question and Answer Session
- Chapter 5—Configuring the Terminal Handler
- Chapter 6—Configuring the Hardware and Memory
- Chapter 7—Building the System and System Generation

Part 2

- Chapter 8—Tuning the System
- Chapter 9—Configuring the Timesharing Executive
- Chapter 10—Modifying DCL and System Tasks
- Chapter 11—System Start-Up Procedures

Appendixes

- Appendix A—Sample Installation
- Appendix B—System Generation Files
- Appendix C—Device Characteristics Words

Preface

Documentation Conventions

This manual uses the following conventions:

Convention	Meaning
<code>RET</code>	A box symbol with a one- to six-character abbreviation indicates that you press the appropriate key on the terminal, for example, <code>RET</code> .
<code>Ctrl/X</code>	The phrase CTRL/x indicates that you must press the key labeled CTRL while you simultaneously press another key, for example, CTRL/C, CTRL/Y, CTRL/O.
<code>PDS>SHOW TIME</code> <code>05-JUN-1990 11:55:22</code>	Command examples show all output lines or prompting characters that the system prints or displays in capital letters.
<code>PDS>TYPE MYFILE.DAT</code> . . .	Vertical series of periods, or ellipsis, mean either that not all the data that the system would display in response to the particular command is shown or that not all the data a user would enter is shown.
<code>file-spec,...</code>	Horizontal ellipsis (...) indicates that additional parameters, values, or information can be entered.
<code>[logical-name]</code>	Square brackets indicate that the enclosed item is optional. (Square brackets are not, however, optional in the syntax of a directory name in a file specification or in the syntax of a substring specification in an assignment statement.)
quotation marks apostrophes	The term quotation marks is used to refer to double quotation marks ("). The term apostrophe (') is used to refer to a single quotation mark.

Part I IAS Version 3.4 Simple System Installation

1

Introduction

IAS Version 3.4 installation transfers a basic IAS operating system from the distribution media to your system disk. The operating system runs on all Digital-supported PDP-11 processors listed in the Version 3.4 Software Product Description (SPD). You must tailor IAS to your hardware configuration and other system needs.

1.1 Preparing to Install IAS Version 3.4

IAS is distributed on magnetic tape, tape cartridge, or disk.

NOTE: In the past, IAS has been distributed either as a major, completely remastered product (like Version 3.1 or Version 3.2) or as a series of updates to an existing system (like Version 3.2, Update C). Beginning with IAS Version 3.3, all releases are *point* releases rather than *point and update* releases as they were in previous versions. The cover letter and release notes included with your kit describe the release. When you install IAS for the first time, start with the remastered kit. The release notes tell you if any previous version of IAS is required before you install the latest release.

Before you install IAS Version 3.4, read the release notes included with the kit.

Once IAS Version 3.4 is installed on the target disk, you must perform the following procedures:

- 1 A system-building procedure to tailor the system to your hardware configuration.
- 2 A system generation.

The following sections briefly describe the remastered and update release. Review the section pertaining to this release, then proceed to the section that describes how to install your kit.

1.1.1 Remastered Release

The release is considered *remastered* when the operating system and related system components (not layered products) are built from sources. With a remastered IAS release, you receive a new, bootable, distribution medium and you install IAS from scratch.

A remastered distribution kit usually contains the following:

- Cover letter with general information about the release.
- Hard copy release notes that include installation instructions and technical notes about the release.
- Bootable distribution medium labeled "IASSYS" that you use to create your system disk.
- Separate object medium labeled "OBJECTS" containing all files (for example, object, object library, command, overlay descriptors) necessary to re-task-build system components.
- Update medium containing various layered product files necessary to incorporate changes or corrections to the layered products; the update medium can also contain operating-system-specific files not distributed on the system media.

Introduction

NOTE: Read the release notes for information about operating system updates, which are applied after the new system disk is created.

Check your Bill of Materials and the release notes for each kit for details about media identification and quantity.

To use the distribution kit, you must load the distribution medium on unit #0. Your hardware must meet the following requirements:

- It must be able to hardware-boot the distribution media.
- The target disk must be unit #0 for tape distribution or unit #1 for disk distribution.

1.1.2 Update Release

An update release applies corrections to an existing system disk. The installation process copies command files and other required files from the update kit to the target system disk. Once the files are copied, you execute a command procedure that completes the update and performs a system generation with your site-specific [11,17]SYSGEN.COMD and [11,17]SYSBLD.COMD files.

Before you start the update process, perform and verify a backup of the target system disk. This ensures data integrity and recovery, in the event unpredicted system errors occur during the update. Section 3.6 and Section 3.7 describe the methods you can use for backup and recovery.

1.1.3 Updating an Existing System

If you are generating a system to change the hardware configuration or to update software components, your system generation consists of the following procedures:

- 1 Editing the command and parameter definition files.
- 2 Rebuilding system components.
- 3 Generating the system.
- 4 Starting up the system.

2 Installing IAS Version 3.4

2.1 Introduction

When you install IAS Version 3.4 the first time, you should perform the installation operations in the order they are presented below:

- 1 Boot the distribution media.
- 2 Copy the distribution media to a system disk.
- 3 Edit various command and parameter definition files that control the system generation process.
- 4 Rebuild system components.
- 5 Perform a system generation to incorporate your tailored system.
- 6 Install any optional software.
- 7 Install any distributed updates.
- 8 Create a backup of the newly installed system.

Appendix A contains a sample installation that demonstrates these operations.

2.2 Summary of System Generation Options

After you copy the distribution files, system generation begins with a question and answer session. When you complete this, you can tailor the system to your requirements by editing files, rebuilding (assembling and task building) system components, performing a system generation, and starting up the system.

NOTE: If you are not generating the system for the first time, only tailoring your current system to reflect hardware or software changes, it is not necessary to perform the question and answer session.

Table 2-1 lists the steps required to generate a system for the first time (steps 7 through 12 are optional). If this is not a first-time installation, do the following:

- 1 Perform a Perform a procedure to determine what steps you must perform next for a successful system generation.
- 2 Refer to the *Build/Generation Steps* column of Table 2-1.

Installing IAS Version 3.4

Table 2-1 Summary of First-Time System Generation

Operation (Normal Sequence)	Mandatory/Optional	Reference	Build/Generation Steps
1. Bootstrap distribution medium and copy distribution files.	Mandatory	Chapter 3	
2. Complete Question and Answer session.	Mandatory	Chapter 4	See Table 4-1
3. Configure terminal handler	Mandatory (unless you are building a single user system)	Chapter 5	Rebuild terminal handler; perform system generation.
4. Configure hardware and memory.	Mandatory	Chapter 6	Edit [11,17]SYSGEN.COMD; perform system generation.
5. Perform system build.	Mandatory	Chapter 7	
6. Perform system generation.	Mandatory	Chapter 7	
Optional Steps			
7. Configure timesharing executive.	Optional (not applicable for multiuser and real-time systems)	Chapter 9	Rebuild timesharing; perform system generation.
8. Configure file system.	Optional	Chapter 8	Rebuild file system; perform system generation.
9. Modify system tasks.	Optional	Chapter 10	Rebuild appropriate tasks; perform system generation
10. Install optional software.	Optional	Optional software documentation	
11. Perform an update.	Mandatory if any patches exist.	Chapter 1	
12. Perform system start-up.	Mandatory for timesharing systems. Optional for multiuser and real-time systems	Chapter 11	

2.3 Copying the Distribution Files

IAS Version 3.4 is distributed on the following media:

- RL02 disks
- 9-track magnetic tape
 - 800 bpi
 - 1600 bpi
 - 1600 bpi TMSCP tape subsystems (TU81)
- TK50 tape cartridge

Before you can successfully complete a system generation, you must copy distribution files to a system disk.

NOTE: Normally, you must copy the files only when you create a new system disk or when you generate a new version of IAS onto an existing system disk.

See Chapter 3 for a detailed description of the copy process.

2.4 Editing Command and Parameter Definition Files

Various command and parameter definition files describe system characteristics. These files have the following specific functions:

- Perform question and answer session
- Configure the terminal handler
- Configure the hardware and memory
- Configure the timesharing executive
- Configure the file system
- Modify system tasks

You might have to edit some of these files, depending on whether you are generating a system for the first time or updating the system to reflect hardware or software changes.

2.4.1 Question and Answer Session

When you generate a system for the first time, this procedure is mandatory. You answer a series of questions at the operator console to define the type of system to be generated.

You can generate three types of systems:

- Real-time
- Multiuser
- Timesharing

See the *IAS System Management Guide* for a description of these system types and in what circumstances each is used. For more details, see Chapter 4.

2.4.2 Configuring the Terminal Handler

This procedure is mandatory unless you are generating a single-user system. During this configuration, you edit files that describe, for example, the interface to be used and which terminal connects to which interface. For more details, see Chapter 5.

2.4.3 Configuring the Hardware and Memory

This procedure is mandatory. You edit a file to indicate which devices the system is to use and how much memory is to be made available for the system data areas. For more details, see Chapter 6.

Installing IAS Version 3.4

2.4.4 Configuring the Timesharing Executive

Do not use this procedure if you are generating a multiuser or real-time system. To configure the timesharing executive, edit a parameter file to, for example, define default batch scheduling parameters, the maximum number of concurrent users, and the devices to which users have access. For more details, see Chapter 9.

2.4.5 Configuring the File System

This procedure is optional for all types of systems and involves the selection of ancillary control processor (ACP) tasks that manage the file system. For more details, see Chapter 8.

2.4.6 Modifying PDS and System Tasks

This procedure is optional for all types of systems and involves such procedures as rebuilding PDS or system tasks, or installing the tasks with larger extensions. For more details, see Chapter 10.

2.5 Rebuilding System Components

After you edit the necessary command and parameter files, you must rebuild all affected system components. If you are building a timesharing system, you must also rebuild the timesharing components. The indirect command file, [1,1]BUILD.COM, automatically builds all the system components. For details, see Chapter 7.

2.6 Generating the System

System generation combines all the tailored system components to form a new version of the IAS system. The following subsections describe the two phases of the system generation process.

System Generation Phase 1 Process

The system generation Phase 1 process creates a disk file containing the permanently resident parts of the new system. When Phase 1 completes, you boot the new system manually and Phase 2 begins automatically.

System Generation Phase 2 Process

The system generation Phase 2 process brings up the new system created by the Phase 1 process and uses a command file to define the various tasks essential to system operation. The command file can also define other tasks such as utilities and compilers. At the end of Phase 2, you issue a command (SAV) to store the running system back into its disk file so that the system can subsequently be activated in a usable state. Section 7.3 contains details about the system generation process.

2.7 Updating the System

The update is an automated process for applying corrections to the system. The update process can work two ways:

- It can modify the system directly.

- It can replace outdated files on the system with corrected files.

See the system release notes for documentation on updating the system.

NOTE: Online release notes provide information on updating layered products.

2.8 System Startup

Use the system startup procedure for two purposes:

- To start up a newly generated system.
- To override or modify parameters specified during a previous system generation without having to repeat the generation process. For example, you might want to create additional swap files, or the system manager might want to alter the amount of processor time allocated to batch.

The startup procedure is different, depending on whether you have a timesharing, multiuser, or real-time system. In any case, you issue a number of commands each time the system is started. You normally create an indirect command file that contains all the commands necessary for startup. You can edit this file whenever your system requirements change.

You can use SAV /CMD to run [1,1]STARTUP.CMD automatically every time your system is booted.

2.8.1 Timesharing System Startup

To start up timesharing, run the timesharing startup task. This task requires you to specify start-up commands that define the terminals to be used for a timesharing session, and the batch pseudo-devices if you are running batch. You then specify the SET START command to make the timesharing system available to system users. You can also specify the following parameters:

- Batch parameters (when a separate scheduling level is required for batch processing).
- Devices for timesharing users.
- Memory partition for timesharing users.
- Scheduling parameters for the timesharing session.

See the *IAS System Management Guide*, Chapter 3, for more information about timesharing systems.

2.8.2 Multiuser or Real-Time System Startup

A multiuser or real-time system is usually available for program development as soon as the system has been bootstrapped. Although you need not specify the timesharing startup commands, you might want to specify additional MCR (or DCL) commands so that you can, for example, create swap/checkpoint files, enable the IAS scheduler, or set the default user interface for each terminal.

See Chapter 11 for information about system startup.

3

Copying the Distribution Files

3.1

Introduction

The procedures described in this chapter apply only if you are building a system for the first time. If the distribution files have previously been copied and you are generating the system to change the hardware configuration or to update software components, proceed to the next chapter.

Most of the commands contained in this chapter are issued to the monitor console routine (MCR), which is the interface used for system generation and startup. For detailed information about using MCR, refer to the *IAS MCR User's Guide*.

However, if you are already running a system with DCL rather than MCR as the default command language interpreter, enter MCR mode by typing MCR. This enables you to enter MCR commands. See the *IAS MCR User's Guide* for a more detailed description of MCR mode.

NOTE: When you specify an MCR indirect command file, ensure that you first install indirect MCR as follows:

```
SCI> INSTALL/SYSTEM:IND [11,1]INDIAS
```

MCR is designed to “time out” after one minute. A time-out is indicated by a carriage return at the operator console. Press **Ctrl/c** to reactivate MCR.

The *IAS MCR User's Guide* contains details about all necessary MCR commands.

Appendix A contains a sample installation with an example of the procedures described in this chapter.

3.2

Hardware Bootstraps

To copy the distribution files onto the system disk, you must first bootstrap the distribution medium. Subsequently, you must follow the distribution procedures in one of the appropriate sections identified below.

The IAS system is distributed on one of the following types of media:

- Magnetic tape (see Section 3.3)
- TK50 cartridge (see Section 3.3)
- RL02 disk (see Section 3.4)

Table 3-1 shows the device mnemonic and standard control and status registers (CSR) and vectors (VEC) for each supported distribution medium. Consult your PDP-11 processor user's guide and your site guide for more information on hardware-booting the distribution media.

Copying the Distribution Files

Table 3-1 Device Mnemonics, CSRs, and VECs

Distribution Medium	Device Type	Device Mnemonic	Control Status Register	Interrupt Vector Address
RL02 800 bpi tape	RL02	DL0:	177170	160
	TE16	MM0:	172440	224
	TU45	MM0:	172440	224
	TU77	MM0:	172440	224
	TU10	MT0:	172520	224
1600 bpi tape	TE16/TM03	MM0:	172440	224
	TU45/TM03	MM0:	172440	224
	TU77/TM03	MM0:	172440	224
	TU10	MT0:	172520	224
	TS11	MS0:	172520	224
	TS05	MS0:	172520	224
TMSCP	TU81	MU0:	174500	260
	TK50	MU0:	174500	260

3.3 Magnetic Tape Distribution

This section describes the magnetic tape distribution kit and details the copying procedures.

3.3.1 Magnetic Tape Distribution Kit

The magnetic tape distribution kit contains three or more magnetic tapes:

- System tape
- One objects tape
- One update tape (for layered products and miscellaneous system components)
- PDP-11 SORT/MERGE

The system tape contains all the files needed to build an IAS system, together with programs that copy the files to the system disk and create a single-user system.

The objects tape contains all the files (object, object library, command, overlay descriptor) necessary to re-task-build most system components.

After the contents of the system tape are loaded into memory, several questions are asked about the system to be built. Apart from this interaction, the distribution mechanism is completely automatic and must remain untouched until Phase 2 of system generation is completed. When Phase 2 is completed, type **[Ctrl/C]** to obtain the MCR prompt and save the system. Section 7.3 contains details about system generation procedures.

3.3.2 Copying Procedure

This section describes the procedure for copying a distribution system from magnetic tape onto a system device. The system devices are listed in Table 3-2. Section 3.3.3 contains a summary of the responses to update an existing system and to create a new system.

The full copying procedure is as follows:

- 1 Place the system tape on unit 0 (zero).
- 2 Bootstrap the system tape. The system prints the following on the console:

```
IAS V3.4 DISTRIBUTION TAPE BL3407
SYSTEM DISK?
```

Respond with one of the following disk identifiers to indicate the type of system disk:

Table 3-2 System Devices

RA60 ¹	RA70 ¹	RA80 ¹	RA81 ¹	RA82 ¹
RA90 ¹	RC25 ¹	RCF25 ¹	RD31 ¹	RD32 ¹
RD51 ¹	RD52 ¹	RD53 ¹	RD54 ¹	RL01
RL02	RK06	RK07	RM02	RM03
RM05	RP02	RP03	RP04	RP05
RP06				

¹Specify MSCP for these disks.

- 3 Once you type the name of the system disk, the system displays the following message or its equivalent:

```
ENTER NON-STANDARD CSR ADDRESS (OR RETURN):
ENTER NON-STANDARD VECTOR (OR RETURN):
```

If you press **[RET]**, the system uses default values.

- 4 Next, the system prints the following message or its equivalent:

```
LOAD DISK ON xy0 WRITE ENABLED
TYPE 'CR' WHEN READY?
```

where xy = device type.

- 5 When the disk is ready, type **[RET]**. If the disk can be formatted, the system prints the following:

```
FORMAT DISK?
Formatting destroys all information contained on the disk.
```

Respond with one of following:

```
YES to format the system disk
NO if disk formatting is not required to be run
```

- 6 The system then prints the following message:

```
RUN 'BADBLOCKS'?
```

Running BADBLOCKS also destroys all information on the disk by writing to and reading from every block on the disk. The system records on the disk the position of bad areas so that the file system can avoid their use.

NOTE: Answer YES for all types of disks. Even though MSCP disk class devices, such as RA60, RA81, and so on, perform automatic bad block replacement, some system tasks (INIT, BRU, and Shadow Recording) search for the bad block information.

Copying the Distribution Files

MSCP disk class devices must always report 0 bad blocks. Bad blocks could indicate defective disk media or hardware problems and must be corrected.

Respond with one of the following:

YES (to run the BADBLOCKS utility on the system disk)

NO (if this utility is not required)

- 7** If the answer at steps 6 and 8 was NO, the system then prints the following message:

INITIALIZE SYSTEM DISK?

Initialization also destroys all information contained on the disk. If the disk was formatted or if BADBLOCKS was run, the disk must always be initialized and therefore this question is not asked.

Respond with one of the following:

YES (to initialize the disk)

NO (if the disk does not require initialization)

If you answer NO, the system assumes that your system disk contains all the necessary UFDs.

If initialization is not required, the system procedure continues from step 8.

- 8** If the disk requires initialization, the system displays:

STANDARD VOLUME INITIALIZATION?

Volume initialization is described in the *IAS System Management Guide*.

Respond with one of the following:

YES (if standard volume initialization is required)

NO (to make the initialization task prompt for the initialization parameters)

The *IAS MCR User's Guide* contains a full description of these parameters.

NOTE: If you answered YES in Step 6 above, indicating that you want your system disk to be formatted, the system warns you that data will be lost, and asks whether to continue with the formatting:

** WARNING - DATA WILL BE LOST ON ddn: **

CONTINUE? [Y OR N]:

Type Y if you want your system disk to be formatted. Type N if you do not want your system disk to be formatted.

After this, proceed to step 15.

- 9** The system displays:

COPY FILES?

Respond with one of the following:

YES (to copy all files from the magnetic tape and create a new user profile file)

NO (to suppress these operations, because the files have previously been copied from the tape)

10 The system displays:

```
CREATE UFD'S BEFORE COPYING FILES?
```

Respond with one of the following:

```
YES (to create all UFD's required for the building of the system)
NO  (to suppress creation of UFDs; the system assumes all required
     UFDs already exist)
```

11 The system displays:

```
PERFORM SYSTEM GENERATION?
```

Respond with one of the following:

```
YES (to perform system generation)
NO  (to suppress this operation)
```

If you answer NO, system generation will not occur, but a bootstrap block will be written and the existing system will be software bootstrapped. (This is useful if the bootstrap block (block 0) is corrupted or if it has not been written.)

12 The system is then created and information is printed on the console while the creation process is in operation.

When the system prints the following message, the system building procedure is complete:

```
*** END OF SYSTEM GENERATION Phase 2 ***
```

NOTE: A delay might occur between the end of Phase 1 and the start of Phase 2.

13 To save the system, type `Ctrl/C` to invoke MCR, then type the following command:

```
MCR> SAV
```

The system then responds with a sign-on message giving the actual memory size and the version number of the IAS Executive.

If the physical memory size differs from the memory size specified during SYSGEN, the "GEN" partition automatically expands or truncates to use all available physical memory. Accordingly, either of these two messages display to report the size change:

```
SAV -- PARTITION GEN EXPANDED BY nnnn*32 (DEC) WORDS
SAV -- PARTITION GEN TRUNCATED BY nnnn*32 (DEC) WORDS
```

The system is now ready for use. It is a single-user system that can be used to generate a system tailored to the installation hardware and software requirements.

3.3.3 Summary of Responses for Copying Procedure

A summary of responses to the above questions follows.

To create a completely new system on a disk, the responses are:

```
FORMAT DISK? YES (unless the disk has already been
                  formatted)
ENTER NON-STANDARD CSR ADDRESS (OR RETURN):
ENTER NON-STANDARD VECTOR (OR RETURN):
TYPE 'CR' WHEN READY?
```

Copying the Distribution Files

```
RUN 'BADBLOCKS'? YES
INITIALIZE SYSTEM DISK? YES
STANDARD VOLUME INITIALIZATION? YES
COPY FILES? YES
PERFORM SYSTEM GENERATION? YES
```

See Appendix A for a sample installation of IAS Version 3.4.

3.4 RL02 Distribution

This section describes the RL02 distribution kit and details the copy procedure.

3.4.1 RL02 Distribution Kit

The RL02 distribution kit consists of four disk cartridges. The bootable "IASSYS" disk contains a single terminal system and all the files necessary to reconfigure the distributed system. Also on the disk are the files required to rebuild system components.

3.4.2 RL02 Copying Procedure

Before you attempt to perform system generation, make a backup copy of the distribution disk by using the backup restore utility (BRU). Two copy methods are described below. Use method one if you are copying to another RL02 disk pack. Use method two if your target disk is different from the distribution media.

Method One—Target Disk is an RL02

- 1 Hardware bootstrap the disk on drive 0 (zero).
- 2 Install the BAD and BRU utilities by typing the following command:

```
MCR>INS [11,1]BRU,[11,1]BAD
```
- 3 Load a scratch disk pack on the target drive and mount the disk as follows:

```
MCR>MOU DL1:/FOR/ATCH
```

- 4 Perform a bad block scan on the target disk as follows:

```
MCR>BAD DL1:/LI
```

- 5 Dismount the system disk and remount it as a foreign volume:

```
MCR>DMO DL0:
MCR>MOU DL0:/FOR/ATCH
```

- 6 Write protect the system disk.
- 7 Copy the distribution disk to the scratch disk as follows:

```
MCR>BRU /INIT/VER DL0: DL1:
```

- 8 Halt your system, remove the distribution disk pack, and store it safely for future use. Move the target disk pack to unit 0 (zero) and reboot your system.

You are now ready to build your system. Proceed to the next chapter.

Method Two—Target Disk is Not an RL02

- 1 Hardware bootstrap the distribution disk pack on drive 0 (zero).
- 2 Install the BRU and BAD utilities by typing the following commands:

```
MCR>INS [11,1]BRU,[11,1]BAD
```
- 3 Look up your target disk in Table 3-3 and load the appropriate device handler:

```
MCR>INS [11,1]handler-task-name
```

Load handler of target drive:

```
MCR>LOA handler-name
```

See Table 3-3 for the handler name for each specific disk.

If you are using a DU device, include:

```
MCR>INS [11,1]HIBBR
```
- 4 Load a scratch disk pack on the target drive and mount the disk as follows:

```
MCR>MOU target-disk/FOR/ATCH
```
- 5 Write protect the system disk.
- 6 Perform a bad block scan on the target disk as follows:

```
MCR>BAD DL0:/11
MCR>BAD target-disk
```
- 7 Dismount the system disk and remount it as a foreign volume:

```
MCR>INI target-disk: IASSYS
MCR>DMO target-disk
MCR>MOU target-disk:/OVR
```
- 8 Look up your target disk in Table 3-3. Use the following BRU command to copy the disk:

```
MCR>BRU VER/UFD DLO: target-disk
```

Copying the Distribution Files

Table 3-3 Devices

Device	Handler	Task(s)
RP06	DB	[11,1]DB.TSK
RM02/3	DR	[11,1]DR.TSK
RA60	DU	[11,1]DU.TSK, HIBBR.TSK
RA70	DU	[11,1]DU.TSK, HIBBR.TSK
RA80	DU	[11,1]DU.TSK, HIBBR.TSK
RA81	DU	[11,1]DU.TSK, HIBBR.TSK
RA82	DU	[11,1]DU.TSK, HIBBR.TSK
RA90	DU	[11,1]DU.TSK, HIBBR.TSK
RC25	DU	[11,1]DU.TSK, HIBBR.TSK
RCF25	DU	[11,1]DU.TSK, HIBBR.TSK
RD31	DU	[11,1]DU.TSK, HIBBR.TSK
RD32	DU	[11,1]DU.TSK, HIBBR.TSK
RD52	DU	[11,1]DU.TSK, HIBBR.TSK
RD53	DU	[11,1]DU.TSK, HIBBR.TSK
RD54	DU	[11,1]DU.TSK, HIBBR.TSK
RM05	DR	[11,1]DR.TSK
RK07	DM	[11,1]DM.TSK

9 Dismount both disks and remount them as FILES-11 disks:

```
MCR>DMO DL0:
MCR>DMO Dn0:
MCR>MOU DL0:/OVR
MCR>MOU Dn0:/OVR
```

You are now ready to perform a target system generation.

10 Install the tasks required for system generation Phase 1 by typing the following commands:

```
MCR> INS [11,1]SGN1/TASK=...SGN
MCR> INS [11,1]INV
```

11 Edit the system generation Phase 1 command file as follows:

```
MCR> EDI target-disk:[11,17]SYSGEN.CMD
*L SY=
*C/=.../=target-disk0:
*L ]N
*C/]N/]target-disk-handler0
```

where N = the two-character device mnemonic for the disk as distributed.

If a DU device is your target-disk, you must install the host initiated bad block replacement task immediately following step 11.

```
*L INS,
*I
INS,GEN=[11,1]HIBBR
Ctrl/Z
*EX
```

- 12** Run system generation Phase 1 to build a running system on the new disk.

```
MCR> SGN
```

The system responds as follows:

```
SYSGEN PHASE 1
SPECIFY TARGET DEVICE AND FILENAME
SGN>
```

- 13** In response to the SGN> prompt, type the following command:

```
SGN> TARGET=target-disk:[11,17]IAS.SAV
SGN> @target-disk:[11,17]SYSGEN
```

All the commands read from the command file display on the terminal. When command file processing is complete, the following message appears on the terminal:

```
SGN> END OF PHASE 1
```

- 14** Write the Boot block and bootstrap the target system disk as follows:

```
MCR> BOO target-device:[11,17]IAS.SAV/WB
MCR> BOO target-device:[11,17]IAS.SAV
```

- 15** After the system is bootstrapped, the following message appears on the terminal:

```
*** SYSTEM GENERATION Phase 2 ***
```

Phase 2 mounts the new system disk, then executes the commands in the file [11,17]SYSBLD.CMD.

All commands encountered in SYSBLD.CMD display on the terminal.

At completion, the following message appears on the terminal:

```
*** END OF SYSTEM GENERATION Phase 2 ***
```

- 16** Type **CTRL/C** to obtain the MCR> prompt and issue the following commands:

```
MCR> SAV
```

The system then responds with a sign-on announcement giving the actual memory size and version number of the IAS executive.

If the physical memory size differs from the memory size specified during SYSGEN, the "GEN" partition automatically expands or truncates to use all available physical memory. Accordingly, either of these two messages display to report the size change:

```
SAV -- PARTITION GEN EXPANDED BY nnnn*32 (DEC) WORDS
SAV -- PARTITION GEN TRUNCATED BY nnnn*32 (DEC) WORDS
```

- 17** Enter the correct date and time.

You now have a working, single-user system that can generate a system tailored to the hardware and software requirements of your installation.

3.5 Mandatory Update

A mandatory update is required to install the help file for the RMS design utility. The update is located on the media labeled BIN in UFD [200,200]RMSDES.IDX. Please use the appropriate steps below to copy this file to your target disk.

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For RL02 Kits:

```
MCR>MOU DL1:/OVR
MCR>PIP SY:[1,2]/NV=DL1:[200,200]RMSRES.IDX
MCR>DMO DL1:
```

For All Tape Kits:

Substitute Mn: below with your tape device.

```
MCR>MOU Mn0:/FOR/ATCH
MCR>BRU /REW/NOINIT/UFD/NEW_VERSION/BAC:V34UPDATE Mn0:RMSRES.IDX SY:
MCR>PIP SY:[1,2]/NV/RE=SY:[200,200]RMSRES.IDX
MCR>DMO Mn0:
```

3.6 Backup Procedures

Before you begin updating your system, perform and verify a backup of the target system disk. This ensures data integrity and recovery in the event unpredictable system errors occur during the update. The release notes distributed with the update provide exact details for performing the update.

You can use two methods for backup and recovery. The examples below assume your input disk pack is **DU0:**, and your output is **DU1:** for disk or **MM0:** for tape.

Two-Disk Method

- 1 Mount a scratch disk pack on a second drive. The second pack must be the same type of medium or have larger storage than your source disk pack.
- 2 Reboot your system for standalone use. Do not enable login or timesharing (if so configured).
- 3 Load the target medium and place it online, write enabled.
- 4 Use the following MCR commands to back up your system disk.

NOTE: If you are using PDX as your default command line interpreter (CLI), use the MCR mode prefix.

For disk:

```
MCR>INS [11,1]BRU
MCR>MOU DU1:/FOR/ATCH
MCR>DMO DU0:
```

NOTE: Write-protect your system disk at this time.

```
MCR>MOU DU0:/FOR/ATCH
MCR>BRU /INIT/VER DU0: DU1:
```

When BRU has successfully completed, perform these steps:

- 1 Store your input disk in a safe place.
- 2 Load the copy of your system disk in unit #0.
- 3 Boot the new disk pack.

This ensures that you have a reliable backup and that your target disk has the maximum amount of contiguous free space.

Tape Method:

- 1 Physically load a scratch tape on any available tape drive.
- 2 Reboot your system for standalone use. Do not enable login or timesharing (if so configured).
- 3 Use the following MCR commands to back up your system disk.

NOTE: If you are using PDX as your default command line interpreter (CLI) use the MCR mode prefix.

```
MCR>INS [11,1]BRU
MCR>MOU MM0:/FOR/ATCH
MCR>DMO DU0:
```

NOTE: Write-protect your system disk at this time.

```
MCR>MOU DU0:/FOR/ATCH
MCR>BRU /REW/DENS:1600/VER DU0: MM0:
```

When BRU has finished successfully, complete the following steps:

- 1 Store the tape in a safe place.
- 2 Reboot your system and follow the instructions in the release notes.

Copying the Distribution Files

3.7 Recovery Procedures

To restore your system disk from tape if an unpredicted system failure occurs, follow these steps (use Method 1 if you have a bootable system disk for another disk drive).

Method 1

- 1 Boot your alternate system disk.
- 2 Type the following commands: (This example uses DU and MU devices. Your devices could be different.)

```
MCR>INS [11,1]BRU
MCR>INS [11,1]DU
MCR>INS HIBBR
MCR>INS [11,1]TU16
MCR>LOA DU
MCR>LOA MM
MCR>MOU DU0:/FOR/ATCH
MCR>MOU MM0:/FOR/ATCH
MCR>BRU /REW/INIT/VER MM0: DU0:
```

- 3 When BRU successfully completes, boot your restored system disk.

Method 2

- 1 Load a new or scratch medium on your system disk drive.
- 2 Use the IAS tape distribution kit to install a new IAS system from scratch with the instructions in the tape installation section. A summary of the steps follows.
 - a. Boot the distribution tape.
 - b. Use all the steps for initializing the disk and copying the files to install IAS to the target disk.
 - c. Write a new boot block.
 - d. Save the new system.
- 3 Enter the following commands to BRU your backup tape to the new system disk, creating a new version of any existing files. (This example uses DU and MU devices. Your devices might be different.)

```
MCR>INS [11,1]BRU
MCR>INS [11,1]TU16 (or the appropriate device handler)
MCR>LOA MM
MCR>MOU MM0:/FOR/ATCH
MCR>BRU /REW/NEW_VERSION/NOINIT MM0: DU0:
```

NOTE: Your system disk must have enough free space to hold the distribution system and the backup tape. If you do not have enough space, restore several groups at a time and purge each group as you go. However, do not purge [1,1], [11,1], or [11,17].

- 4 Perform a new SYSGEN, write the boot block, and save the system.

```
MCR>INS [11,1]INV
MCR>RUN [11,1]SGN1 (type ESC or ctrl/Z)
SYSGEN Phase 1:
Specify target device and filename:
```


Copying the Distribution Files

```
SGN>TARGET=disk-device:[11,17] Return
SGN>@disk-device:[11,17]SYSGEN.CMD
.
.
.
End of System Generation Phase 1
Ctrl/C
MCR>BOO disk-device:[11,17]/WB
MCR>BOO disk-device:[11,17]
```

When SYSGEN Phase 2 completes, enter the following command:

```
MCR>SAV
```

- 5 Bring your system up for standalone use. Do not enable logins or timesharing (if so configured).**
- 6 Purge the old files.**

```
MCR>PIP [*,*]*.* /PU
```

4

Question and Answer Session

The question and answer session is mandatory if you are building a system for the first time. You can also use the question and answer session at a later time to reconfigure various parts of the system.

The question and answer dialogue can make the following configuration changes:

- Select timesharing, multiuser, or real-time system. (The *IAS System Management Guide* contains descriptions of the three different types of IAS systems.)
- Include IAS scheduler.
- Create swap files.
- Include memory management directives.
- Select batch mode and number of batch streams.
- Include crash dump module.
- Include memory parity support.
- Select command language (for multiuser or real-time systems).

Based on your answers to the questions, the system edits the various command and parameter definition files. The system also performs a number of checks on the replies that you give, ensuring that the responses are consistent.

To start up the question and answer session, type the command:

```
MCR>@[11,17]QASGN
```

If you have a multiuser system with DCL as the default CLI, type the following commands to start up the question and answer session:

```
SCI> INSTALL/SYSTEM:IND [11,1]INDIAS  
SCI> IND @[11,17]QASGN
```

After some questions, you may see, for example:

```
[D R:48.-1920. D:768. ]
```

This indicates that the numeric response is in decimal, the range of the response should be between 48 and 1920, and the default response is 768.

Question and Answer Session

The text below is an example dialogue.

```
@[11,17]QASGN
>
>; DO YOU REQUIRE FULL DIALOGUE? [Y/N]:
>
>;If you request full dialogue, explanatory text displays
>;before each question. If you answer "No" to this question,
>;the explanatory text is omitted. You can request full
>;dialogue at any of the subsequent questions by entering
>;escape or ALTMODE after the question displays.
>
>* DO YOU REQUIRE FULL DIALOGUE? [Y/N]:Y
>
>
>;WHAT IS THE SIZE OF YOUR TARGET MACHINE? [D R:48.-1920. D:768. ]:
>
>
>;You might be building a system to run on a machine whose
>;memory size is different from the current one.
>;If your target machine is small, it is impractical to build
>;either a multiuser system with other than MCR as the default
>;command language interpreter or a timesharing system.
>;If you are building a system for the current machine,
>;simply type a carriage return, or type the memory
>;size of the target machine expressed as a multiple of
>;K-words.
>
>* WHAT IS THE SIZE OF YOUR TARGET MACHINE? [D R48:1920 D768]:
>
>
>;DO YOU REQUIRE A TIMESHARING SYSTEM? [Y/N]:
>
>;A timesharing system contains the protection and control
>;facilities required for general purpose use. It also
>;contains the multi-tasking facilities described in the
>;Guide to Writing Command Language Interpreters. A
>;non-timesharing system is 4K-8K smaller but is only suitable
>;for use by experienced users in a "non-hostile" environment.
>
>* DO YOU REQUIRE A TIMESHARING SYSTEM? [Y/N]: Y
>
>
>;DO YOU WANT SYSGEN TO CREATE A SWAP FILE? [Y/N]:
>
>;You can choose to have a swap file saved into the system so
>;that it is there every time you re-bootstrap the system. The
>;SYSGEN process can do this for you.
>;If you elect to have a swap file created at SYSGEN, the
>;scheduler will also be enabled in the SYSGEN process. If
>;not, you must create a swap file before you can
>;enable the scheduler, either at the end of system
>;generation before saving the system or each time the system
>;is bootstrapped.
>
>* DO YOU WANT SYSGEN TO CREATE A SWAP FILE? [Y/N]: Y
>
>
>;WHAT IS YOUR SWAP DEVICE [S]:
>
>;The device for swap file #1 must be either "SY0:" or a
>;dedicated volume, so it can be saved in the
>;system. If you want a dedicated volume it must be a
```

Question and Answer Session

```
>;non-removable medium device, for example "DS0:" or a DK unit
>;that is an RK05F.
>;
>* WHAT IS YOUR SWAP DEVICE [S]: SY0:
>;
>;
>;HOW BIG DO YOU WANT THE SWAP FILE? [D: R:50.-6000 D:500.]:
>;
>;Swap file size is specified as a number that represents
>;the size in K-words. One swap block represents four
>;256 (decimal) word disk blocks.
>;Before a task can be run under scheduler control,
>;the system swap file(s) must have sufficient space to
>;accommodate that task. Typically,
>;the total swap space should be twice the size of the
>;time-scheduled partition for reasonable response, more if
>;you need more concurrent task activity and can accept poorer
>;response. You do not need to specify it all now. More swap
>;files can be added after system generation is complete or
>;each time the system is bootstrapped. The specified device
>;must have sufficient contiguous free blocks
>;for the swap file to be successfully created.
>;
>* HOW BIG DO YOU WANT THE SWAP FILE? [D R50:6000 D100]: 200
>;
>;
>;DO YOU REQUIRE MEMORY MANAGEMENT DIRECTIVES? [Y/N]:
>;
>;The memory management directives allow a task to create
>;global areas dynamically and to manipulate their own virtual
>;address space. These directives require approximately
>;1-1/2K of permanently resident core. see the IAS System
>;Directives Reference Manual for further details.
>;
>* DO YOU REQUIRE MEMORY MANAGEMENT DIRECTIVES? [Y/N]: Y
>;
>;
>;DO YOU REQUIRE THE EMST$ AND CNCT$ DIRECTIVES? [Y/N]?
>;
>;The connect to task directive (CNCT$) allows a task to specify that
>;it receive exit status from another active task when that task exits
>;or emits status. The emit status directive allows an active task to
>;return exit status to a task connected to it either via the
>;CNCT$ or SPWN$ directives.
>;
>* DO YOU REQUIRE THE CNCT$ AND EMST$ DIRECTIVES? [Y/N]: Y
>;
>;
>;HOW MANY BATCH STREAMS DO YOU REQUIRE? [D R:0.-8.]:
>;
>;As a batch system, IAS services up to a maximum of 8 batch
>;streams. Each stream requires approximately 1K words of
>;physical memory while it is active. Up to eight
>;batch streams are allowed. If batch is to be heavily
>;used, it is worth having up to 4 batch streams, but there
>;is little point in having more. For light batch usage,
>;use only one stream.
>;
>* HOW MANY BATCH STREAMS DO YOU REQUIRE? [D R0:8]: 2
>;
>;
>;DO YOU REQUIRE AN EXCLUSIVE BATCH LEVEL? [Y/N]
>;
```

Question and Answer Session

```
>;If you do not have an exclusive batch level, all batch tasks
>;will run in the interactive levels. The scheduler does not
>;distinguish between batch and interactive when it
>;allocates CPU and memory.
>;If you do have an exclusive batch level, you will have
>;greater control over resource allocation to batch.
>;
>* DO YOU REQUIRE AN EXCLUSIVE BATCH LEVEL? [Y/N]: N
>;
>;
>;DO YOU REQUIRE A NULL DEVICE? [Y/N]
>;
>;The null device absorbs any output directed to it. It
>;accepts all valid QIO requests, returning a status of
>;success with the exception of read requests, which return a
>;status of IE.EOF.
>;The null device is a useful development aid.
>;
>* DO YOU REQUIRE A NULL DEVICE? [Y/N]: Y
>;
>;
>;DO YOU REQUIRE CRASH DUMPS? [Y/N]
>;
>;The executive can be configured to include a crash dump
>;module. If a serious malfunction occurs, a message is
>;output to the console and the system can be dumped to a
>;specified device and subsequently be analyzed. Omitting a
>;crash dump saves approximately 1/4K of memory. Even if no
>;crash module is required, the system normally outputs a
>;short message to the console to indicate that a crash has
>;occurred. This message can be omitted at a later point in
>;this session and will save approximately 100 words of
>;physical memory, in which case the processor will simply
>;halt.
>;
>* DO YOU REQUIRE CRASH DUMPS? [Y/N]: Y
>;
>;
>;WHAT IS YOUR CRASH DEVICE? [S]:
>;
>;The available crash devices are RK05, RK06, RK07, TC11
>;(DECTAPE), TS11, TU10, TU16, RL01, RL02, AND MSCP (RC25, RA60, etc.)
>;
>* WHAT IS YOUR CRASH DEVICE? [S]: MSCP
>;
>;
>;WHAT IS YOUR CRASH DEVICE UNIT NUMBER? [0 R:0-7]:
>;
>;The crash dump can be made on any unit of the specified
>;device. It is not advisable to use the system unit
>;(normally zero) as the dump unit. This could result in
>;overwriting the system disk. If the device has switchable
>;unit numbers (such as DECTape) it is recommended that you
>;use a number that does not normally exist.
>;
>* WHAT IS YOUR CRASH DEVICE UNIT NUMBER? [0 R0:7]: 4
>;
>;
>;DO YOU REQUIRE A NON-STANDARD CSR ADDRESS? [Y/N]:
>;
>;The crash dump modules normally assume that the dump device
>;is configured with its usual CSR address. If the dump
>;device has a non-standard CSR address, it must be specified
```

Question and Answer Session

```
>;here.
>;
>* DO YOU REQUIRE A NON-STANDARD CSR ADDRESS? [Y/N]: N
>;
>;
>;DO YOU REQUIRE MEMORY PARITY SUPPORT? [Y/N]:
>;
>;If the target system does not have memory parity hardware
>;you should answer "No" to this question. If it does, you
>;have two options. Answering "Yes" causes the inclusion
>;of code that logs memory parity errors. Answering "No" will
>;cause a system crash if a parity error occurs.
>;
>* DO YOU REQUIRE MEMORY PARITY SUPPORT? [Y/N]: Y
>;
>;
>;WHICH MEMORY PARITY OPTION DO YOU REQUIRE? [S]:
>;
>;Input the target processor type (e.g., "70" for a
>;PDP-11/70).
>;
>* WHICH MEMORY PARITY OPTION DO YOU REQUIRE? [S]: 70
>;
>;
>;ALL QUESTIONS HAVE BEEN ASKED, DO YOU WISH TO PROCEED? [Y/N]:
>;
>;At this point, you should check the whole question and
>;answer dialogue. If any errors have been made, you should
>;respond "No" to this question and restart the question and
>;answer procedure.
>;
>* ALL QUESTIONS HAVE BEEN ASKED, DO YOU WISH TO PROCEED? [Y/N]: Y
>;
>;BEGIN FILE EDITING
>SLP @[311,114]PARAMSMAC.SLP
>SLP @[11,17]SYSGENCMD.SLP
>SLP @[11,17]SYSBLDCMD.SLP
>SLP @[11,15]EXECODL.SLP
>SLP @[11,15]EXECBLD.SLP
>PIP [311,114]*.SLP/PU,[11,17]*.SLP,[11,15]*.SLP
>;
>;END FILE EDITING
>;
>;
>;[ END OF QUESTION AND ANSWER SYSGEN ]
>;
@ <EOF>
MCR>
```

If this is not a first-time installation, see Table 4-1 which summarizes the system build and system generation requirements based on the responses given to the above questions. These are not necessarily the next steps to take. You still have the option of configuring the terminal handler, the hardware and memory, the timesharing executive, and the file system, or modifying system tasks.

