RSTS/E System Installation and Update Guide

Order Number: AA-2669K-TC

digital software

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Order Number: AA-2669K-TC

August 1990

This guide describes how to install and update a RSTS/E system.

Operating System and Version: RSTS/E Version 10.0

Software Version: RSTS/E Version 10.0

digital equipment corporation
maynard, massachusetts

August 1990

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Preface

Objective

This guide provides a task-oriented procedure for RSTS/E system installation and update.

Audience

The audience for this guide includes:

- Anyone installing RSTS/E for the first time
- Anyone upgrading to RSTS/E Version 10.0 from Version 9.0 or higher
- Anyone performing an online or partial system installation

In addition, Part 5 of this guide provides reference material on all the INIT.SYS options and suboptions. System managers will find this section useful for system tuning.

Document Structure

The guide is divided into six parts:

Part 1	Tells how to build a new RSTS/E system. It is divided into seven phases plus one optional phase, each consisting of one or more tasks. A summary of the installation procedure is printed at the end of Part 1.
Part 2	Explains how to perform a system installation to upgrade an existing pre-Version 10.0 RSTS/E system to Version 10.0.
Part 3	Explains how to perform an online system installation to create a new monitor, install system programs, or perform a full installation.
Part 4	Explains how to update an existing Version 9.0 through Version 9.6 system to a new release. It is divided into five phases plus one optional phase, each consisting of one or more tasks.
Part 5	Is a reference section that describes the INIT.SYS offline options.
Part 6	Appendixes A through F contain supplemental information that you may need for your particular installation.

Related Documents

You may find the following documents useful while performing a system installation:

- *RSTS/E Version 9.0 through Version 10.0 Release Notes*
- *RSTS/E System Manager's Guide*
- *RSTS/E Software Dispatch*

Conventions

This guide uses the following symbols and conventions:

RET	Represents a carriage-return/line-feed combination. Press the RETURN key on your keyboard to produce this combination.
CTRL/x	Represents the Ctrl key and some other keyboard character. For example, to enter Ctrl/U, hold down the CTRL key and press the key labeled "U." RSTS/E echoes or displays the character at your terminal as ^U.
^	Indicates the circumflex key.
Italics	Indicates that a definition follows the italicized technical term.
red print	Indicates the response input by the user. Your response may differ from the response given in the example installation.

Introduction to System Installation

This section explains some basic concepts about system installation. It also explains how to use this guide.

What Is System Installation?

System installation is the process by which you create a RSTS/E system for your requirements. This includes:

- Optionally testing and initializing disk volumes
- Tailoring a RSTS/E monitor
- Installing one or more run-time systems
- Installing system programs
- Installing layered products

The following sections briefly explain each of these items.

Initialize System Disk (DSKINT)

You initialize the system disk using the DSKINT routine. This routine is an INIT.SYS program option.

The DSKINT routine does the following:

- Optionally formats some disks; this writes timing and information on the disk and destroys any previously stored information.
- Optionally checks the disk for bad blocks. DSKINT locates bad blocks on the disk and allocates them to the bad block file (BADB.SYS).
- Writes a minimum RSTS/E file structure on the disk. The minimum RSTS/E file structure contains a pack label and five directories:
  - The Master File Directory (MFD)
  - The Group File Directory (GFD) for groups 0 and 1
  - The User File Directory (UFD) for account [0,1] and [1,2]

    The RSTS/E file structure enables the disk to accept RSTS/E system and other files.

RSTS/E Monitor

The RSTS/E monitor is a set of routines that controls:

- System scheduling - RSTS/E stands for Resource Sharing Time Sharing/Extended. This means the monitor makes sure that all users can work simultaneously without interruption or interference. For example, they can run and create programs, creating programs, access data files, or work with a text editor.
- Memory management - The monitor makes sure that computer memory is used efficiently.
- Input/output (I/O) services - The monitor handles requests to and from a wide variety of I/O devices, including disks, tapes, terminals, and DECnet networks.
- Device management - Your installation probably has a variety of hardware, such as tape drives, line printers, and disk drives. The monitor controls these hardware devices.
- Monitor directives - Monitor directives compose the functions available to user programs on RSTS/E. RSTS/E contains a rich set of monitor directives to simplify program development.

The RSTS/E system is designed to operate in a wide variety of environments. RSTS/E has many configuration options which may be used to tailor the RSTS/E system to your environment. Some options must be set during the installation process; others may be modified at any time. RSTS/E provides defaults for most of these options (determined by analyzing the system configuration) and additionally configures itself for certain system characteristics.

To get you started, Digital supplies a temporary RSTS/E monitor (called the SYSGEN monitor) on the installation media. This monitor is prebuilt and requires no tailoring during system installation. Use it to build your RSTS/E system. After you build your own custom monitor, you no longer need the SYSGEN monitor. The installation procedure will shut down the SYSGEN monitor and automatically start your new monitor if you choose to do so. You can also perform the shut down and new monitor start at your convenience after the installation.

Run-Time Systems and Resident Libraries

A run-time system is software that provides a user interface and/or programming environment. Resident libraries are common routines used by various programming languages.

The run-time systems that Digital supplies with RSTS/E are:

- DCL
- RSX
- BASIC-PLUS
- RT11

DCL is the default keyboard monitor.

You must have the CSP100 resident library installed on your system because most of the system programs use CSP100.

System Programs

System programs provide you with tools for performing common tasks. For example, system programs allow you to efficiently develop programs, manage files, and perform special system management-related tasks. Some system programs are required on all RSTS/E systems while others are optional. During installation, you select which system program packages you want. Additionally, there are certain options you select about system programs during installation as well as bundled software packages that run on a RSTS/E system. These include RMS, EDT, SORT, and other packages.

Layered Products

A layered product, also called optional software, is software that you must purchase from Digital. You can build layered products after you complete the system installation by processing the appropriate command file. Examples of optional software are BASIC-PLUS-2, COBOL-81, and DIBOL.

Types of System Installation

This guide describes four types of system installations:

- New - In this type of system installation, you create a RSTS/E system disk, tailor a RSTS/E monitor, install one or more run-time systems and resident libraries, install the required system programs, and install any other optional system programs.
- Upgrade - In this type of system installation, you upgrade a V8.0 or earlier version of the monitor to a V10.0 system. This system installation differs from the previous one in that you must perform tasks to move your old system disk to a new format disk using either the disk conversion utility (DSKCVT) or other methods to transfer data from the old disk.
- Online - In this type of system installation, you reinstall selected RSTS/E components during timesharing on a previously installed V10.0 system. Note that you cannot perform an online system installation to install a V10.0 system from a V9.7 or earlier system. Online installations are done to change selections made during a previous installation.
- Update - In this type of system installation, you update an existing V9.0 through V9.7 system to a new release. When you receive the new Installation Kit from Digital, use these procedures to update your present V9.0 through V9.7 or earlier system to a V10.0 system.

Another type of system installation is:

- System installation for another PDP-11 - In this type of installation, you build a RSTS/E monitor on one PDP-11 for use on another PDP-11. This is called a "target" build. This means you must know the hardware characteristics of the PDP-11 for which you are building the RSTS/E system.

Dialogue Format

The installation and update dialogue format used in this manual assumes you are running the procedure from a hardcopy terminal. However, you can run the procedure from a video terminal. In this case, the dialogue format will be different. The top part of the screen is reserved for header information, which keeps you informed about progress through the phases of the procedure. The bottom part of the screen is reserved for prompts and status and error messages. The middle part of the screen displays the remaining general information as the procedure progresses through its phases. Figures 1 and 2 show two typical display examples.

How to Use This Guide

The *RSTS/E System Installation and Update Guide* focuses on the tasks you must perform to install or update your system, rather than the option or program used to complete the task. The guide is divided into six parts:

- Part 1 tells how to build a new RSTS/E system. It is divided into seven phases plus one optional phase, each consisting of one or more tasks. This logical division of phases makes it easier to understand the process of system installation. A summary of the installation procedure is printed at the end of Part 1.
- Part 2 explains how to perform a system installation to upgrade an existing pre-V9.0 RSTS/E system to V10.0.
- Part 3 explains how to perform an online system installation to create a new monitor or perform a partial installation.
- Part 4 explains how to update an existing V9.0 through V9.7 system to a V10.0 release. It is divided into five phases plus one optional phase, each consisting of one or more tasks.
- Part 5 is a reference section that describes the INIT.SYS offline options.
- Appendixes A through F contain supplemental information that you may need for your particular installation.

Figure 1: Video Terminal Display with a Prompt

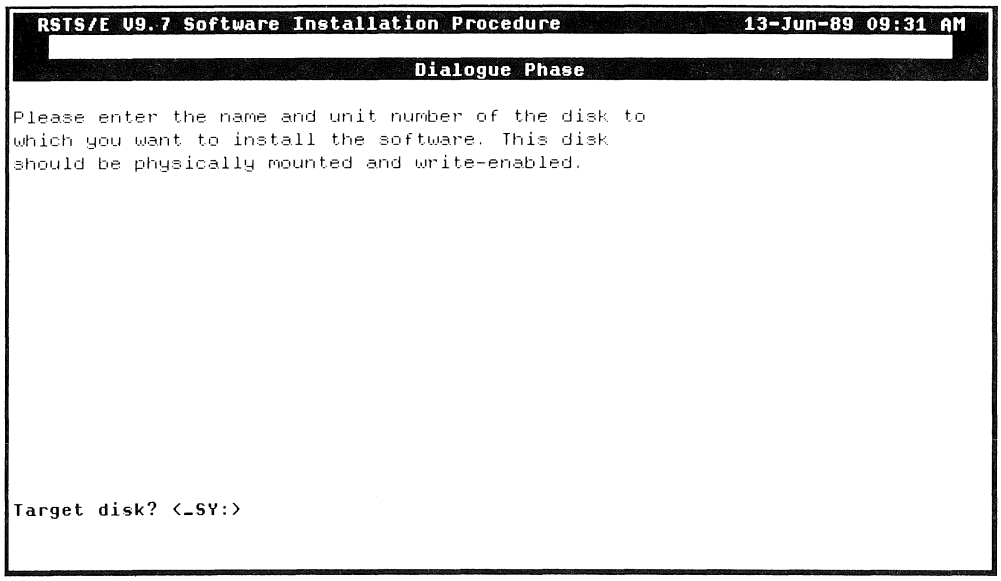
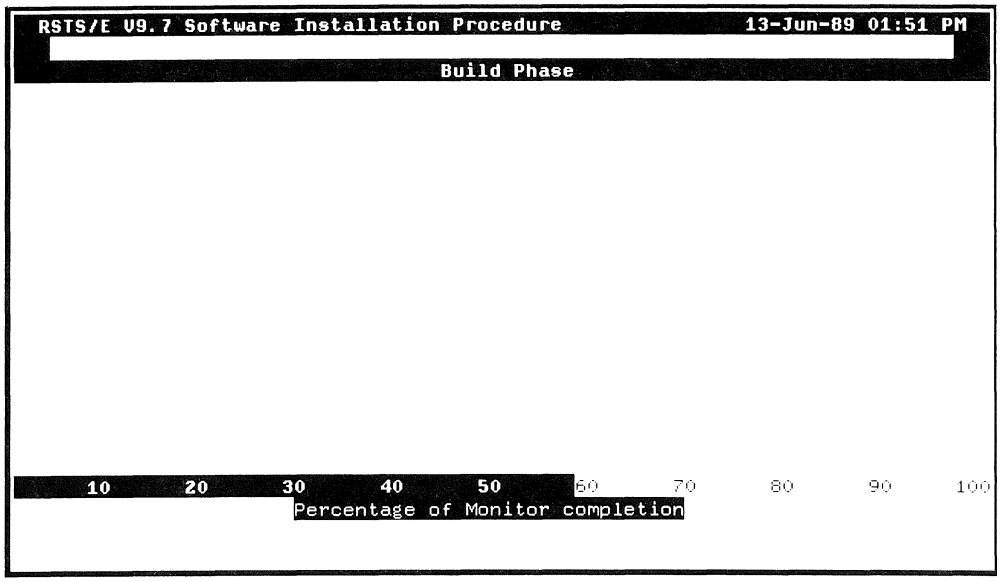


Figure 2: Video Terminal Display with a Dynamic Message



Part 1
Installation

Installing RSTS/E V10.0 on a New System

This part describes the tasks you must perform to install a new RSTS/E V10.0 system. This part of the guide is for users who are less experienced and knowledgeable about performing a system installation. It also provides an example installation for use as an aid in explaining the tasks.

Some tasks require you to load and unload tapes or disks, depending on the RSTS/E installation kit you received. Other tasks require you to answer questions and to make decisions about some of the questions you need to answer.

The method of explanation depends on the type of task you perform. In tasks requiring you to load a tape or disk, the guide gives you general loading instructions.

In tasks requiring you to answer questions and make decisions about the answers to those questions, this guide first gives you any necessary background information, followed by a terminal session. Each terminal session explains the question and gives some possible responses. The response in red next to the question is from an example installation. Use the example installation as a guide when you are building your RSTS/E monitor. The example installation has the following characteristics:

- CPU: PDP-11/44
- Memory: 512K words
- System Disk: RA80
- RSTS/E Distribution Kit: 1600 bpi magnetic tape
- Installation Kit: V10.0

Your responses may differ from the ones you see in the example installation. The following example question is from a terminal session:

```
Disk? DU
```

Explanation—This question asks for the device designator of your system disk.

Response—Acceptable responses for the system disks are: DL, DM, DR, DB, or DU. In the example installation, the response is DU because the system disk is an RA80.

In addition to the explanation in the guide, you also have access to online explanations. To print the online explanation of a question on your console terminal, type a question mark (?).

Structure of Part 1

Part 1 of this guide divides system installation into seven phases plus one optional phase, where each phase consists of one or more tasks. For convenience, all the tasks in a phase appear at the start of that section.

A description of the contents of each phase follows.

Phase 1: Getting Started

Provides instructions on collecting the required installation kits and documentation, checking the kit order numbers, and physically mounting and bootstrapping the Installation tape or disk.

Bootstrap instructions are in Appendix C. However, Phase 1 contains an example of bootstrapping.

Phase 2: Prepare System

Describes how to mount, initialize, and copy files to your system disk. It also explains how to start the SYSGEN monitor.

Phase 3: Configure RSTS/E Monitor

Explains how to answer the configuration questions that determine the hardware and software your RSTS/E monitor will support.

Phase 4: Select RSTS/E System Programs

Describes how to select system programs. It also explains how to select layered product updates that will be transferred later.

Phase 5: Generate RSTS/E System

Explains how to generate the RSTS/E monitor. It also describes how to install system programs and transfer layered product updates. Finally, it describes the dialogue to install BASIC-PLUS and SORT/MERGE.

Phase 6: Create Accounts and Edit System Startup File

Describes how to tailor the START.COM file and create user accounts.

Phase 7: Start RSTS/E Monitor

Explains how to shut down the SYSGEN monitor and start the new RSTS/E monitor.

Phase 8: Optional Tasks

Explains how to relocate system program packages or apply a mandatory patch. This is an optional phase.

System Installation Flowchart

Figure 3, the System Installation Flowchart, summarizes the installation phases and tasks. You may want to use this flowchart while performing the system installation.

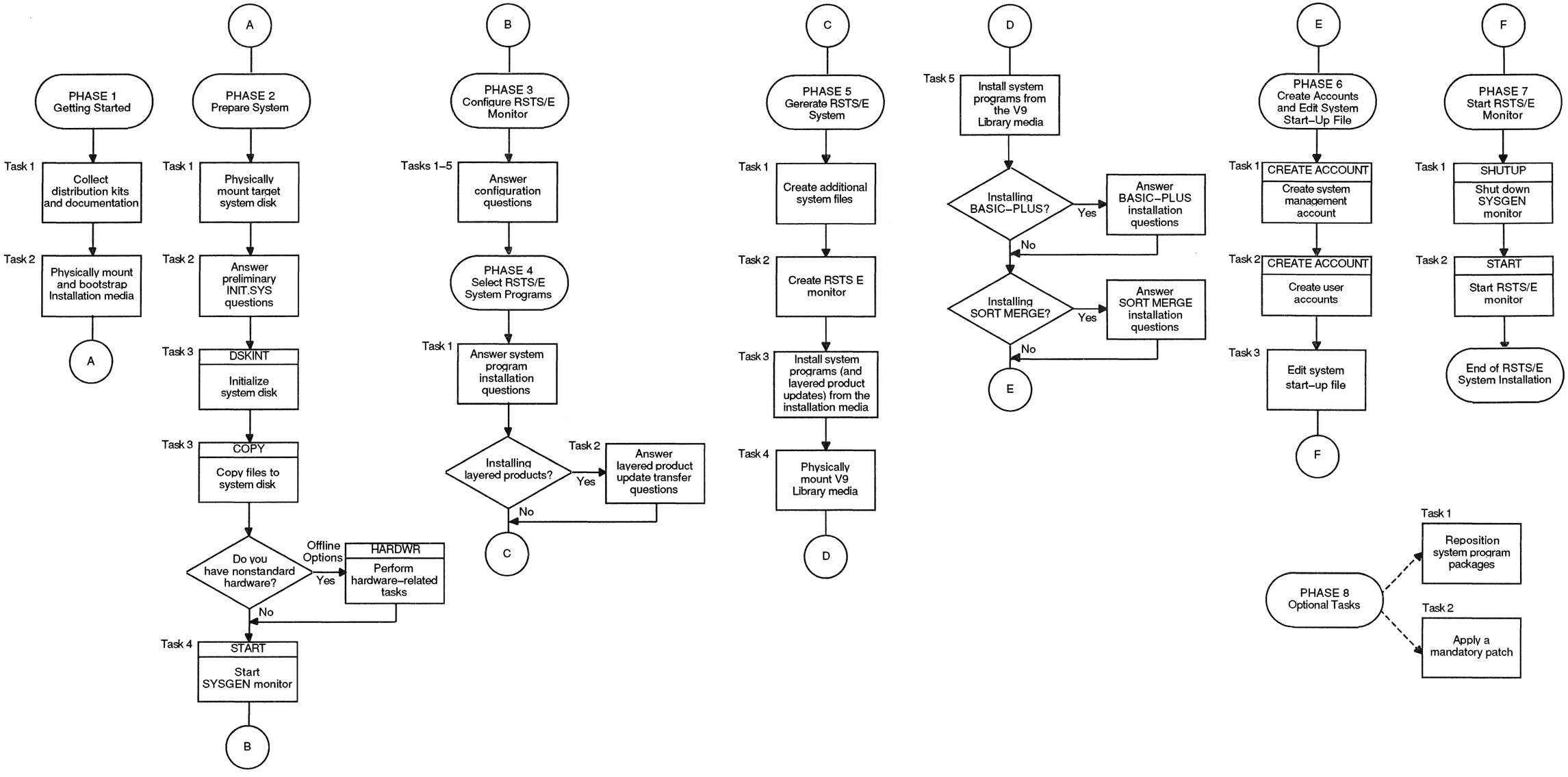


Figure 3: System Installation Flowchart

Phase 1
Getting Started

This phase describes the tasks you must perform to prepare for a RSTS/E system installation.

The tasks in this phase are:

- Task 1: Collect the Distribution Kit and Documentation
- Task 2: Physically Mount and Bootstrap Installation Media

Task 1: Collect Distribution Kits and Documentation

Digital sends you one of the following distribution kits:

- *A Kit* - for new RSTS/E customers. Contains complete RSTS/E V10.0 documentation and Installation Kit, all RSTS/E Release Notes, and all purchased optional software kits.
- *H Kit* - for those whose service contract or warranty has expired, or who have purchased additional CPUs, or who only need to update their system. Contains complete RSTS/E V10.0 documentation and Installation Kit, all RSTS/E Release Notes, and all purchased optional software kits.
- *W Kit* - for those under warranty or software product service contract. Contains complete RSTS/E V10.0 documentation, Installation Kit, and all purchased optional software kits (only if the original version has changed).

To perform a system installation, collect the following items from your kit:

- *RSTS/E V10.0 Installation Kit*- Consists of the tape or disk that contains feature and mandatory patches and replacement modules. It also contains the programs and files you need to perform a system installation. You receive this kit for every new release of RSTS/E. The kits are labeled V10.0, V10.1 and so forth. Because each kit is cumulative, use only the most current one. For example, the V10.1 Installation Kit would contain all the patches and replacement modules that were on the V10.0 Kit, plus some new patches and replacement modules.
- *Layered Product Kit(s)* - Optional software, also called layered products, is purchased separately from the RSTS/E Distribution Kit. Examples of optional software are COBOL-81, BASIC-PLUS-2, and DIBOL. Purchase optional software from an original equipment manufacturer or directly from Digital. Each optional software kit consists of the disk or tape that contains the programs and files you need to install the optional software, along with the appropriate documentation and installation guide. Ensure that you have the appropriate version by checking the SPD Layered Product cross-reference chart.
- *RSTS/E V10.0 Release Notes* - Explains the differences between the most current and previous versions of RSTS/E.

You may want to keep the following items nearby for use as reference material:

- *RSTS/E System Manager's Guide* - Describes how to operate and manage a RSTS/E system. Refer to this manual during system installation for more information about creating accounts and editing the system startup file. Also use this manual to help manage your system on a day-to-day basis.
- *RSTS/E Software Dispatch* - Contains new and revised software product descriptions (SPD), programming notes, patches and announcements for system programs and optional software, and documentation corrections.

If one or more of these items is missing, contact your local Digital software support specialist.

Check the order numbers that appear on the tapes or disks that make up your RSTS/E V10.0 Installation Kit to be sure they match the order numbers that appear in the *RSTS/E Release Notes*. To check the order numbers of any other optional software kits, refer to the bill of materials.

Go to Task 2.

Task 2: Physically Mount and Bootstrap Installation Media

This task requires you to mount and bootstrap the appropriate tape or disk from your RSTS/E Distribution Kit. First, the task provides instructions for mounting the tape on a tape drive, or mounting a disk on a disk drive. Choose the appropriate section for your type of installation media. Second, the task provides an example of bootstrapping the tape or disk.

In the example installation, the kit is a RSTS/E V10.0 Installation Kit, consisting of a 9-track, 1600 bits per inch (bpi) tape.

Tape Mount Session

Mount the 800 or 1600 bpi 9-track tape from your RSTS/E Distribution Kit that has the label V10.0 Installation. This tape contains the system installation files and programs. Note that there may be other programs and files on this tape.

To load the tape on the drive:

1. Physically mount the tape on drive unit 0 or 1 with the write-enable ring removed. If you have an 800 bpi distribution tape, mount it on unit 0 or 1 of the TE10 or TU10 tape drive. If you have a 1600 bpi distribution tape, mount it on unit 0 or 1 of the TU16, TE16, TU45, TU77, TS11, TSV05, TU80, or TU81 tape drive. If you have a TK50 installation medium, mount it on unit 0 or 1 of the TK50 tape drive.
2. Press the LOAD indicator.
3. The drive automatically winds the tape until the beginning of tape (BOT) indicator light comes on. This indicates the tape is at its load point.
4. Make sure that the write-lock (WR) indicator light is on. (If not, dismount the tape, remove the write-enable ring, and then remount the tape.)
5. Press the ONLINE indicator. The indicator light comes on.
6. Make sure the console terminal is on line. The console terminal is usually a hard-copy terminal that you use during system installation.

NOTE

If the previous instructions do not apply to your tape drive, see the hardware manual supplied with your tape drive for the load instructions.

The tape drive MUST be write-protected and online for the installation to proceed properly.

Disk Mount Session

Mount the disk from your RSTS/E Distribution Kit that has the label V10.0 Installation. This disk contains the system installation programs and files. Note that this disk may also contain other files and programs.

To load the disk onto the disk drive:

1. Physically mount the disk in drive unit 0 or 1. If you have an RL02 disk, you can mount the disk in any drive unit.
2. Make sure that the READY light is on.

3. Make sure that the write-protect (WR PROT) light is on.
4. Make sure that the console terminal is on line. The console terminal is usually a hard-copy terminal that you use during system installation.

Bootstrap V10.0 Installation Media

Now you must bootstrap the tape or disk, which means using the PDP-11 hardware bootstrap loader to activate the installation media. There are different types of hardware bootstrap loaders. If you do not know how to bootstrap the V10.0 Installation media, see Appendix C, which contains bootstrap instructions for most of the different types of hardware bootstrap loaders.

The hardware bootstrap loader is a device inside your PDP-11 that reads a bootstrap record from the tape or disk into memory. This bootstrap record contains a program that loads and executes additional program code from the tape or disk.

Your Digital Field Service representative or software support specialist should already have identified the type of hardware bootstrap loader on your PDP-11. The representative should also have given instructions for bootstrapping your tape or disk.

The example installation shows how to bootstrap the 1600 bpi tape from a TU80 tape drive. These bootstrap instructions are:

1. Move the control switch (CONT) to the HALT position.
2. Move the control switch to the BOOT position.

The CPU prints some octal numbers on the console terminal, followed by three angle brackets:

```
>>> B MS0
```

The >>> prompts for a command. Type B to indicate a BOOT operation, followed by the device designator or device specification of the drive on which your tape or disk is mounted. A device designator consists of two letters that identify the device type, followed by the decimal unit number of the drive and a colon. (However, do not specify a colon here.) The example installation uses a TU80 tape drive: thus, the tape device designator is MS0.

The following are general guidelines for the time required for the next step:

1. Disks boot quickly.
2. Tapes boot medium quickly.
3. TK50 boots slowly.

Anywhere from 30 seconds to 10 minutes after you type the device designator, the following prints on the console terminal:

```
Performing limited hardware scan.

RSTS V10.0-L (MS0)  INIT V10.0-L

Today's date?
```

The "Today's date?" prompt means that INIT.SYS is loaded into memory. This prompt is skipped if the 11/93/94 time of year clock has been set. You have successfully bootstrapped your installation media. Note that the device designator of the tape or disk drive you bootstrapped appears within parentheses. In the example installation, the device designator is MS0.

Note that the time required for this step varies according to the bootable device you use and the size of your system. The following are some more specific guidelines for the time for this step:

- If you are booting a disk such as an RL02 or RK07, this step should take less than 30 seconds.
- If you are booting a TK50 on a large system with many devices attached, this step could take up to 10 minutes.

Table 1 lists the tape device designators. Table 2 lists the bootable disk device designators. Enter the appropriate device designator for your installation.

Table 1: Tape Device Designators

Designator	Devices Available During Installation
MM0: to MM1:	TE16/TU16/TU45/TU77 magnetic tape units 0 or 1
MS0: to MS1:	TS11/TSV05/TU80/TK25[1] magnetic tape units 0 or 1
MT0: to MT1:	TE10/TU10/TS03[2] magnetic tape units 0 or 1
MU0: to MU1:	TK50/TU81/TU81-PLUS magnetic tape units 0 or 1

[1] — Note: You cannot use a TK25 drive for system installation.
[2] — Note: You cannot use a TS03 drive for system installation.

Table 2: Bootable Disk Device Designators

Designator	Devices Available During Installation
DB0: to DB1:	RP04/RP05/RP06 disk drive units 0 or 1 [1]
DL0: to DL3:	RL01/RL02 disk drive units 0 to 3
DM0: to DM1:	RK06/RK07 disk drive units 0 or 1
DR0: to DR1:	RM02/RM03/RM05/RM80 disk drive units 0 or 1 [1]
DU0: to DU15:	RA60/RA70/RA80/RA81/RA82/RA90/RCF25/RC25/RD31/RD32/ RD51/ RD52/RD53/RD54/RX33/RX50 disk drive units 0 to 15

[1] — See Appendix F for more information on multiple RH controller (otherwise known as DB and DR controllers) configurations.

Go to Phase 2.

Phase 2
Prepare System

After you bootstrap the V10.0 Installation tape or disk, you are ready to prepare your system for the installation. First you prepare your system disk. The system disk is the disk on which your RSTS/E monitor will reside. Nonsystem disks store other files and programs that might not fit on the system disk. Next you start the SYSGEN monitor, a prebuilt monitor supplied by Digital. You use the SYSGEN monitor to generate your new monitor.

The tasks in this phase are:

- Task 1: Physically Mount Target System Disk
- Task 2: Answer Preliminary INIT.SYS Questions
- Task 3: Initialize System Disk (DSKINT)
- Task 4: Start SYSGEN Monitor (START)

Task 1: Physically Mount Target System Disk

Mount your system disk on a free drive, either 0 or 1. If you are performing an installation for another system, mount the target system disk instead.

NOTE

Unless your system disk is a DU or DL class device, you must mount your system disk (as well as your V10.0 Installation tape or disk) on drive 0 or 1 because the SYSGEN monitor recognizes only units 0 and 1 of each device type. For example, if you mount your system disk on drive 2 at this stage, the SYSGEN monitor fails during startup.

If your disk is a DL class device, you can mount it on any disk drive (0, 1, 2, or 3). If your disk is a DU, then you can mount it on disk drive 0 through 15. See Table 2 for a list of disk device designators.

Follow either the disk mount instructions in Task 2 of Phase 1 or the disk mount instructions in the appropriate hardware manual. Do not remove the V10.0 Installation tape or disk that contains the system installation programs and files.

Go to Task 2.

Task 2: Answer Preliminary INIT.SYS Questions

Your next task is to answer the Date and Time questions, and then to answer the preliminary INIT.SYS questions.

Terminal Session

You have now successfully bootstrapped your V10.0 Installation media, and the INIT.SYS program is loaded into memory. INIT.SYS prints its banner, and prompts you for the date and time.

```
RSTS V10.0-L (MS0) INIT V10.0-L

Today's date? 13-Sep-90

Current time? 05:00 AM
```

Explanation—INIT.SYS prompts you for a valid date and time. You see the date and time prompts when you bootstrap a disk from the console boot/restart switch.