Question and Answer Session

Table 4-1 Summary of Question and Answer Responses

Question	Response	Mandatory System Build and Generation Steps
Do you require a timesharing system?	Yes (when previous response was No). No (when previous response was Yes).	Use @BUILD and perform a system generation. Rebuild the terminal handler and the executive, then perform a system generation.
Do you require the scheduler?	Yes (when previous response was No).	Rebuild the executive and perform a system generation.
Specification of swap files	Any change from previous response.	Perform a system generation.
Do you require memory-management directives?	Any change from previous response.	Rebuild the executive and perform a system generation.
How many batch streams do you require?	Any change from previous response.	Perform a system generation.
Do you require an exclusive batch level?	Any change from previous response.	Perform a system generation.
Do you require a null device?	Any change from previous response.	Perform a system generation.
Specification of crash dump information	Any change from previous response.	Rebuild the executive and perform a system generation.
Specification of memory parity support information	Any change from previous response.	Rebuild the executive and perform a system generation.
Do you require the Digital Command Language?	Any change from previous response.	Perform a system generation.

If you are generating a system for the first time, see Table 2-1 for a summary of the steps you must follow after you complete the question and answer session.

5

Configuring the Terminal Handler

5.1 Introduction

This chapter describes how to configure the terminal handler to define the system terminals. The procedures described are mandatory if you are building a non-single-user system for the first time. If you are not generating a system for the first time, you must edit the terminal handler files in the following two cases:

- If you are adding new terminals to the system.
- If you are changing terminal interfaces.

You must edit the following two files:

- [311,114]PARAMS.MAC
This file describes the required facilities (for example, the number of each type of interface in the system). (See Section 5.2).
- [311,114]CONFIG.MAC
This file describes in detail each interface and terminal connection. (See Section 5.3.)

After you set up these files, you must assemble and build the handler. Section 5.4 contains a summary of the assembly and build procedures.

Appendix A includes an example of how to configure the terminal handler.

5.2 Editing the PARAMS.MAC File

This file consists of three parts:

- 1 Assembly parameters that you must set up for every system.
- 2 Assembly parameters that you do not normally change. (You might have to change them to suit the particular needs of the installation.)
- 3 Assembly parameters you must not change.

Table 5-1 and Table 5-2 describe the parameters in the PARAMS.MAC file that you can edit to reconfigure the terminal handler. When you have edited this file, proceed to Section 5.3 for information on how to edit the CONFIG.MAC file.

Section B.4 contains an example of the PARAMS.MAC file. See Appendix A for an example of how to edit this file.

Configuring the Terminal Handler

Table 5-1 Terminal Handler Group 1 Assembly Parameters

Name	Octal/Binary ¹ Normal Setting	Meaning
U\$NNTS	O—20	Maximum number of terminals to be serviced.
B\$\$22	B—1	=1 if 22-bit support required; must be set on configurations with more than 124K words of memory and when a DH11, DHU11, DHV11, or DHQ11 interface is present. Should =1 on all 22-bit systems (for example, 11/84, 11/83, 11/73, 11/70, 11/53, 11/44).
B\$\$AW	B—1	"Bells and whistles." Should =1 unless space is at a premium. Bells and whistles takes up approximately 1.2K words. If it =0, the following features are omitted: B\$\$SCN, B\$\$SP, D\$\$CHR, G\$\$CHR, H\$\$OLD, I\$RST, U\$\$CHA, R\$\$BTB, S\$\$CHR, S\$\$FF, U\$\$ERR.
B\$\$LCK	B—0	=1 for block-mode terminal support. Block-mode terminal support takes up approximately .3K words.
D\$\$C11	O—0	Number of DC11 single-line interfaces in the configuration.
D\$\$CDU	B—0	=1 if any DC11 interfaces are connected to modems for dialup support.
D\$\$H11	O—0	Number of DH11 16-line multiplexer interfaces in the configuration.
D\$\$U11	O—1	Number of DHU11, DHV11, DHQ11, and DHF11 16-line NPR multiplexer interfaces.
D\$\$UDU	O—1	Dialup support for DHU11, DHV11, and DHQ11. This must =1 if any DHU11, DHV11, or DHQ11 interfaces are connected to a modem for dialup support.
D\$\$IAL	B—1	Dialup and remote line support. =1 if any dialup and remote support lines are required in the system. If it equals 0, the system ignores dialup and remote lines. Dialup support takes up approximately .4K words.
D\$\$ABD	O—1	Automatic detection of baud rate on dialup lines. If it is set to 1, the terminal handler attempts to determine the baud rate of the incoming caller. Note that the character the handler uses is a carriage return. If it is set to 1, you log into the system by typing one or more carriage returns instead of <u>CTRL/C</u> .
D\$\$J11	O—0	Number of DJ11 16-line interfaces in the configuration.
D\$\$L11	O—1	Number of DL11 single-line interfaces in the configuration.
D\$\$LDU	B—0	=1 if any DL11 (DL11E) interfaces are connected to modems for dialup support.
D\$\$M11	O—0	Number of DM11BB 16-line modem control interfaces in the configuration. These provide dialup support for lines interfaced through DH11s.
D\$\$Z11	O—0	Number of DZ11, DZV11, and DZQ11 8-line interfaces in the configuration.
D\$\$ZDU	B—0	=1 if any DZ11 interfaces are connected to modems for dialup support.
E\$\$SEQ	O—4	Escape sequence support.

¹All values are octal or binary unless otherwise specified.

Table 5-1 (Cont.) Terminal Handler Group 1 Assembly Parameters

Name	Octal/Binary ¹ Normal Setting	Meaning
		<ul style="list-style-type: none"> • -0—no escape sequence support. • -1—only VT52 sequences supported (this takes up approximately .5K words). • -2—only ANSI (for example, VT100, VT2xx, VT3xx) sequences supported (this takes up approximately .5K words). • -3—both VT52 and ANSI sequences supported (this takes up approximately 1K words). • -4—both VT52 and ANSI sequences supported but no translation (this takes up approximately .5K words). <p>See the <i>IAS Device Handler Reference Manual, Chapter 2, Section 2.6</i> for further details.</p>
H\$\$SYN	O—0	Host synchronization. Set to 1 and the handler issues XON/XOFF to allow hosting of transmission synchronization. NOTE: The transmitting host must have XON/XOFF support enabled; otherwise, data loss can occur at higher baud rate settings.
H\$\$RTZ	D—60.	Clock frequency (50., 60., or 100.). The "." is necessary and indicates a decimal number.

¹All values are octal or binary unless otherwise specified.

Table 5-2 Terminal Handler Group 2 Assembly Parameters

Name	Normal Setting	Meaning
B\$\$LIM	0	Maximum number of block mode transfers allowed to be in progress at one time. (0 indicates no limit.) If not 0, the setting should be PROC*N/LOAD, where: PROC = 128 for 11/44, 11/50, 11/55, 11/70, 11/84, (and 11/34 and 11/60 with cache) processors; PROC = 64 for 11/45 processors; PROC = 40 for 11/35, 11/40, (and 11/34 and 11/60 without cache) processors. N = number of block mode terminals. LOAD = sum of X, where X is calculated for each block mode terminal. X = baud rate/1200. If the value of PROC*N/LOAD exceeds the number of block mode terminals, the setting should be 0.
B\$\$SCN	B\$\$AW	If it =1, allows typeahead, CTRL/R , and Backspace Over Tab.
B\$\$SP	B\$\$AW	If it =1, it supports terminals with hardware backspace. If it =0, backspace is output but the handler loses track of terminal horizontal position.
D\$\$CHR	S\$\$CHR	=1 to enable dump characteristics subfunction (SF.GAC, SF.SAC in the <i>IAS Device Handlers Reference Manual</i> , sections 2.4.3.7 and 2.4.3.8). Allows application programs to change terminal characteristics and restore them on exit.
D\$\$KIL	0	If non-zero, IO.KIL clears the AST, event flag, and IOSB for any aborted requests. If zero, these are left and partial input is returned to the user.

Configuring the Terminal Handler

Table 5-2 (Cont.) Terminal Handler Group 2 Assembly Parameters

Name	Normal Setting	Meaning
D\$\$RAT	2	<p>Default read-ahead processing type.</p> <p>If it =0, typeahead is illegal and is ignored.</p> <p>If it =1, it is in "deferred processing" mode. In this case, characters typed ahead are only processed when read. Thus, DEL and <code>CTRL/U</code>, for example, are not seen until a read is performed.</p> <p>If it =2, it is in "immediate processing, deferred echo" mode. In this case, characters are processed as they are typed but not echoed until they are read. Echo is thus a "clean copy."</p> <p>NOTE: Read-ahead type can be changed in the configuration file for particular lines.</p>
E\$\$ALT	1	<p>ESC is echoed as \$ followed by carriage return.</p> <p>If it =0, ESC is not echoed.</p>
F\$\$LTY	T\$\$CP	<p>Set to 1 by default on timesharing systems.</p> <p>Set to 0 if typeahead is not to be flushed when <code>CTRL/C</code> is typed.</p> <p>Set to 1 if typeahead flushing is required.</p>
G\$\$CHR	S\$\$CHR	<p>Equals 1 to enable "get characteristics" subfunctions of "set characteristics" (SF.GSC, SF.GMC; see the <i>IAS Device Handlers Reference Manual</i>, Sections 2.4.3.5 and 2.4.3.6). Allows application programs to determine characteristics of terminal on which they are running.</p>
H\$\$OLD	B\$\$AW	<p>=1 for support of VT%x hold-screen mode. This support is provided automatically if E\$\$SEQ is set to non-zero.</p>
I\$\$ERM	O\$\$VR	<p>Initialization error messages. This value is almost always enabled. It is used only for tape distribution handler.</p>
I\$\$RST	B\$\$AW	<p>Supports IO.RST and IO.RTT functions.</p>
L\$\$30S	1	<p>Supports LA30S serial DECwriters.</p>
M\$\$ANS	2	<p>Time, in seconds, to wait after sensing first ring before answering the telephone. Parameters M\$\$ANS through M\$\$WCR are described more fully in the <i>IAS Device Handlers Reference Manual</i>, Chapter 2, Table 2-5.</p>
M\$\$CAR	0	<p>Time, in seconds, to wait after answering the telephone before applying carrier.</p>
M\$\$PRI	5	<p>Priority of interrupt service routines. This =5 unless there are not multiplexer interfaces in the system, in which case it can =4. It might be useful for configurations with no block-mode terminals to use a BR jumper in DH11/DJ11/DZ11 interfaces to improve the service to disks and the like, when M\$\$PRI should be changed accordingly.</p>
M\$\$RNG	4	<p>Time, in seconds, to wait for a confirming ring signal. If a ring signal is not detected in this interval, the caller is assumed to have hung up. This time must be greater than the period of the ring cycle (3 seconds in the U.S.A.).</p>
M\$\$UK	0	<p>=1 if UK-type short modem timeouts are required. Some countries (including the UK), require a line to be dropped within a very short time after detecting carrier loss because their modems and some acoustic couplers do not distinguish carrier from dial tone. This facility is not available for modems interfaced via a DZ11.</p>
M\$\$WCR	2	<p>Time to wait after carrier loss before assuming caller has hung up. If M\$\$UK is greater than or equal to 0, this time is M\$\$WCR seconds. It should allow for the phone being disturbed on the bed of an acoustic coupler or for dropouts on the line. If M\$\$UK =1, this time is M\$\$WCR clock ticks. It should be such that the line is guaranteed to be dropped in the required time.</p>

Table 5-2 (Cont.) Terminal Handler Group 2 Assembly Parameters

Name	Normal Setting	Meaning
M\$\$WIC	20	Time, in seconds, to wait for caller to apply carrier after the system has applied carrier. This allows the caller time to place the phone in its bed on an acoustic coupler without tying up the line for too long when a wrong number is dialed then canceled.
N\$\$L	1	Newline terminal support should equal 1 for support of terminals that treat code 12 (octal) as newline rather than line feed and have a newline key instead of a carriage return.
N\$\$ODS		Total number of 16-word nodes in handler internal node pool. Nodes are picked from the pool for all internal buffering. This includes typeahead, reads, writes and the saving of default values when terminal characteristics are reset. If this pool is not big enough strange things can happen—for example, characters can be lost. The distributed handler calculates the value automatically based upon the value of U\$\$NTS. (See Table 5-1.) The handler determines the number of nodes as follows: for U\$\$NTS from 0 to 5, allow 5 nodes per terminal. For each terminal from 6 to 32, allow 3 more nodes. For each terminal beyond 32, allow 2 more nodes.
O\$\$VR	1	Builds overlaid version of handler. Handler should normally be overlaid (see Section 5.4).
R\$\$BTB	B\$\$AW & B\$\$SCN	If it equals 1, enables scope tab rubout. Rubout over tab then moves cursor to where it was before tab was typed. If it =0, saves about 60 words but rubout over tab then echoes as backspace-space-backspace.
R\$\$INT		Parameter should be non-zero if DH11 and DZ11 silo interrupt control is required (see the <i>IAS Device Handlers Reference Manual</i> , section 2.9.2.) Its value is the optimum interval, in ticks, between read interrupts. For most applications, 3 is a suitable value. The silo control option is included by default if block-mode support is required (B\$\$LCK=1) and either DH11 and DZ11 interfaces are present. In this case, the parameter is set to 3.
S\$\$CHR	B\$\$AW	=1 to enable "set characteristics" function (see <i>IAS Device Handlers Reference Manual</i> , Chapter 2). The MCR TER and PDS SET TERMINAL commands rely on this function. The function uses more than .5K words of memory and can be omitted for small systems.
S\$\$FF	B\$\$AW	=1 for software simulation of formfeed and vertical tab. On terminals with characteristics set correctly, this replaces a token output of a fixed number of line feeds. It is used when a printer is connected via a terminal interface. The length of the form is set via the MCR TER or PDS SET TERMINAL command.

Configuring the Terminal Handler

Table 5-2 (Cont.) Terminal Handler Group 2 Assembly Parameters

Name	Normal Setting	Meaning
SS\$INT	0	This parameter is used to specify the time interval between modem inspections when DZ11 interfaces are used in conjunction with dialup lines. If the parameter is zero, the handler performs inspections every second. If non-zero, it specifies the number of clock ticks between modem inspections. The modem is inspected by the handler for the ring signal, which is present only intermittently just as a telephone rings intermittently. Thus, care must be taken in choosing this parameter to ensure that the modem inspection corresponds with the ring signal within a reasonable period of time. NOTE: This parameter is also used for calculation of the timeout period used for the "read-with-timeout" subfunction. See the <i>IAS Device Handlers Reference Manual</i> , section 2.4.1.4. Therefore, some multiple of the period chosen must lie within the range 9.5–10.5 seconds.
T\$\$APE	B\$\$AW	=1 for low-speed paper tape support.
U\$\$CHA	B\$\$AW	=1 for unsolicited character AST support.
U\$\$ERR	B\$\$AW	=1 if character error detection (parity, overrun and framing errors) is required.
V\$\$FIL	1	Sets the VT05-type vertical fill (see the <i>IAS Device Handlers Reference Manual</i> , Chapter 2). It must =1 if any VT05 is configured in the system. Set to 0 unless you need Fill or Pad character.

5.3 Editing the CONFIG.MAC File

The CONFIG.MAC file contains the following three parts:

- Interface descriptions
- Optional definition of additional non-Digital terminal types
- Terminal descriptions

Section B.3 contains an example of the CONFIG.MAC file. See Appendix A for an example of how to edit the CONFIG.MAC file.

5.3.1 Interface Descriptions

Each interface is described by a line in the following format:

```
INTF    number,type,address,vector[,extra]
```

where:

- *number* = interface number. The first interface must be 0 and the remainder must follow in consecutive ascending order. Interface 0 must be the console DL11.
- *type* = interface type, selected from DC, DH, DJ, DL, DM, DU, DZ.
- *address* = external page address of the first register of the interface; for example, 177560 for the console.
- *vector* = first interrupt vector address of the interface; for example, 60 for the console.

- *extra* = place for interface-dependent information, although it can be absent. Use it as follows:

- DC—indicates the type of DC11

```
0-DC11AS
1-DC11AA
2-DC11AB
3-DC11AC
4-DC11AD
5-DC11AE
6-DC11AG
7-DC11AH
```

- DH—if the DH11 has a corresponding DM11BB for dialup line control, this must be the number of the DM11BB interface. The DM11BB must precede the DH11 in this file.
- DL—if “extra” is present and non-zero, the interface is a DL11E.

You can specify up to 24 interfaces.

5.3.2 Additional Terminal Types

To define non-Digital terminals, specify the line beginning with DEFTRM as follows.

NOTE: You must supply all parameters.

```
DEFTRM  name, xspd, rspd, length, width
CHR     <<ch1,val1>,<ch2,val2>,...>
.
.
.
ENDTRM
```

where:

- *name* = name of the terminal type; that is, USR0 through USR4.
- *xspd* = speed at which the terminal transmits. A decimal point must not be used with transmission speeds.
- *rspd* = speed at which the terminal receives. A decimal point must not be used with receiver speeds.
- *length* = page length of the terminal, or for a VDU the number of lines on the screen. This can be specified with a decimal point.
- *width* = maximum number of characters that can be output on one line. This can be specified with a decimal point.

The definition can have up to nine lines of the form:

```
CHR     <<ch1,val1>,<ch2,val2>,...>
```

Each line can contain as many characteristics as fit on one line of MACRO input. Specify each characteristic in the form <ch1,val1> where *ch1* is the name of the characteristic and *val1* is the value. Characteristics that you specify here are those that you must not set to the default value of 0.

You must select the characteristics from the list given in Note 1 of Chapter 2, Table 2-3 in the *IAS Device Handlers Reference Manual*. Do not include the TC prefix to the name.

Configuring the Terminal Handler

The characteristics you specify here are the default for the terminal type, but you can override them, either in the TERM macro (Section 5.3.3), or dynamically with the SET TERMINAL command.

The file [311,114]TBLS.MAC contains definitions of the standard Digital terminal types. Use this file as an example when specifying additional non-Digital terminals.

5.3.3 Terminal Descriptions

Each terminal is described by a line in the following format:

```
TERM      number,intnum,subline,type,<SPEED>,<DIALUP>,<<CHAR>>
```

where:

- *number* = terminal number. The first terminal must be number 0, and the remainder must be in consecutive ascending order.
- *intnum* = interface number to which this terminal is connected.
- *subline* = subline number on the interface for terminals connected to multiplexer interfaces; can be blank for single-line interfaces.

For all but the first (zero'th) subline of a multiplexer interface, this parameter can be NEXT, which means that the next subline in sequence is to be used.

- *type* = terminal type, selected from: AS33 (ASR33), KS33 (KSR33), AS35 (ASR35), L30S (LA30S), L30P (LA30P), LA36, VT05, VT50, VT52, VT55, VT61, V100 (VT100), L100 (LA100), L120 (LA120), L180 (LA180S), USR0-USR4.
- *<SPEED>* = terminal baud rate or for a split-speed line, two numbers separated by a comma and enclosed in angle brackets, with the keyboard (lower) speed first, for example, <150,2400>, unless you are using the default speed for the terminal, in which case it can be blank.
- *<DIALUP>* = the string <DIALUP> if the terminal is connected to a dialup line, or the string <REMOTE> if the terminal is connected to a remote line; otherwise, it must be blank.
- *<<CHAR>>* = specification of any non-standard terminal characteristics. The parameter is a list of pairs of characteristic names and values; for example, <<ch1,0>,<ch2,3>,<ch3,1>>. The names are those specified in the *IAS Device Handlers Reference Manual*, Table 2-2 (without the TC. prefix). The value can be any acceptable value as specified in that table. The number of pairs allowed in this list is limited only by the length of the line. If you need still more, you can use an alternate form of the TERM macro:

```
TERMBG number,intnum,subline,type,speed,dialup
SETFLD ch1,vall
... ..
... ..
SETFLD chn,valn
TERMED
```

You must use a separate line for each characteristic.

5.4 Building the Handler

Use the following commands to build the handler.

```
MCR>SET /UIC=[1,1]
MCR>MAC @[311,114]TTMACCHK ; (Optional. See below)
MCR>MAC @[311,114]TTMACNLST
MCR>TKB @[11,114]TTTKBNMAP
```

NOTE: You can also use the **BUILD.CMD** indirect command file to build the handler. The build file builds all the system components.

If you intend to use the **BUILD** command file to build the system (see Chapter 7, Section 7.3), do not specify these commands.

If the assembly parameter files have been set up incorrectly, it is possible that some assembly errors will be reported. To minimize wasted time, use the following command file to check for these first.

```
MCR> MAC @[311,114]TTMACCHK
```

This assembles only the modules that can produce errors. If the **CONFIG.MAC** file is changed but the **PARAMS.MAC** file is not (because some interfaces have been relocated in the external page) you can assemble **CONFIG.MAC** using the command file **[311,114]CONFIGMAC.CMD**.

The normal version of the terminal handler is overlaid; one overlay segment contains the code to deal with I/O requests and the other contains the initialization and powerfail code. This means that the handler has to access the disk where it resides when the system is bootstrapped or during powerfail recovery. For some applications this might be impractical, in which case it is possible to build a non-overlaid version. For example, the non-overlaid version is used in the distribution kit where there is no system disk from which to read overlays. You can build the non-overlaid handler using the **TKB** command file **[11,114]TTUNOVR.CMD**. When you build the non-overlaid handler, the symbol **O\$VR** in **PARAMS.MAC** must be 0 (zero). It is recommended that **I\$ERM** also be 0 (zero) in this case, so that space is not used to store the initialization error messages.

5.5 Terminal Handler Error Messages

The terminal handler checks the consistency of the parameters used to build it. Some errors are detected at assembly time, but others cannot be detected until the handler becomes active, at the beginning of system generation Phase 2 (SGN2). These error messages are printed when the system is first bootstrapped, and have the form:

```
TT.... **FATAL** error message
```

If the error is related to a particular terminal or interface, its number is printed after the message. Then **SGN2** prints the following:

```
UNABLE TO FIND ATL FOR TERMINAL HANDLER(TT....)
```

At this point, the system is not usable and you must rebuild the terminal handler correctly and repeat system generation.

The handler abandons initialization as soon as an error is found. For this reason, if more than one error condition is present, only the first is reported.

SGN2 might also print the following message without the preceding error message from the terminal handler:

```
UNABLE TO FIND ATL FOR TERMINAL HANDLER (TT....)
```


Configuring the Terminal Handler

This indicates that the terminal handler encountered an error it was not able to report. The most likely causes for this message are either an error in the file CONFIG.MAC, or the specification of vector, priority, and external page address in the DEV directive (see Section 6.6).

If you bootstrap a system (after system generation) and you have moved IAS to a machine with more than 124K words of memory from a smaller machine, you might occasionally see the following message:

```
FAILED TO ALLOCATE UNIBUS MAP REGISTER
```

The terminal handler error messages follow.

5.6 Terminal Handler Error Messages

DH11 MODEM INTERFACE IS NOT A DM11

Explanation: The interface specified as the extra parameter for a DH11 is not a DM11BB.

DH11 MUST FOLLOW CORRESPONDING DM11

Explanation: The interface specified as the extra parameter for a DH11 has a number greater than that of the DM11. It is essential that the DM11BB precede the DH11 so initialization can be performed in the right order.

FAILED TO ALLOCATE UNIBUS-MAP REGISTER

Explanation: On a UNIBUS configuration with more than 124K of memory, the handler must allocate a UNIBUS Map Register (UMR) to service DH11 lines. If all the 31 available registers are in use by other handlers, this message occurs. Normally, this happens only if the system is moved from a small (<124K words) machine to a larger one, and if a large number of UNIBUS NPR devices (for example, RK, TU10, RP03; or RMxx, RPxx, or TU16 on a PDP-11/44) are on the system.

FAILED TO CONNECT TO INTERRUPT VECTOR

Explanation: This message indicates an error either in CONFIG.MAC or in the parameters supplied to Phase 1 of system generation.

Two conditions might cause this error:

- There is an error in the CONFIG.MAC file such that more than one interface is specified as having the same interrupt vector address.
- Another handler is connected to one of the interrupt vectors specified in the CONFIG.MAC file. This indicates an error either in CONFIG.MAC or in the parameters supplied to system generation Phase 1.

FAILED TO DECLARE HANDLER

Explanation: Another version of the handler, or another terminal handler, is already active.

FAILED TO DECLARE POWER FAIL AST

Explanation: This error should not occur, but it might occur if the terminal handler build file is changed to reduce the node pool limit of the handler.

HANDLER LIBRARY 'HNDLIB' NOT RESIDENT

Explanation: This can occur only if the system disk handler is user-written and does not map into the system library.

ILLEGAL DC11 SPEED TYPE

Explanation: The speed type of a DC11 interface, specified as the extra parameter, is not in the range 0-7.

LINE SPEED NOT VALID FOR THIS INTERFACE

Explanation: The speed specified for a terminal, either implicitly by the terminal type or explicitly as the speed parameter to the TERM macro, is not available on the specified interface. This can occur, for example, if a VT50 is connected to a DC11 without an explicit speed specification suitable for the interface.

MORE THAN ONE DH11 REFERS TO ONE DM11

Explanation: More than one DH11 interface has specified the same DM11BB modem control interface as the extra parameter.

MORE THAN ONE TERMINAL ON SINGLE-LINE INTERFACE

Explanation: More than one terminal has specified the same single-line interface in the CONFIG.MAC file.

NO MODEM INTERFACE FOR DIALUP LINE

Explanation: A terminal has the dialup parameter set, but its interface has no dialup capability.

SLAVE INTERFACE USED AS PRIMARY INTERFACE

Explanation: The interface specified for a terminal in the TERM macro is a DM11.

TWO TERMINALS ON SAME SUBLINE

Explanation: More than one terminal has specified the same subline of the same multiplexer interface.

6

Configuring the Hardware and Memory

6.1 Introduction

This chapter describes the Phase 1 system generation directives that enable you to configure hardware and memory.

You must configure the hardware and memory SYSGEN parameters if you are building a system for the first time.

Edit the file [11,17]SYSGEN.CMD to define all devices in the configuration and to define how much memory is available for the system communication area (SCOM).

See the sample installation in Appendix A for an example of how to configure the hardware.

6.2 Phase 1 System Generation Directives

Phase 1 system generation directives fall into the following categories:

- TARGET directive—defines the target system device
- PDP11 directive—defines the processor to be used
- EXEC, SCOM, and PAR directives—divide the memory into the executive, the system communication area, and the partitions, respectively
- DEV directive—defines the system peripherals
- SY, DPAR, DUIC, and DCLI directives—supply system default information
- The INS directives that install tasks needed for Phase 2
- The SYSBLD directive that allows you to specify an alternative system generation Phase 2 command file

NOTE: If you place the directives in an indirect command file, you should name the file [11,17]SYSGEN.CMD (until you are very familiar with IAS), because both the question and answer session (see Chapter 4) and an advanced usage of the distribution kit expect this file name.

Whether you type the directives in response to system generation requests or you use an indirect file, you must separate each category of directive from the preceding category by a record containing only a slash (/). Indicate the end of input to Phase 1 with a record containing two slashes (/). Many system generation directives can have multiple parameter sets for a single occurrence of the directive name.

Separate multiple sets from each other by backslash (\) characters. The following examples illustrate two PAR directives, then the same two directives using the convention for multiple parameter sets.

```
PAR=JIM,,,U
PAR=JOHN,,,U
```

or:

```
PAR=JIM,,,U\JOHN,,,U
```

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6.3 Target Directive

Use the optional TARGET directive to define the target device (that is, the device where Phase 1—SGN1—is to create its output file and obtain all required tasks for installation). The TARGET directive has the following format:

```
TARGET=xyn: [ufd]filename.type
```

where:

- xyn: = device mnemonic and unit number (default is SY0)
- [ufd] = UFD under which Phase 1 is to store the system file (default is [11,17]).
- filename.type = file name and file type used to name the file created by Phase 1 (default is IAS.SAV).

If you omit TARGET directive, Phase 1 uses the following file specification:

```
SY0: [11,17]IAS.SAV
```

NOTE: Only one TARGET directive is permitted.

When the message SPECIFY TARGET DEVICE AND FILENAME displays on the console, type either the TARGET directive or the name of the indirect command file to be used. To omit the TARGET directive, simply proceed to input the PDP11 directive described in Section 6.4.

If you use the TARGET directive, it completely describes where the output file of SGN1 is to be created and with what name. The following example creates a file named 64KSYS.SAV on DB1 under UFD [11,17].

```
SGN>TARGET=DB1: [11,17]64KSYS.SAV
```

If you have entered the TARGET directive from the console, SGN1 prompts for the CPU specification, as follows.

```
SGN>TARGET=DB1: [11,17]64KSYS
SGN>/
ENTER CPU SPECIFICATION
SGN>
```

6.4 PDP11 Directive

Use the PDP11 directive to define the target system processor configuration. One PDP11 directive is required. The directive has the following format:

```
PDP11=cpu-type, [mem-size], [fpt-optn], [clock-freq]
```

where:

- cpu-type = processor type (for example, 44 for a PDP-11/44, 70 for a PDP-11/70, 84 for a PDP-11/84, 53 for a MicroPDP-11/53, 73 for a MicroPDP-11/73, 83 for a MicroPDP-11/83).
- mem-size = physical memory size, specified as nnnnK words. nnnn must be a decimal integer. If you omit this parameter, 64K words is the default memory size. The mem-size specified must be equal to or less than the amount of memory on the target hardware. The maximum memory size permitted is as follows:

Memory Size	Processors
1920K words	PDP-11/44 PDP-11/70 PDP-11/84
2044K words	MicroPDP-11/53 MicroPDP-11/73 MicroPDP-11/83
124K words	All other processors.

This value defines the size of the save image file. However, if you specify a value higher than 124K words, system generation always truncates the size of the save image file to 124K words.

- `fpt-optn = FP` to indicate that the hardware supports floating-point instructions. If floating-point instructions are not supported, omit this parameter.

Always specify `FP` for PDP-11/60, PDP-11/84, MicroPDP-11/53, MicroPDP-11/73, and MicroPDP-11/83. The floating-point instructions are microcoded into these systems. An optional floating-point accelerator is available for PDP-11/60, PDP-11/84, and MicroPDP-11/83.

Do not specify `FP` for any other processor unless a hardware floating-point unit has been installed. If you do specify `FP` and your system does not support floating-point instructions, unpredictable results occur during system generation.

- `clock-freq = system clock ticks per second for the standard clock (KW11-L) or interrupts per second, clock identification, and clock ticks per interrupt for the programmable clock (KW11-P).`

For the standard clock, specify a decimal number equal to the line frequency (normally 50 or 60). The system runs with the line frequency clock at the specified frequency. If you omit the parameter, 60Hz is the default.

For a programmable clock, specify three decimal numbers:

- Number of clock interrupts per second. For example, 100. The executive uses this number for its timing functions.
- Clock rate identification
 - 0=100 kHz
 - 1=10 kHz
 - 2=line frequency
 - 3=external

This parameter is used to initialize bits <2:1> of the KW11-P control and status register.

- Number of clock ticks per interrupt.

This number is loaded into the Count Set Buffer register of the KW11-P.

NOTE: The KW11-P is run in repeat-interrupt mode.

Enclose the three numbers in angle brackets and separate them with commas as in the following example:

```
<100,0,1000>
```

This indicates that the programmable clock is to be used as the system clock. It is interrupting 100 times per second using the 100 kHz clock with a count of 1000 loaded into the count register.

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The product of the first and third numbers must equal the clock rate specified by the second number.

When the message ENTER CPU SPECIFICATION displays on the console, enter the PDP11 directive followed by a record containing only a slash (/) as follows:

```
SGN>PDP11=70,96K
SGN>/
```

6.5 Memory Allocation Directives

Memory allocation directives enable you to position the executive and system communication area in memory, and to establish partitions. Allocate memory with the following directives:

- EXEC (optional)
- SCOM (mandatory)
- PAR (mandatory)

Enter these directives either from an indirect command file or in any order in response to the following request that displays on the console:

```
SPECIFY DIVISION OF MEMORY
```

Follow memory allocation directives with a record containing only a slash (/).

6.5.1 EXEC Directive

Use the EXEC directive to load the IAS executive into memory, starting at a specified 32-word boundary. You must use an address higher than the bootstrap program. The bootstraps supplied with IAS Version 3.4 are 512 bytes long.

The EXEC directive has the following format:

```
EXEC=base
```

where:

base = a 32-word boundary that indicates where the executive starts. System generation software multiplies the specified octal number by 100 (octal) to determine the starting address. For example, if you specify base as 540, the starting address is memory location 54000 (octal).

This directive is optional. If you do not include it, the executive starts at the next 32-word boundary after the bootstrap program. Base addresses specified in subsequent directives are ignored.

If you include the EXEC directive, you must also specify a base address in the SCOM directive (see Section 6.5.2) and all PAR directives (see Section 6.5.3).

If you are generating a 22-bit system (for example, PDP-11/44, PDP-11/53, PDP-11/70, PDP-11/73, PDP-11/83, PDP-11/84) in excess of 124K words, the executive and SCOM must be partitioned completely below the 124K word boundary. Furthermore, the partitions where the system disk handler and SGN2 are installed must have sufficient space below the 124K word boundary for these tasks to fit completely. Phase 1 checks for all the above conditions and issues an error message if they are not satisfied.

6.5.2 SCOM Directive

The SCOM directive allocates space for the system communication area (SCOM), which comprises the system subroutines, a communication region, the system tables (including the system task directory) and the node pool. The System Communication Area cannot exceed 12K words, or 600 octal 32-word blocks.

NOTE: When you first generate the system, follow this procedure:

- 1 **Generate your system with SCOM as large as possible (maximum is 12K words).**
- 2 **A 12K word SCOM provides the most space for the system node pool. You can regenerate your system to reduce the size of SCOM if necessary.**

One SCOM directive is mandatory and has the following format:

```
SCOM=[base],size,std-entries
```

where:

- **base** = starting system communication area address.
Specify this location using the same conventions as for the base address in the EXEC directive (see Section 6.5.1). If you include the EXEC directive in system generation, you must include the base parameter in the SCOM directive. If you omit both this parameter and the EXEC directive, the System Communication Area follows the Executive in memory.
- **size** = total length of the system communication area.
Specify the size as an octal number of 32-word blocks or as nnK. When you use the form nnK, the number (nn) is multiplied by 1024 words to determine the desired size.
- **std-entries** = decimal number equivalent to the number of system task directory (STD) entries.
This parameter establishes the maximum number of simultaneously installed tasks (user and system tasks) that the system is to support. The number you specify is rounded up to the next multiple of 32, so that if you do not specify a multiple of 32 the number of STD entries allowed might be more than you specified. A value of 160 is normally sufficient.

SCOM Size

For a general-purpose system (for example, a timesharing or program development system), a reasonable size for SCOM is 4K+200n words, where n equals the number of terminals. Take into account other variable factors as well (for example, each active real-time task uses 24 words).

On a system where memory is not a constraint (typically on PDP-11/44, PDP-11/53, PDP-11/70, PDP-11/73, PDP-11/83, and PDP-11/84 installations), set the size of SCOM to the maximum value, 12K words.

Otherwise, SCOM size is the sum of the following elements:

- 1 Length in words of the system subroutines and the communication area. (Subroutines and communication area = 1184 decimal.)
- 2 Number of tasks installed at any given time, multiplied by 16 words.
- 3 Number of STD entries specified by the parameter *std-entries*.
- 4 Number of DEV directives (see Section 6.6) multiplied by 26 words.
- 5 Number of PAR directives (see Section 6.5.3) multiplied by 10 words.

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6 Number of shareable global areas (SGAs) installed at any given time (taking account of pure areas), multiplied by 24 words.

7 Number of swap files specified, multiplied by 16, plus the size of each swapfile bitmap. To calculate the size of each swapfile bitmap, divide the number of blocks in each swapfile by 16, then round up to the next whole word.

Use the MCR command `SWA /LI` or the SCI command `SHOW SWAP_FILES` to find the number of blocks in the Bitmap.

8 Number of scheduling levels (on a timesharing or multiuser system) multiplied by 16 words. See the *IAS System Management Guide* for a description of scheduling levels.

9 Number of interrupt vectors dealt with by each device handler, multiplied by 16 words.

10 Variable-length node pool size.

To determine the size of the node pool, subtract the first nine items above from the SCOM size parameter as follows:

$$\text{Pool size} = \text{SCOM size} - (\text{sum of items 1 to 9})$$

The node pool is used by the executive and many of the system utilities as dynamic storage. Each node consists of a variable number of eight-word blocks. Insufficient nodes can cause your system to hang (that is, you cannot obtain a response from the system on any terminal). Until you gain experience with the system, allocate as much space as possible to the node pool.

6.5.3 PAR Directive

The partition directive establishes the name, base address, size, and type of every partition in the target system. You must define every partition in the system during system generation.

Multiple parameter sets are allowed.

The PAR directive has the following format:

```
PAR=par-name, [base], size, [par-type]
```

where:

- `par-name` = an up-to-six-character ASCII name for the partition.
- `base` = an optional starting address for the partition named above. Specify this parameter only if you include a base address in the EXEC directive. This parameter follows the same rules as those for the EXEC directive.

If you omit the base address, the system places the partition optimally in memory.

- `size` = partition size, specified as an octal number of 32-word blocks or as `nnK`. When you use `nnK`, `nn` is multiplied by 1024 to determine the desired size.

Only one partition in the PAR specifications can contain an asterisk (*) instead of an actual size. The size of that partition is generated as the remainder of memory after the bootstrap, Executive, SCOM, and all sizes of the other partitions are subtracted from the memory size stated in the PDP11 directive.

- `par-type` = partition type:

U—user-controlled
S—system-controlled
T—timesharing

If you omit par-type, U is assumed.

Use T-type partitions only if the system contains the IAS scheduler.

You can use any number of U, S, and T partitions.

To create a node pool extension for the Send/Receive directive, use PAR to specify a user-controlled partition.