If you specified the date and time at some earlier point and you used the BOOT option of INIT.SYS to bootstrap the disk, then INIT.SYS simply displays today's date and time before proceeding to the next prompt.

On 11/93 and 11/94 systems, RSTS/E will determine the date and time from the built-in time of year clock. These questions will be asked only if the time has not yet been set.

Response—Type today's date and time in either of the RSTS/E date and time formats. Type a question mark (?) to print an online explanation of the response formats for this question on your console terminal.

```
Installing RSTS on a new system disk? <Yes> RET
```

Explanation—INIT.SYS asks this question whenever you bootstrap a read-only tape or disk. (RSTS/E Distribution Kits are always read-only.) If you answer YES, INIT.SYS assumes you are performing a new V10.0 installation and you want to use the DSKINT option to initialize your system disk. INIT.SYS then prompts you for the location of the system disk.

If you answer NO, INIT.SYS asks if you are updating an existing RSTS system disk before proceeding with a COPY operation.

NOTE

In V9.0 or later, any system or public disk must be a RDS1.2 format disk. Answer YES to this question if you are performing a new installation. If you are upgrading to V10.0 from an earlier release of RSTS/E, see Part 2 of this guide for instructions.

Response—Type YES or press RETURN to proceed with the disk initialization. Because the example installation is a new RSTS/E V10.0 installation, the response is RETURN to accept the default of YES.

If you answered YES to the previous question, go to Task 3.

If you answered NO to the previous question, go to Task 4.

Task 3: Initialize System Disk (DSKINT)

Your next task is to initialize the system disk with DSKINT, an INIT.SYS program option. DSKINT:

- Optionally formats some disks. DSKINT writes timing and sense marks on the disk and destroys any previously stored information.
- Optionally checks the disk for bad blocks. DSKINT locates bad blocks on the disk and allocates them to the bad block file (BADB.SYS).
- Writes a minimum RSTS/E file structure on the disk. The minimum RSTS/E file structure contains a pack label and five directories:
  - The Master File Directory (MFD)
  - The Group File Directory (GFD) for groups 0 and 1
  - The User File Directory (UFD) for account [0,1] and [1,2]
- Prepares the disk to accept RSTS/E system and other files.

Terminal Session

To initialize your system disk, you must answer the DSKINT questions. This terminal session lists the questions, explains them, and gives you some possible responses. After you understand the question, type the response at your console terminal. In some cases, your response will differ from the response shown in red in the example installation.

These responses have special meaning:

Response	Description
RET	Accept the default response
?	Obtain an online explanation of the question
^	Return to the previous question
CTRL/Z	Restart DSKINT dialogue
CTRL/C	Abort DSKINT and return to the Option:prompt

The common DSKINT dialogue error messages appear at the end of this task. If you receive an error message that does not appear there, see Appendix A.

```
13-Sep-90 - 05:02 AM

Disk? DU
```

Explanation—After you answer YES to the Installing RSTS on a new system disk? question, INIT.SYS automatically begins the DSKINT dialogue. DSKINT prints the current date and time, and then asks for the device designator of your system disk.

Response—Type one of the acceptable responses for system disks: DL, DM, DR, DB, or DU. In the example installation, the response is DU because the system disk is an RA80.

```
Unit? <0> 0
```

Explanation—DSKINT asks for the unit number of the disk drive on which your system disk is mounted.

Response—Type one of the acceptable responses at this stage of system installation: 0 or 1. (If your system disk is a DL class device, acceptable responses are 0, 1, 2, or 3. If your system disk is a DU class device, acceptable responses are 0 through 15.) The response is 0 in the example installation.

NOTE

If the message "Performing limited hardware scan." was printed during this boot and you try to initialize or copy to a nonexistent DU type disk, then you will receive the following prompt:

```
That disk was not found during limited hardware scan.

Do you wish to perform a reboot with full hardware scan? <YES>
```

Response—If you answer YES, then the distribution device will be rebooted and the "Performing limited hardware scan." message will NOT reappear.

```
This disk appears to be a RSTS/E formatted
disk with the following characteristics:

Pack ID:                NATHAN
Pack Cluster Size:      8
Pack is currently:      Private,
                        Update access date on writes,
                        Level: 1.2

Pack ID? SYSDSK
```

Explanation—After you type the unit number, DSKINT prints the disk's pack label information, if the disk has been initialized before. If the disk has not been initialized before, DSKINT does not print the identifying information. The pack label information lists:

- Pack ID
- Pack cluster size
- Pack status (public or private)
- Whether files are catalogued with the date they were last modified (written to) or accessed (read, opened, closed, and so forth)
- New files first information
- Whether the disk is read-only
- RSTS/E disk structure level

This private disk could be a system disk; DSKINT cannot determine whether a private disk is also a system disk. In the example installation, the pack ID is NATHAN, the pack cluster size is 8, the pack status is private, the files are catalogued with the date they were last written to, and the format level is RDS1.2.

This information lets you decide whether to initialize the disk. When you initialize a disk, you destroy any information stored on it. Because this disk contains no vital information, it will be initialized and used as the new system disk. If your disk contains vital information, see Part 2, Installing RSTS/E on a Pre-V9.0 System, for information on how to preserve the information.

After printing the pack label information, DSKINT asks for a pack ID. The pack ID becomes a systemwide logical name.

Response—Type a pack ID. The pack ID can be any combination of alphanumeric characters up to 6 characters long. The pack ID in the example installation is SYSDSK.

```
Pack cluster size <4>? RET
```

NOTE

Some questions show a response within brackets, such as the one in this question (<4>?). This is the default response. To accept any default response, press RETURN. (The RETURN response does not print on your console terminal. The RET symbol appears in the example installation to show you that the RETURN key was chosen as a response.)

Explanation—A cluster is a fixed number of 512-byte blocks of storage area allocated contiguously on a disk. The pack cluster size is the minimum number of blocks that your RSTS/E monitor can allocate to a file on the disk.

Your answer to this question depends on the type of processing and the disk requirements of your installation. The pack cluster size affects disk space and speed of file creation and access. A large pack cluster size improves access time to programs and user files because the monitor allocates space for data in cluster units. For example, if the pack cluster size is 16, the monitor allocates 16 blocks at a time. However, if the pack cluster size is 2, the monitor allocates only 2 blocks at a time. Thus, more disk accesses and CPU time are needed to allocate the same amount of space.

On the other hand, a large pack cluster size may waste disk space. For example, if you assign a pack cluster size of 16, the monitor allocates one cluster of 16 contiguous blocks (8,192 bytes) to a file that contains only one block (512 bytes) of information. Fifteen blocks (7,680 bytes) are wasted. Likewise, the monitor allocates one cluster of 16 contiguous blocks to a 15-block (7,680 bytes) file. In this case, only one block (512 bytes) is wasted.

Response—Type the disk pack cluster size. For system disks, Digital recommends a pack cluster size of 4 or greater. In the example installation, the response is RETURN to accept the default cluster size of 4. Table 3 lists the disk cluster sizes.

Table 3: Disk Pack Cluster Sizes

Disk Type	Pack Cluster Size
RA60	8, 16, 32, 64
RA70	16, 32, 64
RA80	4, 8, 16, 32, 64
RA81	16, 32, 64
RA82	32, 64
RA90	64
RC25	1, 2, 4, 8, 16, 32, 64
RD31	2, 4, 8, 16, 32, 64
RD32	2, 4, 8, 16, 32, 64
RD51	1, 2, 4, 8, 16, 32, 64
RD52	1, 2, 4, 8, 16, 32, 64
RD53	4, 8, 16, 32, 64

Table 3 (Cont.): Disk Pack Cluster Sizes

Disk Type	Pack Cluster Size
RD54	8, 16, 32, 64
RK05[1]	1, 2, 4, 8, 16, 32, 64
RK05F[1]	1, 2, 4, 8, 16, 32, 64
RK06	1, 2, 4, 8, 16, 32, 64
RK07	1, 2, 4, 8, 16, 32, 64
RL01	1, 2, 4, 8, 16, 32, 64
RL02	1, 2, 4, 8, 16, 32, 64
RM02	4, 8, 16, 32, 64
RM03	4, 8, 16, 32, 64
RM05	8, 16, 32, 64
RM80	4, 8, 16, 32, 64
RP04	4, 8, 16, 32, 64
RP05	4, 8, 16, 32, 64
RP06	8, 16, 32, 64
RX33[1]	1, 2, 4, 8, 16, 32, 64
RX50[1]	1, 2, 4, 8, 16, 32, 64

[1] — You cannot use these disks as system disks.

```
MFD cluster size <16>? RET
```

Explanation—The master file directory (MFD) stores information about all groups of accounts on a disk. The monitor accesses the MFD to locate and create files and accounts.

This question asks for the MFD cluster size, which is the maximum number of 512-byte blocks that each cluster allocated to the MFD can contain. The MFD can have a maximum of seven clusters (if you answer YES to the Pre-extend directories? question later in this task), and each directory is the size that you specify here. If you answer YES, the maximum of seven clusters is allocated now. The MFD cluster size must be greater than or equal to the pack cluster size unless the pack cluster size is 32 or 64. If the pack cluster size is 32 or 64, then the MFD cluster size will be 16.

Legal values for the example installation MFD cluster size are 4, 8, or 16.

Response—Type 4, 8, or 16. Or, press RETURN to accept the default response of 16, as in the example installation.

```
SATT.SYS base <18595>? RET
```

Explanation—The SATT.SYS file controls the use of storage space on a disk through a storage allocation table (SAT). The monitor accesses this file each time you extend or delete files. You are asked where you want to position this file on the disk. It is advantageous to position the SATT.SYS file near the center of the disk to reduce average seek times for the disk heads. On the other hand, if you use only the first half of a disk or need to create large contiguous files or use LOAD/INDEX commands, you may want to locate SATT.SYS in a place other than the center. This reduces fragmentation of the disk.

The position of the SATT.SYS file is also important because its position determines the default placement of the monitor and the default keyboard monitor, as well as the SWAP.SYS system file.

The number that appears within brackets is the center of the disk as calculated by DSKINT. (DSKINT may calculate a different number for your disk.) The device cluster number can range from 1 to the total device size divided by the device cluster size. See Table 4 for a list of disk device cluster sizes and total device sizes.

Response—Press RETURN to have DSKINT position the file near the center of the disk. In the example installation, the response is RETURN.

Or, type the device cluster number where you want the file placed.

Table 4 lists the disk device cluster sizes and total device sizes. Note that the table shows the total blocks that are available for use, not the total size of the disk. In addition, the number of available blocks may vary if your system has a different device cluster size.

Table 4: Device Cluster Sizes and Total Device Sizes

Disk Type	Device Cluster Size	Total Available Blocks [2]
RA60	8	400,168
RA70	16	547,040
RA80	4	237,208
RA81	16	891,072
RA82	32	1,216,640
RA90	64	2,376,128
RC25	1	50,901 per unit; 2 units per spindle
RD31	2	41,559
RD32	2	83,204
RD51	1	21,599
RD52	1	60,479
RD53	4	138,668
RD54	8	311,200
RK05[1]	1	4800
RK05F[1]	1	4800 per unit; 2 units per drive
RK06	1	27,104
RK07	1	53,768
RL01	1	10,220
RL02	1	20,460
RM02	4	131,648
RM03	4	131,648
RM05	8	500,352
RM80	4	242,572
RP04	4	171,796
RP05	4	171,796

[1] — You cannot use these disks as system disks.
[2] — Total available blocks represent the number of blocks when the disk is initialized at the device cluster size. The number of blocks on the RA/RC/RD class disks is subject to change with new revisions of these disks.

Table 4 (Cont.): Device Cluster Sizes and Total Device Sizes

Disk Type	Device Cluster Size	Total Available Blocks [2]
RP06	8	340,664
RX33[1]	1	2400
RX50[1]	1	800

[1] — You cannot use these disks as system disks.
[2] — Total available blocks represent the number of blocks when the disk is initialized at the device cluster size. The number of blocks on the RA/RC/RD class disks is subject to change with new revisions of these disks.

```
Pre-extend directories <NO>? RET
```

Explanation—This question asks if you want DSKINT to allocate automatically a maximum of seven clusters to the system account [0,1], the LB: library account [1,1], the system library account [1,2], and the MFD and GFDs for groups 0 and 1. The number of blocks each of these seven clusters contains depends on how you answered the cluster size questions for each of these accounts. For example, if you specify 16 as the cluster size for account [1,2] and answer YES to this question, DSKINT allocates the maximum of seven clusters to this account. Each cluster is 8,192 bytes (16 times 512 bytes). If you answer YES to this question, you will have faster access time because the blocks will be next to each other in the accounts. You answer this question YES normally unless disk space usage is a concern for you.

Response —Type YES to have DSKINT automatically allocate a maximum of seven adjacent clusters to these accounts. In the example installation, the response is RETURN.

Or, type NO or press RETURN if you want DSKINT to allocate only the minimum of 0 or 1 clusters.

```
PUB, PRI, or SYS <SYS>? RET
```

Explanation—This question asks you to designate the disk you are initializing as either public, private, or system. The system disk is the disk on which the RSTS/E monitor resides. It always contains account [1,2].

Response—Type SYS or press RETURN, because you are initializing a system disk in this task. In the example installation, the response is RETURN.

```
[1,1] cluster size <16>? RET
```

Explanation—This question asks for the cluster size of the User File Directory (UFD) for account [1,1]. The UFD is an area on the disk that stores information about the files created under a particular user account number. The cluster size for account [1,1] is the maximum number of 512-byte blocks that each cluster allocated to this account can contain.

Response—Press RETURN to accept the default response of 16. In the example installation, the response is RETURN. Or, type the cluster size for account [1,1]: 1, 2, 4, 8, or 16. It must be greater than or equal to the pack cluster size unless the pack cluster size is 32 or 64. If the pack cluster size is 32 or 64, then the UFD cluster size will be 16. Specifying a large cluster size improves disk access time and allows more files to be stored in that account.

Because the example installation's answer to the Pre-extend directories? question was NO, DSKINT allocates one cluster containing 8,192 bytes (16 times 512 bytes) to this account.

```
[1,2] cluster size <16>? RET
```

Explanation—This question asks for the cluster size of the UFD for account [1,2]. The cluster size for account [1,2] is the maximum number of 512-byte blocks that each cluster allocated to this account can contain.

Response—Type the cluster size for account [1,2]: 1,2,4,8, or 16. It must be greater than or equal to the pack cluster size unless the pack cluster size is 32 or 64. If the pack cluster size is 32 or 64, then the UFD cluster size must be 16.

Press RETURN to accept the default response of 16 if the pack cluster size equals 32 or 64.

Digital recommends that the cluster size for account [1,2] be 16, to improve disk access time. Press RETURN to accept the default response of 16, as in the example installation.

Because the example installation's answer to the Pre-extend directories? question was NO, DSKINT allocates one cluster containing 8192 bytes (16 times 512 bytes) to this account.

```
[1,1] and [1,2] account base <18595>? RET
```

Explanation—This question asks whether you want to place accounts [1,1] and [1,2] near the center of the disk or in some other place. The number that appears within brackets is the position of SATT.SYS, that is, the number you specified to the SATT.SYS base? question, or the middle of the disk as calculated by DSKINT if you specified RETURN to that question. DSKINT may show a different number for your disk.

Response—Press RETURN to place these accounts near the SATT.SYS file. In the example installation, the response is RETURN. Or, type the device cluster number where you want these files placed. The device cluster number can range from 1 to the total device size divided by the device cluster size. See Table 4 for a list of device cluster sizes and total device sizes.

```
Date last modified <YES>? RET
```

Explanation—This question asks whether you want to retain the date on which files were last modified (written to) or last accessed (written to, opened, read from, closed, and so forth).

Response—Type YES or press RETURN to retain the date on which files were last modified. This response is useful if you plan to use the BACKUP system program to back up files that have changed since the last backup. This response also decreases disk activity because the RSTS/E monitor updates the date only if the files are written to. In the example installation, the response is RETURN, which means the monitor updates the date each time the files are modified.

Or, type NO to retain the date on which files were last accessed. This response is useful for reordering the files, so the most frequently accessed files can be placed at the beginning of the directory. This response increases disk activity because the RSTS/E monitor updates the date no matter how the file is accessed for reads or writes.

```
New files first <NO>? RET
```

Explanation—This question asks if you want newly created files placed at the beginning or end of the directory of the account in which they are created.

Response—Digital recommends that you type NO or press RETURN to place newly created files at the end of the directory, giving you overall faster access time. In the example installation, the response is RETURN.

Or, type YES to place newly created files at the beginning of the directory. This response is useful when you have a private disk on which the files you most frequently access are new files.

```
Read-only <NO>? RET
```

Explanation—This question asks if you want this disk to be, by default, a read-only or a read/write device when it is logically mounted. You can write to a read-only disk when you logically mount it with the /WRITE qualifier.

Response—Press RETURN to make your system disk read/write. In the example installation, the response is RETURN.

```
Use previous bad block info <YES>? RET
```

Explanation—This question does not appear if you are initializing a new disk. The question asks if you want DSKINT to create a new bad block file (BADB.SYS) in system account [0,1] by using information from the existing bad block file. DSKINT checks each block on the disk (if you answer 1, 2, or 3 to the Patterns? question that comes later). If DSKINT finds unreliable blocks, it allocates the pack cluster in which the block resides to the BADB.SYS file.

Response—Digital recommends that you type YES or press RETURN to create the new bad block file, using information from the existing bad block file. In the example installation, the response is RETURN.

Or, type NO to have DSKINT ignore the current bad block file when creating the new one. You may want to answer NO, for example, if you are reinitializing a disk to decrease the pack cluster size. In this case, you want to obtain new bad block information.

```
Format <NO>?
```

Explanation—This question asks if you want DSKINT to format your disk. Formatting a disk means that DSKINT writes timing and sense marks onto the disk and destroys any information that previously existed on the disk. You must format the following disks if you are initializing them for the first time: RK05, RK05F, RP04, RP05, RP06, RX33.

You can optionally reformat these disks: RK06, RK07, RM02, RM03, RM05.

You cannot format or reformat (in which case this question would not appear) these disks: RL01, RL02, RA60, RA70, RA80, RA81, RA82, RA90, RC25, RCF25, RM80, RD51, RD52, RD53, RD54, RD31, RD32, RX50.

NOTE

If you are formatting a disk, Digital recommends that you mount the disk on the drive and leave it spinning for 20-30 minutes before initializing it. This ensures that the disk temperature is stable and uniform during the formatting. Failure to do this may cause unreliable data storage on the disk.

Response—Type YES to format the disk; type NO or press RETURN if you do not need to format the disk. This question does not appear in the example installation.

```
Patterns <3>? RET
```

Explanation—This question asks for the number of patterns DSKINT should use in checking for bad blocks. You can select a number from 0 to 3. If you select 0 patterns, DSKINT also prints the Erase disk? prompt.

DSKINT writes a pattern to the disk, and then reads it to check that the data was written correctly. The time DSKINT takes to run these pattern checks for bad blocks depends on the disk you are initializing. Type a question mark (?) to have DSKINT print the approximate time (in minutes) required for the different disks to complete one format check for bad blocks.

For DU class disks, with the exception of RX50 and RX33, bad blocks are handled transparently by the hardware. No blocks are ever added to the BADB.SYS file, since the hardware simply replaces the bad block with a new one. Digital still recommends that you run 3 patterns the first time you initialize a DU class disk.

Response—Type the number of patterns (0 to 3). Digital recommends you run 3. Any bad blocks discovered during pattern checking are added to the bad block file (BADB.SYS) so that data will not be written to these blocks. If you specify 0, DSKINT then asks the next question. In the example installation, the response is RETURN.

```
Erase disk <YES>?
```

Explanation—This question, which appears only if you answered 0 to the Patterns? question, asks if you want to erase the disk. If you answer YES, DSKINT wipes out all data on the disk. This is usually done for security purposes.

If you answer NO, DSKINT writes only the basic RSTS/E file structure on the disk. Use the NO response under the following conditions:

- You are initializing a disk that has been initialized before.
- You answered YES to the Use previous bad block info? question.
- You are confident no additional bad blocks are on the disk.
- You are not concerned about the security of old data that could still be accessed.

Response—The example installation did not see this question because it did not answer 0 to the Patterns? question.

```
Proceed (Y or N)? Y
```

Explanation—This question allows you to check your responses to the dialogue questions and abort the initialization if you have made any errors.

Response—Type Y to proceed with the disk initialization. In the example installation, the response is Y.

Or, type N to abort the initialization and return to the Option: prompt. If you type N, then you reboot your installation media.

DSKINT formats the disk, then begins pattern checking with pattern 3 and ends with pattern 1. If DSKINT prints a block and device cluster number during pattern checking, it adds the device cluster number (not the block number) to the BADB.SYS file. Note that this disk (a DU class disk) did not contain any bad blocks. Even if there were bad blocks, the hardware would have automatically replaced the bad blocks with good blocks. If the bad block replacement process fails, then DSKINT will abort with a fatal error.

```
13-Sep-90 - 05:17 AM

Copying required system files

Performing limited hardware scan.

RSTS V10.0-L (DU0) INIT V10.0-L
```

Explanation—The disk initialization is complete. INIT.SYS now transfers files that are required for the installation to your new system disk.

When the transfer is complete, INIT.SYS automatically bootstraps your system disk, prints a message on your console terminal.

A list of the DSKINT error messages follows. If your error message does not appear there, see Appendix A.

BLOCK NUMBER TOO BIG

> **Explanation:** The block number you typed is greater than or equal to the maximum logical block number for the disk.

?DRIVE NOT READY:

> **Explanation:** The initialization cannot proceed because the disk to be initialized is not on line and ready.
>
> **User Action:** You can make the drive ready and press RETURN to proceed, or you can press Ctrl/C to abort the initialization.

?DSKINT NOT LEGAL ON SYSTEM DISK

> **Explanation:** You specified the disk from which the initialization code was bootstrapped. You cannot initialize this disk now because the initialization code would be destroyed.

FORMATTING FAILURE:

> **Explanation:** The disk could not be formatted.
>
> **User Action:** Mount the disk on the drive and leave it spinning for 20-30 minutes before formatting the disk. If you still receive the same error message after one retry, then use a new disk.

?ILLEGAL DISK NAME

> **Explanation:** The string you typed is not the name of a valid RSTS/E disk device.
>
> **User Action:** Enter a valid name.

?ILLEGAL NUMBER OF PATTERNS

> **Explanation:** The number of patterns must be 0 through 3.

?ILLEGAL NUMBER, TRY AGAIN

> **Explanation:** The number you typed is not a valid octal number between 1 and 177777.

?ILLEGAL PACK ID

> **Explanation:** The pack ID must consist only of characters from "A" to "Z" or "0" through "9."

?SORRY, BUT THAT DISK DOESN'T EXIST

Explanation: The string you typed is a valid RSTS/E disk name, but that disk controller or the unit number does not exist on this system.

THAT DISK WAS NOT FOUND DURING LIMITED HARDWARE SCAN

Explanation: You tried to initialize or copy to a nonexistent DU type disk.

User Action: If you answer YES to the "Do you wish to perform a reboot with full hardware scan ?", then the distribution device will be rebooted and the "Performing limited hardware scan." message will NOT reappear.

?UNABLE TO READ BAD BLOCK TRACK DATA

Explanation: The manufacturer's bad block information could not be read.

User Action: Either run 3 patterns on the pack or try a different pack.

Go to Task 4.

Task 4: Start SYSGEN Monitor (START)

Digital supplies a prebuilt RSTS/E monitor, called the SYSGEN monitor, on the Installation tape or disk. It resides in account [0,1] with the file name SYSGEN.SIL. The SYSGEN monitor is a temporary monitor; you use it only to build your RSTS/E monitor. (Phase 7 describes how to shut down the SYSGEN monitor when it is no longer needed.)

Terminal Session

This terminal session lists the INIT.SYS questions, explains them, and gives you some possible responses. After you understand a question, type the response at your console terminal. In some cases, your response will differ from the response printed in red in the example installation.

```
Rebooting . . .

RSTS V10.0-L (DU0) INIT V10.0-L

13-Sep-90 - 05:17 AM

Creating SWAP.SYS file with minimum size of 136 blocks

Memory allocation table:

   0K: 00000000 - 00407777 (  66K) : EXEC
  66K: 00410000 - 03467777 ( 396K) : USER
 462K: 03470000 - 03777777 (  50K) : XBUF
 512K: 04000000 - End              : NXM

Memory available to RSTS/E is 512K words.

Creating CRASH.SYS file with minimum size of 336 blocks

8 devices disabled
```

Explanation—INIT.SYS prints these messages as it starts the SYSGEN monitor. These messages may be slightly different due to configuration differences.

NOTE

It is sometimes necessary to use the HARDWR option to set non-standard CSR addresses during this part of the procedure. However, with RSTS/E V10.0, the SYSGEN.SIL is started automatically, and the "Option" prompt is not asked.

If you need to access the "Option" prompt, follow this procedure:

1. During the installation procedure, the message "Copying required system files" appears. Several files are then copied from the distribution medium to your system disk.
2. Following this, your system disk is booted.
3. Immediately after the INIT header line is displayed, type ^C (Ctrl/C) twice. The ^C characters will not be echoed on the terminal.
4. After a pause of ten seconds to two minutes, depending on your configuration, the "Option" prompt appears.

If you get the "Option" prompt again when you are finished with your changes, simply press RETURN to continue with the procedure.

Go to Phase 3.

Phase 3
Configure RSTS/E Monitor

You now have a temporary monitor to use in building your RSTS/E monitor. Unlike the SYSGEN monitor, which comes prebuilt, you must configure your RSTS/E monitor. To configure a monitor means to select the hardware and software it will support. You select the hardware and software by answering configuration questions. These questions ask you what hardware (controllers, disk drives, tape drives, and so forth) and software features (EMT logging and so forth) your RSTS/E monitor will support.

This phase discusses the tasks you must perform to configure your RSTS/E monitor.

The tasks in this phase are:

- Task 1: Answer Preliminary Configuration Questions
- Task 2: Answer Disk Units Configuration Questions
- Task 3: Answer Peripheral Devices Configuration Questions
- Task 4: Calculate Number of Jobs
- Task 5: Answer Software Tuning and Features Configuration Questions

Each question in Phase 3 prints a default answer within brackets. If the system cannot determine a default response, it prints ?? within the brackets. Answer the questions based on the configuration of your system. If you are building a RSTS/E monitor for another PDP-11, answer the questions based on the configuration of the other PDP-11.

Note that you may see different default responses than the ones provided in the example installation.

If you want to start over at any time while answering the configuration questions, enter Ctrl/Z. You return to the beginning of the task. These responses have special meaning:

Response	Description
RET	Accept the default response
?	Obtain an online explanation of the question
^	Return to the previous question
CTRL/Z	Return to the beginning of the dialogue section
CTRL/C	Abort the dialogue and return to the DCL $ prompt

Task 1: Answer Preliminary Configuration Questions

Your next task is to answer the preliminary questions asked by the installation procedure. The system executes INSTAL.COM immediately after it starts the SYSGEN monitor.

Before INSTAL.COM asks any questions, it opens a log file named INSTAL.LOG in the account from which you are running the installation. This account is always [1,2] since you are logged in automatically. INSTAL.COM closes this log file at the end of the installation. You can then print INSTAL.LOG to obtain a record of the installation session.

Terminal Session

This terminal session lists the preliminary configuration questions and provides some possible responses. In some cases, your response will differ from the response shown in red in the example installation.

```
   RSTS/E V10.0-L


13-Sep-90 05:19 AM

Please mount the RSTS/E Installation media and enter the name
and unit number of the device.
Valid device types are: 'MM', 'MS', 'MT', 'MU', 'DM' or 'DL'

Installation device <_mmn:>?

Restoring required _SY:[0,1] components

   RSTS/E V10.0-L


Deleting all global symbols

13-Sep-90 05:21 AM

                    RSTS/E Software Installation Procedure
                          * Dialogue Phase *

During this installation procedure you may:

Type '?' for help
Type '^' to go back to the previous question
Type CTRL/Z to return to the beginning of the present section
```

Explanation—This question asks for the location of your Installation media. The default is the device on which you booted the Installation media.

Response—Press RETURN to accept the default response. In the example installation, the response is MMN.

```
Please enter the name and unit number of the disk to
which you want to install the software. This disk
should be physically mounted and write-enabled.

Target disk? <_SY:> :     RET
```

Explanation—This question is for anyone building a RSTS/E system for another PDP-11. Your response to this question determines the disk where the new RSTS/E monitor and system programs will be installed.

If you specify a disk other than the system disk (_SY:), physically mount and write-enable the disk before you answer this question. The disk does not need to be initialized at this time, because the next question asks if you want to initialize it. If you don't type _SY:, you must have already updated your system disk.

Response—Type the disk name and unit number of the target disk if you are installing RSTS/E for another PDP-11. You then see the Do you want to initialize the target disk? question.

Type SY or press RETURN to install RSTS/E on your present system disk, the disk you initialized in Phase 2. In the example installation, the response is RETURN.

```
Restoring required _SY:[1,2] components

Assigning system logicals

Are you ready to proceed? <yes>  RET
```

Explanation—This question asks if you are ready to continue. If you type YES or press RETURN, the dialogue continues. If you type NO, you see the $ prompt.

Answer NO, for example, if you need to recover a corrupted system disk by issuing the $RESTORE command. You resume the installation procedure by typing PROCEED.

Response—Type YES or press RETURN to continue with the installation. In the example installation, the response is RETURN.

```
    ** Starting Monitor Section **

13-Sep-90  05:22 AM

Do you want to install the RSTS/E monitor? <yes>  RET
```

Explanation—This question asks if you want to install the monitor. Answer NO to this question if you want to install only system programs and/or layered product updates. You then skip the monitor installation. You can only skip this if you already have a current version monitor.

If you answer YES or press RETURN to this question, you continue with the dialogue to install a RSTS/E V10.0 monitor.

If you answer NO to this question, go to Phase 4.

Response—Type YES or press RETURN to proceed with the RSTS/E monitor installation. In the example installation, the response is RETURN.

```
There is a prebuilt monitor available which is suitable for
Micro-PDP-11 systems. You may use this prebuilt monitor, or
you may build your monitor. Building your monitor will allow
you to specify the features you wish to include in the monitor.

You may now choose:      (A) Build your monitor
                         (B) Use prebuilt monitor

Please type A or B <A> ?

The prebuilt monitor MICRO.SIL offers the following features:

RK05's:0              RL01/RL02's:4              Overlapped seek:Yes
RK06/RK07's:0         Disks on DR controller:0   Disks on DB controller:0
MSCP support:Yes      TU16/TE16/TU45/TU77's:0    TU10/TE10/TS03's:0
TS11/TSV05/TU80's:1   TMSCP tape drives:2        Printers:1
RX01/RX02's:0         CR11/CM11 card reader:No   CD11 card reader:No
DMC11's/DMR11's:0     DMP11's/DMV11's:0          Simultaneous IBM Links:0
RJ2780 support:No     Maximum jobs:10            Small buffers:250
EMT Logging:No

Please type A or B <A> A
```

Explanation— The prebuilt monitor has been configured for a Micro-PDP-11 system. However, you can also use this monitor on PDP-11 systems if the configuration is suitable for your system configuration.

The default system configuration for the prebuilt monitor is:

Support	Default Value
RK05	00
RL01/RL02	04
Overlapped seek	Yes
RK06/RK07	00
Disks on DR controller	00
Disks on DB controller	00
MSCP support	Yes
TU16/TE16/TU45/TU77	00
TS11/TSV05/TU80	01
TMSCP tape drives	02
RX01/RX02	00
CR11/CM11 card reader	No
CD11 card reader	No
DMC11/DMR11	00
DMP11/DMV11	00
Simultaneous IBM links	00
RJ2780 support	No
Maximum jobs	10
Small buffers	250
EMT logging	No

Response— Type A to build your own monitor or type B to use the prebuilt monitor. If you select B, go to the end of this task.

```
Restoring required SYSGEN components
```

Explanation—The system now copies files that you need to continue the installation. Then you begin the monitor configuration dialogue.

```
Starting System Generation

Use template monitor ? <N> NO
```

Explanation—This question asks if you want the system to obtain default answers from a previous monitor. If you do have a previous V9.0 through V9.7 monitor and want to use information from it, type YES and then follow the steps in Phase 3, Task 2 of Part 4. Type NO if you do not have a previous V9.0 through V9.7 monitor to serve as a template. The default response to this question is NO if the SYSGEN monitor is the only monitor on the system. The default response is YES if there is at least one other monitor on the system. The other monitor then becomes the system default in the following response question.

Response—Type NO or press RETURN, because you do not have an existing V9.0 through V9.7 monitor to use as a template. In the example installation, the response is NO.

```
Template monitor's name? <V97> ?

A monitor has a name from 1 to 6
alphanumeric characters and a filetype
of "SIL". Enter the name of the
template monitor whose parameters you
wish to use

The following is a list of the .SILs in [0,1]:

         File .Typ       Creation

        V97.SIL          13-Jun-89
        SYSGEN.SIL       13-Sep-90

Template monitor's name ? <V97>   V97
```

Explanation— You see this question only if you answered YES to the Use template monitor? question. You must type the name of an existing monitor.

Response— Type ? or RETURN to accept the default and see a list of monitors in [0,1], followed by a reprompt for the monitor name. This time type the name of the monitor you want to use as a template.

```
New Monitor name ? <RSTS> RSTS10
```

Explanation—This question asks for the name of your new RSTS/E monitor, which will be stored as a save image library (SIL) in account [0,1] on your system disk. The installation procedure performs a lookup to see if the monitor name you specify already exists. If it already exists and it is the currently installed SIL, the procedure returns an error message and then reprompts.

Response—Type a name for your RSTS/E monitor. The name can be any combination of alphanumeric characters up to 6 characters long. The default response is RSTS. In the example installation, the response is RSTS10.

```
Supersede existing monitor ? <N>
```

Explanation—You see this question only if the monitor name specified already exists and is not the currently installed SIL. If you type NO or press RETURN to accept the default, the program returns to the New monitor name? prompt. If you type YES, your new monitor supersedes the existing monitor.

Response—In the example installation, this question does not appear because no previous monitor named RSTS10 exists.

```
Accept defaults ? <N> RET
```

Explanation—This question gives you the opportunity to modify the configuration of your new SIL. If you answer NO, the installation procedure gives you the opportunity to make changes at the beginning of each specific configuration section (Tasks 2, 3, 4, 5).

If you answer YES, the installation procedure chooses the default configuration and asks no configuration questions.

You can type a ? to list the defaults that will be selected if you answer YES to this question.

Response—Type NO to continue with the configuration questions, as in the example installation. Digital recommends that you answer NO if:

- You are performing a first time V10.0 system installation.
- You are not using a template monitor.

Type YES if you want to accept the default configuration.

You can type a ? to list the defaults that will be selected if you answer YES.

If you type NO, go to Task 2.

```
** End of Monitor Section **
```

Go to Phase 4.

Task 2: Answer Disk Units Configuration Questions

Your next task is to answer the disk units configuration questions. These questions deal with the number and types of disk drives supported by your RSTS/E monitor.

Terminal Session

This terminal session lists the disk units configuration questions, explains them, and gives some possible responses (printed in red). After you understand the question, type the response at your console terminal.

If you are generating a monitor for another PDP-11, answer the questions based on the configuration of the target system.

```
The following questions deal with the
numbers and kinds of disk units on this
system.

Accept Disk defaults ? <N>  RET
```

Explanation—You see this question only if you answered NO to the Accept defaults? question in Task 1.

If you answer YES to this question, you receive the default disk configuration, and skip to the peripheral device configuration questions (Task 3). Digital recommends that you answer YES to this question since the installation procedure chooses appropriate responses based on a hardware scan at system startup. Answer NO only if you anticipate changes in hardware or if devices were offline at times of system startup. If you answer NO or press RETURN, you see these disk configuration questions:

```
RK05's ?
RL01/RL02's ?
RK06/RK07's ?
Overlapped seek ?
Disks on DR controller ?
Disks on DB controller ?
MSCP support ?
```

Response—Answer NO or press RETURN to see the disk configuration questions. In the example installation, the response is RETURN.

```
RK05's ? <00>  RET
```

Explanation—The RK05 disk system consists of an RK11 controller and from one to eight RK05 moving-head cartridge disk drives. The RK05F counts as two units.

Response—Type the number (0 to 8) of RK05 disk drives that your RSTS/E monitor supports. In the example installation, the default answer indicates that there are none of these drives; thus, the response is RETURN.

If you type 1 or 0, you skip the next question and go to the RL01/RL02's? question.

```
Overlapped seek ? <Y>
```

Explanation—The overlapped seek driver is software that increases the efficiency of RK05 disk I/O at the expense of some memory.

Response—Type Y or press RETURN to use the overlapped seek driver; type N to use the non-overlapped seek driver. Digital recommends you type Y to this question unless you have a single RK05F disk and no RK05 disks. Overlapping cannot occur on the RK05F disk. Because the example installation does not have any RK05 disk drives, there is no response to this question.

```
RL01/RL02's ? <00> RET
```

Explanation—The RL01/RL02 disk system consists of an RL11 or an RLV12 controller and any combination of up to four RL01 and RL02 disk drives.

Response—Type the number (0 to 4) of RL01 and RL02 disk drives that your RSTS/E monitor supports. In the example installation, the program indicates that there are none of these drives; thus, the response is RETURN.

If you type 0 or 1, you skip the next question and go to the RK06/RK07's? question.

```
Overlapped seek ? <Y>
```

Explanation—The overlapped seek driver increases the efficiency of RL01/RL02 disk I/O, at the expense of some memory.

Response—Type Y or press RETURN to use the overlapped seek driver; type N to use the non-overlapped seek driver. Digital recommends you choose the overlapped seek driver if you have more than one RL01/RL02 disk drive.

```
RK06/RK07's ? <02> RET
```

Explanation—The RK06/RK07 disk system consists of an RK611 or RK711 controller and any combination of up to eight RK06 and RK07 disk drives.

Response—Type the number (0 to 8) of RK06 and RK07 disk drives that your RSTS/E monitor supports. In the example installation, the program indicates that there are two of these drives; thus, the response is RETURN.

If you type 0 or 1, you skip the next question and go to the Disks on DR controller? question.

```
Overlapped seek ? <Y> RET
```

Explanation—The overlapped seek driver increases the efficiency of RK06/RK07 disk input/output at the expense of some memory.

Response—Type Y or press RETURN to use the overlapped seek driver; type N to use the non-overlapped seek driver. Digital recommends you choose the overlapped seek driver if you have more than one drive. In the example installation, the response is RETURN.

```
Disks on DR controller ? <00> RET
```

Explanation—The RH70 controller supports any combination of up to eight RM02, RM03, RM05, RM80, RP04, RP05, and RP06 disk drives. The RH11 controller supports any combination of up to eight RM02, RP04, RP05, and RP06 disk drives. This question asks you to type the number of RM02/RM03/RM05/RM80 and RP04/RP05/RP06 drives your RSTS/E monitor supports on this controller. (RSTS/E supports a maximum of two disk RH70/RH11 controllers.) See Appendix F for more information on mixing RM and RP type disks on the same controller.

Response—Type the number (0 to 8) of RM02/RM03/RM05/RM80 and RP04/RP05/RP06 disk drives that your RSTS/E monitor supports on this controller. In the example installation, the program indicates that there are none of these drives; thus, the response is RETURN.

If you type 0 or 1, you skip the next question and go to the Disks on DB controller? question.

```
Overlapped seek ? <Y>
```

Explanation—The overlapped seek driver increases the efficiency of RM02/RM03/RM05/RM80 and RP04/RP05/RP06 disk input/output, at the expense of some memory.

In addition, answering YES to this question allows those disks to be accessed in "dual-port" mode. When two systems are connected to these disks, they can be accessed read-only by both systems at the same time.

Response—Type Y or press RETURN to use the overlapped seek driver; type N to use the non-overlapped seek driver. Digital recommends you choose the overlapped seek driver if you have more than one RM02/RM03/RM05/RM80 and RP04/RP05/RP06 disk drive. In the example installation, there is no response because there are none of these drives.

```
Disks on DB controller ? <00> RET
```

Explanation—The RH70 controller supports any combination of up to eight RP04, RP05, RP06, RM02, RM03, RM05, and RM80 disk drives. The RH11 controller supports any combination of up to eight RP04, RP05, RP06, and RM02 disk drives. This question asks you to type the number of RP04/RP05/RP06 and RM02/RM03/RM05/RM80 drives your RSTS/E monitor supports on this controller. (RSTS/E supports a maximum of two disk RH70/RH11 controllers.) See Appendix F for more information on mixing RP and RM type disks on the same controller.

Response—Type the number (0 to 8) of RP04/RP05/RP06 and RM02/RM03/RM05/RM80 disk drives that your RSTS/E monitor supports on this controller. In the example installation, the program indicates that there are none of these drives; thus, the response is RETURN.

If you type 0 or 1, you skip the next question and go to the MSCP support question.

```
Overlapped seek ? <Y>
```

Explanation—The overlapped seek driver increases the efficiency of RP04/RP05/RP06 and RM02/RM03/RM05/RM80 disk input/output at the expense of some memory.

In addition, answering YES to this question allows those disks to be accessed in "dual-port" mode. When two systems are connected to these disks, they can be accessed read-only by both systems at the same time.

Response—Type Y to support the overlapped seek driver; type N to support the non-overlapped seek driver. Digital recommends you choose the overlapped seek driver if you have more than one RP04/RP05/RP06 and RM02/RM03/RM05/RM80 drive. Because the example installation has none of these disk drives, there is no response to this question.

```
MSCP support ? <Y> RET
```

Explanation—This question asks whether you have MSCP disk drives supported by the MSCP controllers. The MSCP controllers include the UDA50, KDA50, RC25, RQDX1, RQDX2, RQDX3, and RUX50 controllers. Available disk drives include the RA60, RA70, RA80, RA81, RA82, RA90, RC25, RD31, RD32, RD51, RD52, RD53, RD54, RX33, and RX50 disk drives.

Response—Type Y if your RSTS/E monitor supports MSCP disk drives. In the example installation, the program indicates there are MSCP disk drives; thus the response is RETURN.

Go to Task 3.

Task 3: Answer Peripheral Devices Configuration Questions

Your next task is to answer the peripheral devices configuration questions. These questions deal with the number and types of tape drives, printers, and card readers that your RSTS/E monitor supports. There are also questions related to DECnet/E, RJ2780, 3271, and 2780/3780.

Terminal Session

This terminal session lists the peripheral devices configuration questions, explains them, and gives some possible responses (printed in red). After you understand the question, type the response at your console terminal.

If you are generating a monitor for another PDP-11, answer the questions based on the configuration of the target system.

```
The following questions deal with the
peripheral devices attached to this
RSTS/E system.

Accept Peripheral defaults ? <N> RET
```

Explanation—You see this question only if you answered NO to the Accept defaults? question in Task 1.

If you answer YES to this question, you receive the default peripheral devices configuration, and skip to the software tuning and features configuration questions (Task 5). Digital recommends that you answer YES to this question unless you are not using a template monitor and you require 2780 or card reader support. The installation procedure chooses appropriate responses based on a hardware scan at system startup. If you answer NO or press RETURN, you see these peripheral devices configuration questions:

```
TU16/TE16/TU45/TU77's ?
TU10/TE10/TS03's ?
TS11/TK25/TSV05/TU80's ?
TMSCP tape drives ?
Printers ?
RX01/RX02's ?
CR11/CM11 card reader ?
CD11 card reader ?
DMC11's/DMR11's ?
DMV11's/DMP11's ?
IBM 3271 or 2780/3780 simultaneous links ?
RJ2780 support ?
```

Response—Type NO or press RETURN to see the peripheral configuration questions. In the example installation, the response is RETURN.

```
TU16/TE16/TU45/TU77's ? <00> RET
```

Explanation– The TU16/TE16/TU45/TU77 magnetic tape system consists of an RH11 or RH70 MASSBUS interface, a TM02 or TM03 controller, and a maximum of eight TU16, TE16, TU45, or four TU77 magnetic tape drives.

Response—Type the number (0 to 8) of these tape drives that your RSTS/E monitor supports. In the example installation, the response is RETURN.

```
TU10/TE10/TS03's ? <00> RET
```

Explanation—The TU10/TE10/TS03 magnetic tape system consists of a TM11, TMA11, or TMB11 magnetic tape controller and a maximum of eight TU10, TE10, or TS03 magnetic tape drives.

Response—Type the number (0 to 8) of these tape drives that your RSTS/E monitor supports. In the example installation, the response is RETURN.

```
TS11/TK25/TSV05/TU80's ? <01> RET
```

Explanation—The TS11 magnetic tape system consists of a TS11 class controller and one TS11, TK25, TSV05, or TU80 magnetic tape drive.

Response—Type the number (0 to 4) of TS11, TK25, TSV05, or TU80 tape drives supported by your RSTS/E monitor. In the example installation, the response is RETURN to accept the default of 1.

```
TMSCP tape drives ? <00> RET
```

Explanation—RSTS/E can support up to two TMSCP class tape drives. Each TMSCP controller can support one TK50, TU81, or TU81-PLUS tape drive.

Response—Type the number (0 to 2) of TMSCP tape drives that your RSTS/E monitor supports. In the example installation, the response is RETURN.

```
Printers ? <01> RET
```

Explanation—A RSTS/E monitor can support a maximum of eight LP11 or LPV11 printers.

Response—Type the number of LP11 or LPV11 line printers (0 to 8) that your RSTS/E monitor supports. In the example installation, the response is RETURN to accept the default of 1. (Note that the LP11 and LPV11 line printers include the LP25, LP26, LP27, LP29, LG01, LG02, LA180-P, and so forth. Do not count printers connected to DECserver 250 terminal servers.)

```
RX01/RX02's ? <00> RET
```

Explanation—The RX11 or RX211 flexible diskette system consists of an interface and an RX01 single-density or RX02 double-density flexible diskette subsystem. The RXV11 flexible diskette system consists of an interface and an RX01 single-density subsystem. RSTS/E does not support the RXV12 flexible diskette subsystem. The RX01 and RX02 flexible diskette subsystems each consist of a disk controller and two flexible diskette drives. The RSTS/E monitor supports a maximum of four RX11, RX211, or RXV11 flexible diskette systems, for a maximum of eight RX01 or RX02 flexible diskette drives.

Response—Type the number (0 to 8) of RX01 or RX02 flexible diskette drives that your RSTS/E monitor supports. The example installation has none of these drives; thus, the response is RETURN.

```
CR11/CM11 card reader ? <N> RET
```

Explanation—This question asks if your RSTS/E monitor supports the CR11 punched card reader or the CM11 marked card reader.

Response—Type Y if your RSTS/E monitor supports either of these devices; type N if it does not support either of these devices. In the example installation, the response is RETURN.

```
CD11 card reader ? <N> RET
```

Explanation—This question asks if your RSTS/E monitor supports the CD11 high-speed punched card reader.

Response—Type Y if your RSTS/E monitor supports this device; type N if your RSTS/E monitor does not support this device. In the example installation, the response is RETURN.

```
Card decode ?
```

Explanation—This question appears only if you answered Y to the CR11/CM11 card reader? or the CD11 card reader? questions. The RSTS/E monitor interprets cards through the use of an ANSI standard card decoder. However, it is possible that your installation uses some other card decoder. This question asks you to type the card decoder you want your RSTS/E monitor to support. See the *RSTS/E Programming Manual* for more information on the card codes.

Response—In the example installation, there is no response because N was the response to the previous card reader questions. Possible responses are:

- ANSI
- 029 for cards punched in DEC 029
- 026 for cards punched in DEC 026
- 1401 for cards punched in IBM 1401

```
DMC11's/DMR11's ? <00>  RET
```

Explanation—The DMC11 and DMR11 network links are synchronous communication line interfaces that implement the DDCMP line protocol in the hardware. These interfaces are used primarily with DECnet/E but can be used without it.

Response—Type the number (0 to 16) of DMC11 or DMR11 network links attached to your PDP-11. Because the example installation does not plan to use DECnet/E or the DMC's by themselves, the response is RETURN.

```
DMV11's/DMP11's ?
```

Explanation—(Note that this question shows either DMV11 or DMP11, depending on the hardware on your system.) The DMV11 and DMP11 network links are synchronous communication line interfaces that implement the DDCMP line protocol in the hardware. The DMV11 and DMP11 links can be used only by DECnet. This question asks for the number of DMV11 or DMP11 network links attached to your PDP-11.

Response—Type the number (0 to 16) of DMV11 or DMP11 network links attached to your PDP-11. If you type 0, you go to the IBM 3271 or 2780/3780 simultaneous links ? configuration question. Because the example installation will not use DECnet/E, there is no response to this question.

```
DMV11/DMP11 unit xx tributaries ?
```

Explanation—This question asks for the number of tributaries you will activate at one time. The program prints this question for each DMV11/DMP11 supported by your RSTS/E monitor. For example, if you type 5 to the DMV11/DMP11's? question, this question appears five times. (The guide shows this question only once.) The question refers to either DMV11 or DMP11, depending on the hardware on your system.

The program repeats the DMV11's/DMP11's? configuration question if you specified a total of more than 128 tributaries. See the *DECnet/E Installation Guide* and *DECnet/E Release Notes* for information on this question.

Response—Type the number (1 to 12) for the DMV11, or type the number (1 to 32) for the DMP11. Because the example installation does not use either of these line interfaces, there is no response to this question.

```
IBM 3271 or 2780/3780 simultaneous links ? <00>  RET
```

Explanation—Each KMC-11 microprocessor controls one DUP11 synchronous line interface to the 3271 or 2780/3780 host. The 3271 is a terminal; the 2780/3780 is a remote batch job entry device. An IBM host connected to a RSTS/E computer system can communicate with these devices as though they were actually present because the RSTS/E monitor emulates them. This question asks for the number of 3271 or 2780/3780 simultaneous links you want.

Response—Type the number (0 to 16) of KMC-11/3271 or KMC-11/2780/3780 simultaneous links you want attached to your PDP-11. Because the example installation does not support KMC-11s, the response to this question is 0 or RETURN.

NOTE

The 3271 or 2780/3780 IBM protocol emulators are DECUS products.

```
RJ2780 support ? <N> RET
```

Explanation—The RJ2780 Emulator Package is a DECUS software product that emulates the IBM RJ2780 Model 1 data transmission terminal. This software lets a RSTS/E monitor communicate with any IBM computer that supports these types of RJE terminals, or with another Digital computer running the RJ2780 terminal emulator package.

Transmission of data can originate from a card reader or disk files. Received data can be directed to a line printer or disk files. All data is transmitted in EBCDIC or binary code, and communication is supported over synchronous, point-to-point contention mode only, at up to 4800 baud. This package also supports a spooling operation that allows RSTS/E users to queue files for transmission. Digital does not provide support for this feature unless you have it in a Digital Software Services Consultation contract. If you want to use the RJ2780 software, you must order the RJ2780 software kit from DECUS. For more information on this software package, see the RSTS/2780 User's Guide. In Phase 5, the system will tell you when to mount the tape or disk that contains the RJ2780 software.

Response—Type Y to add the code needed by the RSTS/E monitor to support this optional DECUS software; type N if you do not want to add this optional software. Type Y/Q if you intend to use the RJ2780 software on a Q-bus machine using a DUV11 interface. In the example installation, the response is RETURN.

Go to Task 4.

Task 4: Calculate Number of Jobs

This task helps you calculate the maximum number of jobs your system needs. You need to know the number of jobs in order to answer the Maximum jobs? question later in this task. There is no terminal session in this task, only a preparation session.

Preparation Session

The RSTS/E monitor assigns jobs to keep track of all user activities. To calculate the maximum number of jobs your system needs, add the following:

- Number of physical terminals you have or plan to have in use simultaneously.
- Number of LAT sessions that will be simultaneously active on your system. Note that a single user of a terminal server may create more than one session.
- Number of pseudo keyboards you need. A pseudo keyboard is a logical device that has the characteristics of a terminal, but has no physical terminal associated with it.
- Number of DECnet SET HOST connections you need.
- One detached job for ERRCPY, the error logger program that reads error-related information stored in the monitor area of memory. A detached job is a job that is not associated with a terminal. See the *RSTS/E System Manager's Guide* for information on ERRCPY.
- One detached job for OMS, the Operator/Message Services package. See the *RSTS/E System Manager's Guide* for information on OMS.
- Number of detached jobs for print/batch requests. For the Print/Batch Services (PBS) package, allow one detached job for each copy of the PRINT and BATCH server programs. Each PBS package handles up to three batch requests and up to two print requests. If the PBS package gets requests for more print/batch requests than that and additional jobs are available, then PBS spawns a copy of itself. This copy can handle up to four additional batch requests and up to three additional print requests. For the OPSER-based spooling package, allow two detached jobs plus one job for each line printer and batch server. See the *RSTS/E System Manager's Guide* for more information on these programs.
- Two to five jobs if your installation uses dial-up terminals. These terminals may become detached as a result of a faulty phone connection or users disconnecting without logging out. See the *RSTS/E System Manager's Guide* for more information.
- A number of detached jobs for optional software like WPS-PLUS and DECnet/E. See the appropriate installation guide for more information on job requirements.

The example installation calculates a total of 40 jobs:

- Terminals - 14
- LAT terminals - 16 (1 DECserver 200 with 2 sessions per terminal)
- Pseudo keyboards - 5
- System programs - 5 (1 for Print/Batch Services requests; 3 for OPSER requests; 1 for OMS).

Figure 4 provides a job calculation worksheet to allow you to write the number of jobs needed by your installation. The maximum number of jobs allowed by the RSTS/E monitor is 63.

Figure 4: Job Calculation Worksheet

How many physical terminals do you plan to support?	_____
How many LAT sessions do you plan to have connected to your system?	_____
How many pseudo keyboards does your software require at any one time?	_____
How many DECnet SET HOST connections do you need?	_____
How many detached jobs do you need for ERRCPY, Print/Batch Services (PBS), and/or the OPSER-based spooling package?	_____
How many jobs do you need to accommodate detached dial-up jobs?	_____
How many detached jobs do you need for optional software?	_____
Total # of jobs	_____

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Go to Task 5.

Task 5: Answer Software Tuning and Features Configuration Questions

Your next task is to answer the software tuning and features configuration questions. These questions deal with RSTS/E monitor software features, such as maximum number of jobs, small buffers, and so forth.

Terminal Session

This terminal session lists the software tuning and features configuration questions, explains them, and gives you some possible responses (printed in red). After you understand the question, type the response at your console terminal.

If you are generating a monitor for another PDP-11, answer the questions based on the configuration of the target system.

```
The following questions deal with the
capacity and features of this RSTS/E
system provided at the system manager's
option.

Accept Software defaults? <N> RET
```

Explanation—You see this question only if you answered NO to the Accept defaults? question in Task 1.

If you answer YES to this question, you receive the software tuning and features defaults, and skip to the Proceed? prompt at the beginning of Phase 4. If you answer NO or press RETURN, you see these software tuning and features configuration questions:

```
Maximum jobs ?
Small buffers ?
EMT logging ?
```

Response—Answer NO or press RETURN to see the software tuning and features configuration questions. In the example installation, the response is RETURN.

```
Maximum jobs ? <25> 40
```

Explanation—In Task 4 you used the Job Calculation Worksheet to calculate the number of jobs your RSTS/E monitor supports. Once you establish the maximum number of jobs, you cannot increase the number unless you perform another system installation. However, you can decrease the number you enter here online during timesharing by using the SET LOGINS command (see the *RSTS/E System Manager's Guide*).

Response—Check your Job Calculation Worksheet (Task 4, Figure 2) and enter the maximum number of jobs (2 to 63) your RSTS/E monitor supports. In the example installation, the response is 40.

```
Small buffers ? <440> 550
```

Explanation—A small buffer is a 16-word storage area located in the monitor area of memory. There are two types of small buffers: general small buffers and FIP small buffers. You allocate the minimum number of general small buffers now by answering this question. Note that the installation procedure automatically calculates a recommended number of general small buffers you need for your installation. In the example installation, the installation procedure calculates a total of 440 general small buffers.

Your default may differ from the default in the example installation. Your installation may also need more than the number printed in the default. A more detailed explanation of how to add general and FIP small buffers is provided in the BUFFERS suboption of the DEFAULT option, located in Part 5 of this guide.

Response—Press RETURN to accept the default. In the example installation, the response is 550.

Or, type the number of small buffers (1-999) you want on your system. In general, a response within the range of 600 small buffers is acceptable for most systems.

NOTE

If the number of small buffers you specify is too high for your system, the command procedure may lower the number when it creates your new monitor (see Task 2 of Phase 5).

If you specify many more buffers than can fit on your system, the command procedure asks the configuration questions again before it creates your new monitor.

```
EMT logging ? <N> RET
```

Explanation—EMT logging is a feature that allows the monitor to pass information on selected monitor directives by means of send/receive to a program that you write after you build your monitor. Your program can then make use of these monitor directives to log selected kinds of system activity. See the *RSTS/E System Manager's Guide* for more information on EMT logging.

Response—Type Y if you want your monitor to support EMT logging, in which case you will have to write a program (the UNSUPP system program package contains a demonstration program); type N if you do not want this support. In the example installation, the response is RETURN, which accepts the default of NO.

```
** End of Monitor Section **
```

Go to Phase 4.

Phase 4
Select RSTS/E System Programs

Now that you have finished answering the configuration questions, you are ready to perform the second part of configuring your RSTS/E system. In this phase, you specify which system programs to install on your system.

The tasks in this phase are:

- Task 1: Answer System Program Installation Questions
- Task 2: Answer Layered Product-Related Questions

These responses have special meaning:

Response	Description
RET	Accept the default response
CTRL/Z	Return to the beginning of a dialogue section
?	Obtain an online explanation of the question
^	Return to the previous question

Task 1: Answer System Program Installation Questions

Your next task is to answer the system program installation questions.

System programs provide you with tools for performing common tasks during timesharing. For example, system programs allow you to efficiently develop programs, manage files, and perform special system management-related tasks.

Digital supplies RSTS/E system programs on the V10.0 Library and update media. The programs are grouped into the packages listed in Table 5. See Appendix C for a complete list of system programs contained in each package as well as package sizes.