The node pool extension ranges in size from 32 words to 4K words. The node pool extension must be the first partition specified. The example below creates a 4K word node pool extension partition.

```
PAR=SENPAR,*,4K,U
```

SENPAR must be the first PAR directive, and the general partition (usually called GEN) should be last. The *IAS System Management Guide* and the *IAS Executive Facilities Reference Manual* describe the use and purpose of memory partitions.

The Phase 1 command file is distributed with one partition, called GEN. This occupies all available memory and is either T-type (if the IAS scheduler is configured into the system) or S-type (if the IAS scheduler is omitted). Additional partitions are normally used for real-time applications.

6.6 DEV Directive

You use the DEV directive to define each device in the target system.

The format of the DEV directive follows:

```
DEV=xyn,type,[vect],[pri],[ext-page],[devacp]
```

NOTE: For standard devices, you need not specify vect, pri, ext-page and devacp. Table 6-1 lists their default values.

where:

- xy = two-character ASCII mnemonic to be used to refer to the device. Table 6-1 shows default values.
- n = a one- or two-digit (octal) unit number or a range of unit numbers specified as <n1-n2>. For example, DEV=DB<0-2>,RP04 defines three devices: DB0, DB1 and DB2.
- type = either a device type that Phase 1 uses to determine the device characteristics, or the actual device characteristics.

Default values for the vect, pri, and ext-page parameters are associated with each device type. These are set if the device type is specified as this parameter value. Table 6-1 lists the device types recognized by Phase 1, as well as their associated default values.

When you specify the four device characteristics, place them between angle brackets as in the following example:

```
DEV=XY0,<3,17,21,1000>,210,5,177000
```

- vect = the address of the device interrupt vector. Table 6-1 shows default values.
- pri = software priority at which the device interrupts are to be serviced. Ensure that the software priority is equal to or higher than the hardware level at which the device interrupts, unless the interrupt service routine of the handler is reentrant. Table 6-1 shows default values.

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- *ext-page* = external page address of the device controller. In most cases, *ext-page* is the lowest address when a device uses several external page addresses. Table 6-1 shows default values.
- *devacp* = optional ACP name for file-oriented devices.

An ACP (ancillary control processor) task assists a device handler in managing a file-structured volume.

If you do not specify an ACP, Phase 1 defaults to F11ACP for directory devices, and MTAACP for magnetic tape. If you specify an ACP task, its name must be 6 characters, ending in ACP. The first three characters are stored in the Physical Unit Directory (PUD) and used at mount time. The ACP task must be installed before you can mount the device.

Table 6-1 Device Information

Mnemonic (xy)	Normal Type (type)	Vector (vect)	Priority (pri)	External Page Address (ext-page)
AD	AD01	130	6	176770
AF	AF11	134	4	172570
BA	BATCH	None	None	None
CR	CR11	230	6	177160
	CD11	230	4	172460
CT	TA11	260	6	177500
DB	RP04 ³	254	5	176700
	RP05 ³	254	5	176700
	RP06 ¹	254	5	176700
DD	TU58	300	5	176500
DF	RFn ²	204	5	177460
DK	RK03	220	5	177400
	RK05 ¹	220	5	177400
DL	RL01	330	5	174400
	RL02	330	5	174400
DM	RK06	210	5	177440
	RK07	210	5	177440
DP	RP03B	254	5	176710
	RP02	254	5	176710
DR	RM02, RM03, RM05	254	5	176700
DS	RS03	204	5	172040
	RS04 ³	204	5	172040
DT	DT11	214	6	177340

¹Specify an RK05F disk as two RK05 units. The unit numbers must be paired as follows for each RK05F unit: [DK0 and DK1], [DK2 and DK3], [DK4 and DK5], and [DK6 and DK7].

²n = number of RF11 platters (1-8).

³Disks on the RH11 MASSBUS controller (except on a PDP-11/44). The DB unit number must correspond to the number assigned by physical connection to the RH11.

Table 6-1 (Cont.) Device Information

Mnemonic (xy)	Normal Type (type)	Vector (vect)	Priority (pri)	External Page Address (ext-page)
DU	RA60, RA70, RA80, RA81, RA82, RA90, RC25, RCF25, RD31, RD32, RD52, RD53, RD54, RX50, RX33	154	5	172150
DX	RX01	264	5	177440
DY	RX02	264	5	177170
LP	Lx11yz ⁶	200	4	177514
LS	LPS11	Float	5	170400
MM	TU16, TE16, TU45, TU77(2)	224	5	172440
MO	None	None	None	None
MS	TS11, TS05	224	5	172520
MT	TU10, TS03, TE10	224	5	172520
MU	TU81, TK50	260	5	174500
NL	NULL	None	None	None
PP	PTP	74	4	177554
PR	PTR	70	4	177550
SP	PSEUDO	None	None	None
TT	CONSOL	60	4	177560
	TERM ⁴	Float	Float	Float
	NONTRM ^{4,5}	Float	Float	Float
UD	UDC11	234	6	171000

⁴Vector, priority, and external page address for these devices are defined with the INTF macro in the file [311,114]CONFIG.MAC when you configure the terminal handler. *Do not use the DEV directive to define them.*

⁵Use the device type NONTRM for devices that are connected to terminal interfaces but that do not function interactively. For example, the LA180S medium-speed printer.

⁶Line printer type is Lxlyz, where x = S for LS11, LP11-V, LP11-W, LP05; x = P for other LP11 and LVP11 line printers; y = W for wide (132-column) printers; y = N for narrow (80-column) printers; z = U translate lowercase characters to uppercase (ASCII codes 140-176 are converted to 100-135; z = L for no translation of characters.)

For various combinations of the above devices, vector addresses and external page addresses might differ from those in Table 6-1. Field service engineers can determine the correct vector and external page address for any configuration. The *PDP-11 Peripherals Handbook* and the *PDP-11 Terminals and Communications Handbook* have more information.

NOTE: If a device vector address and/or external page address are different from the default, you must specify them explicitly in the DEV directive.

Type the DEV directive in response to the following message:

SPECIFY DEVICES

When you have entered all the directives, type a record containing a slash (/).

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If the system is to support more than a single terminal, you must include a new line of the form:

```
DEV=TT<1-n>,TERM
```

where:

n = number of terminals (octal) minus one; must be one less than the number of terminals declared in the file [311,114]CONFIG.MAC.

A terminal here means any device connected to a terminal interface and handled by the terminal handler (for example, a LA180S line printer).

When you have entered all the directives, type a record containing a slash (/).

6.7 System Default Specifications

The next group of directives determine system defaults. Place them in any order, either at the console or from an indirect command file. The directives are:

- SY—mandatory
- DPAR—optional
- DUIC—optional
- DCLI—optional

Place a record containing a slash (/) after the last directive specified.

If you are entering the directives at the console, they follow the prompt SPECIFY DEFAULTS.

6.7.1 SY Directive

The SY directive is set up automatically during the initial system generation process, and you must change it only if you are reconfiguring the system to use a different type of system disk.

The SY directive establishes the system disk to be used when Phase 2 of system generation runs. The SY directive has the following format:

```
SY=xynnn
```

where:

- xy = two-character device mnemonic.
- nnn = device unit number.

Phase 1 of system generation checks that the handler task for the device designated SY is installed. For example, if DB0 is the system device, you must install DB.... during Phase 1 of system generation. Phase 1 uses the information to select the bootstrap module for the system being generated.

NOTE: HIBBR is required and must be installed during Phase 1 when your SY is a DU device. UQSSP is also required if you are using the multiuser handler (DUMU.TSK).

6.7.2 DPAR Directive

The DPAR directive specifies the default partition for real-time tasks not running under control of the IAS scheduler, and for SGAs. Real-time tasks and SGAs use this partition if no other is specified during installation, run-time, or task build.

Timesharing tasks, multiuser tasks, and real-time tasks that run under the control of the IAS scheduler, run by default in a T-type (timesharing) partition. If you do not specify partitions for these tasks, they run in the default partition GEN.

The DPAR directive is optional. If you do not specify DPAR, the default partition is GEN.

DPAR has the following format:

```
DPAR=par-name
```

where:

par-name = name of the default partition. The partition must have been defined by a PAR directive.

6.7.3 DUIC Directive

IAS includes an MCR function (referred to as RUN \$) that allows a non-privileged user to run any of a set of multiuser tasks that reside under the same UFD on the system disk. Use the DUIC directive to designate the UFD that is to contain these multiuser tasks. Normally, a non-privileged user would not have access to the designated UFD.

The DUIC directive has the following format:

```
DUIC=g , m
```

where:

- g = group number
- m = member number

For example, if you issue the directive DUIC=200,201 during system generation, any user can run a task having the file specification SY:[200,201]task.TSK by entering the following command:

```
MCR>RUN $task
```

If you omit the DUIC directive, UFD [11,1] is used by default when a RUN \$ command is issued.

It is the system manager's responsibility to ensure that all tasks that are to be available to the non-privileged user by means of RUN \$ are stored under the UFD designated by the DUIC directive, with the appropriate protection.

6.7.4 DCLI Directive

The DCLI directive specifies the default command language interpreter (CLI) to be used on a multiuser or real-time system. The options are either monitor console routine (MCR) or Digital command language (DCL).

MCR is described in the *IAS MCR User's Guide*. DCL is implemented on a multiuser system by PDX, a special form of PDS. PDS is described in the *IAS PDS User's Guide*.

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The DCLI directive has the following format:

```
DCLI=cli
```

where:

cli = MCR or DCL

On a timesharing IAS system, the DCLI directive has no effect.

6.8 INS Directive

The INS directive installs the system tasks needed to allow Phase 2 of system generation to operate. The INS directive has the following format:

```
INS=par-name,filespec[/keyword(s)],filespec[/keyword(s)],...,  
filespec[/keyword(s)]
```

where:

- par-name = partition name.
- filespec = IAS file containing a task to be installed in the named partition. You can specify up to five files in one INS directive. The file specifications must not include a device mnemonic and version number.
- /keyword(s) = parameter that enables you to specify various options. See the description of the INS command in the *IAS MCR User's Guide* for a list of the available options.

NOTE: Each filespec, with its associated keywords, must be 31 characters or less.

After you have entered the default directives, the system prompts with the message SPECIFY INSTALLS.

You then enter the INS directives, followed by a record consisting of a slash (/).

To obtain a list of system tasks that you can install, print a directory of UFD [11,1]. (See also the section *Required Task Installations*, below.)

All tasks installed during Phase 1 of system generation are assumed to be on the device specified in the TARGET directive (see Section 6.3). It is further assumed that they are to be on the target SY when Phase 2 executes.

NOTE: You cannot install more than 15 tasks and shareable global areas into a single partition during Phase 1.

Required Task Installations

At the completion of Phase 1, a target system exists that performs Phase 2 when bootstrapped. The final portion of Phase 1 installs the tasks required to accomplish this.

While processing the INS directives, Phase 1 of system generation checks for the names of the following three system tasks:

- Disk handler for the system disk
- Terminal handler
- System generation Phase 2

If you do not install a device handler during SYSGEN Phase 1, your system will not be operational when it is bootstrapped.

When you use [11,1]DUMU as your system device handler, you must install the UQSSP task. SYSGEN Phase 1 checks that UQSSP is included when you specify DU in the SY directive and DUMU is the installed handler. SYSGEN Phase 1 exits with an error message if UQSSP is omitted.

CAUTION: Do not install [11,1]UQSSP during SYSGEN Phase 1 when DUMU is not your system device handler, or your system will hang when it is booted.

The following tasks are required for Phase 2:

- Mount (MOU).
- File system (FCP, BIGFCP, or RESFCP).
- Terminal handler (TT).
- System disk handler and the library SGA (HNDLIB) used by the handler.
- The port server required if you use DUMU (RA, RD, or RC device) disk handler. The port server task name that you specify in the INS directive is [11,1]UQSSP.TSK
- If either [11,1]DU.TSK or [11,1]DUMU.TSK is installed as the system handler, also install [11,1]HIBBR.TSK.
- The system generation Phase 2 task, SGN2.
- The System Global Area (SGA), SYSRES.

You can install up to 15 tasks in one partition during Phase 1.

Since Phase 2 of system generation automatically mounts the system device, you must install the appropriate ACP tasks during Phase 1. Three versions of the directory device ACP tasks are provided. They all have the task name F11ACP. Their file names are:

- FCP.TSK—small, heavily overlaid version.
- BIGFCP.TSK—larger, slightly overlaid version.
- RESFCP.TSK—memory-resident overlaid version. Requires memory management support in the executive, or your system *hangs* (becomes inoperable) during system generation Phase 2.

If you have your own ACP, you must set the default ACP name in the DEV directive, and you must install that task during system generation Phase 1.

Normally, the only change you must make to the INS directives is to select the appropriate ACP task. Install tasks required for use of the system (for example, utilities and compilers) in Phase 2.

See Section 8.3 for a detailed description of how to configure the file system.

6.9 SYSBLD Directive

Use the SYSBLD directive to specify an alternative Phase 2 command file. The directive has the following format:

```
SYSBLD=[ufd]filename.type
```

where:

- ufd = directory containing the command file (default is [11,17]).
- filename.type = file name and file type (default is SYSBLD.CMD).

If you omit the SYSBLD directive, Phase 2 reads the file [11,17]SYSBLD.CMD.

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Only one SYSBLD directive is permitted. A device specification is not allowed.

The file must exist on the system disk by the time it is bootstrapped to perform Phase 2.

Do not use Phase 2 command files with names other than [11,17]SYSBLD.COM until you are very familiar with IAS. The Question and Answer session (described in Chapter 4) edits a file of this name as you respond to the questions at the terminal.

The SYSBLD.COM command file distributed with the kit contains a wide variety of tasks. You might want to edit this file to eliminate unnecessary tasks or change the list to suite your needs. Each installed task requires space in SCOM. Unnecessarily installed tasks reduce the system node pool and could degrade or hang system performance.

7

Building the System and System Generation

7.1 Introduction

In the previous chapters, this manual described how to configure the system components. This chapter describes how to build the system components and how to perform a system generation. (The term *build* means assembling and task building the files that were edited and changed.) After you build the system components, you can then perform a system generation. Normally, you cannot perform a system generation until after you have built the system components. (If you have only performed a Question and Answer session, it might not be necessary to build the system components before performing the system generation. Table 4-1 shows when a build is necessary.)

This chapter uses the terms *initial system* to indicate a system being built for the first time and *rebuilding the system* to indicate a reconfigured system.

NOTE: The commands in this chapter are MCR commands. If you are running a multiuser system with DCL as the default CLI, before you issue MCR commands enter MCR mode as follows:

```
SCI>MCR
```

See Appendix A for examples of how to build the system and how to perform a system generation.

7.2 Building the System

To build the initial system, use the MCR indirect command file [1,1]BUILD.COMD (after you have executed QASGN (see Chapter 4)). Use this file to build any type of system on any of the supported system disks. You can also use BUILD.COMD when you are rebuilding a system.

If you are not rebuilding the entire system, you might prefer to use a command file for a specific component. There are separate command files to build the terminal handler, the Executive, and the timesharing components. You would use any of these files instead of BUILD.COMD. A description of how to use the component command files is in each component's configuration chapter.

To execute the BUILD command file to build all the system components, type the following command:

```
MCR> @[1,1]BUILD
```

Building the System and System Generation

7.3 System Generation Procedures

A system generation is usually performed to accomplish one or more of the the following goals:

- Create an IAS initial system from the distribution kit.
- Incorporate new or changed hardware or memory.
- Incorporate new or updated software components into the system.

The following sections describe:

- How to prepare for system generation (Read Section 7.3.1 before proceeding with the generation procedures)
- How to generate a system on the current system disk
- How to generate a system on a disk other than the current system disk
- How to recover from Phase 2 system generation failure

The system generation process has two phases:

- 1 System generation Phase 1**—Builds into a disk file an image of the newly configured system. The system generation Phase 1 task is called [11,1]SGN1.TSK. This task accepts commands either directly from a terminal or from a previously prepared indirect command file. These commands are described in Chapter 6.

At the end of Phase 1, the system generation disk contains an image of the new system with the executive data structures set up to start the Phase 2 process automatically.

- 2 System generation Phase 2**—Starts running as soon as the new system image (SAVE image) is loaded into memory, either by bootstrapping the system from the hardware bootstrap or by issuing an MCR BOO command (see the *IAS MCR User's Guide*).

The Phase 2 task accepts commands only from an indirect command file that must exist on the system disk. The standard command file is [11,17]SYSBLD.COMD, although another command file can be nominated using the SYSBLD directive during Phase 1 (see Chapter 6 for details).

Use the indirect command file to perform the following operations:

- Install all tasks required for normal system operation.
- Load handler tasks for devices in the system.
- Set up pseudo-devices and spooled devices.
- Create a swap file.
- Set up and start the IAS scheduler (if necessary).

The *IAS MCR User's Guide* and the *IAS System Management Guide* describe the commands used to perform the above operations.

You can edit the command file any time before system generation. Typically, you edit this file for one or more of the following reasons.

- To install additional tasks (for example, compilers or user-written utilities), or to prevent installation of unneeded tasks to conserve SCOM pool space.
- To change the way system tasks are installed (for example, to give them a larger task extension).

- To load additional device handlers.
- To change the specification of the swap file.
- To change the scheduler parameters.

7.3.1 Preparing for System Generation

System generation makes substantial use of the System Communication Area (SCOM). If there is not enough free space within SCOM, the system *hangs* (this prevents any further system activity). Only execute system generation when the system is quiescent.

Use the REM utility with the supplied indirect command file to free space in SCOM. If you are building a new system onto the current system disk, use the file [11,17]SYSGENREM.CMD by typing the following command:

```
MCR>REM @[11,17]SYSGENREM.CMD
```

Before you start system generation, make sure you have enough contiguous disk space to contain the new system image. Because each disk block contains one-quarter K words, the number of disk blocks occupied by the new system images is four times the new memory size (in K words), but it never exceeds 496 (decimal) blocks. For example, a 124K word system occupies 496 (decimal) blocks. The memory size is specified in the PDP11 directive in the system generation Phase 1 command file.

To determine whether you have sufficient contiguous disk space, type the following command:

```
MCR>PIP /FR
```

The system displays the number of free blocks and also tells you what the largest contiguous space is, in decimal blocks.

To create more disk space, delete unwanted files, and use the Backup Restore Utility (BRU) to reclaim fragmented disk space. Refer to the *IAS Utilities Manual* for a full description of the BRU utility.

If you are not certain that the new system can execute successfully, enter the following command before the REM command:

```
MCR>PIP [11,1]/NV=[11,1]MOU.TSK,TT,INS
```

Note: Serious consequences can occur if Phase 2 fails and you did not perform the above command.

You must also make a copy of the appropriate disk handler and FCP task. This enables you to reboot your system disk provided you do not delete the current version of [11,17]IAS.SAV nor change the system boot block.

7.3.2 Generating a System on the Current System Disk

If you are generating a system on a disk other than the current system disk, go to Section 7.3.3.

To create a new system on the current system disk, type the following commands:

Building the System and System Generation

```
MCR>INS [11,1]INV
MCR>INS [11,1]SGN1/TASK=...SGN
MCR>REM @[11,17]SYSGENREM
MCR>SGN @[11,17]SYSGEN
MCR>BOO [11,17]
```

NOTE: The DU disk subsystem might take as long as two minutes before terminal output is generated. This delay is caused by disk hardware and software initialization and by some hardware disk diagnostics. The drive indicator lights (if any) go on and off several times before SYSGEN Phase 2 begins. This is normal behavior.

After a while, Phase 2 of the system generation process completes with the following message:

```
*** END OF SYSTEM GENERATION PHASE 2 ***
```

If Phase 2 fails to start, see Section 7.4.

Next, type **CTRL/C**, followed by either:

```
MCR>BOO [11,17]/WB
MCR>SAV
```

or

```
SCI> SET BOOTSTRAP [11,17]
SCI> SAVE
```

The new system is now generated. Ignore any displayed warning messages from SAV. Refer to Chapter 11 for details of the system start-up procedure.

7.3.3 Generating a System on Other than the Current System Disk

Generating a system on other than the current system disk is known as target system generation.

This procedure assumes that the files SYSGEN.COMD and SYSBLD.COMD both reside on the mounted target device.

To create a new system on a disk other than the current system disk, type the following commands:

```
MCR>INS [11,1]INV
MCR>INS [11,1]SGN1/TASK=...SGN
MCR>REM @[11,17]SYSGENREM
MCR>SGN

SPECIFY TARGET DEVICE AND FILENAME

SGN>TARGET=target-device:[11,17]
SGN>@target-device:[11,17]SYSGEN.COMD
MCR>BOO target-device:[11,17]
```

NOTE: The DU disk subsystem might take as long as two minutes before terminal output is generated. This delay is caused by disk hardware and software initialization and by some hardware disk diagnostics. The drive indicator lights (if any) go on and off several times before SYSGEN Phase 2 begins. This is normal behavior.

After some time, Phase 2 of the system generation process completes and displays the following message:

```
*** END OF SYSTEM GENERATION PHASE 2 ***
```

If Phase 2 fails to start, see Section 7.4.

Next, type **CTRL/C**, then the following commands:

```
MCR>BOO [11,17]/WB  
MCR>SAV
```

or:

```
SCI> SET BOOTSTRAP [11,17]  
SCI> SAVE
```

The new system is now generated. Ignore any warning messages that SAV displays. Refer to Chapter 11 for details about the system start-up procedure.

7.4 System Generation Phase 2 Failure Recovery

One or more of the following problems might cause Phase 2 not to start up:

- Incorrect terminal handler configuration.
Correct [311,114]CONFIG.MAC and/or [311,144]PARAMS.MAC, then assemble and build the terminal handler before starting another system generation.
- The DEV=TT<1-n>,TERM directive in the system generation Phase 1 command file specifies less terminals than the terminal handler parameter file, [311,114]PARAMS.MAC specifies.
Edit the system generation Phase 1 command file, [11,17]SYSGEN.COMD, then start another system generation.
- The executive is not built with support for T-type (timesharing) partitions, but the system generation Phase 1 command file specifies a T-type partition. This might occur if you use the Question and Answer session without subsequently using the BUILD command file or rebuilding the executive.
See Table 4-1 or use the BUILD command file before performing another system generation.
- You specified RESFCP and did not rebuild the executive to support memory management directives.
- You specified UQSSP and are not using DUMU as your system device handler.

Part II IAS Version 3.4 System Tailoring

8 Tuning the System

8.1 Introduction

After you have successfully installed your base system, you can begin to tune your system. See the *IAS Tuning and Performance Manual* for more detailed information on how to tune your system.

If you have more than one MSCP controller, it is recommended that you investigate using the MSCP multiuser device handler. Section 8.2 describes this.

Section 8.3 explains how to configure your file system. It is important to tailor your file system to your needs, or it can prove to be a bottleneck.

8.2 MSCP Multiuser Device Handler

If your system has one or more MSCP controllers and one or more T/MSCP controllers, use the multiuser handlers for these devices. Multiuser device handlers have the following advantages over single-user device handlers:

- Reduce the amount of memory resident code.
- Use one device mnemonic to refer to devices on several controllers of one kind.
- Reduce the load on system resources.
- Use only 1 UMR to map all T/MSCP communications areas.

8.2.1 Including the TMSCP Handler (MU....) into Your System

To include the TMSCP device handler in your system, edit the system generation command file, [11,17]SYSGEN.COMD, to define all TMSCP devices using the DEV directive. For example:

```
DEV=MU0,TU81
DEV=MU1,TK50,<vector>,<br level>,<CSR>
```

where <vector>,<br level>,<csr> are optional, nonstandard values.

Perform a system generation to incorporate the new devices. After Phase 2 of the system generation procedure is complete, install the desired MU.... handler and load the appropriate controllers. Systems with both DU and MU devices should always use the multiuser handlers to conserve memory and UMRs.

For example:

For single-user operations (one TMSCP controller/drive)

```
MCR>INS [11,1]MU
MCR>LOA MU
```

For multiuser operations (one TMSCP controller/drive)

```
MCR>INS [11,1]MUMU
MCR>INS [11,1]UQSSP
MCR>LOA MU0
MCR>LOA MU1
```

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Loading the the multiuser version of MU.... prompts the UQSSP port server to issue a message to the system console stating the success or failure of the hardware initialization process.

For both the multiuser and single-user versions of MU...., the handler issues a message to the console stating the success or failure of bringing the controller ONLINE and ready for I/O operations.

If you want to perform T/MSCP error-logging, install [11,1]ERRDSA.TSK for either the singl or multiuser T/MSCP handler.

NOTE: UQSSP might already be installed on your system if you are using the multiuser DU handler (DUMU.TSK).

8.3 Configuring the File System

On a typical timesharing system, the disks and file system are heavily used by all users. Consequently, on a system with many users, it is particularly important that you tailor the file system to the installation's needs. Otherwise the file system is likely to restrict system throughput.

If you are building a system for the first time, BIGFCP is used as the Ancillary Control Processor task and provides adequate performance. If you are including memory management support in your executive, RESFCP provides superior performance and is recommended. If your memory resources are limited, you can use FCP, which is a heavily overlaid task, to reduce memory usage.

You can tailor the file system in four ways:

- 1 Select the appropriate ACP task for your system.
- 2 Use multiple ACP tasks.
- 3 Increase the size of the file system's private data areas to reduce the load on the system node pool.
- 4 Modify the disk access parameters at volume initialization or mount time, to reduce disk accesses.

These methods are described in the rest of the chapter.

8.3.1 Selecting the Appropriate ACP Task

The IAS file system operates through privileged tasks called ancillary control processors (ACPs). These tasks use the file structure information on the disk to convert file-oriented requests from tasks into the necessary disk accesses.

IAS provides three versions of the disk ACP task (F11ACP):

- 1 FCP.TSK - a very heavily overlaid, small version.
Use this version if you have a small system where memory is at a premium.
- 2 BIGFCP.TSK - a lightly overlaid, larger version.
Use this version if your system has several simultaneous users. You are recommended to use this version on any timesharing or multiuser system that has at least 48K words of memory available for user task processing.
- 3 RESFCP.TSK - a memory-resident overlaid version.

Use this version to improve the performance of the file system. Access to memory-resident overlays is faster than to disk-resident overlays. However, memory-resident overlays take up more memory. You need to decide whether your system can spare the extra memory, and if the time saved is worth the extra memory involved.

The ACP task is installed during Phase 1 of system generation. You select the required ACP task by editing the Phase 1 command file (normally [11,17]SYSGEN.COMD). Change the following line from:

```
INS=GEN, [11,1]FCP
```

to:

```
INS=GEN, filespec
```

where:

filespec is the name of the task image file containing the required ACP task (BIGFCP, RESFCP).

For magnetic tape handling, one magnetic tape ACP task is provided. The ACP task is called MTAACP, and it is the default ACP task for magnetic tape.

8.3.2 Use of Multiple ACP Tasks

Normally, only one ACP task is used for all Files-11 devices (disks and DECTapes). This task processes all requests for all such devices sequentially, one at a time. However, sequential processing is likely to restrict system throughput because some file operations require several disk accesses. You can minimize the problem by allocating a separate ACP task to each heavily used disk. In this way, file operations for different disks can occur concurrently.

For each disk that is to have its own ACP task, you must perform the following operations:

- Install the ACP task with a different name, which must be of the form xxxACP.
- Specify that the disk is to use this ACP task. You can do this in two ways:
 - In the system generation Phase 1 file, under the DEV directive. The format of this directive is:

```
DEV=ddn,type,csr,vcc,pri,acp
```

where:

acp = the ACP task name.

In this case, the specified ACP is used each time the disk is mounted, unless this is overridden.

- At mount time. The /ACP or /PROCESSOR switch to the MOUNT command allows the ACP task name to be specified in the form:

```
/ACP=xxxACP (MCR)
```

or:

```
/PROCESSOR:xxxACP (PDS)
```

In this case, the ACP must be specified each time the disk is mounted.

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For example, suppose a system has three RA81 drives that are heavily used by timesharing users, and you want to use a separate ACP for each of these. One is the system disk, and can use the standard ACP. For the other two, the procedure is:

- 1 Edit the system generation Phase 2 command file (normally [11,17]SYSBLD.COM) to include:

```
INS [11,1]BIGFCP/TASK=DU1ACP
INS [11,1]BIGFCP/TASK=DU2ACP
```

- 2 Edit the Phase 1 command file (normally [11,17]SYSGEN.COM) to include (assuming standard vector and CSR assignment):

```
DEV=DU0,RA81
DEV=DU1,RA81,,,,DU1ACP
DEV=DU2,RA81,,,,DU1ACP
```

8.3.3 The DECTape ACP Task

There is a special ACP task that is designed for DECTape. This ACP task is a version of F11ACP modified to reduce the amount of tape motion. If DECTape uses the same ACP as disks, all file processing on the disks is held up whenever a DECTape file operation is in progress. The DECTape ACP is contained in the file [11,1]DTAACP.TSK, and has the task name DTAACP.

It is strongly recommended that DTAACP be used whenever Files-11 DECTape is to be used regularly. The procedure for using DTAACP is the same as for using an alternative disk ACP. The command to install the task is:

```
INS [11,1]DTAACP
```

8.4 Extending the File System Data Areas

The file system has to maintain a number of data structures to keep track of open files and mounted volumes. Some of these data structures take nodes from the SCOM node pool. However, to reduce the load on the SCOM node pool you can configure the file system at system generation time so that nodes are taken from private data areas instead. This is particularly valuable for a system with 24 or more users.

The file system data structures are as follows:

- A volume control block (VCB) of 23 words for each mounted volume.
- A file control block (FCB) of 22 words for each open file.
- A file window block of 16 words for each file opened by each task.

There is a difference between an FCB and a Window block. If more than one task opens the same file simultaneously, only one FCB contains information about the file. However, one Window block exists for each task that contains information about the particular access to the file.

- A locked block list for each file opened with shared access, using RMS-11. This contains a varying number of entries of 8 words each.

The following data areas exist to contain these structures:

- The SCOM node pool.
- The F11ACP common area, FCPCOM. This is a pool of up to 4K words that all Files-11 ACP tasks share.

- A data area private to each ACP task.

A F11ACP task can only pick nodes for some data structures from certain data areas, as described in Table 8-1.

Table 8-1 Picking Nodes for Data Structures

Data Structure Area	VCB	FCB	Window Block	Locked Block List
SCOM	1	3	2	1
FCPCOM	-	2	1	-
Task	-	1	-	-

- indicates that the structure cannot be picked from the area.

1,2,3 indicates that the structure is to be picked from the area marked 1 if possible, then the area marked 2 and so on.

You can extend the size of FCPCOM and the data areas within an ACP task to accommodate the data structures at system generation time (see Section 8.4.1 and Section 8.4.2).

8.4.1 Extending the Size of FCPCOM

You can extend size of FCPCOM as follows:

- Determine the size of FCPCOM. Since FCPCOM is used mainly for window blocks its size should be approximately $32n$ bytes, where n is the typical number of open files. As a guide, on a general timesharing system calculate n as twice the number of terminals and batch streams. The maximum size is 4k words.
- Edit the command file [11,16]FCPCOMBLD.COMD. Edit the line:

```
EXTSCT=FCPCOM:nnnnn
```

so that $nnnnn + 2010$ is the required size (in octal bytes).

- Rebuild FCPCOM using the command:

```
TKB @[11,16]FCPCOMBLD
```

After rebuilding FCPCOM, you must rebuild all the Files-11 ACP tasks so that they refer to the new version.

8.4.2 Extending the Size of Data Areas Within the ACP Task

You can extend size of data areas within the ACP task as follows:

- 1 Determine the required size for the data area. Since this area is used for FCBs, its size should be approximately $44n$ bytes, where n is the typical number of open files.

The maximum size of the data area is as follows:

- F11ACP (using FCP.TSK) 20000 octal bytes
- F11ACP (using BIGFCP.TSK) 6700 octal bytes

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- F11ACP (using RESFCP.TSK) 5300 octal bytes
 - DTAACP 20000 octal bytes
- 2 Edit the build file for the appropriate FCP task file, either [11,16]BIGFCPBLD.CMD, [11,16]FCPBLD.CMD, [11,16]RESFCPBLD.CMD, or [11,16]DTAACPBLD.CMD.

change the line:

```
EXTSCT=$$AFR1:nnnnn
```

so that nnnnn +2 is the required size (in octal bytes).

- 3 Rebuild the task using the command:

```
TKB @buildfile
```

where *buildfile* is the file selected above.

8.5 Reducing File System Disk Accesses

Three parameters are available to reduce the number of disk accesses made by the file system. Specify these parameters to the INITIALIZE or MOUNT (DCL), or INI or MOU (MCR) commands. The three parameters are described below:

- 1 The directory LTU cache. This feature allows directories to be pre-accessed as follows: the first time you perform a directory operation on a MFD or a UFD, you access that directory. A 22-word File Control block (FCB) is stored in the directory least recently used (LRU) list. The LRU list is a thread through the FCB list to which the volume control block points.

Pre-accessing directories in this way normally saves three disk accesses for every directory operation. The search of the MFD to identify the UFD is completely bypassed; this eliminates reading the MFD file header and data block. Pre-accessing the UFD also eliminates reading the UFD's file header.

However, including this time-saving feature occurs at the expense of nodes in FCP's data area, because each preaccessed directory that you specify (for each mounted volume) requires an 18-word LRU entry. For example, if you specify LRU=3, you require three 18-word LRU entries. Users with limited dynamic memory available might find they cannot include this feature.

- 2 The default file extension. When you create a sequential file, the file system cannot know in advance how much space the file needs. The file system initially allocates the file a certain amount of space, and subsequently extends the file by the amount necessary. Each such extension might require up to three or more disk accesses. The default value for the file extension size is five blocks; thus extending the file several times can increase the number of disk accesses by as much as 50%.

If you have large disks, you can reduce the number of disk accesses by specifying a larger file extension of, for example, 20 blocks. The disadvantage of a large file extension is that a certain amount of space is wasted at the end of each file. On average, this is half the default extension size per file. Therefore, if your installation has many small files rather than a few larger files, you might prefer to accept the overhead of disk accesses rather than wasting disk space.

Alternatively, regular use of the DSC utility (see the *RSX-11M/M-PLUS Manual*) makes files contiguous and reduces the number of file extensions. DSC allocates only the exact space needed to accommodate the file, so that there is no wasted space at the end of the file.

- 3** The Window block size. The file window block contains retrieval pointers that indicate the location of the blocks of the files on the disk. By default, seven such retrieval pointers are held for each file. Access to a part of the file to which the current set of retrieval pointers do not refer necessitates a single disk access. Particularly in commercial applications that use large files, it can be an advantage to extend the number of retrieval pointers. However, this feature uses extra memory, so you need to consider whether the advantages gained outweigh the loss of memory. Alternatively, use the DSC utility (see the *RSX-11M/M-PLUS Manual*) to make your file contiguous, because contiguous files need fewer retrieval pointers.

Ideally, the Window block for a file contains sufficient retrieval pointers to cover the whole file. Calculate this number as follows:

$$\text{file size} / \text{default extension}$$

where *default extension* is as described in list item 2 above.

You can specify all the above parameters either when you are initializing or mounting a volume. The corresponding command qualifiers or switches are:

for MCR (INI and MOU):

- /LRU=n (to set the directory LRU cache size)
- /EXT=n (to set the default file extension)
- /WIN=n (to set the default window block size)

For DCL (PDS INITIALIZE and MOUNT):

- /ACCESSED:n
- /EXTENSION:n (to set the default file extension)
- /WINDOW:n (to set the default window block size)

9

Configuring the Timesharing Executive

9.1 Introduction

If you are generating a timesharing system, you can configure the Timesharing Executive by editing the Macro parameter file [311,107]SGDATA.MAC. An example of how to configure a timesharing system is in Appendix A.

To configure a timesharing system, you must edit the following parameters:

- SGTMM—number of timesharing terminals and batch streams
- SGDEV—number of devices in the system to be made available to timesharing users
- SGDEVM—number of mountable devices (disks, DECtapes, magnetic tapes) to be made available to timesharing users
- SGUVL—number of devices to be made available to any one user at any time

Other changes are possible, depending on how the system is to be used.

9.2 Configuring the Timesharing Executive

The following procedures are necessary only if you are configuring a timesharing system. The purpose of configuring the Timesharing Executive is to create an executive that corresponds to the current installation's interactive and batch processing requirements. You specify your installation requirements by editing a macro source file called [311,107] SGDATA.MAC. The file contains the parameters needed by IAS to control timesharing activity.

Configuring the Timesharing Executive determines the size and contents of all the tables, lists, and node pools available for the timesharing control primitives (TCP). See the *IAS Executive Facilities Reference Manual* for descriptions of system tables, lists, and node pools.

9.3 Editing the SGDATA.MAC file

Table 9-1 describes the parameters contained in the file [311,107]SGDATA.MAC.

Table 9-1 Parameters in the [311,107] SGDATA.MAC File

Parameter	Description
SGLUN	The maximum number of LUNs that each user can have assigned at any one time. In PDS terms this means the maximum number of LUN assignments you can make with the ASSIGN command. It limits the maximum number of LUNs a task can have reassigned at task run time. SGLUN controls the generation of the LUN table section of a terminal node.

Configuring the Timesharing Executive

Table 9-1 (Cont.) Parameters in the [311,107] SGDATA.MAC File

Parameter	Description
SGUVL	<p>The maximum number of devices that each user can have allocated at any one time, including the default system devices (for example, SY). See the <i>IAS System Management Guide</i> for details of default system devices.</p> <p>SGUVL controls the generation of the device map table in the terminal node.</p> <p>NOTE: PDS only allows six devices to be allocated to a user. If you specify more than six devices using this parameter, you must also rebuild the DCL interface to reflect this, see Section 10.2.2.</p>
SGDEV	<p>The maximum number of devices, excluding timesharing terminals, available for interactive and batch jobs. This includes devices that are connected to the system as terminals, but are not used as interactive terminals, for example, LA180s DECprinters.</p> <p>You must make sufficient entries available should be made for devices that are automatically inserted into the device table. These are SP, TO, SY0 and all output spooled devices.</p> <p>SGDEV controls the generation of the available device section of the DVT with the specified number of entries for devices that are not timesharing terminals.</p>
SGDEVM	<p>The maximum number of devices that can be concurrently mounted after IAS start-up. Establishes the number of entries in the device load table.</p>
SGTMM	<p>The maximum number of timesharing terminals available at any one time, including batch pseudo-terminals (BAn).</p> <p>SGTMM controls the generation of additional entries in the DVT for terminal devices and a user terminal node (UTN) for each terminal.</p>
SGATT	<p>The maximum number of timesharing terminals active at any one time. This parameter generates one job node (UJN) for each CLI task and is normally set equal to SGTMM.</p>
SGXTSK	<p>The number of non-CLI timesharing tasks. For a system that uses only PDS, this value should be equal to the number of active timesharing terminals (SGATT), plus a small number for nonsuspendable tasks running while other tasks are suspended.</p> <p>If you want to use the subtasking features of TCS, or if you are going to rebuild PDS to allow more than one task to be run at the same time, you must increase this value accordingly.</p>
SGCIT	<p>The maximum number of CLIs that can be concurrently declared to the system via the system control interface. If you are going to use only PDS (which includes SCI), SGCIT should have a value of 1.</p> <p>SGCIT generates the command interpreter table (CIT) with the specified number of entries.</p>

9.4 Generation Procedures

This section describes the procedures for:

- Rebuilding the Timesharing Executive to include changes made to the SGDATA.MAC file
- Including a new Timesharing Executive without performing a system generation

NOTE: Timesharing terminals include any device from which a command language interpreter (CLI) can receive input, for example, an interactive terminal (TT) or a batch stream (pseudo device BA).

The limited capacity of an RK05 (4800 blocks) requires that two disks be used during initial system generation if an RK05 system is being generated.

9.4.1 Rebuilding the Timesharing Executive

If you are building a system for the first time, you need only perform Step 1, below, because the command file BUILD.CMD automatically executes Steps 2 and 3. To build the Timesharing Executive proceed as follows:

- 1 The first step is to edit the file [311,107]SGDATA.MAC, which contains the interactive and batch parameters. These parameters are described in Table 9-1.

The following command invokes the IAS text editor to edit [311,107] SGDATA.MAC:

```
MCR>EDIT [311,107]SGDATA.MAC
```

When you have set each parameter to the required value, issue the commands described below. Most commands invoke indirect command files, thus simplifying the Timesharing Executive generation procedure. Appendix B lists the contents of the various command files.

- 2 To assemble the IAS timesharing library, IASCOM, type:

```
MCR>SET /UIC=[1,1]
MCR>MAC @[311,107]IASCOMMACH
```

- 3 To relink all the tasks that use the library IASCOM, type:

```
MCR>TKB @[1,1]TSTKB
```

9.4.2 Including a New Timesharing Executive

It is possible to include a new Timesharing Executive in the system without performing a system generation. You can do this as follows:

- 1 You must remove the old tasks and libraries from the system. You cannot remove the libraries until all tasks that link to them have also been removed, as follows:

```
MCR>REM @TSREM
```

- 2 To install the new versions of the tasks, type:

```
MCR>INS @TSINS
```

- 3 To save the system with the new Timesharing Executive and installed tasks, type:

```
MCR>SAV
```

A new version of the Timesharing Executive tasks has now been built and saved into the system.

10 Modifying DCL and System Tasks

10.1 Introduction

You can modify various system tasks by rebuilding them with a larger static or dynamic extension so that they can use more memory.

The following is a summary of possible changes:

- ACT task—increase the number of tasks that can be displayed.
- CMP task—increase the number of differences that can be handled.
- CRF, LBR, MAC, and TKB tasks—increase the execution speed.
- DEMO task—increase the number of SGAs and tasks that can be displayed.
- EDI task—increase the size of the page buffer.
- PDS task—increase the number of tasks that can be run simultaneously; specify MCR mode as the default at login; various other changes.
- PIP task—increase the size of the intermediate buffer used for disk-to-disk copying.
- SDM task—alter the frequency at which shutdown warning messages are sent to active timesharing terminals.

This chapter describes the ways you can rebuild the DCL interface to include certain options. Also, Table 10–1 lists ways you can modify various system tasks, either by rebuilding them or installing them with a larger extension.

10.2 DCL Interface

This section describes how you can modify the DCL interface to suit the requirements of your installation.

10.2.1 Rebuilding the DCL Interface

If you are rebuilding the user/system DCL interface (PDS on timesharing systems; PDX on multiuser and real-time systems), copy the following files from the object distribution media to the system device. Also create UFD [111,100] on the system device.

- Timesharing System (PDS) files
 - [11,100]PDS.OLB
 - [11,100]PDSODL.ODL
 - [11,100]PDSTKB.CMD
- Multiuser and Real-Time System (PDX) files
 - [11,100]PDX.OLB

Modifying DCL and System Tasks

- [11,100]PDXODL.ODL
- [11,100]PDXTKB.CMD

NOTE: Although a DCL interface is provided (implemented by PDX) on real-time systems, due to space constraints it is recommended that you use MCR only. PDX is not supported.

10.2.2 Build Options

You can rebuild the user/system DCL interface to include one or more of the following options:

- 1 Change timeout values for **PDS>** prompt, **SCI>** prompt, default batch job limit, and shutdown. A terminal never times out if the PDS timeout value is set to zero. Batch jobs run for an unlimited time if the batch job limit is set to zero and no time limit was specified in the \$JOB command.
- 2 Increase the number of tasks that can be invoked from a terminal at any one time.
- 3 Increase the size of the internal device table to allow more devices to be allocated/mounted for each user.
- 4 Redefine the default command mode to MCR mode. On a timesharing system, request operator intervention for MCR MOU commands.
- 5 Change command default parameters:
 - Inhibit the automatic **LIBR=SYSRES:RO** option on the **LINK** command.
 - Inhibit the use of the **CREATE/DIRECTORY** command.
 - Redefine the maximum print, queue, and submit priority for non-system users.
 - Define **DEFERRED** printing as the default.
 - Define **/NOOPERATOR** as a default qualifier to mount (timesharing only).
 - Define **/NOBANNERS** as the default qualifier for **PRINT** and **QUEUE**.

For details of these options, refer to the appropriate build command files. The build command files are held on the object distribution media and are:

- [11,100]PDSTKB.CMD for timesharing systems
- [11,100]PDXTKB.CMD for multiuser or real-time systems

10.2.3 System Identification

You can rebuild the user/system DCL interface so that an installation dependent identification is displayed at **LOGIN**. Issue the necessary commands using **MCR**, or after entering **MCR** mode (**SCI>MCR**). Include this identification in **PDS** or **PDX** as follows:

- 1 Copy all files required to rebuild the interface (see Section 10.2), and copy [311,100]PSYSID.MAC from the object distribution media to the system device.
- 2 Edit [311,100]PSYSID.MAC to include the system identification. (for example: for system identification "IAS Timesharing system")

```
>EDI [311,100]PSYSID.MAC
*PL <<<<
      SYSID <> ; <<<<<<<edit this line >>>>>>>
*R  SYSID <IAS Timesharing system>
*EX
>
```

3 Assemble this module and replace it in the object module library.

```
>MAC [11,100]PSYSID=[311,100]SYSID
>LBR [11,100]PDS/RP=[11,100]PSYSID (timesharing)
```

or

```
>LBR [11,100]PDX/RP=[11,100]PSYSID (multiuser or real-time)
```

4 Rebuild the interface (after changing any options listed in Section 10.2.2):

```
>TKB @[11,100]PDSTKB (timesharing)
```

or

```
>TKB @[11,100]PDXTKB (multiuser or real-time)
```

Modifying DCL and System Tasks

10.3 Modifying System Tasks

Table 10-1 summarizes how you can modify various system tasks to your advantage.

Table 10-1 Summary of Modifications to System Tasks

Task	Operation	Result
ACT	Rebuild for number of active tasks	Increases the number of active tasks that can be displayed. Refer to the build file [11,13]ACTTKB.CMD.
CMP	Install with a larger extension ¹	Increases the size of differences that can be handled.
CRF,LBR	Install with a larger extension ¹	Increases execution speed. On systems with ample free memory, specify an extension of 15000 words for these tasks.
DEMO	Install with a larger extension ¹	Increases the number of tasks and SGAs that can be displayed. If the terminal handler is built without the option, 'get characteristics', you must rebuild demo to reflect the type of terminal where it is to be run. The build file is [11,13]DEMOTKB.CMD.
EDI	Install with a larger extension ¹	Increases the size of the page buffer from the default of 80 lines. Edit the files [11,20]EDIBLD.CMD and [11,20]TKB20.CMD.
EDT	Rebuild a smaller, more heavily overlaid version or rebuild memory resident overlay version	Use the files EDTOVBLD.CMD and EDTOVBLD.ODL in UFD [11,20] on the object distribution media.
PIP	Rebuild PIP	Increases the buffer size (and hence speed) for disk-to-disk copying and gives larger block sizes for ANSI magnetic tape. Edit the file [11,5]PIPBLD.CMD, changing the line: EXTSCT=\$DYB1:5100 to give a larger value.
SDM	Edit frequency of shutdown warnings	Alters the frequency at which shutdown warning messages are sent to active timesharing terminals. The source file is called [311,101]SDM.MAC and is the file built using [11,101]SDMTKB.CMD.

¹You can use the MCR INS command with the /INC=(asterix) switch to install the task with the largest possible extension.

10.4 Modifying Device Handler's Pool Limits

You might want to increase the pool limit when building handlers supplied with the system. The distributed build files use a default pool limit of 40, which is adequate for the average handler usage. However, if a handler services several drives and is heavily used, increasing the pool limit reduces the likelihood of the handler running out of nodes.

You can increase the pool limit by rebuilding the handler after you have inserted a pool option in the appropriate command file in UFD [11,14] on the object distribution media. For more details on the pool option, see the *IAS Task Builder Reference Manual*.

You can also increase the pool option when you install the handler. See the *IAS PDS User's Guide* or the *IAS MCR User's Guide*.

11 System Start-Up Procedures

11.1 Introduction

Once you have configured the system to your installation's requirements and you have completed a system build (see Chapter 7) and a system generation (see Chapter 7) as appropriate, the next procedure is to start up the system. The system start-up procedure differs for timesharing systems and for multiuser or real-time systems.

Section 11.2 outlines the procedures for system start-up on multiuser and real-time systems. Section 11.3 describes the more detailed procedures for timesharing system start-up (including start-up command descriptions). Appendix A contains an example of a system startup.

11.2 Starting Up Multiuser and Real-Time Systems

A multiuser or real-time system is normally available for program development as soon as you have bootstrapped the generated system. You may want to specify additional commands to:

- Create swap/checkpoint files
- Enable the IAS scheduler
- Mount any globally available devices
- Set the default CLI for each terminal
- Set the terminal characteristics
- Start up timesharing

These commands are MCR commands (or PDS commands if you have a multiuser system with DCL as the default CLI). You can use indirect command files to contain these commands. See the *IAS MCR User's Guide* or the *IAS PDS User's Guide* for details.

An MCR command file called [1,1]STARTUP.COMD can automatically be invoked each time the system is booted. This feature is enabled when the system is saved by using the /CMD SAV switch (eg. SAV /CMD).

11.3 Starting Up Timesharing Systems

Like multiuser or real-time system start-up, some MCR (or DCL) commands may be necessary prior to starting up a timesharing system. You can use an indirect command file to contain these commands.

Use timesharing system start-up commands to:

- Initiate a timesharing system
- Specify which terminals are to be timesharing terminals
- Specify which devices a timesharing user can access
- If necessary, to override parameters specified during a previous system generation

System Start-Up Procedures

Some start-up commands are mandatory, but if you do not specify any of the optional commands, the default specified at system generation is used. Timesharing system start-up is activated by running the timesharing start-up task ...IAS. Run the task by typing IAS in response to the MCR> prompt. Timesharing system start-up prompts IAS for commands in the following format:

```
IAS>SET <section name>
```

where:

<section name> is any of the following system start-up groups:

- Terminal
- Batch
- Device
- Partition
- Quantum
- Start

The SET TERMINAL and SET START commands are mandatory at timesharing system start-up. SET BATCH, SET DEVICE, SET PARTITION and SET QUANTUM are optional. If you do not specify the SET BATCH or SET QUANTUM commands at system start-up, the IAS scheduling parameters are set to their default values. The scheduling parameter default values are listed in the *IAS Performance and Tuning Guide*, together with guidance on how to alter the values to suit your particular installation.

Each of the SET start-up commands prompts for command parameters, following the <section name> parameter. You must not enter these parameters on the same line as the SET command itself. When there is more than one type of parameter, enter the types in any order. You must enter one per line. You terminate a command by typing either RET or a new SET <section name> in response to a prompt.

You can specify any SET command except SET START more than once. The new values replace the original values given.

Numeric values are assumed to be octal, unless followed by a decimal point (to indicate a decimal number).

11.3.1 Start-up Command File

You can enter timesharing system start-up commands either individually at the terminal, or specified together in a command file. To execute commands from a command file the command is:

```
IAS>@filespec
```

or:

```
MCR>IAS @filespec
```

where:

filespec has the following standard format:

```
dev:[ufd]filename.type;version
```

where:

- *dev:* = physical device on which the volume containing the command file is mounted (default is SY0:).
- [*ufd*] = UFD containing the desired file (default is [1,1]).
- *filename* = name of the file (no default).
- *type* = file type (default is .CMD).
- *version* = file version number (default is the highest version).

Before each timesharing system start-up session, you can edit the command file again to reset the system for that session. The command file must contain commands typed in the same format as if they were entered directly at the terminal.

The form of the file is shown in the example below:

```
SET TERM
TT1
TT2
TT3
TT5
TT6
TT7
TT10
TT31
TT37
TT40
BA0
BA1
BA2
SET DEVI
DB1/S
DK0
DK1
DT0
DT1
MM0
MM1
CR0
SET START
```

Terminals are specified as a list (one per line) of timesharing terminals, including one BAn for each batch stream.

System Start-Up Procedures

Devices are specified as a list (one per line) of devices in the system to be made available to timesharing users. This is normally every device in the system, except the timesharing terminals.

The command file does not contain prompts given by the system, and, in the case of the start-up commands, you must enter the parameters after the <section name> parameter one per line.

NOTE: Specify all time parameters as a number of clock ticks. Specify all memory parameters as a number of memory blocks. A memory block is 32 decimal words in length.

11.3.2 Start-up Error Messages

The error messages for each start-up command are described separately for each command.

The SET start-up command itself has two self-explanatory messages:

- INVALID SECTION NAME
- SECTION NAME NOT SPECIFIED

In addition, four general error messages are associated with each system start-up command:

- COMMAND I-O ERROR
- OPEN FILE FAILURE ON INDIRECT COMMAND FILE
- INDIRECT COMMAND SYNTAX ERROR
- INDIRECT FILE DEPTH EXCEEDED

11.3.3 SET BATCH Command

Function

You use the SET BATCH command to specify the batch scheduling parameters for the current session and to override the default batch scheduling parameters. See the *IAS Performance and Tuning Guide* for the default values.

If you set the batch quantum to 0 (zero), batch tasks are scheduled and have memory allocated as does any other scheduler-controlled task.

Format

```
IAS>SET BATCH
```

You can use any of the following command lines in any order:

```
BATCH>QUANTUM nn
```

```
BATCH>SCHEDULE nn
```

where:

- QUANTUM nn = required batch quantum (given in clock ticks).
- SCHEDULE nn = time interval between batch schedules (given in clock ticks).

Examples

```
IAS>SET BATCH
BATCH>QUANTUM 10
BATCH>SCHED 50
```

This example sets the batch quantum to 10 clock ticks, allowing a time interval of 50 clock ticks between batch schedules.

Error Messages

- SYNTAX ERROR
- SYNTAX ERROR—NON OCTAL/DECIMAL CHARACTER
- MISSING PARAMETER(S)
- PARTITION NOT IN SYSTEM

11.3.4 SET DEVICE Command

Function

A SET DEVICE command specifies the devices in the system which may be used by timesharing users. You specify the maximum number of timesharing devices to be supported at any one time by the SGDEV parameter during system generation.

Format

```
IAS>SET DEVICE
DEVICE>xxnn[:][/S]
```

where:

- xx = device type
- nn[:] = unit number
- [/S] = optional parameter to specify the device as a system device. This is a DEVICE characteristic. A Files-11 volume mounted globally on such a device is mounted automatically for all subsequent timesharing users at login time. You can mount a volume globally either by MCR>MOU before you activate timesharing, or by PDS> MOUNT/GLOBAL from any timesharing terminal. See the *IAS MCR User's Guide* and the *IAS PDS User's Guide* for details of the MOU and MOUNT/GLOBAL commands. If a volume is not mounted globally, this device is then available for general timesharing use. Volumes mounted using a timesharing MOUNT command (nonglobal) are not mounted automatically for other users.

Volumes mounted globally on /S devices should **not** be globally dismounted under timesharing (DISMOUNT/GLOBAL). Although the system accepts this command and attempts to dismount the volume, this could result in the device being lost to timesharing users. Global volumes on /S devices should always remain mounted throughout a timesharing session.

Examples

```
IAS>SET DEVICE
DEVICE>DK0:/S
DEVICE>DK1:
```

This example sets two devices to be known to the system: DK0 as a global system device and device DK1.

System Start-Up Procedures

Error Messages

- SYNTAX ERROR
- SYNTAX ERROR–NON OCTAL/DECIMAL CHARACTER
- DEVICE NOT IN SYSTEM
- DEVICE TABLE FULL
- MISSING PARAMETER(S)
- INVALID SWITCH
- DEVICE ALREADY SPECIFIED

11.3.5 SET PARTITION Command

Function

The SET PARTITION command specifies the partition to be used for user timesharing tasks.

Format

```
IAS>SET PARTITION
```

Use the following command line:

```
PART>USER partition-name
```

where:

- USER partition-name = name of the partition where timesharing user tasks are to be executed. The default is GEN.

Examples

```
IAS>SET PARTITION  
PART>USER ATOD
```

This example specifies a partition named ATOD to be used for executing timesharing user tasks.

Error Messages

- SYNTAX ERROR
- INVALID COMMAND
- MISSING PARAMETER(S)
- INVALID RAD50 CHARACTER
- PARTITION NOT IN SYSTEM

11.3.6 SET QUANTUM Command

Function

The SET QUANTUM command specifies the scheduling parameters for the session and overrides the default scheduling parameter values. For a description of the functions of these parameters and a list of the default values, see the *IAS Performance and Tuning Guide*.

Format

```
IAS>SET QUANTUM
```

You can use any of the following command lines:

```
QUANTUM>PROMOTION nn
QUANTUM>CONSTANT nn
QUANTUM>ALLOCATION size time
QUANTUM>LEVEL m nn
```

where:

- PROMOTION nn = time interval between scheduler promotions (given in clock ticks).
- CONSTANT nn = quantum constant (given in clock ticks).
- ALLOCATION size time = allocation factor, where:
 - size is given in 32-word blocks
 - time is given in ticks
 - the allocation factor = time/size
- LEVEL m nn = time factor for a level, where:
 - m = scheduling level
 - nn = time factor (in clock ticks)

Examples

```
IAS>SET QUANTUM
QUANTUM>PRO 10
QUANTUM>CON 1
QUANTUM>ALLOC 40 1
QUANTUM>LEVEL 2 5
```

This example specifies the quantum parameters to be used for the current session. The time interval between scheduler promotions is set at 10 clock ticks, with a quantum constant of 1 clock tick. The allocation factor is set at 1 clock tick per 40 units of 32-word blocks. The time factor used for scheduling level 2 is set to 5 clock ticks.

Error Messages

- MISSING PARAMETER(S)
- INVALID LEVEL NUMBER
- TOO MANY PARAMETERS SPECIFIED

11.3.7 SET TERMINAL Command

Function

The SET TERMINAL command specifies the terminals for the timesharing session. This command is mandatory at timesharing system start-up. You must specify batch pseudo devices BA0-BAn if batch is to be run.

The Console Output (CO) terminal is automatically specified by the system for SCI.

System Start-Up Procedures

Format

```
IAS>SET TERMINAL [/NOPDS]
TERMINAL>ddnn[ : ]
```

where:

- NOPDS specifies that only the console is automatically allocated to PDS at start-up. All other timesharing terminals are not allocated to a CLI.
- dd = device type (for example, TT for an interactive terminal or BA for a batch stream)
- nn[:] = unit number

Examples

```
IAS>SET TERMINAL
TERMINAL>TT2:
TERMINAL>TT3:
TERMINAL>BA0:
```

This example specifies TT2, TT3, and BA0 as the terminals to be used in the current session.

```
IAS>SET TERMINAL/NOPDS
>TT21:
>TT4:
>BA2:
```

This example specifies TT21, TT4, and BA2 as the terminals to be used in the current session, but allocates the console alone to PDS.

Error Messages

- SYNTAX ERROR
- SYNTAX ERROR - NON OCTAL/DECIMAL CHARACTER
- DEVICE NOT IN SYSTEM
- TABLE FULL
- MISSING PARAMETER(S)
- MORE TERMINALS SPECIFIED THAN TERMINAL NODES GENERATED

11.3.8 SET START Command

Function

The SET START command makes the timesharing system available to system users. It must be the last SET command that you issue during timesharing system start-up.

Format

```
IAS>SET START
```

Error Messages

- ERRORS DETECTED IN COMMAND FILE
- FAILED TO LOAD EXECUTIVE TASK
- NO SWAP FILES SPECIFIED
- NO TERMINAL DEVICES SPECIFIED
- FAILED TO ENABLE SCHEDULER

11.4 After Timesharing Starts

Timesharing successfully starts when:

- A summary report of the timesharing environment is displayed on the console terminal,
- The file, [1,1]NOTICE.TXT (if any), is typed out, and the
- SCI> prompt is displayed.

Some functions, such as starting the batch CLI's, mounting any global timesharing devices, and enabling or disabling logins, must be performed after timesharing has started.

11.4.1 Starting the Batch Processors

If you have generated support for batch processing in your system, you must activate the CLI for the batch pseudo-terminals before batch processing can be started. The following steps are necessary to start batch processing. Enter the commands below at the SCI> prompt or include them in a command file that you invoke from the SCI> prompt.

The following example assumes that you have already:

- 1 Included the sysgen directive DEV=BA<0-2>,PSEUDO in [11,17]SYSGEN.CMD
- 2 Specified BA0, BA1, and BA2 as terminals during the IAS timesharing startup.

```
SCI>RUN/CLI BA0
SCI>RUN/CLI BA1
SCI>RUN/CLI BA2
```

11.4.2 Mounting Globally Available Timesharing Devices

Devices globally available to timesharing users must be specified during timesharing startup as a system device as indicated by the /S switch. (See the *IAS System Manager Guide*, timesharing startup SET DEVICE command and/or the example in Appendix A.)

A device can be made globally available via two methods:

- 1 During system startup, mount the global device before starting timesharing via the MCR command

```
MOU Ddn: /GLOBAL/OVR
```

System Start-Up Procedures

- 2 Mount the device twice after timesharing starts (usually in an SCI command file where you start the batch processors) using the PDS/SCI commands:

```
MOUNT/GLOBAL/OVERRIDE:ID Ddn:  
MOUNT Ddn: volume-label  
DISMOUNT Ddn:
```

The first mount establishes the volume as a globally available device but does not yet enable access. The second mount makes the device accessible for the remainder of the timesharing operations to all users. The dismount removes the device from your terminal session.

11.4.3 Enabling and Announcing System Logins

When all timesharing related functions have been enabled, you may enable logins and announce system availability to all timesharing users. Use the following SCI commands:

```
SET LOGIN  
MESS/ALL IAS TIMESHARING IS AVAILABLE
```

The message IAS TIMESHARING IS AVAILABLE broadcasts to all terminals connected to the system that have been defined in the timesharing environment.

A

Sample Installation

A.1 Introduction

The following is an actual installation of a PDP-11/84.

These are the steps taken.

- 1** First, a simple installation is performed (Section A.2).
 - Boot the hardware
 - Copy the distribution files
 - Perform Question and Answer session
 - Define system generation directives to configure the hardware and memory
 - Build (assemble and task build the files that were edited and changed) the system
 - Perform system generation
- 2** Then, begin to tune the system (Section A.3).
 - Configure the system for added performance and to support additional devices and multiuser handlers by editing the system directives in the SYSGEN.CMD file.
 - Perform system generation
 - Write the Boot block
 - Verify that the system has been configured properly by loading some devices
 - Create STARTUP.CMD file
 - Save what has been done
- 3** Next, configure the terminal handler (Section A.4).
 - Edit the PARAMS.MAC file
 - Edit the CONFIG.MAC file
 - Edit the SYSGEN.CMD file
 - Build the system
 - Perform system generation
 - Boot the system
 - Save the new system configuration
- 4** The system is next configured for timesharing (Section A.5).
 - Create a test Timesharing Command file
 - Test this file
 - Invoke Timesharing

Sample Installation

- Start the batch processors

A.2 Begin the Installation Process

Boot the hardware. Either toggle the CPU's *RESTART* switch, or depress the *BREAK* key and type @173000g.

@173000g

```
Testing in progress - Please wait
Memory Size is 4088 K Bytes
9 Step memory test
  Step 1 2 3 4 5 6 7 8 9
```

Message 04 Entering Dialog mode

Show the hardware boot translation (#3 below) to verify the boot translation. This will ensure that the system will boot a valid device. (This is true for PDP-11/83 and PDP-11/84 only.)

Commands are Help, Boot, List, Setup, Map and Test.
Type a command then press the RETURN key: **SETUP**

KDJ11-B Setup mode ROM V8.0

Command	Description
1	Exit
2	List/change parameters in the Setup table
3	List/change boot translations in the Setup table
4	List/change the automatic boot selections in the Setup table
5	List/change optional user data in the Setup table
6	List/change the switch boot selections in the Setup table
7	List boot programs
8	Initialize the Setup table
9	Save the Setup table into the EEPROM
10	Load EEPROM data into the Setup table
11	Delete an EEPROM boot
12	Load an EEPROM boot into memory
13	Edit/create an EEPROM boot
14	Save boot into the EEPROM
15	Enter ROM ODT

Type a command then press the RETURN key: **3**

List/change boot translations in the Setup table

TT1	DU0 address 17772150
TT2	DU20 address 17760334
TT3	DU1 address 17772150
TT4	DU1 address 17760334
TT5	DU2 address 17772150
TT6	DU2 address 17760334
TT7	DU4 address 17760334
TT8	DU6 address 17760334
TT9	MU0 address 17774500

Type CTRL Z to exit or press the RETURN key for No change


```
TT1      DU0 address 17772150
Device name = 
```

NOTE: Your tape and disks must be at the primary addresses or the installation will not start. See Table 6-1 for a list of addresses. 177 in the above list = 1 in Table 6-1 (for example, 172150 = 17772150).

```
KDJ11-B Setup mode
Press the RETURN key for Help
Type a command then press the RETURN key: 
Exit
```

```
Commands are Help, Boot, List, Setup, Map and Test.
Type a command then press the RETURN key: 
```

```
Trying MU0
Starting system from MU0
```

Copy the distribution files.

```
IAS V3.4 - BL3404 DISTRIBUTION TAPE
SYSTEM DISK? 
LOAD DISK ON DU0 WRITE ENABLED
TYPE 'CR' WHEN READY?
RUN 'BADBLOCKS'? 
STANDARD VOLUME INITIALIZATION? 
BAD DU:
07:39:51 - Message from MSCP handler:
DU000:   - Controller is ONLINE
         - Controller software version (5.)
         - Controller hardware version (0.)
         - IP register address: 172150
```

NOTE: Error messages may occur. Please ignore them. These error messages are notifying you that the handler has not yet been installed. It will be installed later in the installation procedure

```
RED DU=SY
INI SY:IASSYS/BAD={AUTO}
07:40:00 - Message from MSCP handler:
DU000:   - Controller is ONLINE
         - Controller software version (5.)
         - Controller hardware version (0.)
         - IP register address: 172150
RED DU=SY
MOU SY:/OVR
07:40:58 - Message from MSCP handler:
DU000:   - Controller is ONLINE
         - Controller software version (5.)
         - Controller hardware version (0.)
         - IP register address: 172150
```

Sample Installation

```
MOUNT-***Volume Information**
      Device =DU0
      Class  =File 11
      Label  =IASSYS
      UIC    =[1,1]
      Access =[RWED,RWED,RWED,RWED]
      Charac =[]
MOUNT -- DU0 ** Mount Complete **
UFD SY:[1,1]/PRO=[RWED,RWED,R,R]
UFD SY:[1,2]/PRO=[RWED,RWED,R,R]
UFD SY:[1,3]
UFD SY:[1,4]/PRO=[RWED,RWED,RWED,RWED]
UFD SY:[1,5]/PRO=[RWED,RWED,R,R]
UFD SY:[1,6]/PRO=[RWED,RWED,RWED,RWED]
UFD SY:[1,100]/PRO=[RWED,RWED,,]
07:41:02 - Message from MSCP handler:
DU000:   - Task "ER$LOG" is not installed

UFD SY:[1,101]
UFD SY:[11,1]
UFD SY:[11,3]
UFD SY:[11,13]
UFD SY:[11,14]
UFD SY:[11,15]
UFD SY:[11,16]
UFD SY:[11,17]
UFD SY:[11,101]
UFD SY:[11,103]
UFD SY:[11,105]
UFD SY:[11,107]
UFD SY:[11,114]
UFD SY:[111,13]
UFD SY:[111,15]
UFD SY:[111,16]
UFD SY:[111,17]
UFD SY:[111,101]
UFD SY:[111,103]
UFD SY:[111,105]
UFD SY:[111,107]
UFD SY:[111,114]

UFD SY:[200,200]
UFD SY:[211,107]
UFD SY:[211,114]
UFD SY:[311,114]
UFD SY:[311,107]

RED DU=SY
MOU SY:/OVR

07:40:59 - Message from MSCP handler:
DU000:   - Controller is ONLINE
          - Controller software version (5.)
          - Controller hardware version (0.)
          - IP register address: 172150

MOUNT-***Volume Information**
      Device =DU0
      Class  =File 11
      Label  =IASSYS
      UIC    =[1,1]
      Access =[RWED,RWED,RWED,RWED]
      Charac =[]
MOUNT -- DU0 ** Mount Complete **
CPY MU:=SY:
```

```

CPY -- STARTING COPY

CPY -- COPY COMPLETE (ALLOW TAPE TO REWIND)

RED DU=SY
MOU SY:/OVR

07:42:04 - Message from MSCP handler:
DU000:   - Controller is ONLINE
         - Controller software version (5.)
         - Controller hardware version (0.)
         - IP register address: 172150

MOUNT-**-Volume Information**-
      Device =DU0
      Class  =File 11
      Label  =IASSYS
      UIC    =[1,1]
      Access =[RWED,RWED,RWED,RWED]
      Charac =[]

MOUNT -- DU0 ** Mount Complete **
INX SYSRES/LI/ACC=RO/UIC=[1,1],[11,1]BOO,[11,1]UNL
INX [11,1]REM,[11,1]INV,[11,1]SGN1/TASK=...SGN

UFX ...INX,...MOU,...RED
UNL MT
UNL MM
UFX MM....,MT....,...UFX
REM DK..../NH,DM..../NH,DP..../NH,DB..../NH
REM DR..../NH,DL..../NH,...RED/NH,...UFX/NH,...INX/NH
REM MT..../NH,MM..../NH,...UNL
SGN @[11,17]SYSGEN
PDP11=45,124K,,00000060
/
SCOM=,8K,90
PAR=GEN,,*,S
/
DEV=SP,PSEUDO
DEV=WK,PSEUDO
DEV=LB,PSEUDO
DEV=MM0,TU16
DEV=MS0,TS11
DEV=MU0,TU81
DEV=MO
DEV=LP0,LP11B
DEV=TT0,CONSOL
DEV=DK<0-3>,RK05
DEV=DP<0-1>,RP03B
DEV=DB<0-1>,RP04
DEV=DM<0-1>,RK06
DEV=DR<0-1>,RM03
DEV=DL<0-1>,RL01
DEV=DU<0-3>,RA80
/
DPAR=GEN
SY=DU0
DCLI=MCR
/
INS=GEN,[1,1]SYSRES/LI/ACC=RO
INS=GEN,[1,1]HNDLIB/LI/ACC=RO
INS=GEN,[1,1]FCPCOM/CM
INS=GEN,[11,1]DU
INS=GEN,[11,1]TT

```

Sample Installation

```
INS=GEN, [11,17]SGN2, [11,1]MOU, [11,1]INS/UIC=[1,1]
INS=GEN, [11,1]HIBBR
INS=GEN, [11,1]BIGFCP
//
SGN>END OF PHASE 1
BOO [11,17]IAS/WB
BOO [11,17]IAS
*** SYSTEM GENERATION PHASE 2 ***
MOU SY:/OVR
MOUNT-**VOLUME INFORMATION**
      DEVICE =DU0
      CLASS  =FILE 11
      LABEL  =IASSYS
      UIC    =[1,1]
      ACCESS =[RWED,RWED,RWED,RWED]
      CHARAC =[]
MOUNT -- DU0 ** MOUNT COMPLETE **
INS [11,1]TKTN
INS [11,1]MCR/UIC=[1,1]
INS [11,1]MFT/POOL=255
INS [11,1]MCRERR
INS [11,1]ACT
INS [11,1]ASN
INS [11,1]BAD
INS [11,1]BOO
INS [11,1]CMP
INS [11,1]CON
INS [11,1]CRF/INC=10000
INS [11,1]DEMO
INS [11,1]DEV
INS [11,1]HIBBR
INS -- TASK NAME ALREADY IN USE FILE HIBBR.TSK;1
INS [11,1]DMO
INS [11,1]DMP
INS [11,1]DSC
INS [11,1]EDI
INS [11,1]EDT
INS [11,1]KED
INS [11,1]K52
INS [11,1]ERRLOG
INS [11,1]FLX
INS [11,1]F11MSG
INS [11,1]HEL
INS [11,1]BYE
INS [11,1]PWD
INS [11,1]WHO
INS [11,1]HELP
INS [11,1]INDIAS
INS [11,1]INIT
INS [11,1]INIT/TASK=...HOM
INS [11,1]LBR
INS [11,1]LOA
INS [11,1]LP
INS [11,1]LUN
INS [11,1]MACIAS
INS [11,1]MO
INS [11,1]MSM
INS [11,1]OPE
INS [11,1]OPR
INS [11,1]PIP
INS [11,1]QUE
INS [11,1]REA
INS [11,1]RED
```

```

INS [11,1]REM
INS [11,1]RUN
INS [11,1]SAV
INS [11,1]SET
INS [11,1]SLP
INS [11,1]SPR
INS [11,1]SPR2
INS [11,1]SWA
INS [11,1]SYS
INS [11,1]TER
INS [11,1]TIM
INS [11,1]TKB
INS [11,1]UFD
INS [11,1]UNL
INS [11,1]USERS
INS [11,1]VFY
INS [11,1]ZAP
RED SY=SP
RED SY=LB
RED SY=WK
RED LP=CL
RED -- WARNING:   HANDLER NOT RESIDENT
SET /SP=LP:
*** END OF SYSTEM GENERATION PHASE 2 ***

```

Save the system.

```

MCR> SAV
DMO -- DU00: ** DISMOUNT COMPLETE **
10:12:52 - Message from MSCP handler:
DU000:   - Controller is ONLINE
          - Controller software version (5.)
          - Controller hardware version (0.)
          - IP register address: 172150

10:12:56 - Message from MSCP handler:
DU000:   - Task "ERSLOG" is not installed

1920K (WORD) IAS VERSION 3.4 BASELEVEL 3404

SAV -- PARTITION GEN   EXPANDED BY   57472 WORDS
10:13:02 - MESSAGE FROM MSCP HANDLER:
DU000:   - TASK "ERSLOG" IS NOT INSTALLED

MOUNT-***VOLUME INFORMATION**
          DEVICE   =DU0
          CLASS    =FILE 11
          LABEL    =IASSYS
          UIC      =[1,1]
          ACCESS   =[RWED,RWED,RWED,RWED]
          CHARAC   =[]
MOUNT -- DU0 ** MOUNT COMPLETE **
17-OCT-89 10:13:03

```

Sample Installation

Perform Question and Answer session.

```
DATE AND TIME, PLEASE? 15-NOV-89 16:40
MCR>
MCR> @([11,17]QASGN)
>;
>* DO YOU REQUIRE FULL DIALOGUE? [Y/N]: 
>;
>;
>;
>;YOU MAY BE BUILDING A SYSTEM TO RUN ON A MACHINE WHOSE
>;MEMORY SIZE IS DIFFERENT FROM THE CURRENT ONE.
>;IF YOUR TARGET MACHINE IS SMALL, IT IS IMPRACTICAL TO BUILD
>;EITHER A MULTIUSER SYSTEM WITH OTHER THAN MCR AS THE DEFAULT
>;COMMAND LANGUAGE INTERPRETER OR A TIMESHARING SYSTEM.
>;IF YOU ARE BUILDING A SYSTEM FOR THE CURRENT MACHINE YOU
>;SHOULD JUST TYPE A CARRIAGE RETURN, ELSE TYPE THE MEMORY
>;SIZE OF THE TARGET MACHINE EXPRESSED AS A MULTIPLE OF
>;K-WORDS.
>;
>* WHAT IS THE SIZE OF YOUR TARGET MACHINE [D R48:2044 D1920]:
>;
>;
>;DO YOU REQUIRE A TIMESHARING SYSTEM? [Y/N]:
>;
>;A TIMESHARING SYSTEM CONTAINS THE PROTECTION AND CONTROL
>;FACILITIES REQUIRED FOR GENERAL PURPOSE USE. IT ALSO
>;CONTAINS THE MULTITASKING FACILITIES DESCRIBED IN THE MANUAL
>;"GUIDE TO WRITING COMMAND LANGUAGE INTERPRETERS". A
>;NON-TIMESHARING SYSTEM IS 4K-8K SMALLER BUT IS ONLY SUITABLE
>;FOR USE BY EXPERIENCED USERS IN A "NON-HOSTILE" ENVIRONMENT.
>;
>* DO YOU REQUIRE A TIMESHARING SYSTEM? [Y/N]: 
>;
>;
>;DO YOU WANT SYSGEN TO CREATE A SWAP FILE? [Y/N]:
>;
>;YOU MAY CHOOSE TO HAVE A SWAP FILE SAVED INTO THE SYSTEM SO
>;THAT IT IS THERE EVERY TIME YOU RE-BOOTSTRAP THE SYSTEM. THE
>;SYSGEN PROCESS CAN DO THIS FOR YOU.
>;IF YOU ELECT TO HAVE A SWAP FILE CREATED AT SYSGEN, THE
>;SCHEDULER WILL ALSO BE ENABLED IN THE SYSGEN PROCESS. IF
>;NOT, YOU WILL NEED TO CREATE A SWAP FILE BEFORE YOU CAN
>;ENABLE THE SCHEDULER, EITHER AT THE END OF SYSTEM
>;GENERATION BEFORE SAVING THE SYSTEM OR EACH TIME THE SYSTEM
>;IS BOOTSTRAPPED.
>;
>* DO YOU WANT SYSGEN TO CREATE A SWAP FILE? [Y/N]: 
>;
>;
>;WHAT IS YOUR SWAP DEVICE [S]:
>;
>;THE DEVICE FOR SWAP FILE #1 MUST BE EITHER "SY0:" OR A
>;DEDICATED VOLUME IN ORDER THAT IT CAN BE SAVED IN THE
>;SYSTEM. IF YOU WANT A DEDICATED VOLUME IT MUST BE A
>;NON-REMOVABLE MEDIUM DEVICE, FOR EXAMPLE "DS0:" OR A DK UNIT
>;THAT IS AN RK05F.
>;
>* WHAT IS YOUR SWAP DEVICE [S]: 
```

Sample Installation

```
>;HOW BIG DO YOU WANT THE SWAP FILE [D: R:50.-6000 D:100.]:
>;
>;THE SIZE OF THE SWAP FILE IS SPECIFIED AS A NUMBER WHERE THE
>;NUMBER IS THE SIZE IN K-WORDS. BEFORE A TASK CAN BE RUN
>;UNDER SCHEDULER CONTROL, THERE MUST BE SUFFICIENT SPACE IN
>;THE SYSTEM SWAP FILE(S) TO ACCOMMODATE THAT TASK. TYPICALLY
>;THE TOTAL SWAP SPACE SHOULD BE TWICE THE SIZE OF THE
>;TIME-SCHEDULED PARTITION FOR REASONABLE RESPONSE, MORE IF
>;YOU NEED MORE CONCURRENT TASK ACTIVITY AND CAN ACCEPT POORER
>;RESPONSE. YOU DO NOT NEED TO SPECIFY IT ALL HERE. MORE SWAP
>;FILES CAN BE ADDED AFTER SYSTEM GENERATION IS COMPLETE OR
>;EACH TIME THE SYSTEM IS BOOTSTRAPPED. THERE MUST BE
>;SUFFICIENT CONTIGUOUS FREE BLOCKS ON THE SPECIFIED DEVICE
>;FOR THE SWAP FILE TO BE SUCCESSFULLY CREATED.
>;
>* HOW BIG DO YOU WANT THE SWAP FILE [D R50:6000 D100]: 500
>;
>;
>;DO YOU REQUIRE MEMORY MANAGEMENT DIRECTIVES? [Y/N]:
>;
>;THE MEMORY MANAGEMENT DIRECTIVES ALLOW A TASK TO CREATE
>;GLOBAL AREAS DYNAMICALLY AND TO MANIPULATE THEIR OWN VIRTUAL
>;ADDRESS SPACE. THESE DIRECTIVES REQUIRE APPROXIMATELY
>;1-1/2K OF PERMANENTLY RESIDENT CORE. SEE THE IAS SYSTEM
>;DIRECTIVES REFERENCE MANUAL FOR FURTHER DETAILS.
>;
>* DO YOU REQUIRE MEMORY MANAGEMENT DIRECTIVES? [Y/N]: 
>;
>;
>;DO YOU REQUIRE THE EMST$ AND CNCT$ DIRECTIVES [Y/N]?
>;
>;THE CONNECT TO TASK DIRECTIVE (CNCT$) ALLOWS A TASK TO SPECIFY THAT
>;IT RECEIVE EXIT STATUS FROM ANOTHER ACTIVE TASK WHEN THAT TASK EXITS OR EMITS
>;STATUS. THE EMIT STATUS DIRECTIVE ALLOWS AN ACTIVE TASK TO RETURN EXIT
>;STATUS TO A TASK WHICH IS CONNECTED TO IT EITHER VIA THE CNCT$ OR SPWN$
>;DIRECTIVES.
>;
>* DO YOU REQUIRE THE CNCT$ AND EMST$ DIRECTIVES? [Y/N]: 
>;
>;
>;HOW MANY BATCH STREAMS DO YOU REQUIRE [D R:0.-8.]:
>;
>;AS A BATCH SYSTEM, IAS SERVICES UP TO A MAXIMUM OF 8 BATCH
>;STREAMS. EACH STREAM REQUIRES APPROXIMATELY 1K WORDS OF
>;PHYSICAL MEMORY WHILE IT IS ACTIVE. THE MAXIMUM NUMBER OF
>;BATCH STREAMS ALLOWED IS EIGHT. IF BATCH IS TO BE HEAVILY
>;USED, IT IS WORTH HAVING UP TO 4 BATCH STREAMS, BUT THERE
>;IS LITTLE POINT IN HAVING MORE. FOR LIGHT BATCH USAGE,
>;ONLY ONE STREAM IS NEEDED.
>;
>* HOW MANY BATCH STREAMS DO YOU REQUIRE [D R0:8]: 2
>;
>;
>;DO YOU REQUIRE AN EXCLUSIVE BATCH LEVEL? [Y/N]
>;
>;IF YOU DO NOT HAVE AN EXCLUSIVE BATCH LEVEL, ALL BATCH TASKS
>;WILL RUN IN THE INTERACTIVE LEVELS. THE SCHEDULER WILL NOT
>;DISTINGUISH BETWEEN BATCH AND INTERACTIVE WHEN ALLOCATING
>;CPU AND MEMORY.
>;IF YOU DO HAVE AN EXCLUSIVE BATCH LEVEL, YOU WILL HAVE
>;GREATER CONTROL OF HOW RESOURCES ARE ALLOCATED TO BATCH.
>;
>* DO YOU REQUIRE AN EXCLUSIVE BATCH LEVEL? [Y/N]: 
```