Table 5: System Program Packages

Package	Description
Auxiliary Library	System programs and data files used with certain peripheral devices and optional software.
BASIC-PLUS	BASIC-PLUS, a BASIC interpreter that lets you perform interactive BASIC programming and also gives you access to system programming features such as system function calls and block I/O. See the *BASIC-PLUS Language Manual* for more information. (You answer the BASIC-PLUS configuration questions in Task 4A of Phase 5.)
Device Testing	The Device Testing Package. See the *RSTS/E System Manager's Guide* for more information.
EDT	A text editor that provides line and character editing, screen editing, and journaling capabilities. See the *Introduction to the EDT Editor* and the *EDT Editor Manual* for more information.
Error	Programs that detect, log, and display errors, as well as perform crash analysis. You automatically receive this package.
File Restore	The pre-V9 BACKUP package. This package allows you to restore data from backup sets created prior to V9.0. See the *RSTS/E Utilities Reference Manual* for more information.
Help	Programs that display online help text.
Operator/Message Services (OMS)	The RSTS/E V10.0 Operator/Message Services Package. See the *RSTS/E System Manager's Guide* for more information.
OPSER-based Spooling	The OPSER-based spooling package. See the *RSTS/E System Manager's Guide* for more information.
Print/Batch Services (PBS)	The RSTS/E V9.x Print/Batch Services package. See the *RSTS/E System Manager's Guide* for more information.
RMS DAP	RMS DECnet Access Package, a set of routines that provides DECnet support for RMS-11 applications. See the *RSTS/E RMS-11 User's Guide* and the *RSTS/E Release Notes* for more information.
RMS-11	A set of routines that allows your programs to gain access to and process (add, modify, and delete) records and files. Many Layered Products and SORT/MERGE use RMS-11. Check your documentation on your specific Layered Product to see if you need RMS-11. For information about RMS-11, see the following manuals: • *RSTS/E RMS-11: An Introduction* and the *RSTS/E RMS-11 User's Guide* provide introductory and user information (MACRO-11 and high-level language programmer). • *RSTS/E RMS-11 Macro Programmer's Guide* contains reference information on the RMS-11 operation routines for MACRO-11 programmers. • *RSTS/E RMS-11 Utilities Manual* provides usage and reference information on the RMS-11 utility programs.

Table 5 (Cont.): System Program Packages

Package	Description
RSX Utilities	Programs that allow you to use programming tools for a variety of languages and other layered products or use the DCL LINK command from any language.
SORT/MERGE	SORT/MERGE V3.0, a set of routines that allows you to read an input file, sort it, and write the data to an output file. See the *PDP-11 SORT/MERGE User's Guide* for more information. (You answer the SORT/MERGE configuration questions in Task 4B of Phase 5.)
SOURCE	.BAS source file for selected system utilities.
System Library	The standard system library. You automatically receive this package.
TECO	TECO (Text Editor and corrector), a text editing program that you can use to edit any form of ASCII text. Digital does not support TECO. See the *PDP-11 TECO User's Guide* for more information.
Unsupported Utility	Utility programs that are unsupported by Digital. See the *RSTS/E Release Notes* for more information.
Update	Programs you may need when installing older optional software. This package contains the BUILD program. If you plan to install any layered products, you should select this package.

Note that the System Library and Error packages are automatically installed on your V10.0 system.

Terminal Session

This terminal session explains the system program installation dialogue and provides some possible responses. In some cases, your response will differ from the response shown in red in the example installation.

```
Are you ready to proceed? <yes> RET
```

Explanation—This question asks if you are ready to continue. If you type YES or press RETURN, the dialogue continues. If you type NO, you see the $ prompt.

You resume the installation procedure by typing PROCEED.

Response—Type YES or press RETURN to continue with the installation. In the example installation, the response is RETURN.

```
     ** Starting System Programs Section **

13-Sep-90 05:23 AM

Do you want to install the System Program packages? <yes> RET
```

Explanation—You are at the beginning of the System Programs Section. If you answer YES, you begin the dialogue to install system programs.

Answer NO if you are only creating a RSTS/E monitor or if you are only installing layered products, or both, and do not want to install system programs. You then skip this phase and go to the Are you ready to proceed? question in Task 1 of Phase 5.

Response—Type YES or press RETURN to begin the dialogue. In the example installation, the response is RETURN.

```
Package names:

   AUXLIB     Auxiliary Library                PBS        Print/Batch Services
   BASIC      Basic-Plus                       RESTORE    File Restore
   DAP        RMS DECnet Data Access Package   RMS        RMS-11 (Includes RSX)
               (includes RMS-11)               RSX        RSX Utilities
   EDT        EDT Editor                       SORT       Sort/Merge (includes RMS)
   HELP       Help Package                     TECO       TECO Editor
   OPSER      Opser-based Spooler              TEST       Device Testing
   OMS        Operator/Message Services        UNSUPP     Unsupported Utilities
                    - New Package              UPDATE     Update Package


Packages currently installed on the target disk:

<RSX,RMS,DAP,PBS,EDT,UPDATE,TEST,UNSUPP,TECO,AUXLIB,RESTORE,OPSER,
SORT,HELP,BASIC,SOURCES,BLDEDT>

Packages to install? <CURRENTLY INSTALLED LIST> :ALL,NODAP,NOUNSUPP,NOSORT,
SOURCE
```

Explanation—The system displays a list of the packages that are available and then displays a question that asks for the names of the packages you want to install on your system.

You see this display only if you are using a disk that already has RSTS/E on it.

Response—Type a list of the package names, separated by commas. Type ALL to install all the packages. If you plan to install nearly all of the packages, type:

ALL,NO*nnnnnn*,NO*nnnnnn*

where *nnnnnn* refers to a package you want to exclude.

In the example installation, the response is ALL,NODAP,NOUNSUPP,NOSORT, SOURCES.

Remember, if you make a mistake you can type ^ to return to the previous question, or enter Ctrl/Z to return to the beginning of the section.

```
Packages to install? <ALL>: ?

The valid responses are:

     DIALOGUE  Switches you to the long form of the System
                       Software Packages dialogue where a more
                       detailed description of each package is provided
     ALL               Selects all packages
     ALL,NOpkg[,...]   Selects all packages except pkg and any packages
                       that include pkg
     ,pkg[,...]        Adds pkg to the default list (during an update)
     ,NOpkg[,...]      Deletes pkg from the default list

Use a comma as a separator. e.g.: RSX,PBS,RMS

Package names:

   AUXLIB     Auxiliary Library                PBS        Print/Batch Services
   BASIC      Basic-Plus                       RESTORE    File Restore
   DAP        RMS DECnet Data Access Package   RMS        RMS-11 (Includes RSX)
              (includes RMS-11)                RSX        RSX Utilities
   EDT        EDT Editor                       SORT       Sort/Merge (includes RMS)
   HELP       Help Package                     TECO       TECO Editor
   OPSER      Opser-based Spooler              TEST       Device Testing
   OMS        Operator/Message Services        UNSUPP     Unsupported Utilities
                    - New Package              UPDATE     Update Package

Packages to install? : ALL,NODAP,NOUNSUPP,NOSORT,SOURCE
```

Explanation— If the disk you are using does not already have RSTS/E on it, you see this display of the available system programs.

After you type a ?, you see the list of available system program packages. Then the system reprompts for the packages to install. Note that the RMS, DAP, and SORT packages need other packages to work properly. If you specify any of these packages, you automatically receive the associated package.

Response— If you know what packages you want to install, type a list of the package names, separated by commas. Remember, if you make a mistake you can type ^ to return to the previous question, or enter Ctrl/Z to return to the beginning of the section.

If you want more information before deciding whether to install a package, type DIALOGUE to see the long form of the dialogue.

Type ALL to install all the packages. If you plan to install nearly all of the packages, type:

ALL,NOnnnnnn,NOnnnnnn

where nnnnnn refers to a package you want to exclude.

In the example installation, the response is ALL,NODAP,NOUNSUPP,NOSORT, SOURCE.

```
The following will be installed:

        RSX         RMS         PBS         EDT
        UPDATE      TEST        TECO        AUXLIB
        RESTORE     OPSER       HELP
You may answer "Yes" to accept this list, or "No" to change it.

Is this list OK? <yes> RET
```

Explanation— The system lists the packages it will install and asks if this list of packages is the one you want. If you answer NO to this question, you return to the Packages to install: prompt.

Response—Type YES or press RETURN to continue with the installation. Or, type NO if you want to change the packages to install on your system. In the example installation, the response is RETURN.

```
Do you want the I&D versions of tasks? <Y> NO
```

Explanation—The system copies some required files and then asks if you want the I&D versions of tasks. You see this question only if you specified RSX and/or AUXLIB in response to the Packages to install: question.

Instruction and Data (I&D) space is available on the PDP-11/44, 45, 50, 53, 55, 70, 73, 83, 84, 93, or 94. Digital does not recommend that systems with less than 256K words of memory (PDP-11/45, 50, or 55) use I&D space. If your system has more than 256K words of memory (PDP-11/44, 53, 70, 73, 83, 84, 93, or 94.), you may want to take advantage of this hardware feature which yields better performance from the following Digital-supplied tasks: TKB, MAC, STK, and REORDR.

Note that if you answer YES to this question, you must specify a SWAP MAX of 66K words to accommodate the larger amount of physical memory required by the tasks. You will be asked to set the size of SWAP.MAX later in the installation.

The system uses your response to this question later in the installation when it asks whether you want to create a SWAP1.SYS file (see Task 1 of Phase 5). If you answer YES to this question, the system assumes a SWAP MAX of 66K words. Otherwise, the system assumes a SWAP MAX of 34K words.

Response—Type YES or press RETURN to receive the I&D versions of tasks. Type NO to receive the normal versions. The example installation does not plan to use I&D space; thus, the response is NO.

```
Use resident library version of RMS? <Y> RET

Use RMS resident libraries in DAP? <Y> RET

Use RMS resident libraries in PBS? <Y> RET

Use resident library version of EDT? <Y> RET

Use resident library version of EDT? <Y> RET
```

Explanation—If you choose RMS, DAP, PBS, or EDT, the system asks you to choose either the resident library or overlaid version. The example installation sees the RMS, PBS, and EDT resident library questions. In general, the overlaid version requires less memory, but can impact performance. The resident library version requires less disk space, but requires more memory. Choose the resident library versions if your system has sufficient memory and you have more than one user accessing a program simultaneously.

Response—Type YES or press RETURN to install the resident library version. Type NO to install the overlaid version. The response in the example installation is RETURN because it has sufficient memory to install the resident library versions.

```
During the build phase there will be further questions
for BASIC-PLUS and SORT/MERGE
```

Explanation—You see these messages if you chose the BASIC-PLUS and/or SORT/MERGE packages. You answer the BASIC-PLUS configuration questions in Task 4A of Phase 5. You answer the SORT/MERGE questions in Task 4B of Phase 5.

```
     ** End of System Programs Section **

Are you ready to proceed? <yes> RET
```

Explanation—You are finished with the System Programs Section. This question asks if you are ready to continue. If you type YES or press RETURN, the dialogue continues. If you type NO, you see the $ prompt.

You resume the installation procedure by typing PROCEED.

Response—Type YES or press RETURN to continue with the installation. In the example installation, the response is RETURN.

```
13-Sep-90 05:24 AM

    ** Starting Layered Products Section **

You may now transfer the layered product update components
from the Installation kit.

Do you wish to do the transfer? <yes> RET
```

Explanation—This question asks if you want to transfer any layered product updates from the Installation kit while it is still mounted. Answer YES to this question if you plan to install any layered products on your system. If you answer YES, you continue the Layered Products Section.

Response—Type YES or press RETURN to continue the Layered Products Section. Type NO to skip the section. In the example installation, the response is YES.

If you answered YES to the previous question, go to Task 2.

If you answered NO to the previous question, go to Phase 5.

Task 2: Answer Layered Product-Related Questions

You perform this task if you plan to install layered products on your RSTS/E system. A layered product, also called optional software, is software that you must purchase from Digital. Examples of layered products are BASIC-PLUS-2, COBOL-81, and DIBOL.

In this task, you specify which layered products you plan to install on your system, so that the installation procedure can transfer updates for those products from the Installation kit.

NOTE

The RSTS/E Installation Procedure does not perform a layered product installation. See the individual layered product installation guide for the procedures to perform the installation.

Terminal Session

This terminal session explains the layered product-related questions and provides some possible responses.

```
13-Sep-90 05:24 AM

    ** Starting Layered Products Section **

You may now transfer the layered product update components
from the Installation kit.

Do you wish to do the transfer? <Yes> RET
```

Explanation—You see this question at the end of Task 1.

Response—Type YES or press RETURN to begin the dialogue to transfer layered products updates. Type NO to skip this section. The example installation response is RETURN.

```
Product updates to transfer: ALL
```

Explanation—This question asks for the names of the layered product updates you want to transfer to your system.

Response—Type a ? to list the layered product packages that are available with RSTS/E.

```
The valid responses are:

     ALL                Transfers all product updates
     ALL,NOprod[,...]   Transfers all product updated except prod
     ,pkg[,...]          Adds pkg to the default list (during an update)
     ,NOpkg[,...]        Deletes pkg from the default list

Use a comma as a separator. e.g.: BP2,C81

Product names:

BP2          DIBOL        FRTRN77      PLXY         3271
C81          DTR          MAIL         RJ2780
DECDX        FMS          MENU         WPS
DECNET       FORTRAN      PDPDBG       2780/3780

Product updates to transfer?:
```

Explanation—After you type a ?, you see the list of available layered products. Then the system reprompts for the product updates to transfer.

Response—Type a list of the product names, separated by commas. Remember, if you make a mistake you can type ^ to return to the previous question, or enter Ctrl/Z to return to the beginning of the section.

Type ALL to transfer all the updates. If you plan to transfer nearly all of the product updates, type:

ALL,NOnnnnnn,NOnnnnnn

where nnnnnn refers to a product update you want to exclude.

```
The following will be transferred:

        BP2         C81         DECDX       DECNET
        DIBOL       DTR         FMS         FORTRAN
        FRTRN77     MAIL        MENU        PDPDBG
        PLXY        RJ2780      WPS         27803780
        3271

You may answer "Yes" to accept this list, or "No" to change it.

Is this list OK? <yes> RET
```

Explanation—The system lists the product updates it will transfer to your system and then asks if you want to continue. If you type NO, you return to the Product updates to transfer?: prompt.

Response—Type YES or press RETURN to continue the layered product update transfer. Type NO if you want to specify a different list of layered product updates to transfer to your system.

```
Note: Any files currently in the PATCH ACCOUNT will be deleted.

Since some layered products may require the Update package
(from the System Programs section), it will be included.
To install a layered product please refer to the individual
layered product installation guide.

Patch account <PATCH$:>
```

Explanation—Now you must specify the account in which you want the layered product update information placed. The default account is PATCH$:.

After you complete the RSTS/E installation, you must follow the installation procedures outlined in the specific layered product installation guide to install that layered product. Some of the layered products use the BUILD program to perform the installation. See Appendix E for a description of BUILD.

Response—Press RETURN to accept the default patch account, PATCH$. Or specify a different account.

```
** End of Layered Products Section **
```

Explanation—You are finished with Phase 4. If any error messages appear in the printout, see Appendix A.

Go to Phase 5.

Phase 5
Generate RSTS/E System

You have answered all the configuration questions and are ready to install your RSTS/E system. In this phase, you create some required system files if they do not already exist. Then you create the RSTS/E monitor and install the system programs you selected in Phase 4. See the appropriate installation guides for instructions on building optional software such as BASIC-PLUS-2.

The tasks you perform in this phase are:

- Task 1: Create Additional System Files
- Task 2: Create RSTS/E Monitor
- Task 3: Install System Programs from the Installation Media
- Task 4A: Answer BASIC-PLUS Installation Questions
- Task 4B: Answer SORT/MERGE Installation Questions

These responses have special meaning:

Response	Description
RET	Accept the default response
?	Obtain an online explanation of the question

Task 1: Create Additional System Files

System files are files of special use to the system itself. They reside in account [0,1].

SWAP files are the most important system files. They store jobs transferred out of memory. Without at least one SWAP file, the system cannot swap jobs out of memory and will not work. There are four available SWAP files: SWAP0.SYS, SWAP1.SYS, SWAP.SYS (this is the primary file), and SWAP3.SYS.

During system start-up, INIT.SYS automatically creates the SWAP.SYS file at a size large enough to store one job at the maximum size of 34K words. In addition, INIT.SYS automatically creates the system file CRASH.SYS during system start-up.

In this task, the installation procedure creates the SWAP1.SYS file at a size large enough to hold the number of jobs you specified when you answered the Maximum jobs? question in Task 5 of Phase 3.

You can create other system files later by using the INIT.SYS REFRESH option or the DCL INSTALL command. For a detailed description of system files, see the REFRESH Option section in Part 5.

Terminal Session

This terminal session explains how to specify a password for account [1,2].

```
You must now set the password for account _SY:[1,2]
New password:
New password again, for verification:
Password set for account _SY:[1,2]
```

Explanation—This question asks you to specify a password for the system library account, [1,2]. This is a precautionary measure to provide you with an account that you can log into in case of unforeseen problems. Digital does not recommend that you log into and use account [1,2] on a regular basis, because of the importance of the files that reside in the account.

Response—Type a password from 6 to 14 characters. You can specify any multinational character, including the space character, but not the ? character. Retype the password when prompted.

```
This is the end of the DIALOGUE phase.

The next phase is the BUILD phase.

Are you ready to proceed? <yes> RET
```

Explanation—The system asks if you are ready to generate your RSTS/E system. If you are ready to proceed, type YES or press RETURN.

If you are not ready, type NO. You then see the dollar sign ($) prompt. You may need to answer NO, for example, if you want to modify the SYSGEN.COM or the CONFIG.MAC configuration files, which generate the RSTS/E monitor. Type the following to make EDT available at this point for unsupported modifications:

```
$ RUN SYSGEN$:EDT
```

After making any modifications, type PROCEED to continue the installation.

Response—Type YES or press RETURN to begin the build phase of the installation. In the example installation, the response is RETURN because it is ready to proceed.

```
                    * Build phase *

13-Sep-90 05:31 AM

What size would you like SWAPMAX to be? <66> RET
```

Explanation— This question is displayed only if you have Instruction and Data (I&D) space hardware, otherwise SWAPMAX is automatically set to 34.

The RSTS/E monitor moves jobs from memory to disk as needed. For a job to move to disk, a special file must exist to store the job. This file is called a swap file. The SWAP MAX or swap maximum is the maximum amount of disk storage space that a job can occupy in a swap file when the job is swapped from memory to disk during timesharing. The size of your SWAP MAX depends on the run-time systems you plan to use, and whether you plan to write programs using I&D space. You can specify a size up to 66K.

Response— Type the new SWAPMAX (a number from 34 to 66).

```
Do you want _SY0:SWAP1.SYS created (at xxxx blocks)? <yes> RET
Creating _SY0:[0,1]SWAP1.SYS at xxxx blocks
```

Explanation—The system checks for a SWAP1.SYS file on your system. If it does not find SWAP1.SYS, the system asks if you want to create a SWAP1.SYS file at a size large enough to hold all the jobs on your system. It automatically creates SWAP1.SYS as close to the center of the system disk as possible. The system determines the size of SWAP1.SYS according to this formula:

(JOB MAX-1) * SWAP MAX * 4

where:

JOB MAX-1	is the number of jobs you specified in Task 5 of Phase 3, minus 1.
SWAP MAX	is the value given in answer to the SWAP MAX question, or is 34K words if you do not have I&D space hardware.

You do not see this message if your system has a SWAP1.SYS file and if you are performing an on-line installation.

You might not want to create SWAP1.SYS on your system disk. Type NO in this case. Use the following DCL command to create swap space manually:

```
$ INSTALL/SWAPFILE name
```

Response—Type YES or press RETURN to create SWAP1.SYS. Type NO to skip the creation of SWAP1.SYS. Type a ? if you want to know the size of SWAP1.SYS before you answer the question. In the example, the response is RETURN. The system then creates SWAP1.SYS at a size of 4992 blocks.

```
Creating RSTS/E monitor
```

Go to Task 2.

Task 2: Create RSTS/E Monitor

The command procedure now creates your RSTS/E monitor.

Note that the time required for this process varies according to the type of your CPU and the size of your monitor. The following are some general guidelines for the time for this step:

- If you are creating your RSTS/E monitor on an 11/70, 11/73, 11/83, 11/84, 11/93 or an 11/94 CPU, this process could take up to 30 minutes.
- If you are creating your RSTS/E monitor on an 11/44, 11/45, 11/50, 11/53, 11/55, or an 11/60 CPU, this process could take up to 1 hour.
- If you are creating your RSTS/E monitor on an 11/34, 11/35, or an 11/40 CPU, this process could take up to 2 hours.
- If you are creating your RSTS/E monitor on an 11/23 or an 11/24 CPU, this process could take up to 3 hours.

If the command procedure encounters an error during the monitor build, it prints the error and returns to the configuration questions in Phase 3. You see the Beginning of RSTS/E system generation message. If you see this message, return to Phase 3 and answer the configuration questions again. For example, you may have to answer the configuration questions again if the monitor you configured exceeds RSTS/E configuration limits.

Terminal Session

This terminal session explains the procedures that generate the RSTS/E monitor. The procedures will differ depending on your response to certain configuration questions in Phase 3.

```
Creating RSTS/E monitor
```

Explanation—The command procedure now begins the RSTS/E monitor generation.

If you answered YES to the RJ2780 support? question in Task 3 of Phase 3, the program prompts you to mount the RJ2780 Software Kit at this time. Mount the RJ2780 kit when you see this prompt:

```
Please mount the RJ2780 Installation kit and enter the name
and unit number of the device.
Valid device types are: 'MM', 'MS', 'MT',  'DM', 'DL' or 'SY'

Installation device <_dev:> :
```

You may have to dismount the RSTS/E Installation media to make room for the RJ2780 kit, if you do not have a free drive available. The system prompts you to remount the RSTS/E Installation media later. Remount the installation media on the indicated drive when prompted.

Messages Produced While Building a RSTS/E Monitor

```
%Small buffers lowered by xxx buffers
This will leave you with yyy buffers
```

Explanation—The command procedure checks whether the number of small buffers you specified in Task 5 of Phase 3 will fit on your system. If the number you specified is too high, the command procedure attempts to decrease the number of buffers so that the monitor fits on your system. If the number of small buffers you specified in Task 5 of Phase 3 is much too high for the maximum number allowed for your system, you see the message:

```
?LINK-F-Address space exceeded

Beginning of RSTS/E system generation
```

In general this indicates that the system you configured is too big. Rather than make such a radical adjustment to your monitor by significantly decreasing the small buffers, the command procedure returns to the configuration questions in Phase 3 of Part 1. If you see this message, return to Phase 3 and answer the configuration questions. You may want to decrease the size of your system by changing the answers to some of the questions such as fewer devices. Also, specify a much smaller number to the Small buffers? question in Task 5. In general, 600 to 700 is a good response to the Small buffers? question.

See the BUFFERS suboption of DEFAULT in Part 5 of this guide for more information on small buffers.

The command procedure did not lower the number of small buffers in the example installation.

```
This monitor has a valid buffer count
Monitor creation 20% complete.
Monitor creation 40% complete.
Monitor creation 60% complete.
Monitor creation 80% complete.

Directory of SIL V10  .SIL on 13-Sep-90 at 05:32 AM

Name      Ident     Load     Size    Transfer  Total

RSTS      10.00L   000000   116500    000001    20K
MVR       10.00L   120000   014100    000001    23K
   .
   .
   .
OV2       10.00L   002000   034000    000001   118K
DEFALT    10.00L   001000   003000    000001   119K

Maximum buffers available without using data space:
  415 general small buffers.
  90 FIP small buffers.

Maximum buffers available using data space:
  668 general small buffers.
  494 FIP small buffers.

If you choose to restart the installation, you may
specify up to 573 small buffers for this system.
Doing so will increase the number of general buffers
available both with and without data space.


Monitor creation 100% complete.

Before attempting to start your new SIL, you must have swap
file space of 11264 blocks and if you use files other than
SWAP1.SYS you must also edit START.COM to install them.
```

Explanation—You see these messages if your new monitor is an acceptable size and the build progresses satisfactorily.

Go to Task 3.

Task 3: Install System Programs from the Installation Media

The system now installs the system programs according to the instructions you gave in Phase 4. First, the system transfers the remaining files from the Installation tape or disk. The system also transfers any layered product updates you specified in Phase 4. This task should take fifteen to twenty minutes, depending on the size of the installation.

The system installs each package at the location pointed to by its associated logical name. If the program finds no associated logical name, it installs the package at the default location. This is the case in a new installation.

Table 6 lists the logical names and default locations for each package.

Table 6: System Program Package Logical Names

Package	Logical Name	Location
Auxiliary Library	AUXLIB$:	[0,14]
BASIC-PLUS	BASIC$:	[0,12]
Device Testing	TEST$:	[0,5]
EDT	EDT$:	[0,11]
Error	ERROR$:	[0,3]
File Restore	RESTOR$:	[0,7]
Help	HELP$:	[0,2]
Operator/Message Services (OMS)	OMS$:	[0,20]
OPSER-based Spooling	OPSER$:	[0,8]
Print/Batch Services (PBS)	PBS$:	[0,6]
RMS-11	RMS$:	[0,10]
RSX Utilities	LB:	[1,1] [1,2]
SORT/MERGE	SORT$:	[0,15]
SOURCE	SOURCE$:	[0,17]
System Library	SYSLIB$:	[1,2]
TECO	TECO$:	[0,13]
Unsupported Utility	UNSUPP$:	[0,9]
Update	UPDATE$:	[0,4] [1,2]

Terminal Session

This terminal session explains the procedures that transfer the system programs from the Installation media.

```
13-Sep-90 05:48 AM

Restoring the xxxxxx package from the Installation kit
```

Explanation—The system now installs the system programs. First it installs updates for the three packages that are automatically installed on all systems: System Startup, System Library, and Error. Then, as the system installs each optional package, it prints one of the above messages. In both messages, xxxxxx is the name of the specific software package.

In the example installation, the system prints the following messages. The messages for your installation may vary depending on how you answered the system program questions in Phase 4. For example, if you use an RL02 drive, your installation kit comes in two volumes. After all the files from volume 1 are restored, the system displays the message "Please mount volume 2 on device *n*. Press RETURN to continue".

```
13-Sep-90 05:25 AM

Restoring the System Startup files from the Installation kit
Restoring the System Library package from the Installation kit
Restoring the Error package from the Installation kit
Restoring the RSX Libraries from the Installation kit
Restoring the RSX Utilities from the Installation kit
Restoring the RMS-11 package from the Installation kit
Restoring the RMS Libraries from the Installation kit
Restoring the Print/Batch Services package from the Installation kit
Restoring the EDT package from the Installation kit
Restoring the Update package from the Installation kit
Restoring the Device Testing package from the Installation kit
Restoring the Unsupported Utilities from the Installation kit
Restoring the TECO package from the Installation kit
Restoring the Auxiliary Libraries from the Installation kit
Restoring the File Restore package from the Installation kit
Restoring the Opser-based Spooling package from the Installation kit
Restoring the Help package from the Installation kit
Restoring the Program Sources from the Installation kit
Restoring the EDT Maintenance package from the Installation kit

Restoring the OMS package from the Installation kit

Restoring the Resident Libraries from the Installation kit
```

After the system completes the system program file transfers, it restores the layered product updates you specified in Phase 4. As the system transfers each layered product update, it prints the message:

```
Restoring xxxxxx update components from the Installation kit
```

where xxxxxx is the name of the layered product. For the sample installation, the system prints the following messages:

```
13-Sep-90 05:26 AM

Restoring BP2 update components from the Installation kit
Restoring C81 update components from the Installation kit
Restoring DECDX update components from the Installation kit
Restoring DECNET update components from the Installation kit
Restoring DIBOL update components from the Installation kit
Restoring DTR update components from the Installation kit
Restoring FMS update components from the Installation kit
Restoring FORTRAN update components from the Installation kit
Restoring FRTRN77 update components from the Installation kit
Restoring MAIL update components from the Installation kit
Restoring MENU update components from the Installation kit
Restoring PDPDBG update components from the Installation kit
Restoring PLXY update components from the Installation kit
Restoring RJ2780 update components from the Installation kit
Restoring WPS update components from the Installation kit
Restoring 27803780 update components from the Installation kit
Restoring 3271 update components from the Installation kit


    RSTS/E V10.0-L

13-Sep-90 05:26 AM

                    RSTS/E Software Installation Procedure
13-Sep-90 05:26 AM
```

```
START.00L and LOGIN.00L in account [0,1] are the templates

for those .COM files. Your present .COM files should be
edited to reflect any changes.
```

Explanation— This message indicates that there are two templates available for you to edit to create START.COM and LOGIN.COM for your system as directed in Phase 6.

You see this message only when your system already has a version of START.COM and LOGIN.COM. Otherwise, the procedure renames START.00L and LOGIN.00L to START.COM and LOGIN.COM.

```
13-Sep-90 05:26 AM

Installing system packages
```

Explanation— The system now begins installing the system packages.

If you specified BASIC-PLUS as one of the packages to install, then go to task 4A for a complete description of the BASIC-PLUS dialogue and return to this point. Otherwise, continue with this task. The example installation does not plan to install BASIC-PLUS.

If you are not installing BASIC-PLUS but you want to install SORT/MERGE, then go to Task 4B for a complete description of the SORT/MERGE dialogue and return to this point. Otherwise, continue with this task. The example installation does not plan to install SORT/MERGE.

```
Finished installing system packages

13-Sep-90 05:26 AM

            The RSTS/E Software Installation Procedure is complete

Would you like to start your new monitor now? <Y> YES
```

Explanation— After the system packages are installed, you are asked if you want to start your new monitor now.

Response– Type YES or press RETURN to have the system start your new monitor. If you type NO, you will have to shut down the SYSGEN monitor and start your new monitor as directed in Phase 7.

```
Deleting all global symbols

Deassigning system logicals

13-Sep-90 06:17 AM

System tape label default set to DOS

SY:[1,2]INSTAL.LOG is a log file of this session

Please wait for system to re-boot itself
```

Explanation—You have completed the installation. The command procedure prints informational messages and reminds you that the INSTAL.LOG file is a record of the installation. The procedure then automatically shuts down the SYSGEN monitor and starts your new monitor.

```
RSTS V10.0-L SYSGEN (DU0) INIT V10.0-L

13-Sep-90 - 6:20 AM
```

```
Memory allocation table:
   0K: 00000000 - 00413777 (  67K) : EXEC
  67K: 00414000 - 03367777 ( 379K) : USER
 446K: 03370000 - 03777777 (  66K) : XBUF
 512K: 04000000 - End              : NXM

Memory available to RSTS/E is 512K words.

Re-creating CRASH.SYS file with minimum size of 380 blocks
```

Explanation—INIT.SYS starts the currently installed monitor, RSTS10.SIL, and starts timesharing under it.