Sample Installation

```
>;
>;
>;DO YOU REQUIRE A NULL DEVICE? [Y/N]
>;
>;THE NULL DEVICE ABSORBS ANY OUTPUT DIRECTED TO IT. IT
>;ACCEPTS ALL VALID QIO REQUESTS, RETURNING A STATUS OF
>;SUCCESS WITH THE EXCEPTION OF READ REQUESTS WHICH RETURN A
>;STATUS OF IE.EOF.
>;THE NULL DEVICE IS A USEFUL DEVELOPMENT AID.
>;
>* DO YOU REQUIRE A NULL DEVICE? [Y/N]: 
>;
>;
>;DO YOU REQUIRE CRASH DUMPS? [Y/N]
>;
>;THE EXECUTIVE CAN BE CONFIGURED TO INCLUDE A CRASH DUMP
>;MODULE. IF A SERIOUS MALFUNCTION OCCURS, A MESSAGE WILL BE
>;OUTPUT TO THE CONSOLE AND THE SYSTEM CAN BE DUMPED TO A
>;SPECIFIED DEVICE AND BE SUBSEQUENTLY ANALYZED. OMITTING A
>;CRASH DUMP SAVES APPROXIMATELY 1/4K OF MEMORY. EVEN IF NO
>;CRASH MODULE IS REQUIRED, THE SYSTEM WILL NORMALLY OUTPUT A
>;SHORT MESSAGE TO THE CONSOLE TO INDICATE THAT A CRASH HAS
>;OCCURRED. THIS MESSAGE MAY BE OMITTED AT A LATER POINT IN
>;THIS SESSION AND WILL SAVE APPROXIMATELY 100 WORDS OF
>;PHYSICAL MEMORY, IN WHICH CASE THE PROCESSOR WILL SIMPLY
>;HALT.
>;
>* DO YOU REQUIRE CRASH DUMPS? [Y/N]: 
>;
>;
>;WHAT IS YOUR CRASH DEVICE [S]:
>;
>;THE CRASH DEVICES AVAILABLE ARE RK05, RK06, RK07, TC11
>;(DECTAPE), TS11, TU10, TU16, RL01, RL02, MSCP (RC25, RA60, ETC.),
>;TMSCP (TUD1, TK50)
>;
>* WHAT IS YOUR CRASH DEVICE [S]: 
>;
>;
>;WHAT IS YOUR CRASH DEVICE UNIT NUMBER [O R:0-7]:
>;
>;THE CRASH DUMP CAN BE MADE ON ANY UNIT OF THE SPECIFIED
>;DEVICE. IT IS NOT ADVISABLE TO USE THE SYSTEM UNIT
>;(NORMALLY ZERO) AS THE DUMP UNIT. THIS COULD RESULT IN
>;OVERWRITING THE SYSTEM DISK. IF THE DEVICE HAS SWITCHABLE
>;UNIT NUMBERS (SUCH AS DECTAPE) IT IS RECOMMENDED THAT A UNIT
>;NUMBER BE USED WHICH DOES NOT NORMALLY EXIST.
>;
>* WHAT IS YOUR CRASH DEVICE UNIT NUMBER [O R0:7]: 
>;
>;
>;DO YOU REQUIRE A NON-STANDARD CSR ADDRESS? [Y/N]:
>;
>;THE CRASH DUMP MODULES NORMALLY ASSUME THAT THE DUMP DEVICE
>;IS CONFIGURED WITH ITS USUAL CSR ADDRESS. IF THE DUMP
>;DEVICE HAS A NON-STANDARD CSR ADDRESS, IT MUST BE SPECIFIED
>;HERE.
>;
>* DO YOU REQUIRE A NON-STANDARD CSR ADDRESS? [Y/N]: 
>;
>;
>;WHAT IS THE CSR ADDRESS [O R:160000-177777]:
>;
```


Sample Installation

```
>;THE CSR ADDRESS MUST BE EXPRESSED AS AN OCTAL NUMBER IN THE
>;RANGE 160000 - 177777.
>;
>* WHAT IS THE CSR ADDRESS [O R160000:177777]: 160354
>;
>;
>;DO YOU REQUIRE MEMORY PARITY SUPPORT? [Y/N]:
>;
>;IF THE TARGET SYSTEM DOES NOT HAVE MEMORY PARITY HARDWARE
>;YOU SHOULD ANSWER "NO" TO THIS QUESTION. IF IT DOES, YOU
>;HAVE TWO OPTIONS. ANSWERING "YES" WILL CAUSE THE INCLUSION
>;OF CODE THAT LOGS MEMORY PARITY ERRORS. ANSWERING "NO" WILL
>;CAUSE A SYSTEM CRASH IF A PARITY ERROR OCCURS.
>;
>* DO YOU REQUIRE MEMORY PARITY SUPPORT? [Y/N]: 
>;
>;
>;WHICH MEMORY PARITY OPTION DO YOU REQUIRE [S]:
>;
>;INPUT THE TARGET PROCESSOR TYPE (FOR EXAMPLE, "70" FOR A
>;PDP-11/70).
>;
>* WHICH MEMORY PARITY OPTION DO YOU REQUIRE [S]: 84
>;
>;
>;ALL QUESTIONS HAVE BEEN ASKED, DO YOU WISH TO PROCEED? [Y/N]:
>;
>;AT THIS POINT, YOU SHOULD CHECK THE WHOLE QUESTION AND
>;ANSWER DIALOGUE. IF ANY ERRORS HAVE BEEN MADE, YOU SHOULD
>;RESPOND "NO" TO THIS QUESTION AND RESTART THE QUESTION AND
>;ANSWER PROCEDURE.
>;
>* ALL QUESTIONS HAVE BEEN ASKED, DO YOU WISH TO PROCEED? [Y/N]: 
>;
>;BEGIN FILE EDITING
>SLP @[311,114]PARAMSMAC.SLP
>SLP @[11,17]SYSGENCMD.SLP
>SLP @[11,17]SYSBLDCMD.SLP
>SLP @[11,15]EXECODL.SLP
>SLP @[11,15]EXECBLD.SLP
>PIP [311,114]*.SLP/PU,[11,17]*.SLP,[11,15]*.SLP
>;
>;END FILE EDITING
>;
>;
>; [ END OF QUESTION AND ANSWER SYSGEN ]
>;
@ <EOF>
MCR>;
```

Edit the SYSGEN.CMD file to configure hardware and memory.

Sample Installation

```
MCR> EDT [11,17]SYSGEN.CMD
1      ; [11,17] SYSGEN.CMD
*
2      ;
*
3      PDP11=45,124K,,00000060
*S/45/84/
3      PDP11=84,124K,,00000060
1 SUBSTITUTION
*S/124K,,/1920K,FP,/
3      PDP11=84,1920K,FP,00000060
1 SUBSTITUTION
*
4      /
*
5      SCOM=,8K,90
*S/8/12/\21/8\8K,90/12K,140/
5      SCOM=,12K,140
1 SUBSTITUTION
*
6      PAR=GEN,,*,T
*
7      /
*
8      DEV=SP,PSEUDO
*
9      DEV=WK,PSEUDO
*
10     DEV=LB,PSEUDO
*
11     DEV=NL0,NULL
*
12     ;DEV=MT0,TU10
*
13     DEV=MM0,TU16
1 SUBSTITUTION
*D
1 LINE DELETED
14     DEV=MS0,TS11
*D
1 LINE DELETED
15     DEV=MU0,TU81
*
16     DEV=MO
*
17     DEV=LP0,LP11B
*
18     DEV=TT0,CONSOL
*
19     DEV=BA<0-1>,BATCH
*
20     DEV=PI
*
21     DEV=DK<0-3>,RK05
*D
1 LINE DELETED
22     ;EV=DP<0-1>,RP02
*D
1 LINE DELETED
23     DEV=DP<0-1>,RP03B
*D
1 LINE DELETED
24     DEV=DB<0-1>,RP04
```

```

*D
1 LINE DELETED
  25      DEV=DM<0-1>,RK06
*D
1 LINE DELETED
  26      DEV=DR<0-1>,RM03
*D
1 LINE DELETED
  27      DEV=DL<0-1>,RL01
*
  28      DEV=DU<0-3>,RA80
*
  29      /
*
  30      DPAR=GEN
*
  31      SY=DU0
*
  32      DCLI=MCR
*
  33      /
*
  34      INS=GEN, [1,1]SYSRES/LI/ACC=RO
*
  35      INS=GEN, [1,1]HNDLIB/LI/ACC=RO
*
  36      INS=GEN, [1,1]IASCOM/LI/ACC=RO/UIC=[1,1]
*
  37      INS=GEN, [1,1]FCPCOM/CM
*
  38      INS=GEN, [11,1]DU
*
  39      INS=GEN, [11,1]TT
*
  40      INS=GEN, [11,17]SGN2, [11,1]MOU, [11,1]INS/UIC=[1,1]
*
  41      INS=GEN, [11,1]HIBBR
*
  42      INS=GEN, [11,1]BIGFCP
*
  43      //
*%WH
  1      ; [11,17] SYSGEN.CMD
  2      ;
  3      PDP11=84,1920K,FP,00000060
  4      /
  5      SCOM=,12K,140
  6      PAR=GEN,,*,T
  7      /
  8      DEV=SP,PSEUDO
  9      DEV=WK,PSEUDO
 10     DEV=LB,PSEUDO
 11     DEV=NLO,NULL
 12     ;DEV=MT0,TU10
 15     DEV=MU0,TU81
 16     DEV=MO
 17     DEV=LP0,LP11B
 18     DEV=TT0,CONSOL
 19     DEV=BA<0-1>,BATCH
 20     DEV=PI
 27     DEV=DL<0-1>,RL01
 28     DEV=DU<0-3>,RA80
 29     /

```

Sample Installation

```
30      DPAR=GEN
31      SY=DU0
32      DCLI=MCR
33      /
34      INS=GEN, [1,1]SYSRES/LI/ACC=RO
35      INS=GEN, [1,1]HNDLIB/LI/ACC=RO
36      INS=GEN, [1,1]IASCOM/LI/ACC=RO/UIC=[1,1]
37      INS=GEN, [1,1]FCPCOM/CM
38      INS=GEN, [11,1]DU
39      INS=GEN, [11,1]TT
40      INS=GEN, [11,17]SGN2, [11,1]MOU, [11,1]INS/UIC=[1,1]
41      INS=GEN, [11,1]HIBBR
42      INS=GEN, [11,1]BIGFCP
43      //
[EOB]
*EXIT
DU0: [11,17]SYSGEN.CMD;3 35 LINES
MCR>;
```

Build the system.

```
MCR> @BUILD
>
>; STARTING SYSTEM BUILD
>
>REM ...TKB,...MAC
>INS [11,1]MACIAS/INC=*
>INS [11,1]TKB/INC=*
>
>; ASSEMBLE AND BUILD THE TERMINAL HANDLER
>
>MAC @LB:[311,114]TTMACNLST
>TKB @LB:[11,114]TTTKB
>
>; BUILD RESIDENT EXECUTIVE
>
>TKB @LB:[11,15]EXECBLD
>
>; BUILD IASCOM
>
>MAC @LB:[311,107]IASCOMMACH
>
>TKB @LB:[11,107]IASCOMTKB
>
>; BUILD TCP AND SDM
>
>TKB @[11,101]TCPOVR
>TKB @[11,101]SDMTKB
>
>; BUILD IAS AND IASTART
>
>TKB @LB:[11,105]STRTKB
>TKB @LB:[11,105]IASTKB
>
>; BUILD MSM
>
>TKB @[11,13]MSMBLD
>/
@d <EOF>
```

Perform system generation.

Sample Installation

```
MCR> INS [11,1]SGN1/TASK=...SGN,[11,1]INV
MCR> SGN @[11,17]SYSGEN
PDP11=84,1920K,FP,00000060
/
SCOM=,12K,140
PAR=GEN,,*,T
/
DEV=SP,PSEUDO
DEV=WK,PSEUDO
DEV=LB,PSEUDO
DEV=NL0,NULL
DEV=MU0,TU81
DEV=MO
DEV=LP0,LP11B
DEV=TT0,CONSOL
DEV=BA<0-1>,BATCH
DEV=PI
DEV=DL<0-1>,RL01
DEV=DU<0-3>,RA80
/
DPAR=GEN
SY=DU0
DCLI=MCR
/
INS=GEN,[1,1]SYSRES/LI/ACC=RO
INS=GEN,[1,1]HNDLIB/LI/ACC=RO
INS=GEN,[1,1]IASCOM/LI/ACC=RO/UIC=[1,1]
INS=GEN,[1,1]FCPCOM/CM
INS=GEN,[11,1]DU
INS=GEN,[11,1]TT
INS=GEN,[11,17]SGN2,[11,1]MOU,[11,1]INS/UIC=[1,1]
INS=GEN,[11,1]HIBBR
INS=GEN,[11,1]BIGFCP
//
SGN>END OF PHASE 1
```

Write the Boot block, and boot the new system.

```
MCR> BOO [11,17]/WB
MCR> BOO [11,17]
*** SYSTEM GENERATION PHASE 2 ***
MOU SY:/OVR
MOUNT-**VOLUME INFORMATION**
      DEVICE  =DU0
      CLASS   =FILE 11
      LABEL   =IASSYS
      UIC     =[1,1]
      ACCESS  =[RWED,RWED,RWED,RWED]
      CHARAC  =[]
MOUNT -- DUO ** MOUNT COMPLETE **
INS [11,1]TKTN
INS [11,1]MCR/UIC=[1,1]
INS [11,1]MFT/POOL=255
INS [11,1]MCRERR
INS [11,1]ACT
INS [11,1]ASN
INS [11,1]BA
INS [11,1]BAD
INS [11,1]BOO
INS [11,1]CMP
INS [11,1]CON
INS [11,1]CRF/INC=10000
INS [11,1]DEMO
```

Sample Installation

```
INS [11,1]DEV
INS [11,1]HIBBR
INS -- TASK NAME ALREADY IN USE FILE HIBBR.TSK;1
INS [11,1]DMO
INS [11,1]DMP
INS [11,1]DSC
INS [11,1]EDI
INS [11,1]EDT
INS [11,1]KED
INS [11,1]K52
INS [11,1]ERRLOG
INS [11,1]FLX
INS [11,1]F11MSG
INS [11,1]HELP
INS [11,1]INDIAS
INS [11,1]INIT
INS [11,1]INIT/TASK=...HOM
INS [11,1]LBR
INS [11,1]LOA
INS [11,1]LP
INS [11,1]LUN
INS [11,1]MACIAS
INS [11,1]MO
INS [11,1]MSM
INS [11,1]NL
INS [11,1]OPE
INS [11,1]OPR
INS [11,1]PDS
INS [11,1]PIP
INS [11,1]QUE
INS [11,1]REA
INS [11,1]RED
INS [11,1]REM
INS [11,1]RUN
INS [11,1]SAV
INS [11,1]SET
INS [11,1]SLP
INS [11,1]SPR
INS [11,1]SPR2
INS [11,1]SWA
SWA SY0:/LE:500.
INS [11,1]SYS
INS [11,1]TCP
INS [11,1]IAS
INS [11,1]IASTART
INS [11,1]SDM
INS [11,1]TER
INS [11,1]TIM
INS [11,1]TKB
INS [11,1]UFD
INS [11,1]UNL
INS [11,1]USERS
INS [11,1]UTL
UTL /LV:3
UTL /PT:8
UTL /BQ:0
INS [11,1]VFY
INS [11,1]ZAP
RED SY=SP
RED SY=LB
RED SY=WK
RED LP=CL
RED -- WARNING: HANDLER NOT RESIDENT
```

Sample Installation

```
SET /SP=LP:
LOA BA
LOA NL
*** END OF SYSTEM GENERATION PHASE 2 ***
```

Save the system.

```
MCR> SAV
DMO -- DU00: ** DISMOUNT COMPLETE **
17:23:50 - Message from MSCP handler:
DU000:   - Controller is ONLINE
         - Controller software version (5.)
         - Controller hardware version (0.)
         - IP register address: 172150

17:23:54 - Message from MSCP handler:
DU000:   - Task "ER$LOG" is not installed

17:24:00 - Message from MSCP handler:
DU000:   - Task "ER$LOG" is not installed

1920K (WORD) IAS VERSION 3.4 BASELEVEL 3404

MOUNT-**VOLUME INFORMATION**
        DEVICE  =DU0
        CLASS   =FILE 11
        LABEL   =IASSYS
        UIC     =[1,1]
        ACCESS  =[RWED,RWED,RWED,RWED]
        CHARAC  =[]
MOUNT -- DU0 ** MOUNT COMPLETE **
15-NOV-89 17:24:02

DATE AND TIME, PLEASE? 15-NOV-89 17:30
MCR>
```

This is the end of a simple installation with a few options.

A.3 Adding More Functionality to the System

Now, begin to tune the system.

Edit SYSGEN.CMD to make a more useful system. This edit will:

- Add a SENPAR partition for added partition
- Add extra devices (DU and MU)
- Add RESFCP (Memory Resident Disk ACP) for performance
- Use multiuser DU and MU handlers

The hardware configuration is:

- MU0, TU81 at standard address CSR=174500 VEC=224
- MU1, TU81 at CSR=160444 VEC=314

Sample Installation

- DU4-7 RC25 at CSR=160354 VEC=310
- DU0-3 at standard address/vector CSR=172150 VEC=154
- DL0 RL02 at standard CSR/VEC

See your Site Preparation guide for information specific to your system.

Sample Installation

Edit the SYSGEN.CMD file.

```
MCR> EDT [11,17] SYSGEN.CMD
1      ; [11,17] SYSGEN.CMD
*
2      ;
*
3      PDP11=84,1920K,FP,00000060
*
4      /
*
5      SCOM=,12K,140
*
6      PAR=GEN,,*,T
*I
      PAR=SENPAR,,4K,U
      ^Z
6      PAR=GEN,,*,T
*
7      /
*
8      DEV=SP,PSEUDO
*
9      DEV=WK,PSEUDO
*
10     DEV=LB,PSEUDO
*
11     DEV=NL0,NULL
*
12     ;DEV=MT0,TU10
*I
1 LINE DELETED
13     DEV=MU0,TU81
*
14     DEV=MO
*I
      DEV=MU1,TU81,314,5,160444
      ^Z
14     DEV=MO
*
15     DEV=LP0,LP11B
*
16     DEV=TT0,CONSOL
*
17     DEV=BA<0-1>,BATCH
*
18     DEV=PI
*
19     DEV=DL<0-1>,RL01
*I
19     DEV=DL0,RL01
1 SUBSTITUTION
*
20     DEV=DU<0-3>,RA80
*
21     /
*I
      DEV=DU<4-7>,RC25,310,5,160354
      ^Z
```

Sample Installation

```
21      /
*'DU'
23      SY=DUO
*'
30      INS=GEN, [11,1]DU
*S/DU/DUMU/
30      INS=GEN, [11,1]DUMU
1 SUBSTITUTION
*
31      INS=GEN, [11,1]TT
*I
      INS=GEN, [11,1]UQSSP
      INS=GEN, [11,1]MUMU
      ^Z

31      INS=GEN, [11,1]TT
*'FCP'
34      INS=GEN, [11,1]BIGFCP
*S/BIG/RES/
34      INS=GEN, [11,1]RESFCP
1 SUBSTITUTION
*%WH
1      ; [11,17] SYSGEN.CMD
2      ;
3      PDP11=84,1920K,FP,00000060
4      /
5      SCOM=,12K,140
5.1    PAR=SENPAR,,4K,U
6      PAR=GEN,,*,T
7      /
8      DEV=SP,PSEUDO
9      DEV=WK,PSEUDO
10     DEV=LB,PSEUDO
11     DEV=NLO,NULL
13     DEV=MU0,TU81
13.1   DEV=MU1,TU81,314,5,160444
14     DEV=MO
15     DEV=LPO,LP11B
16     DEV=TT0,CONSOL
17     DEV=BA<0-1>,BATCH
18     DEV=PI
19     DEV=DLO,RL01
20     DEV=DU<0-3>,RA80
20.1   DEV=DU<4-7>,RC25,310,5,160354
21     /
22     DPAR=GEN
23     SY=DUO
24     DCLI=MCR
25     /
26     INS=GEN, [1,1]SYSRES/LI/ACC=RO
27     INS=GEN, [1,1]HNDLIB/LI/ACC=RO
28     INS=GEN, [1,1]IASCOM/LI/ACC=RO/UIC=[1,1]
29     INS=GEN, [1,1]FCPCOM/CM
30     INS=GEN, [11,1]DUMU
30.1   INS=GEN, [11,1]UQSSP
30.2   INS=GEN, [11,1]MUMU
31     INS=GEN, [11,1]TT
32     INS=GEN, [11,17]SGN2, [11,1]MOU, [11,1]INS/UIC=[1,1]
33     INS=GEN, [11,1]HIBBR
34     INS=GEN, [11,1]RESFCP
35     //
[EOB]
*EXIT
```

Sample Installation

```
DUO:[11,17]SYSGEN.CMD;4 40 LINES
MCR>
```

Perform a system generation to incorporate these changes.

```
MCR> INS [11,1]INV,[11,1]SGN1/TASK=...SGN
MCR> SGN @[11,17]SYSGEN
PDP11=84,1920K,FP,00000060
/
SCOM=,12K,140
PAR=SENPAR,,4K,U
PAR=GEN,,*,T
/
DEV=SP,PSEUDO
DEV=WK,PSEUDO
DEV=LB,PSEUDO
DEV=NLO,NULL
DEV=MU0,TU81
DEV=MU1,TU81,314,5,160444
DEV=MO
DEV=LP0,LP11B
DEV=TT0,CONSOL
DEV=BA<0-1>,BATCH
DEV=PI
DEV=DL0,RL01
DEV=DU<0-3>,RA80
DEV=DU<4-7>,RC25,310,5,160354
/
DPAR=GEN
SY=DU0
DCLI=MCR
/
INS=GEN,[1,1]SYSRES/LI/ACC=RO
INS=GEN,[1,1]HNDLIB/LI/ACC=RO
INS=GEN,[1,1]IASCOM/LI/ACC=RO/UIC=[1,1]
INS=GEN,[1,1]FCPCOM/CM
INS=GEN,[11,1]DUMU
INS=GEN,[11,1]UQSSP
INS=GEN,[11,1]MUMU
INS=GEN,[11,1]TT
INS=GEN,[11,17]SGN2,[11,1]MOU,[11,1]INS/UIC=[1,1]
INS=GEN,[11,1]HIBBR
INS=GEN,[11,1]RESFCP
//
SGN>END OF PHASE 1
```

Boot the system.

Sample Installation

```
MCR> BOO [11,17]
*** SYSTEM GENERATION PHASE 2 ***
MOU SY:/OVR
MOUNT-**VOLUME INFORMATION**
      DEVICE  =DU0
      CLASS   =FILE 11
      LABEL   =IASSYS
      UIC     =[1,1]
      ACCESS  =[RWED,RWED,RWED,RWED]
      CHARAC  =[]
MOUNT -- DU0 ** MOUNT COMPLETE **
INS [11,1]TKTN
INS [11,1]MCR/UIC=[1,1]
INS [11,1]MFT/POOL=255
INS [11,1]MCRERR
INS [11,1]ACT
INS [11,1]ASN
INS [11,1]BA
INS [11,1]BAD
INS [11,1]BOO
INS [11,1]CMP
INS [11,1]CON
INS [11,1]CRF/INC=10000
INS [11,1]DEMO
INS [11,1]DEV
INS [11,1]HIBBR
INS -- TASK NAME ALREADY IN USE FILE HIBBR.TSK;1
INS [11,1]DMO
INS [11,1]DMP
INS [11,1]DSC
INS [11,1]EDI
INS [11,1]EDT
INS [11,1]KED
INS [11,1]K52
INS [11,1]ERRLOG
INS [11,1]FLX
INS [11,1]F11MSG
INS [11,1]HELP
INS [11,1]INDIAS
INS [11,1]INIT
INS [11,1]INIT/TASK=...HOM
INS [11,1]LBR
INS [11,1]LOA
INS [11,1]LP
INS [11,1]LUN
INS [11,1]MACIAS
INS [11,1]MO
INS [11,1]MSM
INS [11,1]NL
INS [11,1]OPE
INS [11,1]OPR
INS [11,1]PDS
INS [11,1]PIP
INS [11,1]QUE
INS [11,1]REA
INS [11,1]RED
INS [11,1]REM
INS [11,1]RUN
INS [11,1]SAV
INS [11,1]SET
INS [11,1]SLP
INS [11,1]SPR
INS [11,1]SPR2
```

Sample Installation

```
INS [11,1]SWA
SWA SY0:/LE:500.
INS [11,1]SYS
INS [11,1]TCP
INS [11,1]IAS
INS [11,1]IASTART
INS [11,1]SDM
INS [11,1]TER
INS [11,1]TIM
INS [11,1]TKB
INS [11,1]UFD
INS [11,1]UNL
INS [11,1]USERS
INS [11,1]UTL
UTL /LV:3
UTL /PT:8
UTL /BQ:0
INS [11,1]VFY
INS [11,1]ZAP
RED SY=SP
RED SY=LB
RED SY=WK
RED LP=CL
RED -- WARNING:   HANDLER NOT RESIDENT
SET /SP=LP:
LOA BA
LOA NL
*** END OF SYSTEM GENERATION PHASE 2 ***
MCR>
```

Write the Boot block.

```
MCR> BOO [11,17]/WB
```

Load handlers to save the system with these handlers loaded.

```
MCR> LOA MO
```

```
MCR> LOA LP
```

```
MCR> LOAD DU4
```

```
MCR>
```

```
UQ$SSP - MESSAGE FROM MSCP PORT SERVER:
- UNIBUS/Q-BUS STORAGE SYSTEMS PORT INITIALIZED SUCCESSFULLY.
- REASON FOR HARD INIT: OPERATOR MANUAL LOAD
- MICRO-CODE VERSION: 30
- IP REGISTER ADDRESS: 160354
- SA REGISTER CONTENTS: 000000
```

```
17:56:46 - MESSAGE FROM MSCP HANDLER:
DU004: - CONTROLLER IS ONLINE
- CONTROLLER SOFTWARE VERSION (8.)
- CONTROLLER HARDWARE VERSION (5.)
- IP REGISTER ADDRESS: 160354
```

```
MCR>
```

```
UQ$SSP - MESSAGE FROM MSCP PORT SERVER:
- UNIBUS/Q-BUS STORAGE SYSTEMS PORT INITIALIZED SUCCESSFULLY.
- REASON FOR HARD INIT: OPERATOR MANUAL LOAD
- MICRO-CODE VERSION: 30
- IP REGISTER ADDRESS: 160354
- SA REGISTER CONTENTS: 000000
```

```
17:55:58 - MESSAGE FROM MSCP HANDLER:
DU004: - CONTROLLER IS ONLINE
- CONTROLLER SOFTWARE VERSION (8.)
- CONTROLLER HARDWARE VERSION (5.)
- IP REGISTER ADDRESS: 160354
```

```
MCR> LOA MU0
```

```
MCR>
```

```
UQ$SSP - MESSAGE FROM MSCP PORT SERVER:
- UNIBUS/Q-BUS STORAGE SYSTEMS PORT INITIALIZED SUCCESSFULLY.
- REASON FOR HARD INIT: OPERATOR MANUAL LOAD
- MICRO-CODE VERSION: 122
- IP REGISTER ADDRESS: 174500
- SA REGISTER CONTENTS: 000000
```

```
17:56:10 - MESSAGE FROM TMSCP HANDLER:
MU000: - CONTROLLER IS ONLINE
- CONTROLLER SOFTWARE VERSION (2.)
- CONTROLLER HARDWARE VERSION (0.)
- IP REGISTER ADDRESS: 174500
```

```
MCR> LOA MU1
```

```
MCR>
```

```
UQ$SSP - MESSAGE FROM MSCP PORT SERVER:
- UNIBUS/Q-BUS STORAGE SYSTEMS PORT INITIALIZED SUCCESSFULLY.
- REASON FOR HARD INIT: OPERATOR MANUAL LOAD
- MICRO-CODE VERSION: 121
- IP REGISTER ADDRESS: 160444
- SA REGISTER CONTENTS: 000000
```

Sample Installation

```
17:56:16 - MESSAGE FROM TMSCP HANDLER:
MU001:   - CONTROLLER IS ONLINE
          - CONTROLLER SOFTWARE VERSION (1.)
          - CONTROLLER HARDWARE VERSION (3.)
          - IP REGISTER ADDRESS: 160444
```

Save the system.

```
MCR> SAV
DMO -- DU00: ** DISMOUNT COMPLETE **
UQ$SSP - Message from MSCP port server:
          - Unibus/Q-Bus Storage Systems Port initialized successfully.
          - Reason for hard init: System Re-booted
          - Micro-code version: 30
          - IP register address: 160354
          - SA register contents: 000000

17:56:44 - Message from MSCP handler:
DU004:   - Controller is ONLINE
          - Controller software version (8.)
          - Controller hardware version (5.)
          - IP register address: 160354

UQ$SSP - Message from MSCP port server:
          - Unibus/Q-Bus Storage Systems Port initialized successfully.
          - Reason for hard init: Power failure recovery
```

NOTE: System Rebooted

```
          - Micro-code version: 121
          - IP register address: 160444
          - SA register contents: 000000

UQ$SSP - Message from MSCP port server:
          - Unibus/Q-Bus Storage Systems Port initialized successfully.
          - Reason for hard init: Power failure recovery
```

NOTE: System Rebooted

```
          - Micro-code version: 122
          - IP register address: 174500
          - SA register contents: 000000

17:56:46 - Message from TMSCP handler:
MU000:   - Controller is ONLINE
          - Controller software version (1.)
          - Controller hardware version (3.)
          - IP register address: 174500

UQ$SSP - Message from MSCP port server:
          - Unibus/Q-Bus Storage Systems Port initialized successfully.
          - Reason for hard init: System Re-booted
          - Micro-code version: 145
          - IP register address: 172150
          - SA register contents: 000000

17:56:47 - Message from MSCP handler:
DU000:   - Controller is ONLINE
          - Controller software version (5.)
          - Controller hardware version (0.)
          - IP register address: 172150
```

1920K (WORD) IAS VERSION 3.4 BASELEVEL 3404


```

MOUNT-**VOLUME INFORMATION**
      DEVICE  =DU0
      CLASS   =FILE 11
      LABEL   =IASSYS
      UIC     =[1,1]
      ACCESS  =[RWED,RWED,RWED,RWED]
      CHARAC  =[]
MOUNT -- DU0 ** MOUNT COMPLETE **
15-NOV-89 17:56:59
DATE AND TIME, PLEASE? 15-NOV-89 18:00

```

You can use a system start-up command file to perform tasks automatically everytime the system is started. For example, you could load device handlers when the system is booted. The previous example shows how to save the system with handlers loaded. This example shows an alternative. Assume that you have written the Boot block as shown on page A-22. You could create the following command file to load the handlers and the DSA Error Logger.

```

MCR> EDT STARTUP.CMD
INPUT FILE DOES NOT EXIST
[EOB]
*I

```

NOTE: User input

```

      .; THIS IS A SAMPLE SYSTEM STARTUP COMMAND FILE
      .;
      .; LOAD DEVICE HANDLERS IF THEY ARE NOT ALREADY LOADED
      .;
      .IFNINS MU... INS [11,1]MUMU
      .IFNINS ER$LOG INS [11,1]ERRDSA
      .IFNLOA DU4    LOAD DU4
      .IFNLOA MU0    LOAD MU0
      .IFNLOA MU1    LOAD MU1
      .IFNLOA MO     LOAD MO
      .IFNLOA LP     LOAD LP
      ^Z
[EOB]
*%WH
1      .; THIS IS A SAMPLE SYSTEM STARTUP COMMAND FILE
2      .;
3
4      .; LOAD DEVICE HANDLERS IF THEY ARE NOT ALREADY LOADED
5      .;
6
7      .IFNINS MU... INS [11,1]MUMU
8      .IFNINS ER$LOG INS [11,1]ERRDSA
9
10     .IFNLOA DU4    LOAD DU4
11     .IFNLOA MU0    LOAD MU0
12     .IFNLOA MU1    LOAD MU1
13     .IFNLOA MO     LOAD MO
14     .IFNLOA LP     LOAD LP
[EOB]
*EXIT
DU0:[1,1]STARTUP.CMD;1 14 LINES

```

Then, save the system with the SAV /CMD command. This tells the system to run [1,1]STARTUP.CMD every time the system is booted.

Sample Installation

```
MCR> SAV /CMD

DMO -- DU00: ** DISMOUNT COMPLETE **
UQ$SSP - Message from MSCP port server:
        - Unibus/Q-Bus Storage Systems Port initialized successfully.
        - Reason for hard init: System Re-booted
        - Micro-code version: 145
        - IP register address: 172150
        - SA register contents: 000000

18:05:41 - Message from MSCP handler:
DU000:  - Controller is ONLINE
        - Controller software version (5.)
        - Controller hardware version (0.)
        - IP register address: 172150

1920K (WORD) IAS VERSION 3.4 BASELEVEL 3404

MOUNT-**VOLUME INFORMATION**
        DEVICE =DU0
        CLASS  =FILE 11
        LABEL  =IASSYS
        UIC    =[1,1]
        ACCESS =[RWED,RWED,RWED,RWED]
        CHARAC =[]
MOUNT -- DU0 ** MOUNT COMPLETE **
15-NOV-89 18:05:53

DATE AND TIME, PLEASE? 15-NOV-89 18:14
>INS [11,1]ERRDSA
>LOAD DU4
>LOAD MU0
>LOAD MU1
>LOAD MO
@ <EOF>
UQ$SSP - MESSAGE FROM MSCP PORT SERVER:
        - UNIBUS/Q-BUS STORAGE SYSTEMS PORT INITIALIZED SUCCESSFULLY.
        - REASON FOR HARD INIT: OPERATOR MANUAL LOAD
        - MICRO-CODE VERSION: 30
        - IP REGISTER ADDRESS: 160354
        - SA REGGISTER CONTENTS: 000000
18:14:05 - MESSAGE FROM MSCP HANDLER:
DU004:  - CONTROLLER IS ONLINE
        - CONTROLLER SOFTWARE VERSION (8.)
        - CONTROLLER HARDWARE VERSION (5.)
        - IP REGISTER ADDRESS: 160354

UQ$SSP - MESSAGE FROM MSCP PORT SERVER:
        - UNIBUS/Q-BUS STORAGE SYSTEMS PORT INITIALIZED SUCCESSFULLY.
        - REASON FOR HARD INIT: OPERATOR MANUAL LOAD
        - MICRO-CODE VERSION: 121
        - IP REGISTER ADDRESS: 160444
        - SA REGISTER CONTENTS: 000000

18:14:05 - MESSAGE FROM TMSCP HANDLER:
MU001:  - CONTROLLER IS ONLINE
        - CONTROLLER SOFTWARE VERSION (1.)
        - CONTROLLER HARDWARE VERSION (3.)
        - IP REGISTER ADDRESS: 160444
```

Sample Installation

```
UQ$SSP - MESSAGE FROM MSCP PORT SERVER:
        - UNIBUS/Q-BUS STORAGE SYSTEMS PORT INITIALIZED SUCCESSFULLY.
        - REASON FOR HARD INIT: OPERATOR MANUAL LOAD
        - MICRO-CODE VERSION: 122
        - IP REGISTER ADDRESS: 174500
        - SA REGISTER CONTENTS: 000000

18:14:07 - MESSAGE FROM TMSCP HANDLER:
MU000:  - CONTROLLER IS ONLINE
        - CONTROLLER SOFTWARE VERSION (2.)
        - CONTROLLER HARDWARE VERSION (0.)
        - IP REGISTER ADDRESS: 174500
```

This is the end of a simple installation with a simple customization, including a QASGN and “build” and a few simple edits.

Sample Installation

A.4 Configuring the Terminal Handler

Customizing a terminal handler for the following specification:

- Handler is running on a 22-bit system
- The hardware interface is a DHV-11, 16 line multiplexor
- The console device is an LA120
- The devices on the multiplexor are VT100 terminals at 9600 baud
- The first 6 sublines on the DHV-11 require modem control. (Note: These lines do not have autobaud detection because they are used with a DECserver-200 LAT terminal server and are set to 9600 baud)
- Vertical padding is not required

Note: The comments embedded in the following code example have been truncated. To see the complete comments see Appendix B.

Edit the PARAMS.MAC file.

```
MCR> EDT [311,114]PARAMS.MAC
*48
  48      USSNTS      =1              ; MAXIMUM NUMBER OF TERMINALS TO BE SERVICED. THIS
*S/1/17./
  48      USSNTS      =17.           ; MAXIMUM NUMBER OF TERMINALS TO BE SERVICED. THIS
1 SUBSTITUTION
*52
  52      BSS22       =0              ; 22-BIT SUPPORT REQUIRED (MUST BE 1 ON PDP-11/70
*S/0/1/
  52      BSS22       =1              ; 22-BIT SUPPORT REQUIRED (MUST BE 1 ON PDP-11/70
1 SUBSTITUTION
*56
  56      BSSAW       =0              ; 'BELLS AND WHISTLES'. THIS SHOULD BE 1 UNLESS
*S/0/1/
  56      BSSAW       =1              ; 'BELLS AND WHISTLES'. THIS SHOULD BE 1 UNLESS
1 SUBSTITUTION
*72
  72      DSSU11      =0              ; NUMBER OF DHU11 16-LINE NPR MULTIPLEXOR INTERFACES
*S/0/1/
  72      DSSU11      =1              ; NUMBER OF DHU11 16-LINE NPR MULTIPLEXOR INTERFACES
1 SUBSTITUTION
*74
  74      DSSUDU      =0              ; DIAL-UP SUPPORT FOR DHU11. THIS MUST BE A 1 IF ANY
*S/0/1/
  74      DSSUDU      =1              ; DIAL-UP SUPPORT FOR DHU11. THIS MUST BE A 1 IF ANY
1 SUBSTITUTION
*77
  77      DSSIAL      =0              ; DIALUP SUPPORT. MUST BE 1 IF ANY DIALUP LINES ARE
*S/0/1/
  77      DSSIAL      =1              ; DIALUP SUPPORT. MUST BE 1 IF ANY DIALUP LINES ARE
1 SUBSTITUTION
*118
  118     HSSSYN      =0              ; HOST SYNCHRONIZATION. THE HANDLER ISSUES XON/XOFF
*S/0/1/
  118     HSSSYN      =1              ; HOST SYNCHRONIZATION. THE HANDLER ISSUES XON/XOFF
1 SUBSTITUTION
*180
  180     HSSOLD      =BSSAW         ; TERMINAL HOLD FACILITY OF VT5X TERMINALS SUPPORTED
```

Sample Installation

```
*S/BSSAW/0/
 180      HSSOLD      =0          ; TERMINAL HOLD FACILITY OF VT5X TERMINALS SUPPORTED
1 SUBSTITUTION
*340
 340      VSSFIL      =1          ; VT05 TYPE VERTICAL FILL. THIS MUST BE 1 IF VT05
*S/1/0/
 340      VSSFIL      =0          ; VT05 TYPE VERTICAL FILL. THIS MUST BE 1 IF VT05
1 SUBSTITUTION
*EXIT
DU0:[311,114]PARAMS.MAC;3 397 LINES
```

Edit the CONFIG.MAC file.

```
MCR> EDT [311,114]CONFIG.MAC
1      .SBTTL      TERMINAL AND INTERFACE CONFIGURATION FILE
*50
*I
      INTF      1,DU,160500,320
      ^Z

      50
*109
 109      TERM      0,0, ,L30S
*S/L30S/L120/
 109      TERM      0,0, ,L120
1 SUBSTITUTION
[EOB]
*I
      TERM      1,1,0,V100,9600,<DIALUP>
      TERM      2,1,NEXT,V100,9600,<DIALUP>
      TERM      3,1,NEXT,V100,9600,<DIALUP>
      TERM      4,1,NEXT,V100,9600,<DIALUP>
      TERM      5,1,NEXT,V100,9600,<DIALUP>
      TERM      6,1,NEXT,V100,9600,<DIALUP>
      TERM      7,1,NEXT,V100,9600
      TERM      10,1,NEXT,V100,9600
      TERM      11,1,NEXT,V100,9600
      TERM      12,1,NEXT,V100,9600
      TERM      13,1,NEXT,V100,9600
      TERM      14,1,NEXT,V100,9600
      TERM      15,1,NEXT,V100,9600
      TERM      16,1,NEXT,V100,9600
      TERM      17,1,NEXT,V100,9600
      TERM      20,1,NEXT,V100,9600
      ^Z

[EOB]
```

Sample Installation

```
*%WH
1      .SBTTL      TERMINAL AND INTERFACE CONFIGURATION FILE
2      .IDENT     "V03.00"
3      ;+
4      ; THIS FILE CONTAINS THE MACRO CALLS TO DEFINE THE TERMINALS AND
5      ; INTERFACES PRESENT IN THIS SYSTEM.
6      ; -
7
8      ;
9      ; COPYRIGHT (C) 1976, 1978
10     ; DIGITAL EQUIPMENT CORPORATION, MAYNARD, MASS
11     ;
12     ; THIS SOFTWARE IS FURNISHED UNDER A LICENSE FOR USE ONLY ON A
13     ; SINGLE COMPUTER SYSTEM AND MAY BE COPIED ONLY WITH THE INCLUSION
14     ; OF THE ABOVE COPYRIGHT NOTICE. THIS SOFTWARE, OR ANY OTHER
15     ; COPIES THEREOF, MAY NOT BE PROVIDED OR OTHERWISE MADE AVAILABLE
16     ; TO ANY OTHER PERSON EXCEPT FOR USE ON SUCH SYSTEM AND TO ONE WHO
17     ; AGREES TO THESE LICENSE TERMS. TITLE TO AND OWNERSHIP OF THE
18     ; SOFTWARE SHALL AT ALL TIMES REMAIN IN DEC.
19     ;
20     ; THE INFORMATION IN THIS SOFTWARE IS SUBJECT TO CHANGE WITHOUT
21     ; NOTICE AND SHOULD NOT BE CONSTRUED AS A COMMITMENT BY DIGITAL
22     ; EQUIPMENT CORPORATION.
23     ;
24     ; DEC ASSUMES NO RESPONSIBILITY FOR THE USE OR RELIABILITY OF ITS
25     ; SOFTWARE ON EQUIPMENT WHICH IS NOT SUPPLIED BY DEC.
26     ;
27     ;
28     ;           AUTHOR   :       JOHN HARPER
29     ;           DATE    :       26-JUL-76
30     <FF>
31     ;+
32     ; FIRST DEFINE EACH INTERFACE PRESENT IN THE SYSTEM, IN THE FORM:
33     ;
34     ;   INTF      NUMBER,TYPE,ADDRESS,VECTOR[,EXTRA]
35     ;
36     ;   NUMBER   INTERFACE NUMBER, STARTING AT ZERO. INTERFACE ZERO MUST
37     ;             ALWAYS BE THE CONSOLE DL11.
38     ;   TYPE     IS THE INTERFACE TYPE (E.G. 'DL', 'DH')
39     ;   ADDRESS  IS THE EXTERNAL PAGE ADDRESS OF THE INTERFACE
40     ;   VECTOR   IS THE INTERRUPT VECTOR ADDRESS
41     ;   EXTRA   IF PRESENT CONTAINS INTERFACE DEPENDENT INFORMATION:
42     ;             DL - NON-ZERO IF DL11E
43     ;             DH - INTERFACE NUMBER OF ASSOCIATED DM11, IF ANY, OTHERWISE
44     ;                 BLANK. THE DM MUST PRECEDE THE DH, AND MUST NOT
45     ;                 BE INTERFACE ZERO.
46     ;             DC - 1 FOR DC11AA, 2 FOR DC11AB, ETC, 0 FOR DC11AX
47     ; -
48
49     INTF      0,DL,177560,060
49.1 INTF      1,DU,160500,320
50
51     ;+
52     ; NOW DEFINE ANY USER TERMINAL TYPES REQUIRED. THESE TERMINALS
53     ; ARE GIVEN NAMES USR0 - USR4, AND MAY BE REFERENCED BY THE THE
54     ; TER (RSX) OR SET TERMINAL (IAS) COMMANDS IN EXACTLY THE SAME
55     ; WAY AS DEC-DEFINED TERMINAL TYPES.
56     ;
57     ; THE FORMAT OF A TERMINAL TYPE DEFINITION IS:
58     ;
59     ;   DEFTRM  NAME,XSPD,RSPD,LENGTH,WIDTH
60     ;   CHR     <<CHR1,VAL1>,...>
61     ;
```

```

62 ;
63 ; ENDTRM
64 ;
65 ; NAME IS THE TERMINAL NAME, I.E. USRO
66 ; S
67 ; RSPD IS THE SPEED AT WHICH THE TERMINAL RECEIVES
68 ; LENGTH IS THE TERMINAL PAGE LENGTH (HARDCOPY TERMINALS)
69 ; OR NUMBER OF LINES ON THE SCREEN (VDU'S)
70 ; WIDTH IS THE MAXIMUM NUMBER OF CHARACTERS TO BE
71 ; PRINTED ON ONE LINE
72 ;
73 ; CHR1 IS A CHARACTERISTIC NAME (E.G. 'HFL')
74 ; VAL1 IS THE CORRESPONDING VALUE
75 ;
76 ; THERE MAY BE ANY NUMBER OF CHARACTERISTICS
77 ; ON ONE LINE, SUBJECT ONLY TO LINE LENGTH
78 ; THE 'CHR' MACRO MAY BE USED UP TO NINE TIMES
79 ;
80 ; FOR THE SET OF CHARACTERISTICS ALLOWED, SEE
81 ; SYSGEN REFERENCE MANUAL
82 ;
83 ; FOR EXAMPLES OF THE USE OF THIS MACRO LIST THE FILE [311,114]TBLS.MAC
84 ; -
85
86 ;+
87 ; NOW DEFINE EACH TERMINAL IN THE SYSTEM, USING:
88 ;
89 ; TERM NUMBER,INTNUM,SUBLINE,TYPE,<SPEED>,<DIALUP>,<<CHAR>>
90 ;
91 ; NUMBER IS THE TERMINAL NUMBER STARTING AT ZERO
92 ; INTNUM IS THE NUMBER OF THE INTERFACE TO WHICH IT IS CONNECTED
93 ; SUBLINE IS THE SUBLINE ON THE INTERFACE (BLANK FOR NON-MULTIPLE XOR
94 ; INTERFACES, E.G. DL11)
95 ; TYPE IS THE TERMINAL TYPE, OUT OF: AS33, KS33, AS35, L30S,
96 ; L30P, LA36, L120, VT05, VT50, VT52, VT55, VT61, V100.
97 ; SPEED (MUST BE IN BRACKETS IF PRESENT) IS EITHER ONE VALUE FOR
98 ; SINGLE-SPEED TERMINALS OR <KEYBOARD SPEED, PRINTER SPEED>
99 ; FOR SPLIT-SPEED TERMINALS.
100 ; DIALUP IS EITHER BLANK FOR NON-DIALUP LINES OR '<DIALUP>' FOR
101 ; DIALUP LINES OR '<REMOTE>' FOR REMOTE LINES.
102 ; <<CHAR>> IS A LIST OF CHARACTERISTICS (BRACKETED PAIRS THEMSELVES
103 ; ENCLOSED IN BRACKETS) WHICH ARE NOT STANDARD FOR THIS
104 ; TERMINAL TYPE. FOR A LIST OF THESE CHARACTERISTICS SEE
105 ; DEVICE HANDLER REF MANUAL CHAPTER 2 OR THE FILE
106 ; [311,114]TBLS.MAC
107 ; -
108
109 TERM 0,0, ,L30S
110 TERM 1,1,0,V100,9600,<DIALUP>
111 TERM 2,1,NEXT,V100,9600,<DIALUP>
112 TERM 3,1,NEXT,V100,9600,<DIALUP>
113 TERM 4,1,NEXT,V100,9600,<DIALUP>
114 TERM 5,1,NEXT,V100,9600,<DIALUP>
115 TERM 6,1,NEXT,V100,9600,<DIALUP>
116 TERM 7,1,NEXT,V100,9600
117 TERM 10,1,NEXT,V100,9600
118 TERM 11,1,NEXT,V100,9600
119 TERM 12,1,NEXT,V100,9600
120 TERM 13,1,NEXT,V100,9600
121 TERM 14,1,NEXT,V100,9600
122 TERM 15,1,NEXT,V100,9600
123 TERM 16,1,NEXT,V100,9600
124 TERM 17,1,NEXT,V100,9600

```

Sample Installation

```
125      TERM      20,1,NEXT,V100,9600
[EOB]
*EXIT
DU0:[311,114]CONFIG.MAC;2 126 LINES
```

Edit SYSGEN.CMD to include the new terminals.

```
MCR> EDT [11,17]SYSGEN.CMD
1      ; [11,17] SYSGEN.CMD
*'TT'
17     DEV=TT0,CONSOL
*
18     DEV=BA<0-1>,BATCH
*I
      DEV=TT<1-20>,TERM
      ^Z
18     DEV=BA<0-1>,BATCH
*T 15:20
15     DEV=MO
16     DEV=LP0,LP11B
17     DEV=TT0,CONSOL
17.1   DEV=TT<1-20>,TERM
18     DEV=BA<0-1>,BATCH
19     DEV=PI
20     DEV=DLO,RL01
*EXIT
DU0:[11,17]SYSGEN.CMD;6 40 LINES
```

Install needed tasks.

```
MCR> INS [11,1]SGN1/TASK=...SGN,[11,1]INV
```

Copy tasks in case this system fails.

```
> PIP [11,1]/NV=[11,1]TT.TSK,MOU,INS,DUMU,UQSSP,HIBBR,RESFCP
```

Assemble and task build the new terminal handler.

```
> MAC @[311,114]TTMACNLST
> TKB @[11,114]TTTKBNMAP
```

Perform a new system generation to incorporate the new terminal handler.


```

> REM @([11,17]SYSGENREM
REM -- TASK AD.... NOT IN SYSTEM
REM -- TASK AF.... NOT IN SYSTEM
REM -- TASK BA.... IS ACTIVE
REM -- TASK CD.... NOT IN SYSTEM
REM -- TASK CT.... NOT IN SYSTEM
REM -- TASK CR.... NOT IN SYSTEM
REM -- TASK DD.... NOT IN SYSTEM
REM -- TASK DT.... NOT IN SYSTEM
REM -- TASK LS.... NOT IN SYSTEM
REM -- TASK MM.... NOT IN SYSTEM
REM -- TASK MO.... IS ACTIVE
REM -- TASK MT.... NOT IN SYSTEM
REM -- TASK NL.... IS ACTIVE
REM -- TASK PP.... NOT IN SYSTEM
REM -- TASK PR.... NOT IN SYSTEM
REM -- TASK UD.... NOT IN SYSTEM
REM -- TASK .SUIC. NOT IN SYSTEM
REM -- TASK ...BAS NOT IN SYSTEM
REM -- TASK ...BAT NOT IN SYSTEM
REM -- TASK ...BCK NOT IN SYSTEM
REM -- TASK ...BPR NOT IN SYSTEM
REM -- TASK ...BP2 NOT IN SYSTEM
REM -- TASK ...CNV NOT IN SYSTEM
REM -- TASK ...COR NOT IN SYSTEM
REM -- TASK ...DFN NOT IN SYSTEM
REM -- TASK ...DSP NOT IN SYSTEM
REM -- TASK ...FOR NOT IN SYSTEM
REM -- TASK ...F4P NOT IN SYSTEM
REM -- TASK ...IND NOT IN SYSTEM
REM -- TASK ...PRE NOT IN SYSTEM
REM -- TASK ...RES NOT IN SYSTEM
REM -- TASK ...RST NOT IN SYSTEM
REM -- TASK ...SDM NOT IN SYSTEM
REM -- TASK ...SPR NOT IN SYSTEM

```

Performing a system generation.

```

MCR> INS ([11,1]SGN1/TASK=...SGN,[11,1]INV
MCR> SGN @([11,17]SYSGEN
PDP11=84,1920K,FP,00000060
/
SCOM=,12K,140
PAR=SENPAR,,4K,U
PAR=GEN,,*,T
/
DEV=SP,PSEUDO
DEV=WK,PSEUDO
DEV=LB,PSEUDO
DEV=NL0,NULL
DEV=MU0,TU81
DEV=MU1,TU81,314,5,160444
DEV=MO
DEV=LP0,LP11B
DEV=TT0,CONSOL
DEV=TT<1-20>,TERM
DEV=BA<0-1>,BATCH
DEV=PI
DEV=DL0,RL01
DEV=DU<0-3>,RA80
DEV=DU<4-7>,RC25,310,5,160354
/

```

Sample Installation

```
DPAR=GEN
SY=DU0
DCLI=MCR
/
INS=GEN, [1,1]SYSRES/LI/ACC=RO
INS=GEN, [1,1]HNDLIB/LI/ACC=RO
INS=GEN, [1,1]IASCOM/LI/ACC=RO/UIC=[1,1]
INS=GEN, [1,1]FCPCOM/CM
INS=GEN, [11,1]DUMU
INS=GEN, [11,1]UQSSP
INS=GEN, [11,1]MUMU
INS=GEN, [11,1]TT
INS=GEN, [11,17]SGN2, [11,1]MOU, [11,1]INS/UIC=[1,1]
INS=GEN, [11,1]HIBBR
INS=GEN, [11,1]RESFCP
//
SGN>END OF PHASE 1
```

Boot the new system.

```
MCR> BOO [11,17]
*** SYSTEM GENERATION PHASE 2 ***
MOU SY:/OVR
MOUNT-***VOLUME INFORMATION**
      DEVICE  =DU0
      CLASS   =FILE 11
      LABEL   =IASSYS
      UIC     =[1,1]
      ACCESS  =[RWED,RWED,RWED,RWED]
      CHARAC  =[]
MOUNT -- DU0 ** MOUNT COMPLETE **
INS [11,1]TKTN
INS [11,1]MCR/UIC=[1,1]
INS [11,1]MFT/POOL=255
INS [11,1]MCRERR
INS [11,1]ACT
INS [11,1]ASN
INS [11,1]BA
INS [11,1]BAD
INS [11,1]BOO
INS [11,1]CMP
INS [11,1]CON
INS [11,1]CRF/INC=10000
INS [11,1]DEMO
INS [11,1]DEV
INS [11,1]HIBBR
INS -- TASK NAME ALREADY IN USE FILE HIBBR.TSK;3
INS [11,1]DMO
INS [11,1]DMP
INS [11,1]DSC
INS [11,1]EDI
INS [11,1]EDT
INS [11,1]KED
INS [11,1]K52
INS [11,1]ERRLOG
INS [11,1]FLX
INS [11,1]F11MSG
INS [11,1]HELP
INS [11,1]INDIAS
INS [11,1]INIT
INS [11,1]INIT/TASK=...HOM
INS [11,1]LBR
```

```
INS [11,1]LOA
INS [11,1]LP
INS [11,1]LUN
INS [11,1]MACIAS
INS [11,1]MO
INS [11,1]MSM
INS [11,1]NL
INS [11,1]OPE
INS [11,1]OPR
INS [11,1]PDS
INS [11,1]PIP
INS [11,1]QUE
INS [11,1]REA
INS [11,1]RED
INS [11,1]REM
INS [11,1]RUN
INS [11,1]SAV
INS [11,1]SET
INS [11,1]SLP
INS [11,1]SPR
INS [11,1]SPR2
INS [11,1]SWA
SWA SY0:/LE:500.
INS [11,1]SYS
INS [11,1]TCP
INS [11,1]IAS
INS [11,1]IASTART
INS [11,1]SDM
INS [11,1]TER
INS [11,1]TIM
INS [11,1]TKB
INS [11,1]UFD
INS [11,1]UNL
INS [11,1]USERS
INS [11,1]UTL
UTL /LV:3
UTL /PT:8
UTL /BQ:0
INS [11,1]VFY
INS [11,1]ZAP
RED SY=SP
RED SY=LB
RED SY=WK
RED LP=CL
RED -- WARNING:   HANDLER NOT RESIDENT
SET /SP=LP:
LOA BA
LOA NL
*** END OF SYSTEM GENERATION PHASE 2 ***
```

Save the system using the /CMD switch to execute [1,1]STARTUP.CMD.

```
MCR> SAV /CMD
DMO -- DU00: ** DISMOUNT COMPLETE **
UQ$SSP - Message from MSCP port server:
        - Unibus/Q-Bus Storage Systems Port initialized successfully.
        - Reason for hard init: System Re-booted
        - Micro-code version: 145
        - IP register address: 172150
        - SA register contents: 000000
```

Sample Installation

```
15:34:26 - Message from MSCP handler:
DU000:   - Controller is ONLINE
         - Controller software version (5.)
         - Controller hardware version (0.)
         - IP register address: 172150
```

```
1920K (WORD) IAS VERSION 3.4 BASELEVEL 3404
```

```
MOUNT-**VOLUME INFORMATION**
```

```
DEVICE  =DU0
CLASS   =FILE 11
LABEL   =IASSYS
UIC     =[1,1]
ACCESS  =[RWED,RWED,RWED,RWED]
CHARAC  =[]
```

```
MOUNT -- DU0 ** MOUNT COMPLETE **
```

```
16-NOV-89 15:34:40
```

```
DATE AND TIME, PLEASE? 16-NOV-89 15:35
```

```
>INS [11,1]ERRDSA
```

```
>LOAD DU4
```

```
>LOAD MU0
```

```
>LOAD MU1
```

```
>LOAD MO
```

```
@ <EOF>
```

```
UQ$SSP - MESSAGE FROM MSCP PORT SERVER:
        - PORT FAILED TO HARDWARE INITIALIZE.
        - PORT HARDWARE INIT STEP LEVEL: 1
        - HANDLER TI INDICATOR: 147200
        - HANDLER TASK NAME: MU... FUNCTION CODE: 1
        - IP REGISTER ADDRESS: 174500
        - SA REGISTER CONTENTS: 000000
```

```
UQ$SSP - MESSAGE FROM MSCP PORT SERVER:
        - UNIBUS/Q-BUS STORAGE SYSTEMS PORT INITIALIZED SUCCESSFULLY.
        - REASON FOR HARD INIT: OPERATOR MANUAL LOAD
        - MICRO-CODE VERSION: 30
        - IP REGISTER ADDRESS: 160354
        - SA REGISTER CONTENTS: 000000
```

```
15:35:08 - MESSAGE FROM MSCP HANDLER:
DU004:   - CONTROLLER IS ONLINE
         - CONTROLLER SOFTWARE VERSION (8.)
         - CONTROLLER HARDWARE VERSION (5.)
         - IP REGISTER ADDRESS: 160354
```

```
UQ$SSP - MESSAGE FROM MSCP PORT SERVER:
        - UNIBUS/Q-BUS STORAGE SYSTEMS PORT INITIALIZED SUCCESSFULLY.
        - REASON FOR HARD INIT: OPERATOR MANUAL LOAD
        - MICRO-CODE VERSION: 121
        - IP REGISTER ADDRESS: 160444
        - SA REGISTER CONTENTS: 000000
```

```
15:35:10 - MESSAGE FROM TMSCP HANDLER:
MU001:   - CONTROLLER IS ONLINE
         - CONTROLLER SOFTWARE VERSION (1.)
         - CONTROLLER HARDWARE VERSION (3.)
         - IP REGISTER ADDRESS: 160444
```

A.5 Configuring the System for Timesharing

Create a timesharing startup command file, TIMESHARE.CMD. For a simple test case of the new terminal handler, set the terminal characteristics to do lower case.

```
MCR> TER TI:/LA120
MCR> ddd^U
```

Lower case is now functioning on the terminal. So far, the new terminal handler seems to be working properly.

```
MCR> EDT TIMESHARE.CMD
Input file does not exist
[EOB]
```

User input.

```
*I
; This file established the timesharing environment
; by specifying the timesharing devices and parameters
;
SET DEVICES
DU1
DU2/S
DU3
DU4
DU5
DU6
DU7
DL0
MU0
MU1
SET TERMINAL
BA0
BA1
TT1
TT2
TT3
TT4
TT5
TT6
TT7
TT10
TT11
TT12
TT13
TT14
TT15
TT16
TT17
TT20
SET BATCH
SET START
^Z
```

Sample Installation

```
[EOB]
*&WH
 1      ; This file established the timesharing environment
 2      ; by specifying the timesharing devices and parameters
 3      ;
 4      SET DEVICES
 5      DU1
 6      DU2
 7      DU3
 8      DU4
 9      DU5
10      DU6
11      DU7
12      DL0
13      MU0
14      MU1
15      SET TERMINAL
16      BA0
17      BA1
18      TT1
19      TT2
20      TT3
21      TT4
22      TT5
23      TT6
24      TT7
25      TT10
26      TT11
27      TT12
28      TT13
29      TT14
30      TT15
31      TT16
32      TT17
33      TT20
34      SET BATCH
35      SET START
[EOB]
*EXIT
DU0:[1,1]TIMESHARE.CMD;1 35 lines
```

Invoke timesharing.

Sample Installation

```
MCR> IAS @TIMESHARE
SET DEVICES
DU1
DU2
DU3
DU4
DU5
DU6
DU7
DL0
MU0
MU1
SET TERMINAL
BA0
BA1
TT1
TT2
TT3
TT4
TT5
TT6
TT7
TT10
TT11
TT12
TT13
TT14
TT15
TT16
TT17
TT20
SET BATCH
SET START
USER TASKS PARTITION = GEN
TOTAL TIMESHARING SPACE AVAILABLE IN PARTITION = 162205 OCTAL BLOCKS(32 WORDS)
User SCITERMINAL   UIC [1,1] TT00: 15:41:52 16-NOV-89
SCI>
```

Timesharing is now up and running. The following commands are necessary to start the batch processors.

```
SCI> RUN/CLI BA0
SCI> RUN/CLI BA1
```

The new terminal handler is now working and timesharing is up and running.

B System Generation Files

This appendix lists the following files:

- [11,15]EXECBLD.CMD
- [11,15]EXEC.ODL
- [311,114]CONFIG.MAC
- [11,17]PARAMS.MAC
- [11,17]SYSBLD.CMD
- [311,107]SGDATA.MAC
- [1,1]TSTKB.CMD
- [1,1]BUILD.CMD

System Generation Files

B.1 EXECBLD.CMD

```
;
; [ 1 1 , 1 5 ] E X E C B L D . C M D
;
; TKB Command File To Build IAS Executive
;
[11,17]EXEC/RO/-OR,[111,15]EXEC/-SP,[11,17]EXECUTIVE=
      [11,15]EXEC/MP
STACK=0
UNITS=0
RESAPR=3:4:5:7
;
GBLDEF=.ACTET:54
GBLDEF=.ACTFT:54
GBLDEF=.ACTCP:54
GBLDEF=.ACTEC:54
GBLDEF=.ACTMT:54
GBLDEF=.ACTIO:54
;
;      Dummy DBMS routine global
;      (included for future use only; the following
;      GBLDEF should not be changed for IAS V3.3)
;
GBLDEF=.DBMSX:54
;
;
;      Question and answer system generation is responsible
;      for setting up the rest of this file. It relies on
;      locating the strings ";_***_SYSGEN_OPTIONS_***" and
;      ";_***_END_OF_SYSGEN_OPTIONS_***" (where "_" has been
;      substituted for " ").
;      These strings should never be removed from the file.
;
; *** SYSGEN Options ***
;
;      Dummy out scheduler globals
;
GBLDEF=CC.MFE:0,CC.MF2:0
GBLDEF=.IASFM:54,.IASFR:54,.IASFC:54
GBLDEF=TSSTS1:44,TSSTS2:44
GBLDEF=.TSTOP:54,.TSWAP:54
;
;      Dummy PLAS directive globals
;
GBLDEF=.D.GCX:0
GBLDEF=.D.CRW:0,.D.ELW:0,.D.MAP:0,.D.UNM:0
GBLDEF=.D.ATR:0,.D.CRR:0,.D.DTR:0
GBLDEF=.D.RRF:0
GBLDEF=.D.SRF:0,.D.SRR:0
;
;      Dummy globals for other directives
;
GBLDEF=.D.CNT:0
GBLDEF=.D.EST:0
GBLDEF=.D.GIN:0
;
; *** End of SYSGEN Options ***
;
/
```

B.2 EXEC.ODL

```

;
; [ 1 1 , 1 5 ] E X E C . O D L
;
; Overlay Descriptor File for IAS Executive
;
;
; Question and answer system generation is responsible
; For setting up the following Exec options:
;     PLAS
;     SCHEDULER
;     CRASH MODULE
;     MEMORY PARITY MODULE.
; It relies on locating the following factors in the order given.
;     PLAS
;     ESTPAR
;     TSSHED
;     TSMEM
;     TSDATA
;     CRASH
;     MP
;
; .NAME EXEC
; .NAME ASX
; .NAME DIR
; .NAME QIO
; .NAME SCOMM
;
;
; .ROOT ROOT-!(OVSCOM-!(OVDIR,OVASX,OVQIO))
;
ROOT: .FCTR EXEC-EM00-EM01-EM02-EM03-EM04-EM06-EM07-EM08-EM10-EMNUL-R1
R1: .FCTR ESTPAR-ESMEM-ESREQS-ESSFL-ESEXIO-ESSWAP-R2
R2: .FCTR ESMISC-ESASX-TSMEM-TSDATA-SCMSBS-POOL-R3
R3: .FCTR OPTS-LVEND-SYML-QIODEF-RPSECT
RPSECT: .FCTR ASXSTT
POOL: .FCTR ESPOOL-ESRNMS
OPTS: .FCTR CRASH-ODT-MP
;
OVASX: .FCTR ASX-EM05-TSSHED
;
OVDIR: .FCTR DIR-ESDIR-DMABO-DMALP-DMASS-DMAST-DMATX-DMCMT-DMCSR-D1
D1: .FCTR DMDCP-DMDST-DMEXT-DMFIX-DMGCL-DMGCP-DMGLI-D2
D2: .FCTR DMGMP-DMGPP-DMGSS-DMGTP-DMIAR-DMMKT-D3
D3: .FCTR DMREQ-DMSAR-DMSCH-DMSDV-DMSSED-D4
D4: .FCTR DMSUS-DMPDIR-DMXTK-DMCER-IASSTB-PLAS
;
PLAS: .FCTR NULOBJ
PLAS1: .FCTR ESPLAS-DMGCX-DMMAP-DMREG-DMRRF-DMSRF
;
OVQIO: .FCTR QIO-DMQIO-DMGIN-CRSHDV
OVSCOM: .FCTR SCOMM-SCOMMX
;
EM00: .FCTR [11,15]EXEC/LB:EM00
EM01: .FCTR [11,15]EXEC/LB:EM01
EM02: .FCTR [11,15]EXEC/LB:EM02
EM03: .FCTR [11,15]EXEC/LB:EM03
EM04: .FCTR [11,15]EXEC/LB:EM04
EM05: .FCTR [11,15]EXEC/LB:EM05
EM06: .FCTR [11,15]EXEC/LB:EM06
EM07: .FCTR [11,15]EXEC/LB:EM07

```

System Generation Files

```
EM08: .FCTR [11,15]EXEC/LB:EM08
EM10: .FCTR [11,15]EXEC/LB:EM10
EMNUL: .FCTR [11,15]EXEC/LB:EMNUL
ESTPAR: .FCTR [11,15]EXEC/LB:NULOBJ
ACCTET: .FCTR [11,15]EXEC/LB:ACCTET
ESASX: .FCTR [11,15]EXEC/LB:ESASX
ESDIR: .FCTR [11,15]EXEC/LB:ESDIR
ESMEM: .FCTR [11,15]EXEC/LB:ESMEM
ESREQS: .FCTR [11,15]EXEC/LB:ESREQS
ESSFL: .FCTR [11,15]EXEC/LB:ESSFL
ESEXIO: .FCTR [11,15]EXEC/LB:ESEXIO
ESSWAP: .FCTR [11,15]EXEC/LB:ESSWAP
ESMISC: .FCTR [11,15]EXEC/LB:ESMISC
ESPOOL: .FCTR [11,15]EXEC/LB:ESPOOL
ESRNMS: .FCTR [11,15]EXEC/LB:ESRNMS
SCMSBS: .FCTR [11,15]EXEC/LB:SCMSBS
TSSHED: .FCTR [11,15]EXEC/LB:NULOBJ
TSMEM: .FCTR [11,15]EXEC/LB:NULOBJ
TSDATA: .FCTR [11,15]EXEC/LB:NULOBJ
DMGCL: .FCTR [11,15]EXEC/LB:DMGCL
DMQIO: .FCTR [11,15]EXEC/LB:DMQIO
DMGLI: .FCTR [11,15]EXEC/LB:DMGLI
DMASS: .FCTR [11,15]EXEC/LB:DMASS
DMALP: .FCTR [11,15]EXEC/LB:DMALP
DMREQ: .FCTR [11,15]EXEC/LB:DMREQ
DMSCH: .FCTR [11,15]EXEC/LB:DMSCH
DMMKT: .FCTR [11,15]EXEC/LB:DMMKT
DMCER: .FCTR [11,15]EXEC/LB:NULOBJ
DMCSR: .FCTR [11,15]EXEC/LB:DMCSR
DMCMT: .FCTR [11,15]EXEC/LB:DMCMT
DMSER: .FCTR [11,15]EXEC/LB:DMSER
DMSUS: .FCTR [11,15]EXEC/LB:DMSUS
DMEXT: .FCTR [11,15]EXEC/LB:DMEXT
DMGTP: .FCTR [11,15]EXEC/LB:DMGTP
DMGPP: .FCTR [11,15]EXEC/LB:DMGPP
DMGMP: .FCTR [11,15]EXEC/LB:DMGMP
DMGCP: .FCTR [11,15]EXEC/LB:DMGCP
DMSAR: .FCTR [11,15]EXEC/LB:DMSAR
DMABO: .FCTR [11,15]EXEC/LB:DMABO
DMFIX: .FCTR [11,15]EXEC/LB:DMFIX
DMDST: .FCTR [11,15]EXEC/LB:DMDST
DMDCP: .FCTR [11,15]EXEC/LB:DMDCP
DMIAR: .FCTR [11,15]EXEC/LB:DMIAR
DMSDV: .FCTR [11,15]EXEC/LB:DMSDV
DMAST: .FCTR [11,15]EXEC/LB:DMAST
DMATX: .FCTR [11,15]EXEC/LB:DMATX
DMGIN: .FCTR [11,15]EXEC/LB:NULOBJ
DMGSS: .FCTR [11,15]EXEC/LB:DMGSS
DMREG: .FCTR [11,15]EXEC/LB:DMREG
DMMAP: .FCTR [11,15]EXEC/LB:DMMAP
DMGCX: .FCTR [11,15]EXEC/LB:DMGCX
DMRRF: .FCTR [11,15]EXEC/LB:DMRRF
DMSRF: .FCTR [11,15]EXEC/LB:DMSRF
DMXTK: .FCTR [11,15]EXEC/LB:DMXTK
ESPLAS: .FCTR [11,15]EXEC/LB:ESPLAS
DMPDIR: .FCTR [11,15]EXEC/LB:DMPDIR
LVEND: .FCTR [11,15]EXEC/LB:LVEND
NULOBJ: .FCTR [11,15]EXEC/LB:NULOBJ
;
; DBMS OPTION
;
; ***** The following is included for future use only. *****
; ***** Do not change the following statement on IAS V3.1. *****
```

System Generation Files

```
;
DBMS: .FCTR [11,15]EXEC/LB:NULOBJ
;
; Crash Option
;
; Change the following two factors to include a crash module in the executive.
; The factor labeled 'CRASH:' (which currently references 'XCRASH') should be
; changed to 'CRASH' to include a reason for the crash with or without a crash
; dump.
;
; If 'CRASH' is chosen, the factor labeled 'CRSHDV:' (which currently
; references 'NULOBJ') must be changed to reference the module 'MESSCR' if
; an explanatory message but no crash dump is desired or changed to reference
; 'xxxxCR' (where xxxx is one of the following dump devices) to produce both an
; explanatory message and a crash dump.
;
;       TMSCP   (TU81, TK50, etc.)   Reference 'TMSCPC'
;       MSCP    (RC25, RA60, etc.)
;       RK05
;       RK06
;       RK07
;       RL01
;       RL02    (Use 'RL01' FOR 'XXXX')
;       TU10
;       TU16
;       TC11    (DECTape)
;       TS11
;
; Crash Dump Option
;
CRASH: .FCTR [11,15]EXEC/LB:XCRASH
CRSHDV: .FCTR [11,15]EXEC/LB:NULOBJ
;
; ODT Option
;
; Change 'NODT' to 'ODT' to include executive ODT in the system
;
ODT: .FCTR [11,15]EXEC/LB:NODT
;
; Memory Parity Option
;
; Change 'MPNONE' to:
;
; MP45 To include PDP-11/45 (and 40) memory parity handling
; MP60 To include PDP-11/60 (and 34 with KK11) memory parity handling
; MP70 To include PDP-11/70 memory parity handling
;
MP: .FCTR [11,15]EXEC/LB:MPNONE
;
;
SCOMMX: .FCTR [11,15]EXEC/LB:SCOMM-QIODEF
SYM1: .FCTR [1,1]IASYM.STB
QIODEF: .FCTR LB:[1,1]SYSLIB/LB:QIOSYM
IASSTB: .FCTR [11,15]IASSTB.STB/SS
;
;       .PSECT ASXSTT,OVR,GBL,D
;
;       .END
```

System Generation Files

B.3 CONFIG.MAC

This is a copy of [311,114]CONFIG.MAC as distributed with IAS Version 3.4. The line numbers in your CONFIG.MAC file may be different from the ones shown here.

The first few lines of this listing are an example of how to edit the file. This example displays the console terminal interface parameters, then uses EDT commands to change the option.

```
MCR> EDT [311,114]CONFIG.MAC
1      .SBTTL      TERMINAL AND INTERFACE CONFIGURATION FILE
*109
109      TERM      0,0, ,L30S
* S/L30S/L120/
109      TERM      0,0, ,L120
*

1      .SBTTL      TERMINAL AND INTERFACE CONFIGURATION FILE
2      .IDENT      "V03.00"
3      ;+
4      ; THIS FILE CONTAINS THE MACRO CALLS TO DEFINE THE TERMINALS AND
5      ; INTERFACES PRESENT IN THIS SYSTEM.
6      ; -
7
8      ;
9      ; COPYRIGHT (C) 1976, 1978
10     ; DIGITAL EQUIPMENT CORPORATION, MAYNARD, MASS
11     ;
12     ; THIS SOFTWARE IS FURNISHED UNDER A LICENSE FOR USE ONLY ON A
13     ; SINGLE COMPUTER SYSTEM AND MAY BE COPIED ONLY WITH THE INCLUSION
14     ; OF THE ABOVE COPYRIGHT NOTICE. THIS SOFTWARE, OR ANY OTHER
15     ; COPIES THEREOF, MAY NOT BE PROVIDED OR OTHERWISE MADE AVAILABLE
16     ; TO ANY OTHER PERSON EXCEPT FOR USE ON SUCH SYSTEM AND TO ONE WHO
17     ; AGREES TO THESE LICENSE TERMS. TITLE TO AND OWNERSHIP OF THE
18     ; SOFTWARE SHALL AT ALL TIMES REMAIN IN DEC.
19     ;
20     ; THE INFORMATION IN THIS SOFTWARE IS SUBJECT TO CHANGE WITHOUT
21     ; NOTICE AND SHOULD NOT BE CONSTRUED AS A COMMITMENT BY DIGITAL
22     ; EQUIPMENT CORPORATION.
23     ;
24     ; DEC ASSUMES NO RESPONSIBILITY FOR THE USE OR RELIABILITY OF ITS
25     ; SOFTWARE ON EQUIPMENT WHICH IS NOT SUPPLIED BY DEC.
26     ;
27     ;
28     ;          AUTHOR   :      JOHN HARPER
29     ;          DATE     :      26-JUL-76
30     <FF>
31     ;+
32     ; FIRST DEFINE EACH INTERFACE PRESENT IN THE SYSTEM, IN THE FORM:
33     ;
34     ;   INTF      NUMBER,TYPE,ADDRESS,VECTOR[,EXTRA]
35     ;
36     ;   NUMBER   INTERFACE NUMBER, STARTING AT ZERO. INTERFACE ZERO MUST
37     ;           ALWAYS BE THE CONSOLE DL11.
38     ;   TYPE     IS THE INTERFACE TYPE (E.G. 'DL', 'DH')
39     ;   ADDRESS  IS THE EXTERNAL PAGE ADDRESS OF THE INTERFACE
40     ;   VECTOR   IS THE INTERRUPT VECTOR ADDRESS
41     ;   EXTRA   IF PRESENT CONTAINS INTERFACE DEPENDENT INFORMATION:
42     ;           DL - NON-ZERO IF DL11E
43     ;           DH - INTERFACE NUMBER OF ASSOCIATED DM11, IF ANY, OTHERWISE
44     ;           BLANK. THE DM MUST PRECEDE THE DH, AND MUST NOT
45     ;           BE INTERFACE ZERO.
46     ;           DC - 1 FOR DC11AA, 2 FOR DC11AB, ETC, 0 FOR DC11AX
```

System Generation Files

```
47 ;-
48
49     INTF      0,DL,177560,060
50
51 ;+
52 ; NOW DEFINE ANY USER TERMINAL TYPES REQUIRED.  THESE TERMINALS
53 ; ARE GIVEN NAMES USR0 - USR4, AND MAY BE REFERENCED BY THE THE
54 ; TER (RSX) OR SET TERMINAL (IAS) COMMANDS IN EXACTLY THE SAME
55 ; WAY AS DEC-DEFINED TERMINAL TYPES.
56 ;
57 ; THE FORMAT OF A TERMINAL TYPE DEFINITION IS:
58 ;
59 ;   DEFTRM  NAME,XSPD,RSPD,LENGTH,WIDTH
60 ;           CHR    <<CHR1,VAL1>>,...>
61 ;           .
62 ;           .
63 ;   ENDTRM
64 ;
65 ;           NAME    IS THE TERMINAL NAME, I.E. USR0 - USR4
66 ;           XSPD    IS THE SPEED AT WHICH THE TERMINAL TRANSMITS
67 ;           RSPD    IS THE SPEED AT WHICH THE TERMINAL RECEIVES
68 ;           LENGTH  IS THE TERMINAL PAGE LENGTH (HARDCOPY TERMINALS)
69 ;                   OR NUMBER OF LINES ON THE SCREEN (VDU'S)
70 ;           WIDTH   IS THE MAXIMUM NUMBER OF CHARACTERS TO BE
71 ;                   PRINTED ON ONE LINE
72 ;
73 ;           CHR1    IS A CHARACTERISTIC NAME (E.G. 'HFL')
74 ;           VAL1    IS THE CORRESPONDING VALUE
75 ;
76 ;                   THERE MAY BE ANY NUMBER OF CHARACTERISTICS
77 ;                   ON ONE LINE, SUBJECT ONLY TO LINE LENGTH
78 ;                   THE 'CHR' MACRO MAY BE USED UP TO NINE TIMES
79 ;
80 ;                   FOR THE SET OF CHARACTERISTICS ALLOWED, SEE
81 ;                   SYSGEN REFERENCE MANUAL
82 ;
83 ; FOR EXAMPLES OF THE USE OF THIS MACRO LIST THE FILE [311,114]TBLS.MAC
84 ;-
85
86 ;+
87 ; NOW DEFINE EACH TERMINAL IN THE SYSTEM, USING:
88 ;
89 ;   TERM      NUMBER,INTNUM,SUBLINE,TYPE,<SPEED>,<DIALUP>,<<CHAR>>
90 ;
91 ;   NUMBER    IS THE TERMINAL NUMBER STARTING AT ZERO
92 ;   INTNUM    IS THE NUMBER OF THE INTERFACE TO WHICH IT IS CONNECTED
93 ;   SUBLINE   IS THE SUBLINE ON THE INTERFACE (BLANK FOR NON-MULTIPLE XOR
94 ;             INTERFACES, E.G. DL11)
95 ;   TYPE      IS THE TERMINAL TYPE, OUT OF: AS33, KS33, AS35, L30S,
96 ;             L30P, LA36, L120, VT05, VT50, VT52, VT55, VT61, V100.
97 ;   SPEED     (MUST BE IN BRACKETS IF PRESENT) IS EITHER ONE VALUE FOR
98 ;             SINGLE-SPEED TERMINALS OR <KEYBOARD SPEED, PRINTER SPEED>
99 ;             FOR SPLIT-SPEED TERMINALS.
100 ;   DIALUP    IS EITHER BLANK FOR NON-DIALUP LINES OR '<DIALUP>' FOR
101 ;             DIALUP LINES OR '<REMOTE>' FOR REMOTE LINES.
102 ;   <<CHAR>>  IS A LIST OF CHARACTERISTICS (BRACKETED
103 ;             VES
104 ;             ENCLOSED IN BRACKETS) WHICH ARE NOT STANDARD FOR THIS
105 ;             TERMINAL TYPE.  FOR A LIST OF THESE CHARACTERISTICS SEE
106 ;             DEVICE HANDLER REF MANUAL CHAPTER 2 OR THE FILE
107 ;             [311,114]TBLS.MAC
108 ;-
109
```

System Generation Files

109 TERM 0,0, ,L30S

B.4 PARAMS.MAC

This is a copy of [311,114]PARAMS.MAC as distributed with IAS Version 3.4. The line numbers in your PARAMS.MAC file may be different from the ones shown here.