The procedure then prints the current memory allocation table and checks that the CRASH.SYS file exists in account [0,1] on the system disk, is large enough for the installed RSTS/E monitor and extended buffer pool allocation, and is contiguous.

```
13-Sep-90 - 06:22 AM

8 devices disabled

Proceed with system startup? <YES>  RET

 Beginning RSTS/E system startup...
13-Sep-90 06:22 AM    Mounting disks
13-Sep-90 06:22 AM    Assigning logical names
13-Sep-90 06:22 AM    Starting error logging
13-Sep-90 06:22 AM    Setting system characteristics
13-Sep-90 06:22 AM    Installing run-time systems and libraries
13-Sep-90 06:22 AM    Starting OMS
13-Sep-90 06:23 AM    Setting terminal characteristics
13-Sep-90 06:23 AM    Defining system commands
13-Sep-90 06:23 AM    Setting printer characteristics
13-Sep-90 06:23 AM    Starting spoolers

Print/Batch Services started at 06:23 AM
```

Explanation— The procedure pauses for several seconds while it performs the necessary tasks to start timesharing. It then asks if you are ready to proceed with the start up.

Response– Type YES or press RETURN to start timesharing. Or, type NO if you are not ready to start timesharing. You then see the DCL $ prompt. In the example installation, the response is RETURN.

```
*** From [1,2] on KB0: at 06:23 AM on 13-Sep-90

** RSTS/E is on the air...

 RET

RSTS V10.0-L 13-Sep-90 06:24 AM

User:
```

Explanation— You are finished with the installation. You can now press RETURN to log in to the system. RSTS/E then prints its banner followed by the User: prompt. You can now enter 1,2 to log in to account [1,2], which is currently the only account on the system. You then see the password: prompt. Enter the password you specified during the installation procedure.

Go to Phase 6.

Task 4A: Answer BASIC-PLUS Installation Questions

You perform this task if you are installing BASIC-PLUS on your system. In this task you specify the particular BASIC-PLUS configuration for your system. The BASIC-PLUS installation questions relate to optional features of the BASIC-PLUS run-time system such as math precision, logarithmic functions, and trigonometric functions.

Certain combinations of features will cause your BASIC-PLUS run-time system to exceed 16K words. This limits programs running under BASIC-PLUS to a maximum size of 12K words.

If you select double-precision floating point math precision (see Math precision? question) and do not select FPP (see FPP? question), then you must omit some optional features to keep the size at or below 16K.

Terminal Session

This terminal session explains the BASIC-PLUS installation questions and provides some possible responses. For more information on any of these features, see the *BASIC-PLUS Language Manual*. In some cases, your response will differ from the response shown in red in the example installation.

```
Beginning of RSTS/E BASIC-PLUS generation.

The following is a list of the BASIC RTS's in [0,1]:

         File .Typ       Creation
        BAS4F .RTS       04-Oct-85
        BAS2F .RTS       04-Oct-85
        BAS4AL.RTS       22-Jun-88
        BASIC .RTS       30-Aug-89

BASIC-PLUS RTS's to Update ?     <ALL>  RET
```

Explanation—This question asks for the names of all the BASIC-PLUS run-time systems to update.

Response— Type a list of the names, separated by commas, or press RETURN to update all of them, or type NONE to update none of them. The program works through your list before going on to the Create another BASIC-PLUS RTS? question.

```
Create another BASIC-PLUS RTS ? <N>  Y
```

Explanation— You can add another BASIC-PLUS run-time system, with the characteristics you specify.

Response— Type Y if you want to add another BASIC-PLUS run-time system. Type N if you do not. If you do not, the program creates and installs any BASIC-PLUS run-time systems you have already listed, then exits.

```
Use template run-time system ?  <Y>  Y
```

Explanation— The program can take the necessary configuration information from one of the existing BASIC-PLUS run-time systems; it uses the earlier system as a template.

Response— Type Y if you want to use an earlier run-time system as a template. The program goes on to the Template run-time system's name? question. If you do not want to use a template, type N. The program goes on to the New BASIC-PLUS RTS name? question.

```
Template run-time system's name ? <BASICB>  RET
```

Explanation— The program prompts you for the name of the template BASIC-PLUS run-time system. The default is the last BASIC-PLUS run-time system found in SYSTEM$$: (called BASICB in this instance).

Response— Press RETURN to accept the default or enter the name of another BASIC-PLUS run-time system. This name should be one to six alphanumeric characters long, with the .RTS filetype.

```
The characteristics are:
        Floating Point Processor
        2-word Math precision
        Log functions
        Trig functions
        Print Using
        No Matrices
        No String arithmetic
        No Debug
        No Old-style SEND/RECEIVE

New BASIC-PLUS RTS name ?
```

Explanation— The program lists the default characteristics for the new BASIC-PLUS run-time system, then asks you what name you want to give the new run-time system. The default name is BASIC. The system automatically assigns a file type of .RTS to this name. Your run-time system will be stored as a save image library (SIL) in account [0,1] on your system disk.

Response— Press RETURN to accept the default name BASIC, or type a name. The name must be one to six alphanumeric characters long.

```
Accept defaults ?                    <N> RET
```

Explanation— The program can use the default characteristics it listed before the previous question.

Response— If you are satisfied with the defaults, type Y. The program creates and installs the new BASIC-PLUS run-time system. Otherwise, type N or press RETURN. The program goes on to the Floating Point Processor? question.

```
Floating Point Processor ? <N> RET
```

Explanation—The floating point processor (FPP) is hardware that supports both single-precision (2-word) or double-precision (4-word) floating point instructions. FPP is available for the PDP-11/23 PLUS, 11/24, 11/34, 11/44, 11/45, 11/50, 11/55, and 11/70. It is standard hardware on the 11/53, 11/60, 11/73, 11/83, 11/84, 11/93 and 11/94.

Response—You see a Y default if your PDP-11 has FPP; you see a N default if your PDP-11 does not have FPP. Type YES or press RETURN if your PDP-11 has FPP; type NO or press RETURN if it does not. If you type YES, the program goes to the Math precision? question. If you type NO, the program goes to the FIS? question. In the example installation, the response is RETURN.

```
Floating Instruction Set ? <N>
```

Explanation—This question asks if you want the floating instruction set (FIS) installed. The FIS is hardware that provides single-precision (2-word) floating point instructions. The FIS instructions are only available on the PDP-11/40 and 11/35.

Response—Type Y if you want the FIS installed. Press RETURN or type N if you do not want the software to use FIS installed on your system.

```
Math precision? <02> 4
```

Explanation—This question asks if you want your math package to support single-precision or double-precision floating point instructions. The single-precision floating point instructions provide floating-point numbers that are precise to 6 significant digits; the double-precision floating point instructions provide floating point numbers that are precise to 15 significant digits. In addition, the double-precision floating-point instructions provide a scaled arithmetic feature. Scaled arithmetic is useful for calculating sums that cannot be easily expressed as integer quantities, such as dollars and cents.

Response—Type 2 or press RETURN if you want the single-precision floating point instruction; type 4 if you want the double-precision floating point instruction. In the example installation, the response is 4.

Table 7 lists the BASIC-PLUS optional features. If you must omit some optional features, use Table 7 to determine which combinations you can select. You can include features with a total size of up to 6. Your choice of features will depend on which applications you plan on using.

Table 7: BASIC-PLUS Optional Features

Feature	Size
Log functions	1
Trig functions	1
Print using	2
Matrices	2
String arithmetic	3

```
Log functions? <Y>  RET
```

Explanation—This question asks if you want the BASIC-PLUS run-time system to use the logarithmic functions SQR, EXP, LOG, and LOG10. Some installations may not need this feature, in which case you can reduce the size of the BASIC-PLUS run-time system by answering N to this question. Operations such as X^Y require the log functions if Y is not an integer.

Response—Type YES or press RETURN to add the logarithmic functions; type NO if you do not want to add the logarithmic functions. In the example installation, the response is RETURN.

```
Trig functions? <Y>  RET
```

Explanation—This question asks if you want the BASIC-PLUS run-time system to use the trigonometric functions SIN, COS, TAN, and ATN. Some installations may not need this feature, in which case you can reduce the size of the BASIC-PLUS run-time system by answering N to this question.

Response—Type YES or press RETURN if you need to add these functions; type NO if you do not need to add these functions. In the example installation, the response is RETURN.

```
Print using? <Y>  RET
```

Explanation—This question asks if you want special output formatting with the PRINT-USING statement of BASIC-PLUS. Some layered products require this feature. You can reduce the size of the BASIC-PLUS run-time system by answering N to this question.

Response—Type YES or press RETURN if you need this feature; type NO if you do not need this feature. In the example installation, the response is RETURN.

```
Matrices? <N> Y
```

Explanation—This question asks if you want BASIC-PLUS to operate on an entire matrix using single MAT statements.

Response—Type YES if you need this feature; type NO or press RETURN if you do not need this feature. In the example installation, the response is Y.

```
String arithmetic? <N> RET
```

Explanation—The BASIC-PLUS run-time system can use special string arithmetic functions like SUM$, DIF$, PROD$, QUO$, PLACE$, and COMP%. These functions perform arithmetic functions on strings of numeric characters, minus signs, and decimal points with an accuracy of up to 56 significant digits. The string arithmetic functions, although slow to execute, are useful for applications that involve large numbers, such as monetary conversions.

Response—Type YES if you need this feature; type NO or press RETURN if you do not need this feature. In the example installation, the response is RETURN to accept the default of NO.

```
Debug? <N> RET
```

Explanation—The BASIC-PLUS run-time system has an optional feature that extends the present immediate-mode debugging commands by allowing you to trace the flow of your program and to set breakpoints. See the *RSTS/E Maintenance Notebook* for information on how to use the debug feature.

Response—Type YES if you want to utilize this facility; type NO or press RETURN if you do not need this feature. In the example installation, the response is RETURN to accept the default of NO.

```
Old-style SEND/RECEIVE?  <N> RET
```

Explanation—The BASIC-PLUS run-time system has an optional unsupported feature that allows you to use the old-style SEND/RECEIVE SYS calls. This feature is undocumented and provided for backward compatibility. This feature should only be used until such time as those applications may be modified.

Response—Type YES if you want to utilize this facility; type NO or press RETURN if you do not need this feature. In the example installation, the response is RETURN to accept the default of NO.

```
Create another BASIC-PLUS RTS? <N> RET
```

Explanation—This question allows you to create another BASIC-PLUS run-time system.

Response—Type YES if you want to utilize this feature; type NO or press RETURN if you do not need this feature. In the example installation, the response is RETURN to accept the default of NO.

Return to the point in phase 5 task 3 from which you left.

Task 4B: Answer SORT/MERGE Installation Questions

This task describes the SORT/MERGE installation questions. You see these questions if you specified SORT/MERGE in response to the Packages to install: prompt in Task 1 of Phase 4. Digital recommends that most users installing SORT/MERGE accept the system defaults for the SORT/MERGE package. The defaults will meet the needs of most users. Prior to starting any SORT/MERGE operation, you will be able to change the default response to a different response for that particular SORT/MERGE operation. See the *PDP-11 SORT/MERGE User's Guide* for more information on SORT/MERGE.

Terminal Session

This terminal session describes the SORT/MERGE installation questions and provides some possible responses.

```
Installing SORT/MERGE package

******************************************************
*     This is the beginning of the dialogue to       *
* define the attributes of your SORT/MERGE utility.  *
******************************************************

This procedure will, by default, build and install
SORT and MERGE for optimum performance. The utility
SORT and MERGE tasks will have the following attributes:

     SORT  built at 32K/MERGE built at 32K
     Have ASCII as the default character collating sequence
     Process duplicate records
     Do a nonstable SORT and MERGE
     Retry 2000 times when trying to read a locked bucket
     Allow 55% of the SORT work area for SORT tree structure
     Allow 30% of the MERGE work area for MERGE data structure
     Use five (5) work files for SORT
     Use the RECORD sort process
     Sequence check the input files for MERGE

     Additionally, the default will NOT build the
     SORT and MERGE callable subroutines as a resident library.

     If you want the installation to proceed using
     these defaults, answer YES. If you want to
     change any of these defaults, answer NO.

     Do you want to proceed with the default installation <Yes>?
```

If you answer YES, go to Question 22 to verify your selection of attributes. If you answer NO, go to Question 1.

```
1. If you want to change the default size of the SORT
   or MERGE task, answer YES, otherwise answer NO.

   Do you want to change the default task size   <NO>?
```

If you answer NO, go to Question 5. If you answer YES, go to Question 2.

```
2. The size of the final SORT and MERGE tasks can be
   varied by changing the default size of the work
   area. The work area is currently set to be the
   maximum allowed by your operating system in order
   to give SORT/MERGE the optimum performance.

   Which task size do you want to change
   SORT          MERGE     BOTH      NEITHER     <BOTH>?
```

If your answer is either BOTH or SORT, go to Question 3. If your answer is MERGE, go to Question 4. If your answer is NEITHER, go to Question 5.

```
3. The maximum SORT task size is 32K on your system.
   The minimum SORT task size is 17K words.
   The chosen size must be a whole number between these
   inclusive limits. Decimals will be truncated.

   What size do you want your SORT task to be  <32K>?
```

If you answered SORT to Question 2, go to Question 5. If you answered BOTH to Question 2, go to Question 4, then go to Question 5.

```
4. The maximum MERGE task size is 32K on your system.
   The minimum MERGE task size is 17K words.
   The chosen size must be a whole number between these
   inclusive limits. Decimals will be truncated.

   What size do you want your MERGE task to be <32K>?

5. If you want to change any of the default run-time options, answer
   YES, otherwise, answer NO.

   Do you want to change any of the default run-time options  <NO>?

   ************************************************
   *  IF YOU CHANGE ANY OF THE DEFAULTS, BE SURE TO  *
   *  INFORM YOUR USERS, SINCE THOSE DEFAULTS MAY    *
   *  NOW BE DIFFERENT FROM THE DEFAULTS STATED IN   *
   *  THE SORT/MERGE DOCUMENTATION!                  *
   ************************************************
```

If you answer NO, go to Question 21. If you answer YES, go to Question 6.

```
6. By default, SORT/MERGE will use the ASCII collating sequence
   when operating on character data keys.
```

If you answer YES, you can change the ASCII collating sequence to another collating sequence in question 7.

```
   Do you want to change the default collating sequence   <NO>?
```

If you answer NO, go to Question 8. If you answer YES, go to Question 7, then go to Question 8.

```
7. The choices are ASCII, EBCDIC, or MULTINATIONAL.
   What do you want the default character key collating
   sequence to be?

   ASCII         EBCDIC    MULTI     <ASCII>?

8. By default, SORT/MERGE will process records which are
   found to have duplicate key fields.

   If you wish to have SORT/MERGE eliminate records with
   duplicate keys by default, answer YES.

   If you wish to have SORT/MERGE keep all records with
   duplicate keys by default, answer NO.

   Should SORT/MERGE eliminate duplicate records by default  <NO>?
```

If you answer NO, go to Question 9 and then Question 10. If you answer YES, you see the following message:

```
   ************************************************************
   * YOU HAVE CHOSEN TO ELIMINATE DUPLICATE RECORDS BY DEFAULT.  *
   * STABLE SORT/MERGE AFFECTS DUPLICATE RECORDS. THEREFORE, THE *
   * STABLE AND NODUPLICATES OPTIONS ARE MUTUALLY EXCLUSIVE.     *
   * YOUR DEFAULT FOR THE STABLE OPTION MUST BE NOSTABLE.        *
   ************************************************************
```

If you answered YES, go to Question 10.

```
9. Stable SORT/MERGE imposes extra overhead during the
   key comparison process. For this reason, the default is
   for a nonstable SORT/MERGE. If you wish to change this
   default, answer YES, otherwise answer NO.

   Do you wish the default to be a stable SORT/MERGE  <NO>?

10. The SORT work area is divided into two areas, one
    for the SORT tree data structure, and one for the
    RMS I/O data structures. For SORT, the default division
    giving optimum performance is 55% to the tree and 45% to I/O.
    If the majority of the files you are sorting requires
    a large number of I/O data structures (for example, INDEXED
    files with many keys, or a consistently large number
    of input files), you may want to alter the split so that
    there will be enough room for the I/O requirements.

    If you want to change the default split, answer YES,
    otherwise answer NO.

    Do you want to change the SORT default split  <NO>?
```

If you answer NO, go to Question 12. If you answer YES, go to Question 11 and then 12.

```
11. What percentage of the work area should be allotted to the
    SORT tree data structure? The lower limit is 45%.
    The upper limit is 65%.
    Your answer must be in whole numbers.  <55>?

12. The MERGE work area is divided into two areas, one
    for the MERGE data structure and one for the
    RMS I/O data structures. For MERGE, the default division
    giving optimum performance is 30% to the data structure and
    70% to the RMS data structures.

    If the majority of the files you are merging requires
    a large number of I/O data structures (for example, INDEXED
    files with many keys, or a consistently large number
    of input files), you may want to alter the split so that
    there will be enough room for I/O requirements.

    If you want to change the default split, answer YES,
    otherwise answer NO.

    Do you wish to change the MERGE default split  <NO>?
```

If you answer NO, go to Question 14. If you answer YES, answer Question 13 and then go to Question 14.

```
13. What percentage of work area should be allotted to the
    MERGE data structure? The lower limit is 20%.
    The upper limit is 40%.
    Your answer must be in whole numbers.  <30>?

14. The optimum number of work files for SORT is 5.
    If you wish to change this default, answer YES,
    otherwise answer NO.  <NO>?
```

If you answer NO, go to Question 16. If you answer YES, go to Question 15 and then to Question 16.

```
15. The minimum number of work files is 3, the maximum is 10.
```

Changing the number of work files may change the performance of SORT depending on the data being sorted. See the *PDP-11 SORT/MERGE User's Guide* for more information on changing the number of work files.

```
How many work files should SORT use by default?  <5>?

16. By default, SORT will carry complete records throughout
    the process and output complete records. If you are sorting
    large records with small keys and wish to conserve disk space,
    you may change this default.

    ************************************************************
    *  PLEASE NOTE THAT FOR SORTS USING OTHER THAN THE RECORD  *
    *       PROCESS, ALL INPUT FILES MUST RESIDE ON DISK.      *
    ************************************************************

    If you wish to change the default sort process, answer YES,
    otherwise answer NO.

    Do you wish to change the default sort process  <NO>?
```

If you answer NO, skip Question 17 and answer Questions 18 and 19. If your answer is YES, answer Questions 17 through 19.

```
17. What should the default sort process be?
    RECORD        TAG       ADDRESS   INDEX   <RECORD>?

18. By default, MERGE will sequence check the input records.
    If you want to change this default, answer YES,
    otherwise answer NO.  <NO>?

19. SORT/MERGE will read input files which are in use
    and opened in a shareable mode. If SORT/MERGE
    encounters a locked bucket, the operation will be
    retried a maximum of 2000 times before a fatal error
    is returned. If you want to change the number of
    retries, answer YES, otherwise answer NO.

    Do you want to change the number of retries  <NO>?
```

If you answer NO, go to Question 21. If you answer YES, go to Question 20 and then to Question 21.

```
20. The maximum number of retries allowed is 9999.
    The minimum number of retries allowed is 1.
    How many times should SORT/MERGE try to
    re-read a locked bucket  <2000>?

21. By default, the callable SORT and MERGE subroutines will
    be available via two object libraries. Additionally, if
    you want to build a combined callable SORT and MERGE
    resident library answer YES, otherwise answer NO.
```

If you answer NO, the object libraries will be built into your program upon completion of linking your program. If you answer YES, you will have more free disk space and a faster run-time than if you answered NO.

```
    Do you want to build a combined callable SORT and MERGE
    cluster library  <NO>?
```

This completes the selection of attributes for your SORT/MERGE utility. The installation procedure now shows you the attributes that you have selected, and you have the opportunity to change the attributes. (The attributes shown in this example are not necessarily the default attributes, nor does Digital necessarily recommend them for your system—they are only a sample.)

```
22. ********************************************
    *  Your SORT and MERGE product will be built  *
    * according to the following specifications:  *
    ********************************************

    SORT  TASK SIZE IS 32K WORDS
    MERGE TASK SIZE IS 32K WORDS
    YOU HAVE THE FOLLOWING RUNTIME DEFAULTS:
        ASCII CHARACTER COLLATING SEQUENCE
        RECORDS WITH DUPLICATE KEYS ELIMINATED
        NO STABLE PROCESS
        2000 LOCKED BUCKET RETRIES
        55% OF WORK AREA FOR SORT DATA STRUCTURES
        45% OF WORK AREA FOR SORT RMS DATA STRUCTURES
        30% OF WORK AREA FOR MERGE DATA STRUCTURES
        70% OF WORK AREA FOR MERGE RMS DATA STRUCTURES
        03 WORK FILES
        RECORD SORT
        DO NOT SEQUENCE CHECK MERGE INPUT
    A SORT/MERGE RESIDENT/CLUSTER LIBRARY WILL BE BUILT

    ARE THE ABOVE DEFAULTS THE DESIRED ONES <YES or NO> <YES>?
```

If you answer NO, go back to Question 1 and repeat the dialogue procedure. If you answer YES, you see the following message:

```
    ************************************************
    *  This is the end of the installation dialogue. *
    *    The installation will now proceed without   *
    *         further operator intervention.         *
    ************************************************

Running SORT/MERGE certification tests
```

The installation procedure then continues without operator intervention. It will task build and install the utilities, place the callable overlay description files in [0,15], and automatically execute a SORT/MERGE operation to verify that SORT/MERGE has been properly installed. If an error is encountered, you see the following message:

```
    ??????????????????????????????????????????????
    ?                                              ?
    ?   Either SORT or MERGE did not install       ?
    ?   properly. Contact your software            ?
    ?   specialist for further assistance!         ?
    ??????????????????????????????????????????????
```

If no errors are encountered, return to the point in phase 5 task 3 from which you left.

Phase 6
Create Accounts and Edit System Startup File

After you finish Phase 5, you are ready to tailor your new RSTS/E system.

The tasks in this phase are:

- Task 1: Create the System Management Account (CREATE/ACCOUNT)
- Task 2: Create User Accounts (CREATE/ACCOUNT)
- Task 3: Edit System Startup File

Task 1: Create System Management Account (CREATE/ACCOUNT)

In this task you create the system management account on your system disk with the CREATE/ACCOUNT command. The system management account is the account you use to perform system management tasks. Digital recommends that you make this account different from the account you are currently working in, [1,2]. Normally you grant all privileges to the system management account.

You use qualifiers with the CREATE/ACCOUNT command to establish such things as disk quotas and privileges. Because the detached jobs quota is set to zero by default, be sure to set it to some other value, such as 3, so you can start detached jobs from the system manager's account. If you are not familiar with the qualifiers for the CREATE/ACCOUNT command, see the *RSTS/E System Manager's Guide*.

Terminal Session

This terminal session explains how to use the CREATE/ACCOUNT command to create the system management account.

Type a command of the following format:

```
CREATE/ACCOUNT dev:[p,pn]/PRIVILEGES=(abc,def,...)
Password: <password>
Password again, for verification: <password>
```

Explanation—The CREATE/ACCOUNT command establishes accounts on your RSTS/E system. If you omit the device specification, the default is the system disk, SY0:. The only time you would specify a device is if you are building a target disk. You specify the account privileges as a list following the /PRIVILEGES qualifier. See the *RSTS/E System Manager's Guide* for more information about privileges. The password can be any combination of DEC MCS characters including the space character but not the ? character. The password can be from 6 to 14 characters long. The password is /NOLOOKUP by default. This makes it impossible to look up the password, thus providing additional account security. The example installation plans to create a fully privileged system management account [1,4] on the system disk. The command line in the example installation looks like:

```
CREATE/ACCOUNT [1,4]/PRIVILEGES=ALL
Password:
Password again, for verification:
Account _SY0:[1,4] created at DCN 27345
```

Explanation—These commands create a new account [1,4] on the system disk, SY0:. The account has all privileges. The account password cannot be looked up.

NOTE

It is recommended that you pick an account number other than the example [1,4] since it is very likely that a hostile user may attempt to attack these "sample" accounts.

Back Up the System Disk Onto Another Disk or Tape

Back up the system disk onto another disk or tape (Backup program) prior to creating user accounts. You can use the online V10.0 BACKUP utility to copy your system disk. See the *RSTS/E System Manager's Guide* for more information.

Go to Task 2.

Task 2: Create User Accounts (CREATE/ACCOUNT)

In this task you create user accounts on your system disk with the CREATE/ACCOUNT command. You use qualifiers with the command to establish such things as disk quotas and privileges. If you are not familiar with the qualifiers of the CREATE/ACCOUNT command, see the *RSTS/E System Manager's Guide*.

Terminal Session

This terminal session explains how to use the CREATE/ACCOUNT command. Type a command in the following format:

```
CREATE/ACCOUNT dev:[p,pn][/QUALIFIERS]
Password: <password>
Password again, for verification: <password>
```

Explanation—The CREATE/ACCOUNT command establishes accounts on your RSTS/E system. If you omit the device specification, the default is the system disk, SY0:. The password can be any combination of DEC MCS characters including the space character but not the ? character. The password can be from 6 to 14 characters long.

Go to Task 3.

Task 3: Edit System Startup File

Your next task is to edit START.COM, the system startup file. This command file must contain the information required to properly initialize the system for both normal time-sharing operations and system recovery after a crash.

Digital provides this file in the system account [0,1]. Edit this file as your installation requires. You may need to edit START.COM for one or more of these reasons:

- Add startup commands for terminals and line printers.
- Add system logical definitions or commands associated with optional products such as DECnet. See the installation guide for the particular optional product for specific information.
- Add startup commands for the OPSER-based spooling package.
- Add startup commands to set up LAT shared printers or modems.
- Add system logical definitions or commands associated with software not provided by Digital.

See the *RSTS/E System Manager's Guide* for more information about editing the START.COM file.

NOTE

The START.COM file provided by Digital contains sufficient commands to start your new V10.0 system. If you are using a hard-copy terminal to perform your installation, you may prefer to wait until you have started timesharing under your new monitor to edit START.COM. Then you can log in to a video terminal to edit the file.

If you choose to edit START.COM later, be sure to shut the system down after you make your edits. Then start timesharing again to make sure your new START.COM file works properly.

This session uses EDT to edit the system startup file. You have already installed EDT on your system.

Terminal Session

This terminal session explains how to edit the Digital-provided START.COM command file. First you make a backup copy of START.COM. Responses in the example installation are printed in red.

```
$ COPY [0,1]START.COM [0,1]START.OLD
```

Explanation—Use the DCL COPY command to make a backup copy of START.COM. This provides additional protection in case something goes wrong during your editing session. You can delete the backup version after you successfully start your system using START.COM.

Response—Type a command in the format shown. The example installation creates a copy of START.COM named START.OLD in account [0,1].

```
$ TYPE [0,1]START.COM
```

Explanation—Use this command to print the START.COM command file at your terminal. You may want to study the file before deciding where to make your edits. If you are not using a hard-copy terminal and want to get a printed copy of START.COM, type PRINT [0,1]START.COM.

Response—Type the command as shown to list the START.COM file.

NOTE

If you built the resident library version of EDT, issue the INSTAL/LIBRARY EDT$:EDT command before editing START.COM. Otherwise, the edit command will fail and display the **?Unable to attach to resident library** error message.

```
$ EDIT/EDT [0,1]START.COM
```

Explanation—Use this command to start the EDT editor. The first line of your file will be shown on the screen with an * prompt at the left margin. After you type C and press RETURN, the text of the file appears on your screen. Edit the file according to the needs of your installation. For more information on EDT, see the *Introduction to the EDT Editor* and the *EDT Editor Manual*.

Response—Type the command as shown. Type C and press RETURN at the * prompt to have your file shown on your screen.

```
* EXIT
$
```

Response—Press Ctrl/Z to return to the * prompt. Type EXIT at the * prompt and then press the ENTER key on the keypad when you are ready to exit EDT.

When you use EDT to edit a file, the monitor replaces the sample file in account [0,1] with your version.

Go to Phase 7.

Phase 7
Start RSTS/E Monitor

This phase describes the tasks you must perform to start your RSTS/E monitor if you do not choose to have the installation procedure start it for you.

The tasks in this phase are:

- Task 1: Shut Down SYSGEN Monitor (SHUTUP)
- Task 2: Start your custom RSTS/E Monitor (START)

These responses have special meaning:

Response	Description
RET	Accept the default response
?	Obtain an online explanation of the question

Task 1: Shut Down SYSGEN Monitor (SHUTUP)

Now that you have built your RSTS/E monitor, you no longer need the SYSGEN monitor. To shut down your monitor, run the SHUTUP program. Make sure you are logged in to the console terminal when you run SHUTUP.

Terminal Session

This terminal explains how to use SHUTUP to shut down your SYSGEN monitor.

```
$ RUN $SHUTUP
```

Explanation—You are logged in to the console terminal and you see the DCL $ prompt. You can now shut down the SYSGEN monitor.

Response—Type RUN $SHUTUP to shut down the monitor.

```
SHUTUP V10.0-L  RSTS V10.0-L SYSGEN
6:19 AM 13-Sep-90 ########     Set-up Dialogue Phase     ########

Type '^' to any query to backup one question
Minutes until system shutdown (0-99) <5>? 0
Shutdown with automatic RESTART <NO>? RET
```

Explanation—SHUTUP prints a header and some preliminary information. It then asks you to type the minutes to wait before the RSTS/E monitor shuts down. This question is useful for giving system users fair warning when shutting down the system. The system also asks if you want an automatic RESTART to the system. The default response is NO.