The first few lines of this listing are an example of how to edit the file. This example displays the option for 22-bit addressing, and then uses EDT commands to change the option.

```

MCR> EDT [311,114]PARAMS.MAC
  1          .IDENT  "V3.207"
*52
52          B$$22      =0      ; 22-bit support required (must be 1 on PDP-11/70)
*S/=0/=1/
52          B$$22      =1      ; 22-bit support required (must be 1 on PDP-11/70)
*

  1          .IDENT  "V3.207"
  2          .IIF    NDF,TT, .NLIST
  3          ;
  4          ;
  5          ; COPYRIGHT (C) 1976, 1978, 1979, 1980, 1981, 1982, 1983, 1984, 1985
  6          ; DIGITAL EQUIPMENT CORPORATION, MAYNARD, MASS
  7          ;
  8          ; THIS SOFTWARE IS FURNISHED UNDER A LICENSE FOR USE ONLY ON A
  9          ; SINGLE COMPUTER SYSTEM AND MAY BE COPIED ONLY WITH THE INCLUSION
10          ; OF THE ABOVE COPYRIGHT NOTICE. THIS SOFTWARE, OR ANY OTHER
11          ; COPIES THEREOF, MAY NOT BE PROVIDED OR OTHERWISE MADE AVAILABLE
12          ; TO ANY OTHER PERSON EXCEPT FOR USE ON SUCH SYSTEM AND TO ONE WHO
13          ; AGREES TO THESE LICENSE TERMS. TITLE TO AND OWNERSHIP OF THE
14          ; SOFTWARE SHALL AT ALL TIMES REMAIN IN DEC.
15          ;
16          ; THE INFORMATION IN THIS SOFTWARE IS SUBJECT TO CHANGE WITHOUT
17          ; NOTICE AND SHOULD NOT BE CONSTRUED AS A COMMITMENT BY DIGITAL
18          ; EQUIPMENT CORPORATION.
19          ;
20          ; DEC ASSUMES NO RESPONSIBILITY FOR THE USE OR RELIABILITY OF ITS
21          ; SOFTWARE ON EQUIPMENT WHICH IS NOT SUPPLIED BY DEC.
22          ;
23          ;
24          ;          AUTHOR   :          JOHN HARPER
25          ;          DATE     :          3-JUN-76
26          ;
27          ; MODIFIED BY:
28          ;
29          ; 001          RICARDO ROBLES  24-MAY-86          ADD HOST SYNC (XON/XOFF) SUPPORT
30          <FF>
31          ;+
32          ; THIS FILE CONTAINS ALL THE ASSEMBLY PARAMETER DEFINITIONS FOR THE
33          ; IAS/RX11D TERMINAL HANDLER. THE PARAMETERS ARE DIVIDED INTO THREE
34          ; GROUPS:
35          ;
36          ; 1.          THOSE WHICH ARE EXPECTED TO BE CHANGED FOR EVERY CONFIGURATION.
37          ; 2.          THOSE WHICH WILL NOT NORMALLY NEED TO BE CHANGED, BUT WHICH MAY
38          ; HAVE TO BE IF AN INSTALLATION HAS SPECIAL REQUIREMENTS.
39          ; 3.          THOSE WHICH MUST NOT NORMALLY BE CHANGED. CHANGING THESE WILL HAVE
40          ; THE SAME EFFECT ON SUPPORTABILITY AS CHANGING THE SOURCE - I.E.
41          ; IT BECOMES UNSUPPORTED.
42          ;-
43          <FF>
44          ;+
45          ; GROUP 1 ASSEMBLY PARAMETERS - THOSE WHICH WILL NORMALLY NEED TO BE CHANGED
46          ;-

```


System Generation Files

```

47
48     U$$NTS     =1           ; MAXIMUM NUMBER OF TERMINALS TO BE SERVICED. THIS
49                                     ; SHOULD BE THE SAME AS THE NUMBER OF TERMINALS SPECIFIED IN
50                                     ; THE SYSGEN FILE USED IN BASIC SYSTEM GENERATION PHASE 1.
51
52     B$$22      =0           ; 22-BIT SUPPORT REQUIRED (MUST BE 1 ON PDP-11/70
53                                     ; CONFIGURATIONS WITH MORE THAN 124K OF MEMORY
54                                     ; AND A DH11 OR DHU11 INTERFACE PRESENT)
55
56     B$$AW      =0           ; 'BELLS AND WHISTLES'. THIS SHOULD BE 1 UNLESS SPACE
57                                     ; IS AT A PREMIUM. IF IT IS ZERO, MANY USEFUL BUT
58                                     ; SPACE-CONSUMING FEATURES, SUCH AS 'SMART' RUB OUT,
59                                     ; TYPE-AHEAD CONTROL-R AND SO ON ARE OMITTED.
60
61     B$$LCK     =0           ; BLOCK MODE SUPPORT. TH
62                                     ; SUPPORT IS NEEDED.                                IF BLOCK-MODEL
63
64     D$$C11     =0           ; NUMBER OF DC11 SINGLE-LINE INTERFACES IN THE CONFIGURATION.
65
66     D$$CDU     =0           ; DC11 DIALUP SUPPORT. THIS MUST BE 1 IF ANY DC11 INTERFACES
67                                     ; ARE CONNECTED TO MODEMS FOR DIALUP SUPPORT.
68
69     D$$H11     =0           ; NUMBER OF DH11 16-LINE NPR MULTIPLEXOR INTERFACES
70                                     ; IN THE CONFIGURATION.
71
72     D$$U11     =0           ; NUMBER OF DHU11 16-LINE NPR MULTIPLEX OR INTERFACES
73                                     ; PRESENT IN THE SYSTEM.
74     D$$UDU     =0           ; DIAL-UP SUPPORT FOR DHU11. THIS MUST BE A 1 IF ANY
75                                     ; DHU11 INTERFACES ARE CONNECTED TO A MODEM FOR DIALUP
76                                     ; SUPPORT.
77     D$$IAL     =0           ; DIALUP SUPPORT. MUST BE 1 IF ANY DIALUP LINES ARE
78                                     ; REQUIRED IN THE SYSTEM. IF IT IS ZERO, THE SYSTEM WILL
79                                     ; IGNORE DIALUP LINE
80
81     D$$ABD     =0           ; AUTOMATIC DETECTION OF BAUD RATE ON DIALUP LINES. IF
82                                     ; 1 THE TERMINAL HANDLER WILL ATTEMPT TO DETERMINE THE
83                                     ; BAUD RATE OF THE INCOMING CALLER. NOTE THAT THE
84                                     ; CHARACTER THE HANDLER USES IS A CARRIAGE RETURN.
85     D$$J11     =0           ; NUMBER OF DJ11 16-LINE INTERFACES IN THE
86                                     ; CONFIGURATION.
87
88     D$$L11     =1           ; NUMBER OF DL11 SINGLE-LINE INTERFACES IN THE CONFIGURATION.
89
90     D$$LDU     =0           ; DL11 DIALUP SUPPORT. THIS MUST BE 1 IF ANY DL11 (DL11E)
91                                     ; INTERFACES ARE CONNECTED TO MODEMS FOR DIALUP LINES.
92
93     D$$M11     =0           ; NUMBER OF DM11BB 16-LINE MODEM CONTROL INTERFACES IN THE
94                                     ; CONFIGURATION. THESE INTERFACES ARE USED TO PROVIDE
95                                     ; DIALUP SUPPORT FOR LINES INTERFACED THROUGH DH11 INTERFACES.
96
97     D$$Z11     =0           ; NUMBER OF DZ11 8-LINE INTERFACES IN THE CONFIGURATION.
98
99     D$$ZDU     =0           ; DZ11 DIALUP SUPPORT. MUST BE 1 IF ANY DZ11 INTERFACES
100                                     ; ARE CONNECTED TO MODEMS FOR DIALUP SUPPORT. IT IS IMPORTANT
101                                     ; THAT THIS SHOULD BE ZERO IF DZ11 DIALUP SUPPORT
102                                     ; IS NOT REQUIRED BECAUSE THE HANDLER MUST RUN EVERY SECOND
103                                     ; TO SERVICE DZ11 DIALUP LINES, WHICH IMPOSES AN OVERHEAD
104                                     ; ON THE SYSTEM.
105     E$$SEQ     =0           ; ESCAPE SEQUENCE SUPPORT. MUST BE NON-ZERO IF THE
106                                     ; HANDLER IS TO RECOGNIZE AND PARSE ESCAPE SEQUENCES.
107                                     ; THE PERMITTED VALUES FOR E$$SEQ ARE 0 THROUGH 4.

```

System Generation Files

```

108             ; TWO TYPES OF SEQUENCES CAN BE RECOGNISED BY THE
109             ; HANDLER - VT52 SEQUENCES AND ANSI SEQUENCES AND
110             ; FOR VT52 SEQUENCES TRANSLATION CAN BE PROVIDED.
111             ; SELECT THE OPTIONS AS FOLLOWS:
112             ; E$$$SEQ = 0    NO ESCAPE SEQUENCE SUPPORT
113             ; E$$$SEQ = 1    VT52 SEQUENCES ONLY (TRANSLATION PROVIDED)
114             ; E$$$SEQ = 2    ANSI SEQUENCES ONLY
115             ; E$$$SEQ = 3    BOTH SUPPORTED (TRANSLATION FOR VT52)
116             ; E$$$SEQ = 4    BOTH SUPPORTED (NO TRANSLATION)
117
118 H$$$SYN      =0             ; HOST SYNCHRONIZATION. THE HANDLER ISSUES XON/XOFF
119             ; TO ALLOW HOST TO HOST TRANSMISSION SYNCHRONIZATION.
120             ; NOTE THAT THE TRANSMITTING HOST MUST HAVE XON/XOFF
121             ; SUPPORT ENABLED; OTHERWISE, DATA
122                                     UR AT
123
124 H$$$RTZ      =60.          ; HIGHER BAUD RATE SETTINGS.
125                                     ; NUMBER OF CLOCK TICKS PER SECOND. THIS WILL
126                                     ; NORMALLY BE 60 (USA & CANADA) OR 50 (EVERYWHERE
127                                     ; ELSE), BUT MAY BE 100 IF A PROGRAMMABLE CLOCK
128                                     ; IS BEING USED. ANY OTHER VALUE IS ILLEGAL.
129
130 <FF>
131 ;+
132 ; GROUP 2 ASSEMBLY PARAMETERS - THOSE WHICH WILL NOT NORMALLY NEED TO BE CHANGED.
133 ; -
134
135 B$$$LIM      =0             ; IF NON-ZERO, MAXIMUM NUMBER OF BLOCK MODE TRANSFERS
136             ; ALLOWED TO BE IN PROGRESS AT ONE TIME. IF
137             ; ZERO, THERE IS NO LIMIT. THIS VALUE
138             ; SHOULD BE PROC * N / LOAD, WHERE
139             ;
140             ; PROC = 128. FOR 11/70, 64. FOR 11/45, 40. FOR 11/40
141             ; N     = NO OF BLOCK MODE TERMINALS IN SYSTEM
142             ; LOAD  = SUM OF (BAUD RATE)/1200 FOR EACH BLOCK
143             ; MODE  = MODE TERMINAL (E.G. 32 FOR
144             ;         4 9600 BAUD TERMINALS)
145             ;
146             ; IF THIS VALUE IS GREATER THAN THE NUMBER OF
147             ; BLOCK MODE TERMINALS, B$$$LIM SHOULD BE
148             ; DEFINED AS ZERO
149
150 B$$$SCN      =B$$$AW        ; MUST BE 1 FOR TYPE-AHEAD CONTROL-R AND BACKSPACE
151             ; OVER TAB TO WORK
152
153 B$$$SP       =B$$$AW        ; 1 FOR SUPPORT OF TERMINALS WITH HARDWARE BACKSPACE. IF IT
154             ; IS ZERO BACKSPACE WILL BE OUTPUT BUT THE HANDLER WILL LOSE
155             ; TRACK OF THE TERMINAL'S HORIZONTAL POSITION.
156
157 D$$$KIL      =0             ; IF NON-ZERO, IO.KIL CLEARS THE AST, EVENT FLAG AND
158             ; IOSB FOR ANY ABORTED REQUESTS, AS IN RSX V6B.
159             ; OTHERWISE, THESE ARE LEFT AND PARTIAL INPUT IS
160             ; RETURNED TO THE USER AS IN 11M. THE LATTER IS
161             ; THE DEFAULT.
162
163 D$$$RAT      =2             ; DEFAULT READ-AHEAD PROCESSING TYPE. THE VALUES FOR
164             ; THIS ARE:
165             ;
166             ; 0 - TYPE-AHEAD IS ILLEGAL AND IS IGNORED. CHARACTERS
167             ;     TYPED WHILE NO READ IS UNDER WAY WILL BE ECHOED
168             ;     AS 'BELL' BUT OTHERWISE IGNORED.
169             ; 1 - 'DEFERRED PROCESSING MODE' - CHARACTERS TYPED AHEAD
170             ;     WILL ONLY BE PROCESSED WHEN THEY ARE READ. THUS
171             ;     RUBOUT, CONTROL-U, ETC WILL NOT BE SEEN UNTIL
172             ;     A READ IS PERFORMED.

```

System Generation Files

```
170          ; 2 - 'IMMEDIATE PROCESSING, DEFERRED ECHO MODE' - CHARACTERS
171          ;     ARE PROCESSED AS THEY ARE TYPED BUT ARE NOT ECHOED
172          ;     UNTIL THEY ARE READ.  THUS RUBOUT, ETC, TYPED AHEAD
173          ;     WILL NOT APPEAR IN THE ECHO, WHICH WILL BE A CLEAN COPY.
174          ;
175          ; IT IS ALWAYS POSSIBLE TO CHANGE THE READ-AHEAD TYPE FOR
176          ; PARTICULAR LINES IN THE 'CONFIG' FILE - Q.V.
177
178  E$$ALT      =1          ; 1 TO ECHO ALTMODE (ESCAPE) AS '$' <CR>, 0 NOT TO ECHO
179
180  H$$OLD      =B$$AW      ; TERMINAL HOLD FACILITY OF VT5X TERMINALS SUPPORTED
181
182  I$$RST      =B$$AW      ; IO.RST AND IO.RTT FUNCTIONS SUPPORTED
183  L$$30S      =0          ; MUST BE 1 IF LA30S SERIAL DECWRITERS ARE IN THE
184          ; SYSTEM TO ENSURE THAT THEY RECEIVE THE CORRECT FILL FOR
185          ; CARRIAGE RETURN.  IF SPACE IS VERY CRITICAL AND THERE ARE
186          ; NO LA30S'S A FEW WORDS CAN BE SAVED BY DEFINING THIS AS ZERO.
187
188  M$$ANS      =2          ; TIME, IN SECONDS, TO WAIT AFTER SEEING FIRST RING BEFORE
189          ; ANSWERING THE PHONE.  THIS PRODUCES A SMALL 'HUMAN-LIKE'
190          ; DELAY FOR THE PHONE TO RING.  IT MAY ALSO BE REQUIRED BY
191          ; SOME COUNTRIES.
192
193  M$$CAR      =0          ; TIME TO WAIT AFTER ANSWERING THE PHONE BEFORE APPLYING
194          ; CARRIER, IN SECONDS.  MOST MODEMS ARE JUMPERED SO
195          ; THAT CARRIER IS APPLIED AS SOON AS THE PHONE IS ANSWERED
196          ; BUT SOME COUNTRIES REQUIRE A DELAY TO AVOID ALARMING
197          ; 'WRONG-NUMBER' CALLERS, ETC, AND IN THIS CASE THE
198          ; MODEM SHOULD BE JUMPERED SO THAT 'DATA TERMINAL
199          ; READY' AND 'REQUEST TO SEND' ARE NOT CONNECTED TOGETHER,
200          ; AND THIS PARAMETER SET TO THE REQUISITE VALUE.  THIS
201          ; FEATURE IS NOT AVAILABLE FOR LINES INTERFACED VIA A DZ11.
202
203  M$$RNG      =4          ; TIME, IN SECONDS, TO WAIT FOR A RING SIGNAL AFTER DECIDING
204          ; (AFTER M$$ANS SECONDS) TO ANSWER THE PHONE.  IF A RING
205          ; SIGNAL IS NOT DETECTED IN THIS INTERVAL THE CALLER IS
206          ; ASSUMED TO HAVE HUNG UP.  THIS TIME MUST BE GREATER
207          ; THAN THE PERIOD OF THE RING CYCLE (3 SECONDS
208          ; IN THE USA).
209
210  M$$SUK      =0          ; UK-TYPE SHORT MODEM TIMEOUTS REQUIRED.  SOME COUNTRIES, FOR
211          ; EXAMPLE THE UK, REQUIRE THAT A LINE BE DROPPED WITHIN A
212          ; VERY SHORT TIME INTERVAL AFTER CARRIER LOSS IS DETECTED
213          ; BECAUSE THEIR MODEMS ARE UNABLE TO DISTINGUISH CARRIER FROM
214          ; DIAL TONE (THIS IS ALSO TRUE OF SOME ACOUSTIC COUPLERS).
215          ; THIS PARAMETER MUST BE SET TO 1 FOR THE SHORT TIMEOUT TO
216          ; BE USED.  THIS FACILITY IS NOT AVAILABLE FOR MODEMS
217          ; INTERFACED VIA A DZ11.
218
219  M$$WIC      =30.        ; TIME, IN SECONDS, TO WAIT FOR CALLER TO APPLY CARRIER
220          ; AFTER WE HAVE DONE THE SAME.  THIS SHOULD BELONG
221          ; ENOUGH TO ALLOW THE CALLER TO PLACE THE PHONE IN ITS
222          ; BED ON AN ACOUSTIC COUPLER, BUT NOT
223          ; HAT THE
224          ; LINE IS TIED UP FOR LONG PERIODS AFTER A 'WRONG-NUMBER'
225          ; CALLER PUTS THE PHONE DOWN.
226  M$$WCR      =2          ; TIME TO WAIT AFTER CARRIER LOSS BEFORE ASSUMING THAT
227          ; CALLER HAS HUNG UP.  THIS TIME IS NORMALLY IN SECONDS
228          ; AND SHOULD ALLOW FOR THE PHONE BEING DISTURBED ON
229          ; THE BED OF AN ACOUSTIC COUPLER OR DROPOUTS IN THE LINE, BUT
230          ; IF 'M$$SUK' IS NON-ZERO IT IS IN UNITS OF 'M$$TIC'
231          ; TICKS AND SHOULD BE SUCH THAT THE LINE IS GUARANTEED TO BE
```

System Generation Files

```

232                                     ; DROPPED IN THE REQUIRED TIME.
233
234 M$$PRI      =5      ; PRIORITY OF INTERRUPT SERVICE ROUTINE. THIS WILL BE 5
235                                     ; UNLESS THERE ARE NO MULTIPLEXOR INTERFACES IN
236                                     ; THE SYSTEM, IN WHICH CASE IT IS 4. IT MAY BE USEFUL
237                                     ; FOR CONFIGURATIONS WITH NO BLOCK MODE TERMINALS TO
238                                     ; USE A PR4 JUMPER IN DH11/DJ11/DZ11 INTERFACES TO
239                                     ; IMPROVE THE SERVICE TO DISKS, ETC, IN WHICH CASE THIS
240                                     ; VALUE SHOULD BE CHANGED ACCORDINGLY.
241
242 N$$L        =0      ; NEWLINE TERMINAL SUPPORT. SHOULD BE 1 FOR SUPPORT OF
243                                     ; TERMINALS WHICH TREAT CHARACTER CODE 12 (OCTAL) AS
244                                     ; 'NEWLINE' RATHER THAN 'LINEFEED'.
245
246       .IF      LE,U$$NTS-5
247       $$$=25.
248       .IFF
249       .IF      LE,U$$NTS-32.
250       $$$=U$$NTS*3+10.
251       .IFF
252       $$$=U$$NTS*2+42.
253       .ENDC
254       .ENDC
255       .IF      LE,<254.-<U$$NTS*2>>-$$$
256       $$$=254.-<U$$NTS*2>
257       .ENDC
258 N$$SODS     =$$$      ; NUMBER OF INTERNAL NODES TO ALLOCATE. ALL INTERNAL
259                                     ; BUFFERING, INCLUDING TYPE-AHEAD, INTERMEDIATE BUFFERING
260                                     ; OF READS AND WRITES AND TERMINAL CHARACTERISTIC
261                                     ; DEFAULTS SAVED AFTER A 'SET CHARACTERISTIC' FUNCTION IS
262                                     ; PERFORMED IN NODES PICKED FROM AN INTERNAL POOL
263                                     ; OF 16-WORD NODES. IF THIS POOL IS NOT BIG ENOUGH
264                                     ; STRANGE THINGS WILL HAPPEN - CHARACTERS WILL BE LOSE AND
265                                     ; SO ON, ALTHOUGH THE HANDLER DOES TRY TO DO ITS BEST.
266                                     ; AS A GENERAL RULE, THREE NODES PER TERMINAL IS SUFFICIENT
267                                     ; FOR 5 - 32 TERMINALS. FOR MORE THAN 32 TERMINALS FEWER
268                                     ; NODES ARE SUFFICIENT BECAUSE IT IS UNLIKELY THAT ALL
269                                     ; TERMINALS WILL NEED ALL THEIR NODES AT ONCE. FOR LESS
270                                     ; THAN 5 TERMINALS, MORE SHOULD BE ALLOWED.
271                                     ; FOR MORE THAN 50 OR SO TERMINALS, IT IS NOT POSSIBLE
272                                     ; FOR SPACE REASONS TO HAVE AS MANY NODES AS WE WOULD
273                                     ; LIKE. WE REDUCE THE NUMBER TO THE MAXIMUM POSSIBLE
274                                     ; IN THIS CASE.
275
276 O$$VR       =1      ; BUILD OVERLAID VERSION OF HANDLER. THIS WILL ALWAYS BE
277                                     ; THE CASE EXCEPT FOR THE VERSION OF THE HANDLER USED IN
278                                     ; THE SYSTEM DISTRIBUTION KIT WHICH HAS NO DISK TO
279                                     ; OVERLAY FROM.
280
281 I$$ERM      =O$$VR   ; INITIALISATION ERROR MESSAGES. THESE TAKE SPACE IN
282                                     ; THE INITIALISATION OVERLAY BUT CAN BE OMITTED TO SAVE
283                                     ; DISK SPACE OR FOR THE DISTRIBUTION-KIT VERSION OF THE
284                                     ; HANDLER
285
286 S$$CHR      =B$$AW   ; SET CHARACTERISTICS FUNCTION. THIS IS REQUIRED FOR
287                                     ; THE PDS 'SET TERMINAL' COMMAND, BUT IT USES OVER
288                                     ; 1/2K OF MEMORY AND MAY BE OMITTED FOR SMALL SYSTEMS.
289
290 G$$CHR      =S$$CHR  ; GET CHARACTERISTICS SUBFUNCTIONS OF SET CHARACTERISTICS
291                                     ; (SF.GSC, SF.GMC). THIS FACILITY MAY BE USED
292                                     ; BY APPLICATIONS PROGRAMS TO DETERMINE THE CHARACTERISTICS
293                                     ; OF THE TERMINAL THEY ARE RUNNING ON.
294

```

System Generation Files

```

295     D$$CHR      =$$$CHR          ; DUMP CHARACTERISTICS SUBFUNCTIONS (SF.GAC, SF.SAC).
296                                     ; THIS FACILITY MAY BE USED BY APPLICATIONS PROGRAMS WHICH
297                                     ; CHANGE THE TERMINAL CHARACTERISTICS AND WANT
298                                     ; TO RESTORE THEM ON EXIT.
299
300     R$$BTB      =B$$AW&B$$SCN    ; SCOPE TAB RUBOUT.  IF THIS IS 1, RUBBING OUT A TAB
301                                     ; ON A SCOPE WILL MOVE THE CURSOR TO WHERE IT WAS
302                                     ; BEFORE THE TAB WAS TYPED.  IT IS POSSIBLE TO SAVE ABOUT 60
303                                     ; WORD BY DEFINING THIS PARAMETER AS ZERO, BUT RUBOUT
304                                     ; OVER TAB WILL BE ECHOED AS BACKSPACE-SPACE-BACKSPACE,
305                                     ; NORMALLY LEAVING THE CURSOR IN THE WRONG PLACE.
306
307     R$$INT      =<<D$$H11+999./1000.>I<D$$Z11+999./1000.>&B$$LCK>*3
308                                     ; OPTIMUM INTERVAL BETWEEN DH11 AND DZ11 READ INTERRUPTS
309                                     ; IN TICKS
310
311     S$$FF      =B$$AW          ; SOFTWARE SIMULATION OF FORMFEED AND VERTICAL TAB.
312                                     ; IF THIS IS 1 TERMINALS WHOSE CHARACTERISTICS ARE SET UP
313                                     ; CORRECTLY WILL SIMULATE VERTICAL FORMAT CONTROL
314                                     ; CHARACTERS LIKE A LINEPRINTER, RATHER THAN PRODUCING
315                                     ; 'TOKEN' OUTPUT OF A FIXED NUMBER OF LINEFEEDS.  THIS
316                                     ; IS PARTICULARLY USEFUL IF A SLOW HIGH-QUALITY PRINTER IS
317                                     ; USED FOR DOCUMENTATION (OR SIMILAR) WORK AND IS CONNECTED
318                                     ; VIA A TERMINAL INTERFACE.
319
320     S$$INT      =0              ; IF NON-ZERO, THIS IS THE NUMBER OF TICKS
321                                     ; BETWEEN EACH 'ONCE A SECOND' SCAN.  IT ONLY
322                                     ; NEEDS TO BE NON-ZERO WHEN NON-INTER
323                                     ;
324                                     ; RING CYCLE OF THE TELEPHONE SYSTEM IS SUCH
325                                     ; THAT EXAMINING THE RING LINE ONCE A SECOND
326                                     ; MAY MISS THE RING FOR EVER.  ITS VALUE SHOULD
327                                     ; BE AS CLOSE AS PRACTICAL TO THE NUMBER OF TICKS
328                                     ; IN ONE SECOND AND MUST BE SUCH THAT SOME
329                                     ; MULTIPLE OF THE PERIOD IS WITHIN 0.5 SEC
330                                     ; OF TEN SECONDS
331
332     T$$APE      =0              ; NON-ZERO FOR LOW-SPEED PAPER TAPE SUPPORT
333
334     U$$CHA      =B$$AW          ; UNSOLICITED CHARACTER AST SUPPORT
335
336     U$$ERR      =B$$AW          ; NON-ZERO FOR INPUT ERROR DETECTION (PARITY, BREAK,
337                                     ; DATA OVERRUN)
338
339
340     V$$FIL      =1              ; VT05 TYPE VERTICAL FILL.  THIS MUST BE 1 IF VT05
341                                     ; TERMINALS ARE IN THE CONFIGURATION.
342     <FF>
343     ;+
344     ; GROUP 3 ASSEMBLY PARAMETERS - THOSE WHICH SHOULD NOT NORMALLY BE CHANGED
345     ;-
346
347     C$$1S      =D$$ZDU!<R$$INT+99./100.> ; ONE-SECOND TIMER SERVICE RUNS CONSTANTLY,
348                                     ; RATHER THAN ONLY AS REQUIRED.  THIS IS ESSENTIAL IF DZ11
349                                     ; DIALUP SUPPORT IS BEING USED OR IF DH11 SILO-FILL SUPPORT
350                                     ; IS NEEDED, BUT OTHERWISE IS NOT.
351
352     D$$BUG      =0              ; DEBUGGING FEATURES REQUIRED - HANDLER SERVICES DEVICES
353                                     ; CALLED 'XT' INSTEAD OF 'TT', AND REMEMBERS ITS TI
354                                     ; ADDRESS AFTER CONTROL-C.
355
356     D$$HDU      =0              ; DH11 DIALUP IS EQUIVALENT TO HAVING ONE OR
357     .IF         NE,D$$M11      ; MORE DM11'S

```

System Generation Files

```

358     D$$HDU      =1
359     .ENDC;    D$$M11
360
361     T$$SCP      =1
362                                     ; THIS EQUATE IS SET UP BY QUESTION AND
363                                     ; ANSWER SYSTEM GENERATION. QASGN RELIES
364                                     ; ON LOCATING THE STRING "T$$SCP<TAB>="
365
366     .IF        EQ,T$$SCP
367     F$$LTY     =0
368     .IFF
369     F$$LTY     =1
370     .ENDC
371                                     ; FLUSH TYPE AHEAD. ON NON  TIMESHARING SYSTEMS TYPE AHEAD
372                                     ; WILL NOT NORMALLY BE FLUSHED WHEN CTRL/C IS TYPED. IF
373                                     ; TYPE AHEAD IS REQUIRED ON SUCH A SYSTEM SET F$$LTY=1
374                                     ; CONVERSELY TIMESHARING SYSTEMS WILL NORMALLY HAVE TYPE
375                                     ; AHEAD FLUSH. SET F$$LTY=0 IF NO TYPE AHEAD FLUSH IS
376                                     ; REQUIRED ON A TIMESHARING SYSTEM.
377     M$$PX      =D$$U11!D$$H11!D$$J11!D$$Z11 ; MULTIPLEXOR INTERFACES PRESENT
378
379     M$$TIC     =1                ; NUMBER OF TICKS IN A MODEM SHORT TIME OUT PERIOD.
380
381     N$$PR      =D$$U11!D$$H11      ; CODE TO SUPPORT NPR OUTPUT INTERFACES
382
383     .IF        EQ,S$$INT
384     $$$=10.
385     .IFF
386     $$$=<<<10.*H$$RTZ>>+<S$$INT/2>>/S$$INT
387     .ENDC
388     P$$10S     =$$$                ; NUMBER OF ONE-SECOND INTERVALS IN TEN SECONDS
389
390     S$$CRP     =0                ; SUPPORT OF 'SCRIPT' PERFORMANCE MEASUREMENT LINES
391
392     S$$TAL     =B$$LCK!T$$APE!H$$SYN ; XON/XOFF FROM COMPUTER TO TERMINAL OR
393                                     ; COMPUTER TO COMPUTER REQUIRED
394     S$$UPS     =0                ; TERMINAL RUNS IN SUPERVISOR SPACE (NOT IMPLEMENTED
395                                     ; IN EXEC).
396
397     .IIF      NDF,TT, .LIST

```

System Generation Files

B.5

SYSGEN.CMD

This is a copy of [11,17]SYSGEN.CMD as provided with the tape kit. Your SYSGEN.CMD file may be different, because it reflects your target disk.

```
; [11,17] SYSGEN.CMD
;
PDP11=45,124K,,00000060
/
SCOM=,8K,90
PAR=GEN,,*,S
/
DEV=SP,PSEUDO
DEV=WK,PSEUDO
DEV=LB,PSEUDO
DEV=MT0,TU10
DEV=MM0,TU16
DEV=MS0,TS11
DEV=MU0,TU81
DEV=MO
DEV=LP0,LP11B
DEV=TT0,CONSOL
DEV=DK<0-1>,RK05
DEV=DP<0-1>,RP03B
DEV=DB<0-1>,RP04
DEV=DM<0-1>,RK06
DEV=DR<0-1>,RM03
DEV=DL<0-1>,RL01
DEV=DU<0-1>,RA80
/
DPAR=GEN
SY=DL
DCLI=MCR
/
INS=GEN,[1,1]SYSRES/LI/ACC=RO
INS=GEN,[1,1]HNDLIB/LI/ACC=RO
INS=GEN,[1,1]FCPCOM/CM
INS=GEN,[11,1]DL
INS=GEN,[11,1]TT01
INS=GEN,[11,17]SGN2,[11,1]MOU,[11,1]INS/UIC=[1,1]
INS=GEN,[11,1]HIBBR
INS=GEN,[11,1]BIGFCP
//
```

B.6 SYSBLD.CMD

```

;
; [ 1 1 , 1 7 ] S Y S B L D . C M D
; -----
;
; INPUT FILE TO SYSGEN PHASE 2. ANY MCR FUNCTION IS ALLOWED
; EXCEPT SAV AND BOO. CARE MUST BE TAKEN THAT ANY TASK
; REQUIRED BY SG2 HAS BEEN INSTALLED BEFORE SG2 TRIES TO
; USE IT.
;
; *****
; * IMPORTANT *
; *****
;
; QUESTION AND ANSWER SYSTEM GENERATION RELIES ON LOCATING THE
; FOLLOWING STRINGS WITHIN THE MAIN BODY OF THIS FILE. THESE
; STRINGS MUST NOT BE REMOVED OR RE-ORDERED. (IN THE LIST GIVEN
; HERE, " " SUBSTITUTES FOR " ".)
; INS_[11,1]BA
; INS_[11,1]HEL
; INS_[11,1]BYE
; INS_[11,1]PWD
; INS_[11,1]WHO
; INS_[11,1]NL
; INS_[11,1]PDS
; INS_[11,1]PDX
; INS_[11,1]DCL
; INS_[11,1]SUIC
; SWA.../LE
; INS_[11,1]TCP
; INS_[11,1]IAS
; INS_[11,1]IASTART
; INS_[11,1]SDM
; INS_[11,1]UTL
; UTL_/LV:4
; UTL_/PT:8
; UTL_/BQ:0
; UTL_/EN
; LOA_BA
; LOA_NL
;
;
;
; NOTE:
; -----
; SYSTEM GENERATION PHASE2 ("SGN2") IS INSTALLED AND
; LOADED BY SYSTEM GENERATION PHASE 1 ("SGN1") SUCH THAT
; BOOTING THE NEW SYSTEM DISK RESULTS IN THE RUNNING OF
; SGN2. SGN2 IS LOADED AT THE TOP OF THE SPECIFIED
; PARTITION TO AVOID MEMORY FRAGMENTATION.
;
; SGN2 PERFORMS THE FOLLOWING FUNCTIONS AUTOMATICALLY:
;
; (1). CHECK THERE IS SUFFICIENT MEMORY
;
; (2). CHECK THAT SYSTEM DISK HANDLER IS ACTIVE
;
; (3). REQUEST THE TERMINAL HANDLER ("TT...")
;
; (4). CHECK THAT TT... BECOMES ACTIVE
;
;

```


System Generation Files

```
; (5). FIX THE FILES-11 ACP (F11ACP)
;
; (6). MOUNT THE SYSTEM DISK
;
; (7). OPEN FOR READ THE COMMAND FILE SPECIFIED
; DURING SGN1 OR IF NONE SPECIFIED, THIS
; FILE, SY:[11,17]SYSBLD.CMD
;
; SGN2 ASSUMES THAT THE FILES-11 ANCILIARY CONTROL PROCESSOR
; ("F11ACP") HAS BEEN INSTALLED AS WELL AS TT...., MOUNT ("...MOU")
;
;
; TASK NAME FOR EACH TASK INSTALLED IN THIS COMMAND FILE IS GIVEN IN
; THE PRECEEDING COMMENTRY AS ("TASK").
;
;
; INSTALL THE TASK TERMINATION NOTIFIER (".TKTN.")
;
INS [11,1]TKTN
;
; INSTALL MCR ("...MCR"), THE COMBINED MCR FUNCTION TASK ("...MFT")
; AND THE MCR ERROR TASK ("MCRERR")
;
INS [11,1]MCR/UIC=[1,1]
INS [11,1]MFT/POOL=255
INS [11,1]MCRERR
;
;
;
; NOTE:
; -----
; ALL THE ABOVE FUNCTIONS MUST BE PERFORMED AS SHOWN. ANY
; MODIFICATIONS SHOULD BE MADE BELOW.
;
; MCR FUNCTION TO OUTPUT THE ACTIVE TASK LIST ("...ACT")
;
INS [11,1]ACT
;
; The MCR logical device assignment task (...ASN)
;
INS [11,1]ASN
;
; THE PDS BATCH INPUT/OUTPUT HANDLER ("BA....")
; INCLUDE A ";" AS THE FIRST CHARACTER OF THE FOLLOWING TWO
; TWO LINES, IF BATCH IS NOT REQUIRED
;
;INS [11,1]BA
;
; THE BAD BLOCK DETECTION UTILITY ("...BAD")
;
INS [11,1]BAD
;
; MCR FUNCTION FOR BOOTING SYSTEMS AND WRITING BOOTSTRAP
; BLOCKS ("...BOO")
;
INS [11,1]BOO
;
; THE FILE COMPARE UTILITY ("...CMP")
;
;INS [11,1]CMP
;
; THE MO CONTINUE TASK ("...CON")
```

```

;
INS [11,1]CON
;
; THE GLOBAL CROSS REFERENCE TASK ("CRF...") REQUESTED BY
; ...TKB WHENEVER /CR IS SPECIFIED ON A MAP
; OR ...MAC WHENEVER /CR IS SPECIFIED ON A LISTING
;
; THERE ARE TWO VERSIONS OF CROSS REFERENCE --
; 1) OVERLAYED INSTALLED BY  INS [11,1]CRF
; 2) UNOVERLAYED THIS HAS TO BE BUILT USING COMMAND
;    FILES SUPPLIED ON THE OBJECTS DISTRIBUTION
;    UNDER UFD [11,32]. WHEN BUILT, IT IS
;    INSTALLED BY  INS [11,1]UNOVRCRF
;
; BOTH VERSIONS HAVE TASK NAME "CRF..."
;
; THE EXECUTION TIME OF THE BOTH VERSIONS MAY BE
; DECREASED BY ALLOCATING MORE CORE SPACE AT INSTALL
; TIME USING THE /INC=NNNNN SWITCH. NNNNN MAY BE ANY VALUE
; FROM 0 TO 19000 APPROX FOR [11,1]CRF  (DEFAULT=0)
; FROM 0 TO 20000 APPROX FOR [11,1]UNOVRCRF (DEFAULT=16000)
; HIGHER VALUES GIVE FASTER EXECUTION
INS [11,1]CRF/INC=10000
;
; THE MEMORY USAGE DISPLAY (VDU TERMINALS ONLY) TASK ("...DEM")
;
INS [11,1]DEMO
;
; THE LIST DEVICES UTILITY ("...DEV")
;
INS [11,1]DEV
;
; THE AVAILABLE DISK HANDLERS ARE AS FOLLOWS:
;
;   For RK-11 (RK03,RK05) devices:
; INS [11,1]DK
;   For RK-11 with overlapped seeks on
;   multiple drives:
; INS [11,1]DKOVL
;   For RF-11 multi platter fixed head disks:
; INS [11,1]DF
;   For RP-11C (RP02,RP03) devices:
; INS [11,1]DP
;   For RP04 massbus disks - single controller:
; INS [11,1]DB
;   For RP04 massbus disks - Multiple controllers:
; INS [11,1]DBMU
;   For RL11 disks:
; INS [11,1]DL
;   For RS03, RS04 massbus fixed head disks:
; INS [11,1]DS
;   For RK611 (RK06) disks:
; INS [11,1]DM
;   For RM02, RM03, RM05, RM80 - Single controller:
; INS [11,1]DR
;   For RM02, RM03, RM05, RM80 - Multiple controllers:
; INS [11,1]DRMU
;
;   For RA60, RA80, RA81 (UDA50) disks:
;   For RC25 (KLESI) disks:
;   For RDnn RXnn, (RQDXn) disks:
;
; Multi-user MSCP handler with external Port Server (DU....)

```

System Generation Files

```
;
; INS [11,1]DUMU
; INS [11,1]UQSSP
;
; Single user MSCP handler with internal Port Server
;
; INS [11,1]DU
;
; Host initiated bad block replacement for DU....
;
; INS [11,1]HIBBR
;
; MSCP ERRLOG Server (ER$LOG) and Report Generator
;
; INS [11,1]ERRDSA
; INS [11,1]RPTGEN
;
; ONE OF THESE WILL BE THE SYSTEM DISK HANDLER ALREADY INSTALLED
; AND LOADED BY SYSGEN PHASE 1. IT IS INAPPROPRIATE TO
; ASSUME HERE WHICH IS THE SYSTEM DISK OR WHICH ADDITIONAL DISK
; DEVICES A USER WISHES TO USE. THEREFORE SELECTION OF FURTHER
; DISK HANDLERS FOR INSTALLATION IS LEFT TO THE USER.
;
; ANY OF THE ABOVE MAY BE INSTALLED SIMPLY BY EDITING THIS FILE TO
; DELETING THE ";" AND TAB PRECEDING THE FILE SPECIFICATION.
;
;
; THE DISMOUNT VOLUME MCR FUNCTION ("...DMO")
;
INS [11,1]DMO
;
; THE FILE DUMP MCR UTILITY ("...DMP")
;
;INS [11,1]DMP
;
; THE ONLINE DISC SAVE AND COMPRESS UTILITY ("...DSC")
;
;INS [11,1]DSC
;
; THE DECTAPE I HANDLER
;
; INS [11,1]DT
;
; THE DECTAPE II HANDLER
;
; INS [11,1]DD
;
; THE FLOPPY DISK HANDLERS
;
; RX01
; INS [11,1]DX
; RX02
; INS [11,1]DY
;
; LINE TEXT EDITOR (LETTER) ("...EDI")
;
; INS [11,1]EDI
;
; THE DEC EDITOR ("...EDT")
;
INS [11,1]EDT
;
; THE KEYPAD EDITORS ("...KED") AND ("...K52")
```

System Generation Files

```
;
; INS [11,1]KED
; INS [11,1]K52
;
; THE HARDWARE ERROR LOGGING TASK ("ERRLOG") USED IN CONJUNCTION
; WITH ERROR LOGGING HANDLERS EXCEPT T/MSCP (DU....,MU....)
;
INS [11,1]ERRLOG
;
; THE FILE INTERCHANGE UTILITY ("...FLX")
; (TO AND FROM DOS, RT-11, RSTS SYSTEMS)
;
;INS [11,1]FLX
;
; FILES-11 MESSAGE OUTPUTTING TASK ("F11MSG")
;
INS [11,1]F11MSG
;
; THE NON-DCL LOGIN, LOGOUT, PASSWORD AND WHO TASKS
; ("...HEL" "...BYE" "...PWD" AND "...WHO")
;
INS [11,1]HEL
INS [11,1]BYE
INS [11,1]PWD
INS [11,1]WHO
;
; PDS AND SCI HELP COMMAND TASK ("...HLP")
;
INS [11,1]HELP
;
; MCR INDIRECT COMMAND FILE PROCESSOR ("...AT.")
;
INS [11,1]INDIAS
;
; FILES-11 VOLUME INITIALIZATION MCR FUNCTION ("...INI")
;
INS [11,1]INIT
;
; FILES-11 HOME BLOCK UTILITY ("...HOM")
;
INS [11,1]INIT/TASK=...HOM
;
; THE LIBRARIAN ("...LBR")
; (RELOCATABLE OBJECTS AND RANDOM ACCESS MACROS)
;
INS [11,1]LBR
;
; THE LOAD HANDLER FUNCTION ("...LOA")
;
INS [11,1]LOA
;
; LINE PRINTER HANDLER ("LP....")
;
INS [11,1]LP
;
; THE LOGICAL UNIT INFORMATION MCR FUNCTION ("...LUN")
;
INS [11,1]LUN
;
; The Macro-11 assembler:
;
; **** NORMALLY, MACRO WILL EXTEND ITSELF AUTOMATICALLY
; **** AS IT NEEDS MORE DYNAMIC CORE SPACE. THE FOLLOWING COMMENTS
```

System Generation Files

```
; **** ON THE USE OF THE /INC SWITCH ONLY APPLY IF TASK EXTENSION
; **** WILL BE DISABLED BY THE USE OF THE SET /MAXEXT MCR COMMAND.
;
;
; THE EXECUTION TIME OF THESE ASSEMBLERS MAY
; BE DECREASED CONSIDERABLY WHEN THE NUMBER OF SYMBOLS IS LARGE
; BY ALLOCATING THE ASSEMBLER MORE CORE RESIDENT WORK SPACE.
; THIS MAY BE ACHIEVED BY INSTALLING THE TASK USING THE
; "/INC=NNNNN" SWITCH ON THE COMMAND TO INSTALL. THIS IS
; RECOMMENDED IF IT IS NECESSARY TO RE-BUILD THE TERMINAL HANDLER
; TASK (TT....).
;
INS [11,1]MACIAS
;
; THE MESSAGE OUTPUT (PSEUDO) HANDLER ("MO....")
;
INS [11,1]MO
;
; THE MESSAGE MANAGER TASK ("MSM...")
;
INS [11,1]MSM
;
; THE NULL DEVICE HANDLER ("NL....")
;
INS [11,1]NL
;
; THE MEMORY EXAMINATION AND PATCH UTILITY ("...OPE")
;
INS [11,1]OPE
;
; THE OPERATOR'S SPOOLER CONTROL MCR FUNCTION ("...OPR")
;
INS [11,1]OPR
;
; THE SYSTEM COMMAND LANGUAGE INTERPRETER
;
; THERE ARE TWO VERSIONS OF THE SYSTEM CLI:
; PDS -- USED IN TIMESHARING SYSTEMS ("...PDS")
; PDX -- USED IN MULTI-USER REALTIME SYSTEMS ("...PDX")
; PDX HAS TWO ASSOCIATED TASKS:
; DCL - ("...DCL")
; AND SUIC - (".SUIC.")
;
; NONE OR ONE (BUT NOT BOTH) OF PDS AND PDX SHOULD BE INSTALLED.
; THE OPTIONS THAT ARE NOT REQUIRED SHOULD INCLUDE A ";" AS
; THE FIRST CHARACTER.
;
; INCLUDE THE FOLLOWING FOR TIMESHARING SYSTEMS
;
INS [11,1]PDS
;
; INCLUDE THE FOLLOWING FOR MULTI-USER REALTIME SYSTEMS
;
INS [11,1]PDX
INS [11,1]DCL
INS [11,1]SUIC
;
;
; THE FILES-11 PERIPHERAL AND FILE INTERCHANGE FUNCTION ("...PIP")
;
INS [11,1]PIP
;
; THE POOL USAGE DISPLAYING UTILITY ("POOL")
```

```

;
; INS [11,1]POOL
;
; THE MCR FUNCTION TO QUEUE A FILE FOR OUTPUT ("...QUE")
;
INS [11,1]QUE
;
; THE LOGICAL UNIT REASSIGNMENT FUNCTION ("...REA")
;
INS [11,1]REA
;
; THE DEVICE REDIRECTION MCR FUNCTION ("...RED")
;
INS [11,1]RED
;
; THE MCR FUNCTION FOR REMOVING TASKS AND SGA'S ("...REM")
;
INS [11,1]REM
;
; THE RMS-11 UTILITIES ("...DFN"), ("...CNV"), ("...BCK"),
; ("...RST"), ("...DSP"), ("...DEF") AND ("...IFL")
;
;INS [11,1]RMSDFN
;INS [11,1]RMSCNV
;INS [11,1]RMSBCK
;INS [11,1]RMSRST
;INS [11,1]RMSDSP
;INS [11,1]RMSDEF
;INS [11,1]RMSIFL
;
; THE TASK RUNNING MCR FUNCTION ("...RUN")
;
INS [11,1]RUN
;
; THE SYSTEM SAVING AND RESTARTING MCR FUNCTION ("...SAV")
;
INS [11,1]SAV
;
; THE SYSTEM PARAMETER SETTING MCR FUNCTION ("...SET")
;
INS [11,1]SET
;
; THE BATCH EDITOR, SLIPER ("...SLP")
;
;INS [11,1]SLP
;
; THE SPOOLER TASK ("SPR...")
;
INS [11,1]SPR
;
; THE DESPOOLER TASK ("SPR2..")
;
INS [11,1]SPR2
;
; THE SWAP SPACE MANAGER TASK ("...SWA")
;
INS [11,1]SWA
;SWA SY0:/LE:100
;
; THE SYSTEM INFORMATION MCR FUNCTION ("...SYS")
;
INS [11,1]SYS

```

System Generation Files

```
;
; THE TIMESHARING CONTROL PACKAGE ("PI...")
; THE STARTUP TASKS ("...IAS" AND "...IST")
; THE SHUTDOWN MANAGER ("SDM...")
;
; THESE ARE REQUIRED ONLY IN TIMESHARING SYSTEMS.
; FOR ALL OTHER SYSTEMS, INCLUDE A ";" AS THE FIRST CHARACTER
; OF THE FOLLOWING LINES.
;
;INS [11,1]TCP
;INS [11,1]IAS
;INS [11,1]IASTART
;INS [11,1]SDM
;
; THE ON-LINE TERMINAL CHARACTERISTIC CHANGING FUNCTION ("...TER")
;
INS [11,1]TER
;
; THE TIME SETTING AND ENQUIRING FUNCTION ("...TIM")
;
INS [11,1]TIM
;
; THE LINKER - TASK BUILDER ("...TKB")
;
; **** NORMALLY, THE TASK BUILDER WILL EXTEND ITSELF AUTOMATICALLY
; **** AS IT NEEDS MORE DYNAMIC CORE SPACE. THE FOLLOWING COMMENTS
; **** ON THE USE OF THE /INC SWITCH ONLY APPLY IF TASK EXTENSION
; **** WILL BE DISABLED BY THE USE OF THE SET /MAXEXT MCR COMMAND.
;
; THE EXECUTION TIME OF TASK BUILDER MAY BE
; DECREASED BY ALLOCATING IT MORE CORE SPACE AT INSTALL
; TIME USING THE /INC=NNNNN SWITCH. NNNNN MAY BE ANY
; VALUE FROM 0 TO 20000 APPROX. HIGHER VALUES GIVE
; FASTER EXECUTION.
; THERE IS ALSO A VERSION OF THE TASK BUILDER ("...STB")
; WITH A LARGER VIRTUAL SYMBOL TABLE CAPACITY, BUT WHICH
; RUNS AT UP TO ABOUT 75% SLOWER.
; THIS CAN BE BUILT FROM THE OBJECT DISTRIBUTION BY
; TRANSFERRING [11,11]SLOTKBBLD.COMD, [11,11]SLOTKBBLD.ODL
; AND [11,11]TKB.OLB AND EXECUTING THE COMMAND FILE. THE
; TASK IMAGE FILE IS [11,1]SLOTKB.TSK, AND IS INVOKED VIA
; THE "LINK/LARGESYSMBOLTABLE" COMMAND. IT IS EXPECTED
; THAT THIS VERSION OF THE TASK BUILDER WILL BE REQUIRED
; ONLY IN A VERY FEW CASES. THE EXECUTION SPEED OF
; THE SLOWER TASK BUILDER MAY BE VARIED USING THE /INC
; SWITCH AT INSTALL TIME AS FOR THE FASTER VERSION.
; INS [11,1]SLOTKB/INC=6000
;
INS [11,1]TKB
;
; THE MAGTAPE HANDLERS.
;
; ALTERNATES:
; -----
;
; ("MM...") FOR TJU16 MASSBUS CONTROLLER:
; INS [11,1]TU16
; AND THE DIAGNOSTIC VERSION:
; INS [11,27]TU16D
;
; ("MT...") FOR TM-11 TU10 DEVICES:
; INS [11,1]TU10
;
```

System Generation Files

```
; AND ITS DIAGNOSTIC VERSION:
; INS [11,27]TU10D
;
; ("MS...") for TS11 unibus controller
; INS [11,1]TS11
;
; TMSCP handlers ("MU...") for TMSCP devices (TK50,TU81)
; Multi-user TMSCP handler with external Port Server
; Do not install UQSSP here if already installed for Multi-User DU handler
;
; INS [11,1]MUMU
; INS [11,1]UQSSP
;
; Single-user TMSCP handler with internal Port Server
; INS [11,1]MU
;
; ANSI STANDARD MAGTAPE FILES PRIMITIVES ("MTAACP")
;
; INS [11,1]MTAACP
;
; THE USER FILE DIRECTORY CREATION MCR FUNCTION ("...UFD")
;
; INS [11,1]UFD
;
; THE DEVICE HANDLER UNLOADING FUNCTION ("...UNL")
;
; INS [11,1]UNL
;
; THE PDS ACCOUNTING UTILITY TASK ("...USE")
;
; INS [11,1]USERS
;
;
; THE SCHEDULER DATA STRUCTURES TASK ("...UTL")
;
; THIS TASK IS REQUIRED ONLY IN TIMESHARING AND MULTI-USER SYSTEMS.
; QASGN EDITS THE FOLLOWING COMMANDS.
;
; INS [11,1]UTL
; UTL /LV:4
; UTL /PT:8
; UTL /BQ:0
; UTL /EN
;
; THE FILES-11 SYSTEM VERIFICATION MCR FUNCTION ("...VFY")
;
; INS [11,1]VFY
;
; THE FILE PATCH UTILITY ("...ZAP")
;
; INS [11,1]ZAP
;
; THE SPOOLER USES A PSEUDO DEVICE SP: FOR QUEUING AND
; BUFFERING. THIS DEVICE MUST BE REDIRECTED TO SOME RANDOM
; ACCESS FILES-11 DEVICE WITH A UFD [1,4]/PRO=[RWED,RWED,RWED,RWED]
;
; ASSUME HERE THAT IT IS THE SYSTEM DEVICE.
;
; RED SY=SP
;
; ALSO THERE ARE PSEUDO DEVICES FOR DEFAULT LIBRARIES AND WORK FILES
;
; ASSUME HERE THAT THEY ARE ALSO THE SYSTEM DEVICE
```


System Generation Files

```
;
RED SY=LB
RED SY=WK
RED LP=CL
SET /SP=LP:
;LOA BA
;LOA NL
;
; NOTE :
; -----
; AFTER SGN2 COMPLETES, THE USER SHOULD LOG ON TO THE SYSTEM,
; PERFORM THOSE FUNCTIONS DEEMED DESIRABLE AND THEN SAVE THE
; SYSTEM.
;
; TYPICAL POST SGN2 FUNCTIONS ARE:
; LOA MO ; LOAD MO HANDLER
; LOA LP ; LOAD THE LINE PRINTER HANDLER
; REA ...TKB 8 DS ; REASSIGN THE WORKFILE LUNS OF
; REA CRF... 7 DS ; TKB, MAC AND CRF TO
; REA ...MAC 8 DS ; A FIXED HEAD DISK.
; ; ALTERNATIVELY.....
; RED DS=WK
; TIM HH:MM:SS DD-MMM-YY ; ENTER TIME AND DATE
;
; ALTERNATIVELY, THIS FILE MAY BE EDITED TO
; INCORPORATE THESE COMMANDS
;
```

B.7

SGDATA.MAC

```

.TITLE SYSGEN Modifiable Equates for System Tailoring
;+
;
;
;
; Copyright 1974, 1978 Digital Equipment Corp., Maynard, MA, usa.
;
;
; The material included in this functional specification, including but
; not limited to, instruction times and operating speeds is for
; information purposes only. All such material is subject to change
; without notice. Consequently DEC makes no claim and shall not be liable
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; This software is furnished to purchaser under a licence for use on a
; single computer system and can be copied (with inclusion of DEC's
; copyright notice) only for use in such system, except as might
; otherwise be provided in writing by DEC.
;
;
;
; Module:      SYSGEN Variables
;
; Version:     V001A
;
; Authors:     Hilary Pierce/Andy Wilson
;
; Date:        20th March 1974
;
;
; This module contains the SYSGEN specifiable
; data for ias.
;
; Modified by: Hilary Pierce
; Date:        22-FEB-76   Edit:   +++001
; Date:        31-JAN-77   Edit:   ++002
; DATE:        02-NOV-78   Edit:   ++003
.PAGE
.SBTTL Equates for variable parameters
;
; Variable parameters
;
; These parameters have initial values defaulted to
; them below.
; Those prefixed 'SG' can be changed directly or
; indirectly by user specification at SYSGEN time.
;
;
; SGLUN  = 6.           ;Max no. of LUNs for 1 job
;
; SGUVL  = 12.          ;Max number of devices allocatable by a user
;

```

System Generation Files

```
SGDEV  = 18.      ;No. of non-timesharing terminal devices
                ;available to timesharing
;
SGDEV  = 12.      ;+++001 Max. no. of devices mountable at any time
;
SGTMM  = 24       ;++008 Max no. of timesharing terminals
;
SGATT  = SGTMM    ;Max no. of active terminals at any time
;
SGXTSK = 2*SGTMM  ;No. of tasks over '1 per terminal' (i.e. non-CLI tasks)
;
                ;++003 remove SGBUF
;
SGCIT  = 3.       ;No. of CLIs that can run concurrently
;
```

B.8 TSTKB.CMD

```
;
;   N E W T S T K B . C M D
;
@[11,107]IASCOMTKB
@[11,101]TCPOVR
@[11,103]CDATKB
@[11,105]STRTKB
@[11,105]IASTKB
@[11,101]SDMTKB
@[11,13]MSMBLD
```

System Generation Files

```
.; [ 1 , 1 ] B U I L D . C M D
.;
.ENABLE SUBSTITUTION
.ENABLE GLOBAL
.DISABLE LOWERCASE
.ENABLE ESCAPE
.;
@[1,1]SYSTEM.DFN
.;
.IFF $RK05 .GOTO L800
;
; Tidy up DK0:
;
PIP [11,15]EXECBLD.CMD/PU,EXEC.ODL
PIP [11,15]EXECBLD.SLP;*/DE,EXECODL.SLP;*
PIP [11,17]SYSGEN.CMD/PU,SYSDL
PIP [11,17]SYSGENCMD.SLP;*/DE,SYSDLDCMD.SLP;*
PIP [311,107]SGDATA.MAC/PU
PIP [11,114]*.OBJ;*/DE,[111,114]*.*;*,[211,114]*.*;*
PIP [311,114]CONFIG.MAC/PU,PARAMS
PIP [311,114]PARAMSMAC.SLP;*/DE
.;
.IFT $TCP .GOTO L400
.;
PIP [311,107]SGDATA.MAC;*/DE
.;
.L400:
.IFF $2RK05 .GOTO L800
;
; Preserving edited files to DK1
.L500:
;
; Place data disk (IASFILES) on DK1 - Write enabled
;
.L600:
.ASK Q DK1: READY
.IFF Q .GOTO L600
.IFT <ESCAPE> .GOTO L500
.;
DMO WK:
MOU WK:/OVR
.IF <EXSTAT> <> <SUCCES> .GOTO L500
PIP WK:[11,15]/NV=[11,15]EXECBLD.CMD,EXEC.ODL
.IF <EXSTAT> <> <SUCCES> .GOTO L500
PIP WK:[1,1]/NV=[1,1]SYSTEM.DFN
PIP WK:[11,17]/NV=[11,17]SYSGEN.CMD,SYSDL
.IFF $TCP .GOTO L700
PIP WK:[311,107]/NV=[311,107]SGDATA.MAC
.L700:
PIP WK:[311,114]/NV=[311,114]CONFIG.MAC,PARAMS
PIP WK:[*,*]*.*/*PU
.;
.L800:
;
; STARTING SYSTEM BUILD
;
.IF <MEMSIZ> > 64. @LB:[1,1]REINS
;
; Assemble and build the terminal handler
;
MAC @LB:[311,114]TTMACNLST
.GOSUB CHECK
TKB @LB:[11,114]TTTKB
.GOSUB CHECK
.IFF $RK05 .GOTO L900
```

System Generation Files

```
PIP [11,114]*.*;*/DE,[211,114]*.*;*
.IFF $2RK05 .GOTO L900
PIP [311,114]*.*;*/DE
.L900:
;
; Build resident executive
;
.IFF $RK05 .GOTO L1000
PIP [11,17]EXEC.TSK;*/DE,EXECUTIVE.STB;*
.L1000: TKB @LB:[11,15]EXECBLD
.GOSUB CHECK
.IFF $RK05 .GOTO L1100
PIP [111,15]*.*;*/DE
.IFF $2RK05 .GOTO L1100
PIP [11,15]*.*;*/DE
.;
.L1100:
.IFF $TCP .GOTO L2200
;
; Build IASCOM
;
.IFF $RK05 .GOTO L1200
PIP [*,*]=WK:[311,107]IASCOMM.CMD,IASCOM.MAC,IASSYM,IASSM2,[11,107]*.CMD
PIP [1,1]IASCOM.*;*/DE
.L1200: MAC @LB:[311,107]IASCOMM.CMD
.GOSUB CHECK
TKB @LB:[11,107]IASCOMTKB
.IFF $RK05 .GOTO L1300
PIP [11,107]*.*;*/DE,[211,107]*.*;*,[311,107]*.*;*
.L1300: ;
; BUILD TCP AND SDM
;
.IFF $RK05 .GOTO L1400
PIP [11,101]*.*;*/DE,[111,101]*.*;*
PIP [11,101]=WK:[11,101]*.*
PIP [11,1]TCP.TSK;*/DE,SDM.TSK;*
.L1400: TKB @[11,101]TCPOVR
.GOSUB CHECK
.IFF $RK05 .GOTO L1600
PIP [111,101]*.*;*/DE
.L1600: TKB @[11,101]SDMTKB
.GOSUB CHECK
.IFF $RK05 .GOTO L1700
PIP [11,101]*.*;*/DE,[111,101]*.*;*
.L1700: ;
; Build IAS and IASTART
;
.IFF $RK05 .GOTO L1800
PIP [11,105]*.*;*/DE,[111,105]*.*;*
PIP [11,105]=WK:[11,105]*.*
PIP [11,1]IAS.TSK;*/DE,IASTART.TSK;*
.L1800: TKB @LB:[11,105]STRTKB
.GOSUB CHECK
TKB @LB:[11,105]IASTKB
.GOSUB CHECK
.IFF $RK05 .GOTO L1900
PIP [11,105]*.*;*/DE,[111,105]*.*;*
.L1900: ;
; Build MSM
;
.IFF $RK05 .GOTO L2000
PIP [11,13]*.*;*/DE,[111,13]*.*;*
PIP [11,13]=WK:[11,13]*.*
```

System Generation Files

```
      PIP [11,1]MSM.TSK;*/DE
.L2000: TKB @[11,13]MSMBLD
      .GOSUB CHECK
      .IFF $RK05 .GOTO L2100
      PIP [11,13]*.*;*/DE,[111,13]*.*;*
.L2100: .;
.L2200: .;
      .IFF $RK05 .GOTO L2600
      .IFF $TCP .GOTO L2300
      ;
      ; Copy specific DCL files
      ;
      PIP [11,1]PDX.TSK;*/DE,SUIC;*,DCL;*
      PIP [11,1]=WK:[11,1]PDS.TSK
      PIP [1,2]PDX.HLP;*/DE
      PIP [1,2]=WK:[1,2]PDS.HLP,SCI
      .GOTO L2600
      ;
.L2300:
.L2600:
/
.CHECK:
      .IF <EXSTAT> = <SUCCES> .RETURN
      .IF <EXSTAT> = <WARNIN> .RETURN
      ;
      ; Unexpected command failure -- build aborted
      ;
/
```

C

Device Characteristics Words

```
.TITLE DVSCH
.SBTTL DVSCH -- TITLE PAGE
.IDENT /3.207/
```

```
;
;+
;
;   COPYRIGHT (c) 1973, 1974, 1975, 1976, 1977, 1978, 1980,
;   1983, 1984, 1985, 1986, 1987, 1988, 1989
;   DIGITAL EQUIPMENT CORP., MAYNARD, MASSACHUSETTS 01754.
;
```

```
;
;   THE MATERIAL INCLUDED IN THIS FUNCTIONAL SPECIFICATION,
;   INCLUDING BUT NOT LIMITED TO, INSTRUCTION TIMES AND
;   OPERATING SPEEDS IS FOR INFORMATION PURPOSES ONLY. ALL SUCH
;   MATERIAL IS SUBJECT TO CHANGE WITHOUT NOTICE. CONSEQUENTLY
;   DEC MAKES NO CLAIM AND SHALL NOT BE LIABLE FOR ITS ACCURACY.
;
```

```
;
;   DEC ASSUMES NO RESPONSIBILITY FOR THE USE OR RELIABILITY OF
;   ITS SOFTWARE ON EQUIPMENT WHICH IS NOT SUPPLIED BY DEC.
;
```

```
;
;   UNLESS SPECIFIED OTHERWISE, THE TERMS "RSX" AND "RSX-11"
;   IMPLY "RSX-11D".
;
```

```
;
;
;   MODULE:          DVSCH
;
;   VERSION:         V004A
;
;   AUTHOR:          M. R. GARRY
;
;   DATE:            21 JAN 74
;
```

MODIFICATIONS:

```
;
;   NO.   DATE          PROGRAMMER   PURPOSE
;   ----   -
;   001   01 JUL 74     T.J. PORTER   MASSBUS DEVICES V004B
;   002   17 SEP 74     T.J. PORTER   VERSION 005D
;   003   29 JAN 75     T.J. PORTER   VERSION 006A
;   004   11 SEP 75     T.J. PORTER   ADD CD11 DEVICE CHARACTERISTICS
;   005   25 SEP 75     T.J. PORTER   ADD VT50 DEVICE CHARACTERISTICS
;   006   20-JAN-76     R. NEWLAND    ADD VT52, RP05 AND RP06 CHARACTERISTICS
;   007   02-FEB-76     R. NEWLAND    CHANGE IAS LA30 SETTINGS
;   008   03-MAR-76     R. NEWLAND    CHANGE LA36 FILL CHAR TYPE
;   009   11-MAR-76     R. NEWLAND    ADD NEW LINE PRINTER TYPES
;   010   11-MAR-76     R. NEWLAND    ADD BATCH AND PSEUDO DEVICE TYPES
;   011   12-MAY-76     R. NEWLAND    ADD RK06 DEVICE CHARACTERISTICS
;   012   12-MAY-76     R. NEWLAND    ADD 'TERM' DEVICE TYPE
;   013   21-JUL-76     R. NEWLAND    ADD 'RK05F' DEVICE TYPE
;   014   21-JUL-76     R. NEWLAND    ADD 'RX01' DEVICE TYPE
;   015   22-JUL-76     R. NEWLAND    ADD VECTOR, PRI AND CSR ADDRESS
```


Device Characteristics Words

```

; 013 23-JUL-76 R. NEWLAND ADD 'CONSOL' DEVICE TYPE AND REMOVE
; ALL OTHER TERMINAL TYPES
; 014 13-AUG-76 R. NEWLAND 'DSC' SUPPORT - REMOVE CONVERSION ROUTINES
; 015 06-SEP-76 JOHN HARPER ADD NEW-STYLE DISK CHARACTERISTICS
; 016 19-OCT-76 JOHN HARPER FIX # BLOCKS FOR RX01
; 017 9-NOV-76 ROGER ALLEN FIX ERROR IN 015 AND 003
; 015 - LO BYTE CH. WD. 2 1 BIT OUT
; 003 - SIZE OF RP06 WRONG
; 018 8-DEC-76 ROGER ALLEN LAST WORD ON SIZE OF RP06=815 CYLS
; AND RK05F IS NON-REMOVABLE
; 019 24-JAN-77 RICHARD NEWLAND ADD RM01 CHARACTERISTICS
; 020 18-FEB-77 RICHARD NEWLAND CORRECT RK05F DEVICE CHARACTERISTICS
; 021 04-MAR-77 RICHARD NEWLAND RM01 IS NOW CALLED A RM03
; 022 04-AUG-77 RICHARD NEWLAND ALSO CHANGE RM03 BOOTSTRAP NAME
; 023 12-JAN-78 JOHN HARPER ADD 'NONTRM'
; 024 20-JAN-78 ROGER ALLEN ADD RL01/RL02/RK07
; 025 5-SEP-78 PETE WHITE CORRECT EDIT 24
; 026 5-SEP-78 PETE WHITE ADD 'TC11' TO BE SAME AS DT11
;
; 027 17-OCT-78 CAROL CHORLTON CORRECT SECTOR/TRACK FOR RL01/2
; 028 30-OCT-78 ROGER ALLEN CORRECT RX01 CHARACTERISTICS
; 029 18-SEP-79 DAVID GARROD DEFINE NULL & REMOVE REF TO IAS
; 030 11-JAN-80 CAROL CHORLTON DEFINE NEW V3.1 DEVICES AND CHANGE RM03
; BOOTSTRAP NAME TO RMXR FOR ALL DR DEVS
; 031 29-FEB-80 JEFF GOODENOUGH CORRECT TS11, TU58, RX02
; 032 21-MAY-84 Ricardo Robles Add UDA type disks (RA60/80/81)
; 033 15-Feb-85 Alison Nylander Add AZTEC disks (RC25,RC25F)
; 034 22-Feb-85 Mike Reilly Set U.C2 for all tapes (40000 = does not
; support multiple density, 100000 =
; 1600 bpi supported)
; 035 22-Feb-85 Mike Reilly Add TU80
; 036 20-Jul-85 Mike Reilly Use correct U.C2 values for magtapes
; 037 29-Jul-85 Mike Reilly Add TU81
; 038 07-Nov-85 Ricardo Robles Add device type for all line printers
; 039 04-Feb-85 Mike Reilly Additional MSCP devices
; 040 16-Apr-86 Mike Reilly Correct U.C2 for RX01
; 041 09-Feb-89 Douglas Fyfe Add new disks to list (RA70,RA82)
; 042 26-Mar-89 Douglas Fyfe Add new disks to list (RDnn,RX33)
;
; THIS MODULE CONTAINS:
;
; 1 -- CODE FOR DVSCH.
.PAGE
.SBTTL DVSCH -- THE DEVICE CHARACTERISTICS MACRO
;
; MACRO TO GENERATE AN ENTRY IN THE DEVICE CHARACTERISTICS
; TABLE.
;
; MACRO FORMAT:
;
; DEVCH NAME,AC1,AC2,AC3,AC4,ACP,BNAM,VSIZH,VSIZL,VECT,PRI,CSR
;
; WHERE: NAME = DEVICE NAME STORED AS TWO RAD50
; WORDS.
; AC1 = PUD CHARACTERISTICS WORD 1 (DEV. INDEP.)
; AC2 = " " 2 (DEV. DEPEND.)
; AC3 = " " 3 (DEV. DEPEND.)
; AC4 = " " 4 (TXFR. SIZE)
;
; (FOR DEFINITION OF THE ABOVE, SEE EXECUTIVE AND APPROPRIATE
; DEVICE HANDLER)
;
; ACP = DEFAULT ACP FOR THIS DEVICE

```

Device Characteristics Words

```

;          BNAM      = FOUR ASCII CHARACTERS WHICH
;                    IDENTIFY THE BOOTSTRAP
;                    PROGRAM.
;                    (2 ZERO WORDS FOR NON-BOOTABLE
;                    DEVICES)
;          VSIZH     = HIGH ORDER PART OF VOLUME SIZE
;                    FOR DIRECTORY DEVICES.
;                    (ZERO FOR OTHERS)
;          VSIZL     = LOW ORDER VOL. SIZE
;          VECT      = DEFAULT VECTOR ADDRESS
;          PRI       = DEFAULT PRIORITY
;          CSR       = DEFAULT CONTROL/STATUS REGISTER ADDRESS
;
;
.MACRO     DEVCH    ANAME,AC1,AC2,AC3,AC4,ACP,BNAM,VSIZH,VSIZL,VECT,PRI,CSR,?Z
Z:        .RAD50   /ANAME/
.=Z+4
      .WORD      AC1
      .WORD      AC2
      .WORD      AC3
      .WORD      AC4
      .IIF      NB <ACP>        .RAD50   /ACP/
      .IIF      B  <ACP>        .WORD     0
      .IIF      NB <BNAM>       .ASCII   /BNAM/
      .IIF      B  <BNAM>       .BLKW    2
      .IIF      NB <VSIZH>      .WORD    VSIZH
      .IIF      B  <VSIZH>      .WORD    0
      .IIF      NB <VSIZL>      .WORD    VSIZL
      .IIF      B  <VSIZL>      .WORD    0
      .IIF      NB <VECT>       .WORD    VECT
      .IIF      B  <VECT>       .WORD    0
      .IIF      NB <PRI>        .WORD    PRI
      .IIF      B  <PRI>        .WORD    0
      .IIF      NB <CSR>        .WORD    CSR
      .IIF      B  <CSR>        .WORD    0
;
LNG      =  .-Z          ;LENGTH OF CHARACTERISTICS TABLE
      .ENDM
. PAGE
      .SBTTL     DVSCH -- STANDARD SUPPORTED DEVICE CHARACTERISTICS
;
; DEFINE THE DEVICE CHARACTERISTICS TABLE
;
DCHST:
DEVCH    PTR,40,0,0,1000,,,,,70,4,177550
DEVCH    PTP,40,0,0,1000,,,,,74,4,177554
DEVCH    RK03,140010,21060,1014,512.,F11,RK05,,4800.,220,5,177400 ; +015 +017
DEVCH    LP11A,3,17000,0,80.,,,,,,200,4,177514
DEVCH    LP11B,3,17000,0,132.,,,,,,200,4,177514
DEVCH    LP11WU,3,17000,0,132.,,,,,,200,4,177514 ; +006 +038
DEVCH    LP11WL,3,17001,0,132.,,,,,,200,4,177514 ; +006 +038
DEVCH    LP11NU,3,17000,0,80.,,,,,,200,4,177514 ; +006 +038
DEVCH    LP11NL,3,17001,0,80.,,,,,,200,4,177514 ; +006 +038
DEVCH    LS11WU,3,37002,0,132.,,,,,,200,4,177514 ; +006 +038
DEVCH    LS11WL,3,37003,0,132.,,,,,,200,4,177514 ; +006 +038
DEVCH    LS11NU,3,37002,0,80.,,,,,,200,4,177514 ; +006 +038
DEVCH    LS11NL,3,37003,0,80.,,,,,,200,4,177514 ; +006 +038
DEVCH    DT11,140010,4060,401,512.,F11,,,578.,214,6,177340 ; +015 +017
DEVCH    TC11,140010,4060,401,512.,F11,,,578.,214,6,177340 ; +026
DEVCH    AF11,0,1023.,0,0,,,,,134,4,172570
DEVCH    AD01,0,100,0,0,,,,,130,6,176770
DEVCH    LPS11,0,16.,0,0
DEVCH    UDC11,0,0,0,0,,,,,234,6,171000
DEVCH    RK05,140010,1060,1014,512.,F11,RK05,,4800.,220,5,177400 ; +015 +017
```

Device Characteristics Words

```

DEVCH  RK05F,140010,41020,1014,512.,F11,RK05,,4800.,220,5,177400 ; +010 +018 +020
DEVCH  RP02,140010,41460,12012,512.,F11,RP03,,40000.,254,5,176710 ; +015 +017
DEVCH  RP03A,140010,101460,12012,512.,F11,RP03,1,34200,254,5,176710 ; +015 +017
DEVCH  RP03B,140010,141460,12012,512.,F11,RP03,1,34200,254,5,17671 ; +015 +017
DEVCH  RF1,140010,400,10,512.,F11,RF11,,1024.,204,5,177460 ; +015
DEVCH  RF2,140010,20400,10,512.,F11,RF11,,2048.,204,5,177460 ; +015
DEVCH  RF3,140010,40400,10,512.,F11,RF11,,3072.,204,5,177460 ; +015
DEVCH  RF4,140010,60400,10,512.,F11,RF11,,4096.,204,5,177460 ; +015
DEVCH  RF5,140010,100400,10,512.,F11,RF11,,5120.,204,5,177460 ; +015
DEVCH  RF6,140010,120400,10,512.,F11,RF11,,6144.,204,5,177460 ; +015
DEVCH  RF7,140010,140400,10,512.,F11,RF11,,7168.,204,5,177460 ; +015
DEVCH  RF8,140010,160400,10,512.,F11,RF11,,8192.,204,5,177460 ; +015
DEVCH  CR11,1,0,0,80.,,,,,,230,6,177160
DEVCH  CD11,1,0,0,80.,,,,,,230,4,172460 ; +001
DEVCH  RP04,140010,2060,11426,512.,F11,RP04,2,117426,254,5,176700 ; +015 +017
DEVCH  RP05,140010,22060,11426,512.,F11,RP04,2,117426,254,5,176700 ; +015 +017
DEVCH  RP06,140010,42060,11426,512.,F11,RP04,5,031276,254,5,176700 ; +015 +018
DEVCH  RS03,140010,2400,100,512.,F11,RS04,,1024.,204,5,172040 ; +015
DEVCH  RS04,140010,22400,100,512.,F11,RS04,,2048.,204,5,172040 ; +015
DEVCH  TU10,140070,054000,0,512.,MTA,,,,,224,5,172520 ; +036
DEVCH  TE10,140070,054000,0,512.,MTA,,,,,224,5,172520 ; +036
DEVCH  TU16,140070,114400,0,512.,MTA,,,,,224,5,172440
DEVCH  TE16,140070,114400,0,512.,MTA,,,,,224,5,172440 ; +030
DEVCH  TU45,140070,114400,0,512.,MTA,,,,,224,5,172440 ; +030
DEVCH  TU77,140070,114400,0,512.,MTA,,,,,224,5,172440 ; +030
DEVCH  TS11,140070,155000,0,512.,MTA,,,,,224,5,172520 ; +031 +030
DEVCH  TU80,140070,155000,0,512.,MTA,,,,,224,5,172520 ; +031 +030
DEVCH  TU81,140070,135400,0,512.,MTA,,,,,260,5,174500 ; +037
DEVCH  TU58,140010,5440,2200,512.,F11,,0,1000,300,5,176500 ; +031 +030
DEVCH  TA11,100070,0,0,128.,,,,,,260,6,177500
DEVCH  BATCH,3,0,0,132. ; +007
DEVCH  PSEUDO,10000,0,0,0 ; +007
DEVCH  NULL,3,0,0,512. ; +029
DEVCH  RK06,140010,3160,1426,512.,F11,RK06,,27126.,210,5,177440 ; +017
DEVCH  RK07,140010,23160,1426,512.,F11,RK06,,53790.,210,5,17744 ; +024
DEVCH  TERM,7,0,0,512. ; +009
DEVCH  NONTRM,3,0,0,512. ; +023
DEVCH  CONSOL,7,0,0,512.,,,,,,60,4,177560 ; +009
DEVCH  RX01,140010,3460,415,512.,F11,,494.,264,5,177170 ; +028
DEVCH  RX02,140010,6060,1734,512.,F11,,0,1734,264,5,177170 ; +031 +030
DEVCH  RM03,140010,24560,2440,512.,F11,RMXX,2,1140,254,5,176700 ; +022 +030
DEVCH  RM02,140010,4560,2440,512.,F11,RMXX,2,1140,254,5,176700 ; +030
DEVCH  RM05,140010,44560,11440,512.,F11,RMXX,7,121240,254,5,176700 ; +030
DEVCH  RM80,140010,64520,7037,512.,F11,RMXX,3,131656,254,5,176700 ; +030
DEVCH  RP07,140010,104520,20062,512.,F11,RMXX,17,60600,254,5,176700 ; +030
DEVCH  RL01,140010,5160,1024,512.,F11,RL01,,10240.,160,5,174400 ; +024 +027
DEVCH  RL02,140010,25160,1024,512.,F11,RL01,,20480.,160,5,174400 ; +024 +027 +030
DEVCH  RA60,140010,107060,2052,512.,F11,RAXX,,154,5,172150 ; +032
DEVCH  RA80,140010,027020,7037,512.,F11,RAXX,,154,5,172150 ; +032
DEVCH  RA81,140010,127020,7063,512.,F11,RAXX,,154,5,172150 ; +032
DEVCH  RA82,140010,047020,7471,512.,F11,RAXX,,154,5,172150 ;
DEVCH  RA70,140010,147020,5441,512.,F11,RAXX,,154,5,172150 ;
DEVCH  RC25,140010,047460,7037,512.,F11,RAXX,,154,5,172150 ; +032
DEVCH  RC25F,140010,067420,7037,512.,F11,RAXX,,154,5,172150
DEVCH  RD54,140010,071420,0,512.,F11,RAXX,,154,5,172150 ;
DEVCH  RD53,140010,111420,0,512.,F11,RAXX,,154,5,172150 ;
DEVCH  RD52,140010,131420,0,512.,F11,RAXX,,154,5,172150 ;
DEVCH  RD51,140010,151420,0,512.,F11,RAXX,,154,5,172150 ;
DEVCH  RD31,140010,030020,0,512.,F11,RAXX,,154,5,172150 ;
DEVCH  RD32,140010,050020,0,512.,F11,RAXX,,154,5,172150 ;
DEVCH  RD33,140010,110020,0,512.,F11,RAXX,,154,5,172150 ;
DEVCH  RX33,140010,051460,0,512.,F11,RAXX,,154,5,172150 ;
DEVCH  RX50,140010,171460,0,512.,F11,RAXX,,154,5,172150

```

Device Characteristics Words

```

DEVCH ,0,0,0,0,,,,,,,,,203$ ; +030
DEVCH ,0,0,0,0,,,,,,,,,204$ ; +030
DEVCH ,0,0,0,0,,,,,,,,,205$ ; +030
DCHEN:

.SBTTL DVSCH -- SCAN THE TABLE FOR DEFINED DEVICE
;
; ROUTINE TO SEARCH THE DEVICE CHARACTERISTICS TABLE FOR
; A VALID 'DEVICE'
;
; INPUT R5 POINTER TO THE DEVICE NAME IN RAD50
;
; OUTPUT C BIT OFF VALID DEVICE
;
; 4 CHARACTERISTICS WORDS HAVE
; BEEN MOVED AND R0 POINTS TO BOOT
; NAME IN THE TABLE.
;
; C BIT SET NO DEVICE FOUND
;
SDVSCH:
MOV R1,-(SP) ; SAVE R1
;
MOV #DCHST,R0 ; GET START OF TABLE
5$: MOV R5,R1 ; SAVE POINTER
CMP (R1)+,(R0)+ ; FIRST PART OF THE DEVICE THE SAME
BNE 10$ ; NO - MOVE TO NEXT TABLE ENTRY
CMP (R1),(R0) ; SECOND PART OF THE NAME THE SAME?
BEQ DVFND ; YES - LEAVE
10$: ADD #LNG-2,R0 ; MOVE ON TO NEXT ENTRY
CMP #DCHEN,R0 ; END OF LIST?
BHI 5$ ; NO - GO TO NEXT ENTRY
SEC ; SET ERROR RETURN
BR RET ; RETURN
DVFND: TST (R0)+ ; POINT TO CHARACTERISTICS WORDS
MOV #4,R3 ; MOVE THE CHARACTERISTICS
MOV R5,R1 ; SAVE PARAMETER POINTER
10$: MOV (R0)+,(R1)+
SOB R3,10$
CLC ; SET GOOD RETURN
RET: MOV (SP)+,R1 ; RESTORE R1
RETURN
.END

```

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