Response—Type 0. Press RETURN or type No to accept the default response. You should never answer YES at this point in the installation procedure. You must shutdown the system in order to start the new monitor.

```
6:19 AM 13-Sep-90 ########     Warning Message Phase     ########
Further LOGINs are now disabled
6:19 AM 13-Sep-90 ########   Initial Job Killing Phase   ########
6:19 AM 13-Sep-90 ########   Remove RTS/RES LIB Phase    ########
6:19 AM 13-Sep-90 ########   SWAP File Removal Phase    ########
6:19 AM 13-Sep-90 ########      Disk DISMOUNT Phase      ########
6:19 AM 13-Sep-90 ########      Final Shutdown Phase     ########
Please wait for system to re-boot itself
RSTS V10.0-L SYSGEN (DU0) INIT V10.0-L
13-Sep-90 - 6:20 AM
Start timesharing? <Yes>
```

Explanation—SHUTUP prints several messages before shutting down your system. It then returns to the Start timesharing? question. See the *RSTS/E System Manager's Guide* for more information on SHUTUP.

Go to Task 2.

Task 2: Start RSTS/E Monitor (START)

In Task 1 you ran the SHUTUP program to shut down the SYSGEN monitor. Now you need to start your RSTS/E monitor. You must first decide whether to perform the additional preparatory task:

- Change monitor defaults (INIT.SYS DEFAULT option)

Change Monitor Defaults (DEFAULT Option)

You can set RSTS/E monitor defaults in two ways:

- Accept preselected defaults (START option). INIT.SYS sets defaults for your RSTS/E monitor and then starts timesharing.
- Set your own RSTS/E monitor defaults (DEFAULT option).

INIT.SYS can determine many of your RSTS/E monitor defaults, based on the configuration of your system. You can set the others online during timesharing. Table 8 shows the default settings of your new monitor.

Table 8: Monitor Defaults

Default	Current Setting
	INIT.SYS Settable Defaults
Crash dump file	CRASH.SYS, if enough space is present
Extended buffer pool memory (XBUF)	15% of USER memory is allocated to XBUF, if the total amount of system memory exceeds 128K words. Otherwise, 10% of USER memory is allocated to XBUF. USER memory is memory that is not allocated to any other entity, such as the monitor or run-time system. The minimum size of XBUF without DECnet is 3K words. The minimum size of XBUF with DECnet and endnode is 3K words. The minimum size of XBUF with DECnet and router varies according to the size of your network, but is never less than 3K words. The maximum size is 496K words.
Small buffer pool memory	The maximum allowed for your system, over and above the minimum number you specified in Task 6 of Phase 3. The size varies based on your hardware and software configurations.
System clock	KW11-L Line Time Clock

If you do not plan to change any of the defaults selected by INIT.SYS, then you do not need to use the DEFAULT option before you start timesharing under your RSTS/E monitor. On the other hand, if you want to perform any of the following operations, you need to use the DEFAULT option before you start timesharing:

- Change the amount of memory allocated to the extended buffer pool (XBUF suboption of DEFAULT).
- Change the amount of memory allocated to the small buffer pool (BUFFERS suboption of DEFAULT).

See Part 5 of this guide for a complete description of DEFAULT.

Choose the monitor defaults that are suited to your needs. The example installation plans to accept the INIT.SYS selected defaults.

If you are ready to start your RSTS/E monitor, continue with this task.

If you need to change the monitor defaults or back up your system disk, answer NO to the Start timesharing? question. Then go to Part 5 before continuing with this task.

Terminal Session

To start your RSTS/E monitor, you must answer the START questions. This terminal session lists the START questions, explains them, and gives you some possible responses. After you understand the question, type the response at your console terminal. In some cases, your response will differ from the response shown in red in the example installation.

```
Start timesharing? <Yes> START RSTS10
```

Explanation—This question asks if you are ready to start timesharing. If you answer YES to this question, INIT.SYS starts the currently installed monitor, SYSGEN.SIL, and starts timesharing under it. To start timesharing under your new V10.0 monitor, type START <monitor name>, where <monitor name> is the name of the new monitor.

If you answer NO to this question, INIT.SYS prints its Option: prompt. You can then use the INIT.SYS offline options to perform additional preparatory tasks. Finally, when you are ready to start your RSTS/E monitor, use the INIT.SYS START option.

Response—Type START <monitor name> where <monitor name> is the name of your new RSTS/E monitor. In the example installation, the response is START RSTS10 because RSTS10 is the name of the new V10.0 RSTS/E monitor.

If you do not specify a monitor name, START installs and starts the monitor that was used in the previous timesharing session, which will be the SYSGEN monitor.

```
Memory allocation table:

   0K: 00000000 - 00407777 (  66K) : EXEC
  66K: 00410000 - 03467777 ( 396K) : USER
 462K: 03470000 - 03777777 (  50K) : XBUF
 512K: 04000000 - End              : NXM

Memory available to RSTS/E is 512K words.
```

Explanation—START prints the current memory allocation table. These messages may be slightly different due to configuration differences. Then START checks that the SWAP.SYS file exists in account [0,1] on the system disk, is large enough to hold one job at the current SWAP MAX, and is contiguous. If the file does not exist, START attempts to create SWAP.SYS at the required size. If the file exists but is not contiguous or large enough, START deletes the current SWAP.SYS file and attempts to create a new SWAP.SYS file that is both contiguous and large enough (SWAP MAX * 4). If START cannot find enough free contiguous disk space to create a minimum SWAP.SYS file, it prints the following error message:

```
?Not enough contiguous disk space to create minimum SWAP.SYS file
```

START then attempts to create a SWAP.SYS file that is smaller than the one you specified yet still meets the minimum requirements. This may take up to one minute. If START finds it can create a SWAP.SYS file, it prints these messages:

```
SWAP.SYS can be created if SWAP MAX is reduced to xxK

New SWAP MAX? <xxK>
```

Press RETURN to accept the default value, indicated by xx in the example. Or enter Ctrl/C to return to the Option: prompt. You can then use the FILE suboption of REFRESH to create more disk space.

If START cannot find enough contiguous disk space to create a minimum SWAP.SYS file, it prints these messages:

```
You must free some disk space to start timesharing.

Option:
```

Use the FILE suboption of REFRESH to create more contiguous disk space.

```
Re-creating CRASH.SYS file with minimum size of xxx blocks
```

Explanation—START now checks that the CRASH.SYS file exists in account [0,1] on the system disk, is large enough for the installed RSTS/E monitor and extended buffer pool allocation, and is contiguous. If the file does not exist, START attempts to create CRASH.SYS at the required size. If the file exists but is not contiguous or large enough, START deletes the current CRASH.SYS file and attempts to create a new CRASH.SYS file that is both contiguous and large enough. If START is successful it prints the previous message. If START is unsuccessful, it prints the following error messages:

```
?Not enough contiguous disk space to create minimum CRASH.SYS file

Crash dump automatically disabled
```

The CRASH.SYS file is important because it is used to save diagnostic information during a system crash. When a crash occurs, the RSTS/E monitor dumps the contents of the read/write area of monitor memory into CRASH.SYS. Because the crash dump facility preserves the state of the system at the time of the crash, CRASH.SYS contains important diagnostic information. For these reasons, Digital recommends that you always have crash dump enabled during timesharing. In general, SPRs submitted on system crashes without crash dumps will be answered by Digital as "Insufficient information."

Therefore, if you see the error message, Crash dump automatically disabled, follow these steps to enable crash dump:

1. After you begin timesharing, delete unnecessary files to create more contiguous disk space. Or, move some files to a nonsystem disk.
2. Shut down the RSTS/E monitor using the SHUTUP program.
3. Use the START option to start timesharing. If you do not see the Crash dump disabled message, you know that INIT.SYS was able to create the CRASH.SYS file.

```
13-Sep-90 06:22 AM
8 devices disabled

Proceed with system startup? <YES> RET

 Beginning RSTS/E system startup...
13-Sep-90 06:22 AM    Mounting disks
13-Sep-90 06:22 AM    Assigning logical names
13-Sep-90 06:22 AM    Starting error logging
13-Sep-90 06:22 AM    Setting system characteristics
13-Sep-90 06:22 AM    Installing run-time systems and libraries
13-Sep-90 06:22 AM    Starting OMS
13-Sep-90 06:23 AM    Setting terminal characteristics
13-Sep-90 06:23 AM    Defining system commands
13-Sep-90 06:23 AM    Setting printer characteristics
13-Sep-90 06:23 AM    Starting spoolers
Print/Batch Services started at 06:23 AM
```

Explanation—START prints the current date and time and pauses for several seconds while it performs the necessary tasks to start timesharing. Then START transfers control to the START.COM command file. START.COM asks if you are ready to proceed with the start up. Then START.COM prints a message as it enters each section of commands. See the *RSTS/E System Manager's Guide* for more information on the START.COM command file.

Response—Type YES or press RETURN to start timesharing. Or, type NO if you are not ready to start timesharing. You then see the DCL $ prompt. In the example installation, the response is RETURN.

```
*** From [1,2] on KB0: at 06:23 AM on 13-Sep-90
** RSTS/E is on the air...

RET

RSTS V10.0-L 13-Sep-90 06:24 AM

User:
```

Explanation—You are finished with the installation. You can now press the RETURN key to log in to the system. RSTS/E then prints its banner followed by the User: prompt.

Phase 8 lists some optional tasks that you may want to perform.

If you plan to install layered products, see the individual layered product installation guides for instructions.

Phase 8
Optional Tasks

This phase describes optional tasks you may want to perform to tune your RSTS/E system to your needs.

The tasks in this phase are:

- Task 1: Reposition System Program Packages
- Task 2: Apply Any Mandatory Patches

Task 1: Reposition System Program Packages

This task describes the procedures for moving system program packages to another disk. You may want to perform this task if your system disk is full or to better spread I/O across multiple devices and controllers.

If you have a two disk system and receive your RSTS/E Distribution Kits on disk distribution, Digital does not recommend that you move any system program packages to a second disk. During updates you will not have a free drive on which to mount the second disk.

You selected the system program packages in Phase 4. Then the system installed each package at the default location on your system disk. The system also associated a logical name with each package.

Table 9 lists the logical names and default locations of the RSTS/E system programs.

Table 9: System Program Package Logical Names

Package	Logical Name	Location
RSX Utilities	LB:	[1,1] [1,2]
Help	HELP$:	[0,2]
Error	ERROR$:	[0,3]
Update	UPDATE$:	[0,4] [1,2]
Device Testing	TEST$:	[0,5]
Print/Batch Services (PBS)	PBS$:	[0,6]
File Restore	RESTOR$:	[0,7]
OPSER-based Spooling	OPSER$:	[0,8]
Unsupported Utility	UNSUPP$:	[0,9]
Auxiliary Library	AUXLIB$:	[0,14]
RMS-11	RMS$:	[0,10]
EDT	EDT$:	[0,11]
TECO	TECO$:	[0,13]
SORT/MERGE	SORT$:	[0,15]
SOURCE	SOURCE$:	[0,17]
OMS	OMS$:	[0,20]

You may increase performance by moving the RSX Object Libraries and the Help packages to a nonsystem disk.

If you need to free space on your system disk, you should consider moving any of the following packages to a nonsystem disk: Unsupported Utility, Auxiliary Library, SORT/MERGE, EDT, Error Reporting, Device Testing, Print/Batch Services, Opser-based spooling, and RMS-11.

Terminal Session

This terminal session outlines the procedures you use to reposition a system program package. For more information on a particular step in the process, see the manual or the task and phase referenced.

Step 1: Initialize and Mount a Nonsystem Disk

Initialize and mount the disk on which you intend to reposition the system program packages. Use the mount procedures described in Task 1 of Phase 2. Refer to the *RSTS/E System Managers Guide* for information on using the INITIALIZE command to initialize the disk.

Step 2: Create a New Directory

Create a new directory for the system package by typing a command of the format:

CREATE/ACCOUNT/NOUSER dev:[p,pn]/TEMPLATE=SY:[p,pn]

where:

dev:	specifies the new disk.
[p,pn]	specifies the new directory. Use the same [p,pn] as the existing directory.

See the *RSTS/E System Manager's Guide* for more information on the CREATE/ACCOUNT command.

Step 3: Copy the Package to the New Location

Transfer the package to the new location by typing a command of the format:

COPY <logical name>*.* dev:[p,pn]*.*

where:

<logical name>*.*	specifies all the files in the current location of the system program package.
dev:[p,pn]*.*	specifies the new location of the system program package.

See the *RSTS/E System User's Guide* for more information on the COPY command.

Step 4: Reassign the System Logical Name

Assign the new logical name by typing a command of the format:

ASSIGN/SYSTEM/REPLACE dev:[p,pn] <logical name>

where:

dev:[p,pn]	refers to the new directory you created in step 3.
<logical name>	is the name of the package from Table 9.

See the *RSTS/E System Manager's Guide* for more information on the ASSIGN commands.

Step 5: Point the Logical Name at the New Location

Edit the START.COM system startup file to point the logical name at the new location. See Task 3 of Phase 6 for more information on editing the START.COM file. During an update, the START.COM file uses the disk and directory that you pointed to with the logical name. You might use this when updating layered products.

Step 6: Delete the Old Directory

If you have no further use for the old account, delete the directory by typing a command of the format:

DELETE/ACCOUNT [p,pn]

where [p,pn] refers to the old location of the system package on the system disk.

The system then asks if you want to delete the files in the directory. Type YES.

Task 2: Apply Any Mandatory Patches

A mandatory patch applies an emergency correction to software that might otherwise cause a serious malfunction to your system. For example, Digital would issue an emergency patch to the monitor if in certain instances you could not boot your system after an installation.

The *RSTS/E Software Dispatch* contains the latest software changes between releases. Published monthly, it also contains descriptions of mandatory patches.

You have to apply patches manually if you install:

- Paper patches from articles in the *RSTS/E Software Dispatch*
- Paper patches from the *RSTS/E Release Notes*
- Patches to non-Digital software

There are several dangers when you type in a mandatory patch:

- You could enter incorrect values causing new problems, which you may not recognize as yours, to occur.
- You may not be able to "undo" an incorrect patch because you may not know the value that was there before you replaced it with a new value. (Because of the possibility of errors, you should keep a hard-copy log of patches installed manually.)

  For example, if you entered an instruction incorrectly, the software could fail, and you may not be able to find the instruction you mistyped. Sometimes the only way to "undo" a bad patch is to reinstall the distributed version of the software. In the case of a monitor patch, you would have to do another monitor installation.

When you use manual patching to install a paper patch, follow the directions in the *RSTS/E Software Dispatch*, and type exactly what is printed. This way you do not need to understand fully the commands used for manual patching. If you catch a mistake before pressing the RETURN key on each line, you can use the standard keyboard editing characters, such as Ctrl/R, Ctrl/U, and the DELETE key. Furthermore, you can reenter input if you cause an error message and are reprompted.

You may need to use a RSTS/E program such as ONLPAT to install patches. See Appendix E for information on RSTS/E patching programs.

Installation Example

System Installation Example

This section summarizes the example RSTS/E system installation. This summary shows only those points in the installation where you type a command, respond to a prompt, or take an action. It does not show everything you see on your terminal during the installation. For more information on a question or procedure, see Part 1 of this guide.

Note the use of callouts in the right margin of the example. The purpose of these callouts is to direct your attention to points in the installation where you are required to perform an action, such as mounting a tape or disk.

This is only a sample. Your responses and output will probably differ from this example because your hardware and software requirements are not the same. Remember that you can type a question mark (?) in response to any question or prompt to obtain an online explanation.

The example installation has the following characteristics:

- CPU: PDP-11/44
- Memory: 512K words
- System Disk: RA80
- RSTS/E Distribution Kit: 1600 bpi magnetic tape
- Installation Kit: V10.0

Phase 1

Mount V10.0 Installation Media

Bootstrap V10.0 Installation Media

```
>>>B MS0

Performing limited hardware scan.

RSTS V10.0-L (MS0) INIT V10.0-L
```

Phase 2

Mount Target System Disk

```
Today's date? 13-Sep-90

Current time? 11:55 AM

Installing RSTS on a new system disk? <Yes> RET

13-Sep-90 11:55 AM

Disk? DU
Unit? <0> 0

This disk appears to be a RSTS/E formatted
disk with the following characteristics:

Pack ID:                NATHAN
Pack cluster size:      8
Pack is currently:      Private,
                        Update access on writes,
                        Level: 1.1

Pack ID? SYSDSK
Pack cluster size <4>? RET
MFD cluster size <16>? RET
SATT.SYS base <18595>? RET
Pre-extend directories <NO>? RET
PUB, PRI, or SYS <SYS>? RET
[1,1] cluster size <16>? RET
[1,2] cluster size <16>? RET
[1,1] and [1,2] account base <18595>? RET
Date last modified <YES>? RET
New files first <NO>? RET
Read-only <NO>? RET
Use previous bad block info <YES>? RET
Patterns <3>? RET

Proceed (Y or N)? Y

13-Sep-90 11:57 AM

Copying required system files

Performing limited hardware scan.

RSTS V10.0-L (DU0) INIT V10.0-L

13-Sep-90 11:59 AM
  Rebooting . . .

RSTS V10.0-L (DU0) INIT V10.0-L

13-Sep-90 12:01 PM
```

```
Creating SWAP.SYS file with minimum size of 136 blocks


Memory allocation table:

   0K: 00000000 - 00407777 (  66K) : EXEC
  66K: 00410000 - 03467777 ( 396K) : USER
 462K: 03470000 - 03777777 (  50K) : XBUF
 512K: 04000000 - End              : NXM

Memory available to RSTS/E is 512K words.

Creating CRASH.SYS file with minimum size of 336 blocks

8 devices disabled
```

Phase 3

```
   RSTS/E V10.0-L

13-Sep-90 12:01 PM

Please mount the RSTS/E Installation media and enter the name
and unit number of the device.
Valid device types are: 'MM', 'MS', 'MT', 'MU', 'DM' or 'DL'

Installation device <_MS0:>? RET

Restoring required _SY:[0,1] components

Deleting all global symbols

   RSTS/E V10.0-L

13-Sep-90 12:02 PM

                    RSTS/E Software Installation Procedure
                           * Dialogue Phase *

During this installation procedure you may:

Type '?' for help
Type '^' to go back to the previous question
Type CTRL/Z to return to the beginning of the present section

Please enter the name and unit number of the disk to
which you want to install the software. This disk
should be physically mounted and write-enabled.

Target disk? <_SY:> : RET

Restoring required _SY:[1,2] components

Assigning system logicals

Are you ready to proceed? <yes> RET

    ** Starting Monitor Section **

13-Sep-90 12:03 PM

Do you want to install the RSTS/E monitor? <yes> RET

There is a prebuilt monitor available which is suitable for
Micro-PDP-11 systems. You may use this prebuilt monitor, or
you may build your monitor. Building your monitor will allow
you to specify the features you wish to include in the monitor.

You may now choose:      (A) Build your monitor
                         (B) Use prebuilt monitor

Please type A or B <A> ?
```

```
The prebuilt monitor MICRO.SIL offers the following features:

RK05's: 0              RL01/RL02's:4              Overlapped seek: Yes
RK06/RK07's: 0         Disks on DR controller: 0  Disks on DB controller: 0
MSCP support: Yes      TU16/TE16/TU45/TU77's: 0   TU10/TE10/TS03's: 0
TS11/TSV05/TU80's: 1   TMSCP tape drives: 2       Printers: 1
RX01/RX02's: 0         CR11/CM11 card reader: No  CD11 card reader: No
DMC11's/DMR11's: 0     DMP11's/DMV11's: 0         Simultaneous IBM Links: 0
RJ2780 support: No     Maximum jobs: 10           Small buffers: 250
EMT Logging: No

Please type A or B <A> A

Restoring required SYSGEN components

Starting System Generation

Use template monitor ? <N> NO

New monitor name ? <RSTS> RSTS10

Accept defaults ? <N> RET

The following questions deal with the
numbers and kinds of disk units on this
system.

Accept Disk defaults ?                <N > RET
RK05's ?                              <00> RET
RL01/RL02's ?                         <00> RET
RK06/RK07's ?                         <02> RET
Overlapped seek ?                     <Y > RET
Disks on DR controller ?              <02> RET
Overlapped seek ?                     <Y > RET
Disks on DB controller ?              <00> RET
MSCP support ?                        <Y > RET

The following questions deal with the
peripheral devices attached to this
RSTS/E system.

Accept Peripheral defaults ?          <N > RET
TU16/TE16/TU45/TU77's ?               <00> RET
TU10/TE10/TS03's ?                    <00> RET
TS11/TK25/TSV05/TU80's ?              <01> RET
TMSCP tape drives ?                   <00> RET
Printers ?                            <01> RET
RX01/RX02's ?                         <00> RET
CR11/CM11 card reader ?               <N > RET
CD11 card reader ?                    <N > RET
DMC11's/DMR11's ?                     <00> RET
DMV11's/DMP11's ?                     <00> RET
IBM 3271 OR 2780/3780 simultaneous links?     <00> RET
RJ2780 support ?                      <N > RET

The following questions deal with the
capacity and features of this RSTS/E
system provided at the system manager's
option.

Accept Software defaults ?            <N > RET
Maximum jobs ?                        <25> 40
Small buffers ?                       <440> 550
EMT logging ?                         <N > RET

     ** End of Monitor Section **
```

Phase 4

```
Are you ready to proceed? <yes> RET

    ** Starting System Programs Section **

13-Sep-90 12:05 PM

Do you want to install the System Program packages? <yes>  RET

Packages to install <ALL>: ?

The valid responses are:

     DIALOGUE           Switches you to the long form of the System
                          Software Packages dialogue where a more
                          detailed description of each package is provided
     ALL                Selects all packages
     ALL,NOpkg[,...]    Selects all packages except pkg
     ,pkg[,...]         Adds pkg to the default list (during an update)
     ,NOpkg[,...]       Deletes pkg from the default list

Use a comma as a separator. e.g.: RSX,PBS,RMS

Package names:

AUXLIB   Auxiliary Library                RMS      RMS-11
BASIC    Basic-Plus                                (includes RSX Utilities)
DAP      RMS DECnet Data Access Package   RSX      RSX Utilities
          (includes RMS-11)               SORT     Sort/Merge
EDT      EDT Editor                                (includes RMS-11)
HELP     Help Package                     TECO     TECO Editor
OPSER    Opser-based Spooler              TEST     Device Testing
PBS      Print/Batch Services             UNSUPP   Unsupported Utilities
RESTORE  File Restore                     UPDATE   Update Package

OMS      Operator/Message Services - New Package

Packages to install <ALL>: ALL,NODAP,NOUNSUPP,NOSORT,SOURCE

The following will be installed:

     RSX          RMS          PBS          EDT
     UPDATE       TEST         TECO         AUXLIB
     RESTORE      OPSER        HELP         BASIC
     SOURCES

You may answer "Yes" to accept this list, or "No" to change it.

Is this list OK? <yes> RET

Do you want the I&D versions of tasks? <Y>  RET

Use resident library version of RMS? <Y> RET

Use RMS resident libraries in PBS? <Y> RET

Use resident library version of EDT? <Y> RET

During the build phase there will be further questions
for BASIC-PLUS.

    ** End of System Programs Section **

Are you ready to proceed? <yes> RET

13-Sep-90 12:06 PM

    ** Starting Layered Products Section **

You may now transfer the layered product update components
from the Installation kit.

Do you wish to do the transfer? <yes> RET

Product updates to transfer: ALL
```

```
The following will be transferred:

        BP2         C81         DECDX       DECNET
        DIBOL       DTR         FMS         FORTRAN
        FRTRN77     MAIL        MENU        PDPDBG
        PLXY        RJ2780      WPS         27803780
        3271

You may answer "Yes" to accept this list, or "No" to change it.

Is this list OK? <yes> RET

NOTE: Any files currently in the PATCH ACCOUNT will be deleted

Since some layered products may require the Update package
(from the System Programs section), it will be included.
To install a layered product please refer to the individual
layered product installation guide.

Patch account <PATCH$:>

     ** End of Layered Products Section **
```

Phase 5

```
You must now set the password for account _SY:[1,2]
New password:
New password again, for verification:
Password set for account _SY:[1,2]

This is the end of the DIALOGUE phase.

The next phase is the BUILD phase.

Are you ready to proceed? <yes> RET

                        * Build phase *

13-Sep-90 12:07 PM

What size would you like SWAPMAX to be? <66> RET

Do you want _SY0:SWAP1.SYS created? <yes> RET

Creating _SY0:[0,1]SWAP1.SYS at 4992 blocks

Creating RSTS/E monitor

This monitor has a valid buffer count
Monitor creation 20% complete.
Monitor creation 40% complete.
Monitor creation 60% complete.
Monitor creation 80% complete.

Directory of SIL RSTS10 on 13-Sep-90 12:35 PM

Name      Ident     Load    Size      Transfer     Total

RSTS      10.00L    000000  116500      000001       20K
MVR       10.00L    120000  014100      000001       23K
   .
   .
   .
OV2       10.00L    002000  034000      000001       118K
DEFALT    10.00L    001000  003000      000001       119K

Maximum buffers available without using data space:
  415 general small buffers.
  90 FIP small buffers.

Maximum buffers available using data space:
  668 general small buffers.
  494 FIP small buffers.
```

```
If you choose to restart the installation, you may
specify up to 573 small buffers for this system.
Doing so will increase the number of general buffers
available both with and without data space.

Monitor creation 100% complete.

Before attempting to start your new SIL, you must have swap
file space of 11264 blocks and if you use files other than
SWAP1.SYS you must also edit START.COM to install them.


13-Sep-90 12:37 PM

Restoring the System Startup files from the Installation kit
Restoring the System Library package from the Installation kit
Restoring the Error package from the Installation kit
Restoring the RSX Libraries from the Installation kit
Restoring the RSX Utilities from the Installation kit
Restoring the RMS-11 package from the Installation kit
Restoring the RMS Libraries from the Installation kit
Restoring the Print/Batch Services package from the Installation kit
Restoring the EDT package from the Installation kit
Restoring the Update package from the Installation kit
Restoring the Device Testing package from the Installation kit
Restoring the TECO package from the Installation kit
Restoring the Auxiliary Libraries from the Installation kit
Restoring the File Restore package from the Installation kit
Restoring the Opser-based Spooling package from the Installation kit
Restoring the Help package from the Installation kit
Restoring the BASIC-PLUS package from the Installation kit
Restoring the Program Sources from the Installation kit

Restoring the OMS package from the Installation kit

Restoring the Resident Libraries from the Installation kit


13-Sep-90  12:51 PM

Restoring BP2 update components from the Installation kit
Restoring C81 update components from the Installation kit
Restoring DECDX update components from the Installation kit
Restoring DECNET update components from the Installation kit
Restoring DIBOL update components from the Installation kit
Restoring DTR update components from the Installation kit
Restoring FMS update components from the Installation kit
Restoring FORTRAN update components from the Installation kit
Restoring FRTRN77 update components from the Installation kit
Restoring MAIL update components from the Installation kit
Restoring MENU update components from the Installation kit
Restoring PDPDBG update components from the Installation kit
Restoring PLXY update components from the Installation kit
Restoring RJ2780 update components from the Installation kit
Restoring WPS update components from the Installation kit
Restoring 27803780 update components from the Installation kit
Restoring 3271 update components from the Installation kit


  RSTS/E V10.0-L

13-Sep-90  01:31 PM

                    RSTS/E Software Installation Procedure

13-Sep-90 01:31 PM

Installing system packages

13-Sep-90 01:31 PM

Beginning of RSTS/E BASIC-PLUS generation.
```

```
The following is a list of the BASIC RTS's in [0,1]:

         File .Typ       Creation
        BAS4F .RTS       04-Oct-85
        BAS2F .RTS       04-Oct-85
        BAS4AL.RTS       22-Jun-88
        BASIC .RTS       30-Aug-89

BASIC-PLUS RTS's to Update ?    <ALL>  RET
Working on BAS4F
Working on BAS2F
Working on BAS4AL
Working on BASIC

Create another BASIC-PLUS RTS ? <N> Y

Use template run-time system ?  <Y>   RET

Template run-time system's name ? <BASIC>   RET

The characteristics are:
        Floating Point Processor
        4-word Math precision
        Log functions
        Trig functions
        Print Using
        No Matrices
        No String arithmetic
        No Debug
        No Old-style SEND/RECEIVE

New BASIC-PLUS RTS name ?       <BASIC> ? BAS10

Accept defaults ?               <N>   RET

Floating Point Processor ?      <Y> N

Floating Instruction Set ?      <N>  RET

Math precision ?                <4>  RET

Log functions ?                 <Y>  RET

Trig functions ?                <Y>  RET

Print using ?                   <Y>  RET

Matrices ?                      <N>  RET

String arithmetic ?             <N>  RET

Debug?                          <N>  RET

Old-style SEND/RECEIVE ?        <N>  RET

Create another BASIC-PLUS RTS ? <N>  RET

BAS4F is created and is installed
BAS2F is created and is installed
BAS4AL is created and is installed
BASIC is created and is not installed
BAS10 is created and is installed

Finished installing system packages

13-Sep-90 01:49 PM

          The RSTS/E Software Installation Procedure is complete

Would you like to start your new monitor now? <Y> YES

The monitor changes will take effect upon reboot

Deleting all global symbols

Deassigning system logicals

13-Sep-90 01:50 PM
```

```
System tape label default set to DOS

SY:[1,2]INSTAL.LOG is a log file of this session

Please wait for system to re-boot itself...


RSTS V10.0-L SYSGEN (DU0) INIT V10.0-L

13-Sep-90 01:52 PM

Memory allocation table:

   0K: 00000000 - 00413777 (  67K) : EXEC
  67K: 00414000 - 03367777 ( 379K) : USER
 446K: 03370000 - 03777777 (  66K) : XBUF
 512K: 04000000 - End              : NXM

Memory available to RSTS/E is 512K words.

Re-creating CRASH.SYS file with minimum size of 396 blocks

8 devices disabled

Proceed with system startup? <YES> RET

 Beginning RSTS/E system startup...

13-Sep-90 01:52 PM    Mounting disks
13-Sep-90 01:52 PM    Assigning logical names
13-Sep-90 01:52 PM    Starting error logging
13-Sep-90 01:52 PM    Setting system characteristics
13-Sep-90 01:52 PM    Installing run-time systems and libraries
13-Sep-90 01:52 PM    Starting OMS
13-Sep-90 01:52 PM    Setting terminal characteristics
13-Sep-90 01:53 PM    Defining system commands
13-Sep-90 01:53 PM    Setting printer characteristics
13-Sep-90 01:53 PM    Starting spoolers

Print/Batch Services started at 01:53 PM

*** From [1,2] on KB0: at 01:53 PM on 13-Sep-90

** RSTS/E is on the air...

RET

RSTS V10.0-L 13-Sep-90 01:54 PM

User:
```

Part 2
Upgrade

Installing RSTS/E Version 10.0 on a Pre-V9.0 System

Upgrading a previous version of RSTS/E (V8.0, V7.2, or earlier) to the latest version of RSTS is similar to building a new RSTS/E monitor, which is described in Part 1 of this guide. Part 4 of this guide outlines a number of tasks you perform to update a previous version of RSTS/E to the latest version. You should be familiar with the following V8.0 INIT.SYS program options, which are discussed in the V8.0 *RSTS/E System Generation Manual*:

- SET LIST
- HARDWR LIST
- DEFAULT
- START

Figure 5 is a flowchart that outlines how to do a system installation to upgrade an existing RSTS/E system. Keep the flowchart handy when you are performing the upgrade.

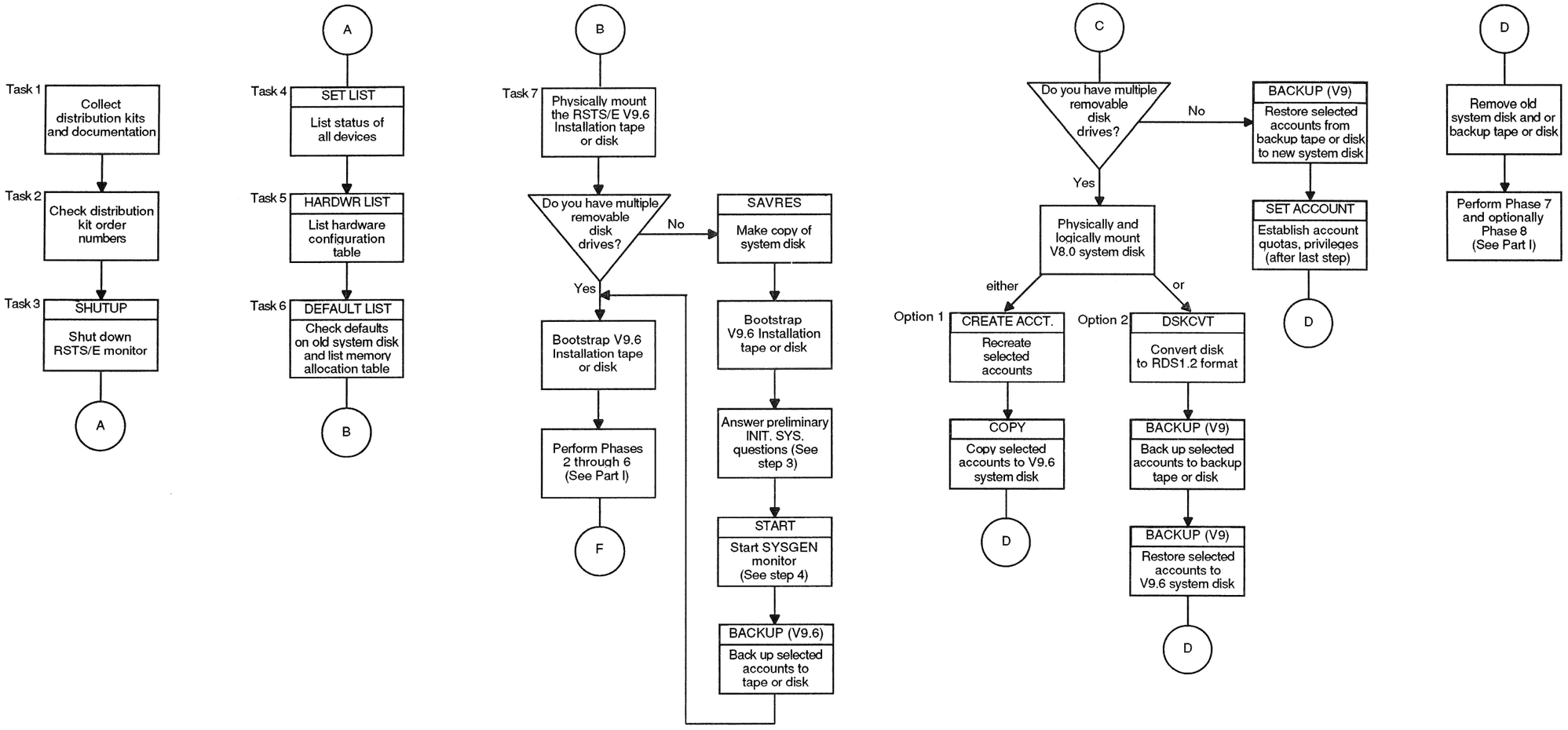


Figure 5: System Upgrade Flowchart

Follow these steps to upgrade your system:

Preliminary Steps

1. Collect distribution kits and documentation. (See Task 1 of Phase 1 in Part 1 of this guide.)
2. Check distribution kit order numbers. (See Task 2 of Phase 1 in Part 1 of this guide.)
3. Shut down your RSTS/E monitor, using the SHUTUP system program.
4. Use the SET LIST ALL option of INIT.SYS to list all of your devices. This list may be useful when you specify device characteristics on your new system disk. This list shows what devices were included on your old system.
5. Use the LIST suboption of HARDWR to list the hardware configuration table. The hardware configuration table may be useful when you specify hardware characteristics on your new system disk.
6. Use the DEFAULT option to check the defaults of your old monitor. When you get to the Any memory allocation changes? prompt, answer YES. Then use the memory allocation table suboption LIST to list the current memory allocation table. Exit from the memory allocation table suboptions and complete the DEFAULT questions. You can use these lists to help you establish defaults and make changes to the memory allocation table for the new system disk.
7. Find out how your current version of BASIC-PLUS is configured so you can build the new version to have the same configuration.
8. Physically mount your RSTS/E V10.0 Installation tape or disk. (See Task 2 of Phase 1 in Part 1 of this guide for instructions and an example of how to mount the Installation media.) If you do not have multiple removable disk drives, you should wait until step 2 of the next section to mount the Installation media.

If you do not have multiple removable disk drives, continue with the next section, No Multiple Removable Disk Drives. If you have multiple removable disk drives, go to the section, Multiple Removable Disk Drives.

No Multiple Removable Disk Drives

This section lists the steps you perform if your system does not have multiple removable disk drives.

NOTE

Although these upgrade steps may seem unorthodox, they provide the best method for you to re-create your current accounts on your V10.0 system. However, do not use these procedures until you have made a copy of your system disk (see step 1).

You must estimate the number of volumes required for the backup and then initialize these disks before starting the backup. You can initialize the disks either on a RSTS/E V8.0 system or in INIT on the V10.0 system you are installing. The important factor is that, if you run out of volumes during the backup, you must either initialize other disks (assuming another RSTS/E system is available) and continue, or stop the backup and initialize other disks in INIT and then restart the backup. The disks can be either RDS1.1 or RDS1.2.

You cannot use the /INITIALIZE qualifier with the BACKUP command because the software required has not been installed at this point.

1. Use the BACKUP utility program that corresponds to your current version of RSTS/E to create a copy of your system disk. Use PIP or PIPEXT if you are updating a pre-V6B RSTS/E system.
2. Bootstrap your RSTS/E V10.0 Installation tape or disk. (See Task 2 of Phase 1 in Part 1 of this guide for instructions and an example of how to bootstrap the installation media.)

NOTE

If your V10.0 installation media is a tape, you cannot use the Boot option on your current system. You must use the appropriate hardware bootstrap procedure. Refer to Appendix D for bootstrapping information.

Depending on the RSTS/E version you are upgrading from and the disk type of your V10.0 installation media, the Boot option may or may not function correctly. If it does not, you must use the hardware bootstrap procedure.

3. INIT.SYS prompts for the date and time, and then asks the following questions. Type the response as indicated:

```
Installing RSTS on a new system disk <Yes>? NO
Are you updating an existing RSTS system disk <Yes>? YES
To which disk? XXn
```

XXn is your device designator and unit number. After you answer these questions, INIT.SYS performs a COPY operation to transfer the components you need to perform the installation. One of these components is the V10.0 BACKUP program.

4. The procedure automatically starts the V10.0 SYSGEN monitor, a prebuilt monitor supplied by Digital.

The installation cannot continue at this point because your disk is not yet RDS1.2 format and therefore RSTS/E mounted your disk read-only. You will see the **?Unable to write to DCL work file** error message displayed several times, followed by the $ prompt. You are now running under the V10.0 SYSGEN monitor, with DCL as the keyboard monitor.

5. Physically mount a backup tape or disk. Then use the V10.0 BACKUP program to do a full backup of your system. XXn: is the device designator of the backup media. Use a command of the format:

```
$ BACKUP/ACCOUNT/FILE RET
From: [*,*]*.*/EXCLUDE=[0,1]*.SYS RET
To: XXn:OLDSYS.BCK
```

NOTE

This step will not back up your system files in [0,1].

You may want to include the /NOLIST qualifier to suppress the listing of backed-up files. If you have a tape drive capable of streaming (such as a TU80, TK50, or TU81-PLUS), you should include the /BUFF=MAXI and /BLOCK=MAXI qualifiers to make RESTORE run faster. See the *RSTS/E System Manager's Guide* for more information on BACKUP.

6. When BACKUP completes, reboot your Installation tape or disk. Halt the system and use the hardware bootstrap loader on your PDP-11 to boot the media. (At this point you are not able to run SHUTUP, since your disk is mounted read-only.) See Task 2 of Phase 1 in Part 1 of this guide for instructions and an example of how to bootstrap the installation media.
7. See Part 1 of this guide and perform all of the tasks associated with Phases 2 through 6. This time answer the questions correctly as if you are performing a new installation. These phases build the RSTS/E V10.0 monitor and system programs onto your system disk.
8. Mount your backup tape or disk and use the RESTORE command to restore the accounts you saved earlier to your new system disk. XXn: is the device designator of the backup media. Use a command of the format:

```
$ RESTORE/ACCOUNT/FILE/NOREPLACE RET
From: xxn:OLDSYS.BCK RET
To: [*,*]*.*
```

NOTE

If you had system programs in any account other than [0,1], those accounts are still on your system. You should do a directory of all utilities that are on your system, particularly in account [1,2]. Prior to V9.0 of RSTS/E, these utilities could exist in any [1,*] account. Delete the utilities that are in accounts other than [0,1]. This will leave only the current versions of the utilities on your new V10.0 system. This will give you more space on your new V10.0 system and prevent confusion.

You may want to include the /NOLIST qualifier to suppress the listing of restored files. If you have a tape drive capable of streaming (such as a TU80, TK50, or TU81-PLUS), you should include the /BUFF=MAXI and /BLOCK=MAXI qualifiers to make RESTORE run faster.

Note that when BACKUP restores account [1,2], it changes the password back to the value on your old system disk.

9. Remove your backup tape or disk.
10. See Part 1 of this guide and perform all of the tasks associated with Phase 7 and, optionally, Phase 8.
11. Use the SET ACCOUNT command to establish V10.0 quotas and privileges. Use the following command format:

```
SET ACCOUNT [1,*]/JOB=a/DETACH=b/INQUOTA=c -
            /PRIV=(ALL,NOSYSMOD,NOEXQTA)/NOEXPIRE
SET ACCOUNT [2-254,*]/JOB=w/DETACH=x -
            /INQUOTA=y/NOEXPIRE
```

You may want to use other qualifiers such as /PRIV to set different account privileges, or /NAME= to set the accounts name. Substitute the number you want for each of the options, (JOB, DETACH, PRIV, and INQUOTA) for the variables a, b, c, w, x, and y. The previous commands (with appropriate values for a,b,c,w,x,y) make your accounts V8.0 compatible.

If you want your V10.0 system to function exactly like your pre-V9.0 system, then also execute the following command:

```
SET ACCOUNT [1,1]/PRIV=SYSMOD
```

Note that Digital does not recommend that you do this procedure.

See the *RSTS/E System Manager's Guide* for more information on SET ACCOUNT.

12. Use the DSKCVT (Disk Convert) utility to convert accounts with "LOOKUP" passwords to "NOLOOKUP." Use the following command format:

```
$  run auxlib$:DSKCVT

DSKCVT V10.0-A  RSTS V10.0-L

L SYSTEM:
Disk to convert?  XXn:
* CURRENT DISK ATTRIBUTES *
    Disk:     XXn:
   Label:     V100
   Level:     1.1
Convert accounts to NOUSER <NO>?  RET
Convert passwords to NOLOOKUP <YES>?  RET
Display accounts <YES>?  RET
Proceed (YES or NO)?  YES
```

See Appendix E for more information on DSKCVT.

NOTE

Some layered products may still require the use of LOOKUP passwords. Therefore, you may need to reset the password for the accounts that use those products back to LOOKUP.

Multiple Removable Disk Drives

This section lists the steps you perform if your system has multiple removable disk drives.

1. Physically mount and bootstrap your RSTS/E V10.0 Installation tape or disk. (See Task 2 of Phase 1 in Part 1 of this guide for instructions and an example of how to mount and bootstrap the installation media.)
2. See Part 1 of this guide and perform all of the tasks associated with Phases 2 through 6. These phases build the RSTS/E V10.0 monitor and system programs onto your system disk.
3. Physically and logically mount your original system disk on a second disk drive. You can then create accounts on your new system disk with one of two options:

   Option 1:

   a. Re-create selected accounts on your new system disk, using the CREATE/ACCOUNT command. See the *RSTS/E System Manager's Guide* for instructions on how to use CREATE/ACCOUNT.

   b. After you re-create all of your selected accounts, copy the files in the accounts from your old system disk to your new system disk, using the COPY command. Use the /NOREPLACE qualifier to ensure that it does not copy a file that already exists. See the *RSTS/E System User's Guide* for instructions on how to use COPY.

   Option 2:

   a. Back up selected accounts to a tape or disk using the BACKUP (V10.0) program. To copy all the accounts, type a command of the format:

```
$ BACKUP/ACCOUNT/FILE  RET
From:  [*,*]*.*/EXCLUDE=[0,1]*.SYS,[1,2]*.*  RET
To:  XXn:OLDSYS.BCK
```

NOTE

This step will not backup your system files in [0,1] and [1,2].

You may want to include the /NOLIST qualifier to suppress the listing of backed-up files. If you have a tape drive capable of streaming (such as a TU80, TK50, or TU81-PLUS), you should include the /BUFF=MAXI and /BLOCK=MAXI qualifiers to make BACKUP run faster. See the *RSTS/E System Manager's Guide* for more information on BACKUP.

b. Restore selected account to your V10.0 system disk using the RESTORE command of the BACKUP program. To restore all accounts, type a command of the format:

```
$ RESTORE/ACCOUNT/FILE/NOREPLACE RET
From:  xxn:OLDSYS.BCK RET
To:  [*,*]*.*
```

NOTE

If you had system programs in any account other than [0,1] or [1,2], those accounts are still on your system. You should do a directory of all utilities that are on your system. Prior to V9.0 of RSTS/E, these utilities could exist in any [1,*] account. Delete the utilities that are in accounts other than [0,1] or [1,2]. This will leave only the current versions of the utilities on your new V10.0 system. This will give you more space on your new V10.0 system and prevent confusion.

You may want to include the /NOLIST qualifier to suppress the listing of restored files. If you have a tape drive capable of streaming (such as a TU80, TK50, or TU81-PLUS), you should include the /BUFF=MAXI and /BLOCK=MAXI qualifiers to make BACKUP run faster. Note that when BACKUP restores account [1,2], it changes the password back to the value on your old system disk. Also, all accounts restored are as they were on the old disk with LOOKUP passwords.

4. Remove your old system disk (if used) and/or backup tape or disk.
5. See Part 1 of this guide and perform all of the tasks associated with Phase 7 and, optionally, Phase 8.
6. Use the SET ACCOUNT command to establish V10.0 quotas and privileges. Use the following command format:

```
SET ACCOUNT [1,*]/JOB=a/DETACH=b/INQUOTA=c -
            /PRIV=(ALL,NOSYSMOD,NOEXQTA)/NOEXPIRE
SET ACCOUNT [2-254,*]/JOB=w/DETACH=x -
            /INQUOTA=y/NOEXPIRE
```

You may want to use other qualifiers such as /PRIV to set different account privileges, or /NAME= to set the accounts name. Substitute the number you want for each of the options, (JOB, DETACH, PRIV, and INQUOTA) for the variables a, b, c, w, x, and y. The above commands (with appropriate values for a,b,c,w,x,y) make your accounts V8.0 compatible.

If you want your V10.0 system to function exactly like your pre-V9.0 system, then run the following command:

```
SET ACCOUNT [1,1]/PRIV=SYSMOD
```

Note that Digital does not recommend that you do this procedure.

See the *RSTS/E System Manager's Guide* for more information on SET ACCOUNT.

7. Use the DSKCVT (Disk Convert) utility to convert accounts with "LOOKUP" passwords to "NOLOOKUP." Use the following command format:

```
$ run auxlib$:DSKCVT

DSKCVT V10.0-A  RSTS V10.0-L SYSTEM:

Disk to convert? XXn:
* CURRENT DISK ATTRIBUTES *
    Disk:      XXn:

   Label:      V10?

   Level:      1.1
Convert accounts to NOUSER <NO>? RET
Convert passwords to NOLOOKUP <YES>? RET
Display accounts <YES>? RET
Proceed (YES or NO)? YES
```

See Appendix E for more information on DSKCVT. See the *RSTS/E System Manager's Guide* for more information on SET ACCOUNT.

Part 3
Online

Performing an Online System Installation

You can use the INSTAL.COM command file online to install products without disturbing your existing system.

NOTE

You cannot use online system installation to build a V10.0 RSTS/E monitor from a V9.7 or earlier monitor.

You used the INSTAL.COM command file to perform your original V10.0 installation. INSTAL.COM resides in account [0,1]. You can also use it to:

- Generate a new monitor
- Install one or more system program packages
- Install layered products (integrated layered products only)
- Transfer layered product updates to your system
- Perform a full installation

In order for the installation to succeed, you must be logged in to an account with the following privileges: MOUNT, INSTAL, TUNE, WREAD, WWRITE, and WACNT. In addition, if you have DATES privilege, the creation date of the new files will be the date the files were placed on the installation kit. If you do not have DATES privilege, the file creation date will be the current date. To access INSTAL.COM, type a command of the following format:

@[0,1]INSTAL function [package,...]

where:

@[0,1]INSTAL	invokes the INSTAL.COM command procedure.
function	specifies the operation to perform. Legal functions are: ALL (the default), MONITOR, SYSTEM_PROGRAMS, and LAYERED_PRODUCTS.
[package,...]	specifies the software package(s) to install when performing a SYSTEM_PROGRAMS, LAYERED_PRODUCTS, or COPYUP operation (see Table 10). See Task 1 of Phase 4 in Part 1 for a complete list of RSTS/E system program packages. See Task 2 of Phase 4 in Part 1 for a list of layered products.

INSTAL.COM Entry Points

When you use INSTAL.COM to perform an installation, you enter the installation process at different points depending on the command format. Table 10 lists the INSTAL.COM commands and the resulting entry points into the installation process. See the appropriate Phase and Task in Part 1 for details on the actual installation procedures.

When you use INSTAL.COM to perform an online installation, you first see this question:

```
Please mount the installation media and enter the name
and unit number of the device.

Valid device types are: 'MM', 'MS', 'MT', 'MU', 'DM', 'DL' or 'SY'
(a response of SY allows monitor only)

Installation device:? <_MM0:>
```

This question prompts you to mount the installation tape or disk and specify its location. See the example later in this section if you need help answering this question.

Table 10 lists the INSTAL.COM commands and the resulting entry points into the installation process.

Table 10: INSTAL.COM Entry Points

Command	Installation Entry Point	Comment
@[0,1]INSTAL	Phase 3, Task 1	Performs new installation (same as INSTAL ALL).
@[0,1]INSTAL ALL	Phase 3, Task 1	Performs new installation (the default).
@[0,1]INSTAL SYSTEM_PROGRAMS	Phase 4, Task 1	Begins system program installation questions.
@[0,1]INSTAL SYSTEM_PROGRAMS [pkg,...]	Phase 5, Task 3	Installs specified package while preserving existing software packages.
@[0,1]INSTAL MONITOR	Phase 3, Task 1	Begins monitor installation section. Skips system program and layered product sections.
@[0,1]INSTAL LAYERED_PRODUCTS	—	This function is available only to integrated layered products. Use this function only if you are directed to do so by a specific layered product installation guide.
@[0,1]INSTAL LAYERED_PRODUCTS [pkg,...]	—	This function is available only to integrated layered products. Use this function only if you are directed to do so by a specific layered product installation guide.
@[0,1]COPYUP	Phase 4, Task 2	Begins dialogue to transfer layered product updates from the installation kit.
@[0,1]COPYUP [pkg,...]	Phase 5, Task 3	Transfers specific layered product updates from the installation kit.

Online Installation Example

This example uses INSTAL.COM to install the RSX system program package. Before you run INSTAL.COM, you must mount the installation media. Mount the tape or disk on a free drive. Follow the tape or disk mount instructions in Task 2 of Phase 1 in Part 1.

```
$ @[0,1]INSTAL SYSTEM_PROGRAMS RSX

   RSTS/E V10.0-L
13-Sep-90 11:10 AM

                    RSTS/E Software Installation Procedure
                            * Dialogue phase *
During this installation procedure you may:
```

```
Type '?' for help
Type '^' to go back to the previous question
Type CTRL/Z to return to the beginning of the present section

Please mount the RSTS/E Installation media and enter the name
and unit number of the device.

Valid device types are: 'MM', 'MS', 'MT', 'MU', 'DM', 'DL' or 'SY'
(a response of SY allows monitor only)
Installation device? <_MM0:>

Please enter the name and unit number of the disk to
which you want to install the software. This disk
should be physically mounted and write-enabled.

Target disk? <SY:>  RET

Assigning system logicals

The following will be installed:

     RSX
You may answer "Yes" to accept this list, or "No" to change it.
Is this list OK? <yes>  RET

Do you want the I&D versions of tasks? <Y>  N

  ** End of System Programs Section **

This is the end of the DIALOGUE phase.

The next phase is the BUILD phase.

Are you ready to proceed? <yes>  RET

                        * Build phase *

13-Sep-90 11:17 AM
```

At this point, if you are using an RL02 drive or an 800 BPI tape, you may be prompted to mount a second volume.

```
Restoring the RSX Libraries from the Installation kit
Restoring the RSX Utilities from the Installation kit

13-Sep-90 11:21 AM

Installing system packages

Finished installing system packages

               The RSTS/E Software Installation Procedure is complete

13-Sep-90 11:21 AM

Deleting all global symbols

Deassigning system logicals

13-Sep-90 11:21 AM

System tape label default set to DOS

SY:[1,2]INSTAL.LOG is a log file of this session

$
```

You have successfully installed the RSX package on your system.

Part 4
Update

Updating a RSTS/E V9.0 through V9.7 System

This part describes how to update a RSTS/E V9.0 through V9.7 system to a new release.

Digital supplies an Installation Kit with each new release of RSTS/E. After V9.0, subsequent kits are labeled in numeric sequence. For example, the first kit distributed after the V9.0 release is called V9.1; the second kit is V9.2.

Each new Installation Kit contains new software features as well as updates to existing software. In addition, the kit may contain mandatory corrections to RSTS/E software.

The contents of each Installation Kit are cumulative. This means that each new installation kit includes updates from all previous kits, as well as any new ones. For example, the V10.0 Installation Kit would include all features of the V9.0 through V9.7 kits.

Each new release of RSTS/E also contains the *RSTS/E Release Notes* for the latest version only. The *RSTS/E Release Notes* describe new features of RSTS/E and explain differences between the latest version and previous version. Read the *RSTS/E Release Notes* before performing a system update.

Structure of Part 4

This part divides the system update into five phases plus one optional phase, each consisting of one or more task(s).

For convenience, a summary of all the tasks in a phase appears at the start of that section. The option, program, or command file you use in a task (such as DSKINT or COPY) appears in parentheses next to the task.

A description of the contents of each phase follows.

Phase 1: Getting Started

Explains how to make backup copies of your system disk and shut down your current monitor.

Phase 2: Prepare System

Describes how to mount your installation media, copy files to your system disk, and start the SYSGEN monitor.

Phase 3: Configure New Monitor and Select Software Updates

Explains how to use information from a template monitor to configure your new monitor. It also explains how to answer the software update questions.

Phase 4: Generate New System

Explains how to create the new RSTS/E monitor. It also describes how to update system programs and layered products.

Phase 5: Start New Monitor

Explains how to shut down the SYSGEN monitor and start the new RSTS/E monitor.

Phase 6: Optional Tasks

Explains how to use the UPDATE.COM command procedure to perform a selective update.

System Update Flowchart

Figure 6, the System Update Flowchart, summarizes how to update a V9.0 through V9.7 RSTS/E system to a V10.0 RSTS/E system. You may want to use this flowchart while you perform the update.

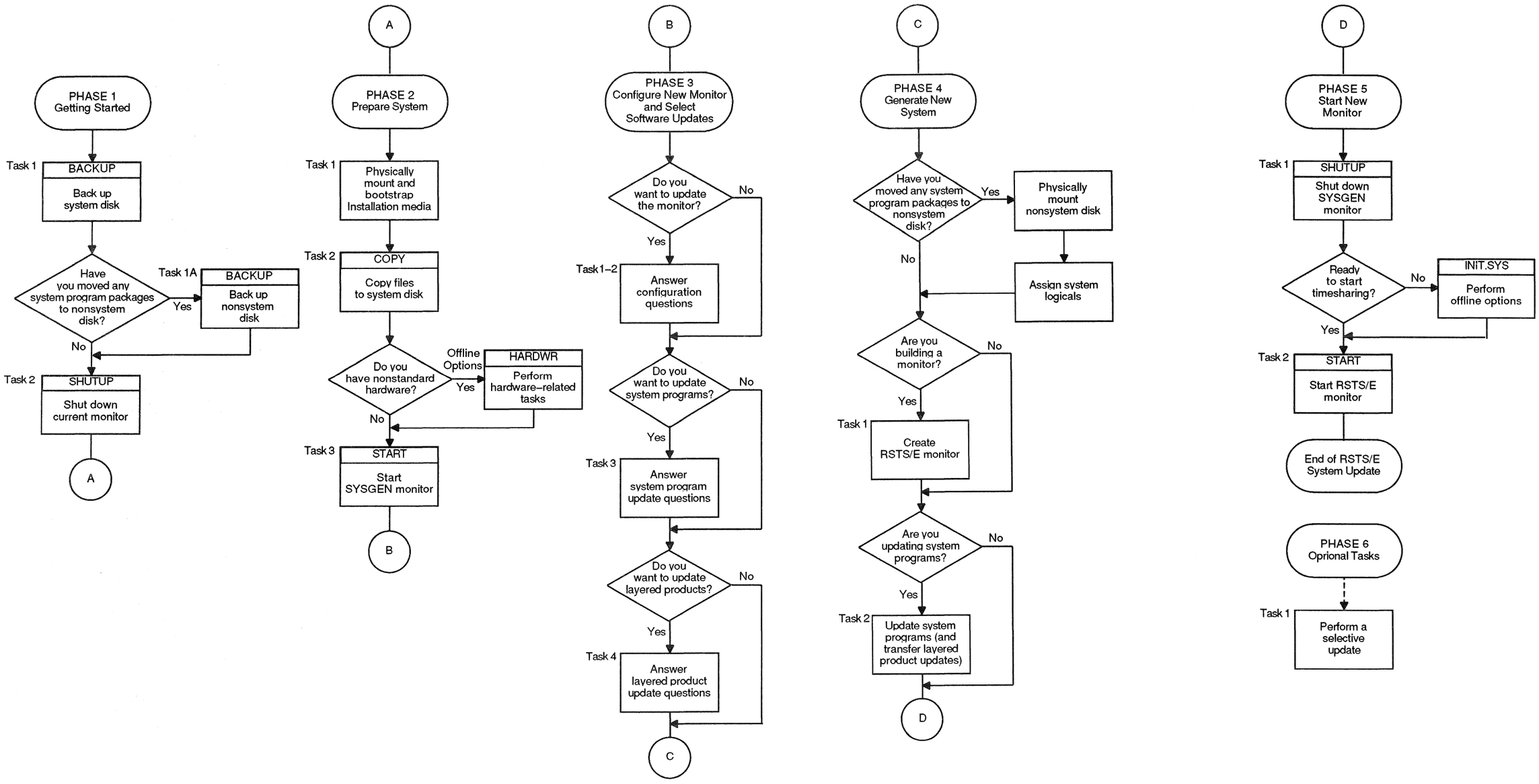


Figure 6: System Update Flowchart

Phase 1
Getting Started

This phase describes the tasks you must perform to prepare for a RSTS/E system update. For the update to succeed, you must be logged in to an account with the following privileges: SHUTUP, MOUNT, WREAD, WWRITE, WACNT, INSTAL, and TUNE. In addition, if you have DATES privilege, the creation date of new files will be the date they were placed on the installation media. If you do not have DATES privilege, the creation date will be the current date.

The tasks in this phase are:

- Task 1: Back Up System Disk (BACKUP)
- Task 1A: Back Up Nonsystem Disk (BACKUP)
- Task 2: Shut Down Current Monitor (SHUTUP)

Task 1: Back Up System Disk (BACKUP)

In this task you use the RSTS/E BACKUP utility to make a backup copy of your system disk. (See the *RSTS/E System Manager's Guide* for a full description of BACKUP.)

This example backs up a RA80 system disk to 1600 bpi tape, mounted on a TU77 tape drive.

```
$ BACKUP/BLOCK=MAXI DU0:[*,*]*.* MM0:SYSBAK
```

Explanation—You see the DCL $ prompt. Type a command of the format:

BACKUP <input-file-spec> <output-file-spec>

where:

BACKUP	invokes the RSTS/E BACKUP utility.
<input-file-spec>	specifies the disk, accounts, and files to back up.
<output-file-spec>	specifies the disk or tape on which to copy the data, and the save set name.

Response—Type an appropriate BACKUP command line for your system. The example BACKUP command line backs up all files in all accounts on the system disk (DU0:) to a magnetic tape mounted on drive MM0:, and names the save set SYSBAK.

```
Please mount volume 1 of Backup set SYSBAK.BCK

Where can this volume be located? <MM0:/NOINITIALIZE> MM0:/INITIALIZE
```

Explanation—BACKUP asks for the location of your save set volume. BACKUP prints the device designator you specified in the command line as the default answer (MM0 in this example).

Response—Type the device designator and unit number of the drive on which the output volume is mounted. If you want to initialize the tape, append /INITIALIZE to your response. In the example, the response is MM0:/INITIALIZE.

Go to Task 1A if you want to back up your nonsystem disk(s).

Go to Task 2 if you do not want to back up your nonsystem disk(s).

Task 1A: Back Up Nonsystem Disk (BACKUP)

You should perform this task if you intend to update system programs and you have moved any system programs packages to a nonsystem disk.

To back up your nonsystem disk, follow the procedures described in Task 1.

Go to Task 2.

Task 2: Shut Down Current Monitor (SHUTUP)

In this task, you run the SHUTUP program to shut down your current monitor. To run SHUTUP, you must have SHUTUP privilege and be logged in to the console terminal.

Terminal Session

This terminal session shows how to run SHUTUP to shut down your system.

```
$ RUN $SHUTUP
```

Explanation—You are logged in to the console terminal and see the DCL $ prompt on your screen. You can now shut down the current monitor.

Response—Type RUN $SHUTUP to shut down the monitor.

```
SHUTUP V9.7  RSTS V9.7 <monitor name>
11:55 AM 13-Sep-90 ########    Set-up Dialogue Phase     ########

Type '^' to any query to backup one question
Allow Print & Batch entries to complete (YES/NO) <Yes>?
```

Explanation—SHUTUP prints a header and some preliminary information. SHUTUP then asks you whether to allow print and batch entries to complete.

Response—Type YES or press RETURN to allow the entries to complete. Type NO to shut down the print and batch queues immediately.

```
Minutes until system shutdown (0-99) <5>?
```

Explanation—SHUTUP asks you to type the minutes to wait before the RSTS/E monitor shuts down. This question is useful for giving system users fair warning when shutting down the system.

Response—Type a number from 0 to 99. Or, press RETURN to accept the default of 5 minutes.

```
Shutdown with automatic RESTART <NO>?
```

Explanation— The system also asks if you want an automatic RESTART to the system. The default response is NO.

Response— Press RETURN or type No.

```
11:55 AM 13-Sep-90 ########     Warning Message Phase     ########
Further LOGINs are now disabled
11:55 AM 13-Sep-90 ########    Initial Job Killing Phase  ########
11:55 AM 13-Sep-90 ########   Print/Batch Shutdown Phase  ########
Print/Batch Services shutdown complete at 11:55 AM.
11:55 AM 13-Sep-90 ########   ' EVTLOG ' Shutdown Phase   ########
11:55 AM 13-Sep-90 ########   ' ERRCPY ' Shutdown Phase   ########
11:55 AM 13-Sep-90 ########    Remove RTS/RES LIB Phase   ########
11:55 AM 13-Sep-90 ########    SWAP File Removal Phase    ########
11:55 AM 13-Sep-90 ########      Disk DISMOUNT Phase      ########
11:55 AM 13-Sep-90 ########     Final Shutdown Phase      ########
Please wait for system to re-boot itself...
```

```
RSTS V9.7 RSTS/E V9.7 (dev) INIT V9.7
13-Sep-90 - 11:56 AM

Start timesharing <Yes>? NO

Option:
```

Explanation—SHUTUP prints several messages before shutting down your system. It then returns to the Start timesharing? question. See the *RSTS/E System Manager's Guide* for more information on SHUTUP.

Response—Type NO. INIT.SYS then prints its Option: prompt.

Go to Phase 2.

Phase 2
Prepare System

This phase describes the tasks you must perform to bootstrap the installation tape or disk and prepare your system disk for a RSTS/E system update. It also explains how to start your SYSGEN monitor.

The tasks in this phase are:

- Task 1: Physically Mount and Bootstrap Installation Media
- Task 2: Copy Files to System Disk (COPY)

These responses have special meaning:

Response	Description
RET	Accept the default response
?	Obtain an online explanation of the question

Task 1: Physically Mount and Bootstrap Installation Media

This task requires you to mount and bootstrap the appropriate tape or disk from your RSTS/E Installation Kit. First, the task provides instructions for mounting the tape on a tape drive, or mounting a disk on a disk drive. Choose the appropriate section depending on the type of media for your installation. Second, the task provides an example of bootstrapping the tape or disk.

Tape Mount Session

Mount the 800 or 1600 bpi 9-track installation tape. To load the tape on the drive:

1. Physically mount the tape on drive unit 0 or 1 with the write-enable ring removed. If you have a combination of TU10, TE10, TU16, TE16, TU45, and TU77 tape drives, load the 800 bpi distribution tape onto unit 0 or 1 of the TU10 or TE10 tape drive. If you have a combination of TU16, TE16, TU45, TU77, TS11, TSV05, and TU80 tape drives, load the 1600 bpi distribution tape on unit 0 or 1 of the TS11, TSV05, or TU80 drive. TK50 and TU81 tape drives can use either unit 0 or 1.
2. Press the LOAD indicator.
3. The drive automatically winds the tape until the beginning of tape (BOT) indicator light comes on. This indicates the tape is at its load point.
4. Make sure that the write-lock (WR) indicator light is on. (If not, dismount the tape, remove the write-enable ring, and then remount the tape.)
5. Press the ONLINE indicator. The indicator light comes on.
6. Make sure the console terminal is on line.

NOTE

The previous instructions may not apply to your tape drive. If so, see the hardware manual supplied with your tape drive for the load instructions.

The tape drive MUST be write-protected and online for the installation to proceed properly.

Disk Mount Session

Mount the RSTS/E installation disk. To load the disk onto the disk drive:

1. Physically mount the disk in drive unit 0 or 1. For an RL02 disk, you can use drive units 0, 1, 2, or 3.
2. Make sure that the READY light is on.
3. Make sure that the write-protect (WR PROT) light is on.
4. Make sure that the console terminal is on line.

NOTE

The disk drive MUST be write-protected and online for the installation to proceed properly.

Bootstrap Installation Media

Now you must bootstrap the installation tape or disk. Depending on the RSTS/E version you are updating from and whether the V10.0 installation media is a disk or a tape, you use one of the following boot methods:

- If your V10.0 installation media is a disk or you are updating from V9.1 or later, use the INIT.SYS BOOT option.
- If you are updating from V9.0 and your V10.0 installation media is a tape, you can:
  - Use the PDP-11 Central Processing Unit (CPU) switches to activate a hardware bootstrap loader
  - Use the console emulator

These bootstrap methods are described in the following sections.

Use the INIT.SYS BOOT Option

The INIT.SYS BOOT option bootstraps magnetic tape and disk devices.

```
Option: BOOT
```

Explanation—After you shut down the system, answer NO to the Start timesharing? question. INIT.SYS returns to the Option: prompt.

Response—Type BOOT or BO.

```
Boot device:

Boot unit:
```

Explanation—BOOT asks for the device designator of the unit.

Response—Type the device designator and unit number of the drive on which you mounted the installation tape or disk. If you type both a device designator and a unit number, BOOT does not print the Boot unit: prompt. Table 11 lists the tape device designators. Table 12 lists the disk device designators.

About 30 seconds to 10 minutes after you type the device designator, the following prints on the console terminal:

```
Performing limited hardware scan.

RSTS V10.0-L (dev) INIT V10.0-L

Today's date?

Current time?
```

The Today's Date? prompt means that INIT.SYS is loaded into memory. This prompt is skipped if the 11/93/94 time of year clock has been set. You have successfully bootstrapped your installation media. Note that the device designator of the tape or disk drive you bootstrapped appears within parentheses.

Note that the time required for this step varies according to the bootable device you use and the size of your system. The following are some general guidelines for the time for this step:

- If you are booting a disk such as an RL02 or RK07, this step should take less than 30 seconds.
- If you are booting a TK50 or on a large system with many devices attached, this step could take up to 10 minutes.

Go to Task 2.

Use the Hardware Bootstrap Loader

The hardware bootstrap loader is a device inside your PDP-11 that reads a bootstrap record from the tape or disk into memory. This bootstrap record contains a program that loads and executes additional program code from the tape or disk. There are different types of hardware bootstrap loaders; the type you have on your PDP-11 determines which CPU switches or commands you use.

Your Digital Field Service representative or software support specialist should already have identified the type of hardware bootstrap loader on your PDP-11. The representative should also have given instructions for bootstrapping your tape or disk.

If you do not know how to bootstrap the Installation media, see Appendix D, which contains bootstrap instructions for the different types of hardware bootstrap loaders.

This example shows how to bootstrap the 1600 bpi tape from a TU80 tape drive, by activating switches on a PDP-11/44. These bootstrap instructions are:

1. Move the control switch (CONT) to the HALT position.
2. Move the control switch to the BOOT position.

The CPU prints some octal numbers on the console terminal, followed by three angle brackets:

```
>>> B MS0
```

The >>> asks for a command. Type B to indicate a BOOT operation, followed by the device designator of the drive on which your tape or disk is mounted. A device designator consists of two letters that identify the device type, followed by the decimal unit number of the drive and a colon. (However, do not specify a colon here.) The example uses a TU80 tape drive; thus, the tape device designator is MS0.

Table 11 lists the tape device designators. Table 12 lists the bootable disk device designators. Enter the appropriate device designator for your installation.

About 30 seconds to 10 minutes after you type the device designator, the following prints on the console terminal:

```
Performing limited hardware scan.

RSTS V10.0-L (MS0) INIT V10.0-L

Today's date?
```

The Today's date? prompt means that INIT.SYS is loaded into memory. You have successfully bootstrapped your installation media. Note that the device designator of the tape or disk drive you bootstrapped appears within parentheses. In the example, the device designator is MS0.

Go to Task 2.

Table 11: Tape Device Designators

Designator	Devices Available During Installation
MM0: to MM1:	TE16/TU16/TU45/TU77 magnetic tape units 0 or 1
MS0: to MS1:	TS11/TSV05/TU80/TK25[1] magnetic tape units 0 or 1
MT0: to MT1:	TE10/TU10/TS03[2] magnetic tape units 0 or 1
MU0: to MU1:	TK50/TU81/TU81-PLUS magnetic tape units 0 or 1

[1]—Note: You cannot use a TK25 drive for system installation.
[2]—Note: You cannot use a TS03 drive for system installation.

Table 12: Bootable Disk Device Designators

Designator	Devices Available During Installation
DB0: to DB1:	RP04/RP05/RP06 disk drive units 0 or 1 [1]
DL0: to DL3:	RL01/RL02 disk drive units 0 to 3
DM0: to DM1:	RK06/RK07 disk drive units 0 or 1
DR0: to DR1:	RM02/RM03/RM05/RM80 disk drive units 0 or 1 [1]
DU0: to DU15:	RA60/RA70/RA80/RA81/RA82/RA90/RCF25/RC25/RD31/RD32/ RD51/RD52/RD53/RD54/RX33/RX50 disk drive units 0 to 15

[1]—See Appendix F for more information on multiple RH controller (otherwise known as DB and DR controllers) configurations.

Task 2: Copy Files to System Disk (COPY)

Your next task is to answer the preliminary INIT.SYS questions. Then the INIT.SYS COPY option transfers some necessary files from the installation media to your system disk.

Terminal Session

This terminal session lists the preliminary INIT.SYS questions, explains them, and gives you some possible responses. After you understand the question, type the response at your console terminal.

The common error messages appear at the end of this task. If your error message does not appear there, see Appendix A.

You have now successfully bootstrapped your installation media, and the INIT.SYS program is loaded into memory.

```
RSTS V10.0-L (dev:) INIT V10.0-L

Today's date ?
Current time ?
```

Explanation—INIT.SYS searches for a valid date and time and prompts you if it cannot find one. You see the date and time prompts, for example, when you bootstrap a tape or bootstrap a disk from the console boot/restart switch.

Response—Type today's date and time in either the alphabetic or numeric format. Type a question mark (?) to print an online explanation of the response formats for this question on your console terminal.

```
Installing RSTS on a new system disk <Yes> ? NO
```

Explanation—INIT.SYS asks this question whenever you bootstrap a tape or disk read-only. (RSTS/E Distribution Kits are always read-only). If you answer YES, INIT.SYS assumes you are performing a first time RSTS/E V10.0 system installation and want to use the DSKINT option to initialize your system disk.

If you answer NO, INIT.SYS assumes that you are bootstrapping the installation media to perform an update on the current system disk. INIT.SYS then asks the next question.

Response—Type NO because you are updating an existing RSTS/E V9.0 through V9.7 system.

```
Are you updating an existing RSTS system disk? <Yes> RET
```

Explanation—This question asks if you are updating a previously generated V9.0 through V9.7 system. If you answer YES, INIT.SYS executes the COPY operation with forced supersede of all files found on the system disk.

If you answer NO, INIT.SYS prints its Option: prompt.

Response—Type YES or press RETURN.

```
13-Sep-90 11:57 AM

Disk to update? DM0 RET
```

Explanation—INIT.SYS asks you to specify the device designator and unit number of your system disk. You should type both the device designator and unit number of your system disk. If you only type the device designator, the system will prompt you for the unit number of your system disk. Possible device designator responses are: DL, DM, DB, DR, or DU.

Response—Type the device designator and unit number of your system disk.

Note—If the message "Performing limited hardware scan." was printed during this boot and you try to initialize or copy to a nonexistent disk, then you will receive the following error messages:

```
That disk was not found during limited hardware scan.

Do you wish to perform a reboot with full hardware scan <YES>?
```

Response—If you answer YES, then the distribution device is rebooted and the "Performing limited hardware scan." message does NOT reappear.

```
Copying required system files

Performing limited hardware scan.


RSTS V10.0-L (dev:) INIT V10.0-L

13-Sep-90 11:57 AM

Rebooting . . .

RSTS V10.0-L (DU0) INIT V10.0-L

13-Sep-90 - 11:57 AM


Creating SWAP.SYS file with minimum size of 136 blocks

Memory allocation table:

   0K: 00000000 - 00407777 (  66K) : EXEC
  66K: 00410000 - 03467777 ( 396K) : USER
 462K: 03470000 - 03777777 (  50K) : XBUF
 512K: 04000000 - End              : NXM

Memory available to RSTS/E is 512K words.

Creating CRASH.SYS file with minimum size of 336 blocks

8 devices disabled
```

Explanation—After you type the system disk device designator and unit number, COPY transfers the files to the system disk. Because you answered YES to the Are you updating an existing RSTS system disk? question, COPY automatically supersedes existing files. COPY prints a message on your terminal as it supersedes each file.

On completion, INIT.SYS bootstraps your system disk and prints a message on your console terminal.

NOTE

It is sometimes necessary to use the HARDWR option to set non-standard CSR addresses during this part of the procedure. However, with RSTS/E V10.0, the SYSGEN.SIL is now started automatically, and the "Option" prompt is no longer asked.

If you need to access the "Option" prompt, follow this procedure:

1. During the installation procedure, the message "Copying required system files" appears. Several files are then copied from the distribution medium to your system disk.
2. Following this, your system disk is booted.
3. Immediately after the INIT header line is displayed, type ^C (Control-C) twice. The ^C characters will not be echoed on the terminal.
4. After a pause of ten seconds to two minutes, depending on your configuration, the "Option" prompt appears.

If you get the "Option" prompt again when you are finished with your changes, simply press RETURN to continue with the procedure.

Go to Task 3.

A list of the COPY error messages follows.

COPY Error Messages

CANNOT COPY TO THE SYSTEM DISK

Explanation: You specified the RSTS/E installation media, which is invalid as an output disk for the COPY option. Specify another disk.

ILLEGAL DISK NAME

Explanation: You typed an invalid disk name. All DF, DK, and DS disks are illegal.

INVALID UNIT NUMBER

Explanation: The disk unit number you specified does not exist on this system.

INVALID RESPONSE

Explanation: The only valid responses to the FILE FILNAM.TYP EXISTS: prompt are Y, N, or Ctrl/C, and you typed something else.

SORRY, BUT THAT DISK DOESN'T EXIST

Explanation: The disk type you specified does not exist on this system or the disk is not properly configured. All properly configured disks on the system are listed in the HARDWR LIST suboption.

THAT DISK WAS NOT FOUND DURING LIMITED HARDWARE SCAN

Explanation: The disk you specified to initialize or copy to was a nonexistent disk. If you answer YES to the "Do you wish to perform a reboot with full hardware scan <YES>?" question, then the distribution device is rebooted and the "Performing limited hardware scan." message does NOT reappear.

Phase 3
Configure New Monitor and Select Software Updates

This phase describes the tasks you must perform to configure your RSTS/E monitor. In this phase you also select the software packages you want to update.

The tasks in this phase are:

- Task 1: Answer Preliminary Questions
- Task 2: Use Information from a Template Monitor
- Task 3: Answer System Program Update Questions
- Task 4: Answer Layered Product Update Questions

These responses have special meaning:

Response	Description
RET	Accept the default response
CTRL/Z	Return to the beginning of the dialogue section
CTRL/C	Abort the operation and return to the DCL $ prompt
?	Obtain an online explanation of the question
^	Return to the previous question

Task 1: Answer Preliminary Questions

Your next task is to answer the questions asked by the the INSTAL.COM command file. The system executes INSTAL.COM immediately after it starts your monitor.

Before INSTAL.COM asks any questions, it opens a log file named INSTAL.LOG in the account from which you are running the update ([1,2] in most cases). INSTAL.COM closes this log file at the end of the update. You can then print INSTAL.LOG to obtain a record of the update session.

NOTE

The update procedure does not replace your existing [0,1]START.COM and [0,1]LOGIN.COM files. If START.COM and LOGIN.COM already exist on your system, the update procedure copies new versions of the files to account [0,1] with the names START.00x and LOGIN.00x, where x refers to the specific release of RSTS/E.

You may want to examine these files for any new features, then delete the files if you do not need them.

Terminal Session

This terminal session lists the preliminary installation questions, and provides some possible responses. In some cases, your response will differ from the response shown in the example.

```
  RSTS/E V10.0-L

13-Sep-90 11:57 AM

Please mount the RSTS/E installation media and enter the name
and unit number of the device.
Valid device types are: 'MM', 'MS', 'MT', 'MU', 'DM' or 'DL'

Installation device <_MS0:>? RET

Restoring required _SY0:[0,1] components

Deleting all global symbols

  RSTS/E V10.0-L

13-Sep-90 - 11:58 AM

                RSTS/E Software Update Procedure
                       * Dialogue Phase *

During this update procedure you may:

Type '?' for help
Type '^' to go back to the previous section
Type CTRL/Z to return to the beginning of the present section
```

Explanation—This question asks for the location of your installation media and starts the dialogue phase of the update. The default is the device on which you booted the installation media.

Response—Press RETURN to accept the default response. In the example installation, the response is MS0.

```
Please enter the name and unit number of the disk to
which you want to update the software. This disk
should be physically mounted and write-enabled.

Target disk? <_SY:> :  RET
```

Explanation—This question is for anyone updating a RSTS/E system for another PDP-11. Your response to this question determines the disk where the new RSTS/E monitor and updated system programs will be updated.

If you specify a disk other than the system disk (_SY:), physically mount and write-enable the disk before you answer this question. The disk does not need to be initialized at this time, because the next question asks if you want to initialize it.

Response—Type the disk name and unit number of the target disk if you are updating RSTS/E for another PDP-11. You then see the "Do you want to initialize the target disk?" question.

Type SY or press RETURN to update RSTS/E on your present system disk.

```
Restoring required _SY:[1,2] components

Assigning system logicals

Are you ready to proceed? <yes>  RET
```

Explanation—This question asks if you are ready to continue. If you type YES or press RETURN, the dialogue continues. If you type NO, you see the $ prompt.

Answer NO, for example, if you need to recover a corrupted system disk by issuing the $RESTORE command. You resume the installation procedure by typing PROCEED.

Response—Type YES or press RETURN to continue with the installation. In the example installation, the response is RETURN.

Go to Task 2.

Task 2: Use Information from a Template Monitor

In this task you use a template monitor to help configure your new monitor. A template monitor is a previous V9.0 through V9.7 monitor that you use as a model for another monitor.

Terminal Session

This terminal session lists the configuration questions, explains them, and gives you some possible responses. After you understand the question, type the response at your console terminal.

If you want to start over at any time while answering the configuration questions, press Ctrl/C. Then type @[0,1]INSTAL when you see the DCL $ prompt. You return to the beginning of Phase 3.

```
     **Starting Monitor Section **

13-Sep-90 12:05 PM

Do you want to install the RSTS/E monitor? <yes> RET
```

Explanation—This question asks if you want to update the monitor. Answer NO to this question if you want to update only system programs and/or layered products. You then skip the monitor update. You can only skip this if you already have a current version monitor.

If you answer YES or press RETURN to this question, you continue with the dialogue to update a pre-V10.0 monitor.

If you answer NO to this question, go to Task 3.

Response—Type YES or press RETURN to proceed with the RSTS/E monitor update. In the example installation, the response is RETURN.

```
There is a prebuilt monitor available which is suitable for
Micro-PDP-11 systems. You may use this prebuilt monitor, or
you may build your monitor. Building your monitor will allow
you to specify the features you wish to include in the monitor.

You may now choose:      (A) Build your monitor
                         (B) Use prebuilt monitor

Please type A or B <A> A
```

Explanation— The prebuilt monitor has been configured for Micro-PDP-11 systems. However, you can use this monitor on PDP-11 systems also if the configuration is suitable for your system configuration. Enter ? to display a list of the prebuilt monitor features.

Response— Type A to build your own monitor or type B to use the prebuilt monitor. If you select B, go to Task 3.

```
Restoring required SYSGEN components
```

Explanation—The system now copies files that you need to continue the update. Then you begin the monitor configuration dialogue.

```
Starting System Generation

Use template monitor? <Y>
```

Explanation—This question asks if you want the program to obtain the information it needs from a template monitor. The default is YES if SYSGEN finds other monitors on the system. Otherwise, the default is NO. Answer NO if you do not have a template monitor already on your system. If you answer YES to this question, you need to answer only the remaining questions in this task to complete Phase 3. You can still answer YES to this question, even if you intend to make some changes to your new monitor's configuration. You have the opportunity to make changes later in this task.

Response—Type YES to use an existing monitor as the template. Or, type NO to this question. You then see the configuration questions in Phase 3 of Part 1 of this guide.

If you answer YES to this question, continue with this task.

If you answer NO to this question, go to the "Use template monitor?" question in Task 1 of Phase 3 in Part 1 of this guide. Perform the rest of the tasks in that Phase. Then proceed to Task 3 of this section.

```
Template monitor name? <RSTS>
```

Explanation— You can use an existing V9.0 through V9.7 monitor as a template. The template monitor can be in any account on any disk that is both physically and logically mounted. If you do not specify the location, the default location is account [0,1] on the system disk. The program looks up the file and reads the necessary information from it. If the file does not exist, the program returns an error message and reprompts you.

If you type a ? to this prompt, a list of all the monitors in account [0,1] on the system disk is displayed.

Response—Type the name of the SIL you want to use as a template monitor.

```
New Monitor name? <RSTS>
```

Explanation—This question asks for the name of your new RSTS/E monitor, which will be stored in account [0,1] on your system disk. The program performs a lookup to see if the monitor name you specify already exists. If you call the new monitor SYSGEN, the program returns an error message and reprompts you.

Response—Type a name for your RSTS/E monitor. The name can be any combination of alphanumeric characters up to 6 characters long. The default response is RSTS.

```
A monitor by that name already exists.
Do you wish to supersede this monitor?

Supersede existing monitor? <N>
```

Explanation—You see this question only if the monitor name specified already exists and is not the currently installed SIL. If you type NO or press RETURN to accept the default, the program returns to the New monitor name? question. If you type YES, the program supersedes the existing monitor.

Response—Type NO or press RETURN to return to the New monitor name? prompt. Type YES to supersede the existing monitor.

```
Accept defaults? <N>
```

Explanation—This question lets you modify the configuration of your new monitor. If you answer NO, you have the opportunity to make changes at the beginning of each configuration section. If you answer YES, the program selects the entire configuration from the template monitor and asks no configuration questions.

If you type a ?, you see a list of the default configuration you will receive if you answer YES to the question.

Answer YES if you do not need to change the configuration.

Answer NO if you need to make configuration changes. This can occur, for instance, when you perform a monitor update to add support for new hardware.

Response—Type NO or press RETURN if you want to make changes. Type YES if you do not want to make changes.

If you answered YES to the Accept defaults? question, go to Task 3.

If you answered NO to the Accept defaults? question, perform Tasks 2 through 6 of Phase 3 in Part 1 of this guide. Then proceed to Task 3 of this section.

Task 3: Answer System Program Update Questions

Your next task is to answer the system program update questions. Your responses determine which system programs are updated on your system. You must update all the system programs you selected during system installation. For a complete description of the system programs available with RSTS/E, see Phase 4 in Part 1 of this guide.

Digital supplies updates to RSTS/E system programs on the installation media. The programs are grouped into the packages listed in Table 13. See Appendix C for a complete list of system programs contained in each package.

The system updates each package at the location pointed to by its associated logical name. The update occurs in Phase 4.

NOTE

If you have moved a software package from its default location to a disk other than the system disk, you will need to mount the other disk on a free drive at the beginning of Phase 4.

Table 13 lists the logical names for each system program package.

Table 13: System Program Package Logical Names

Package	Logical Name
System Library	always [1,2]
RSX Utilities	LB:
Help	HELP$:
Error	ERROR$:
Update	UPDATE$:
Device Testing	TEST$:
Print/Batch Services (PBS)	PBS$:
File Restore	RESTOR$:
Operator/Message Services (OMS)	OMS$:
OPSER-based Spooling	OPSER$:
Unsupported Utility	UNSUPP$:
Auxiliary Library	AUXLIB$:
RMS-11	RMS$:
EDT	EDT$:
TECO	TECO$:
SORT/MERGE	SORT$:
BASIC-PLUS	BASIC$:
SOURCE	SOURCE$:

Terminal Session

This terminal session explains the procedures to update system programs.

```
     ** End of Monitor Section **

Are you ready to proceed? <yes>
```

Explanation—This question asks if you are ready to continue. If you type YES or press RETURN, the dialogue continues. If you type NO, you see the $ prompt.

You resume the installation procedure by typing PROCEED.

Response—Type YES or press RETURN to continue with the installation. In the example installation, the response is RETURN.

```
     ** Starting System Programs Section **

13-Sep-90 11:58 AM

Do you want to install the System Program packages? <yes>
```

Explanation—You are at the beginning of the System Programs Section. If you answer YES, you begin the dialogue to install system programs.

Answer NO if you are only creating a RSTS/E monitor and do not want to install system programs. You then skip this phase and go to the Are you ready to proceed? question in Task 1 of Phase 4.

Response—Type YES or press RETURN to begin the dialogue. In the example installation, the response is RETURN.

```
Packages currently installed on the target disk:

<RSX,RMS,DAP,PBS,EDT,UPDATE,TEST,UNSUPP,TECO,AUXLIB,RESTORE,OPSER,
SORT,HELP,BASIC,SOURCES,BLDETD>

Packages to install? <CURRENTLY INSTALLED LIST> :
```

Explanation—This question asks for the names of the packages you want to update on your system.

Response—Type a ? to list the packages that are available.

```
The following will be installed:

     RSX          RMS          PBS          EDT
     UPDATE       TEST         TECO         AUXLIB
     RESTORE      OPSER        HELP         BASIC
     SOURCES

You may answer "Yes" to accept this list, or "No" to change it.

Is this list OK? <yes> RET
```

Explanation—The system lists the packages it will update on your system and then asks if you want to use this list. If you type NO, you return to the "Packages to install:" prompt.

Response—Type YES or press RETURN to continue the system program update. Type NO of you want to specify a different list of packages to update on your system.

```
Do you want the I&D versions of tasks? <Y>
```

Explanation—The system copies some required files and then asks if you want the I&D versions of tasks. You see this question only if you specified RSX and/or AUXLIB in response to the Packages to install: question.

Instruction and Data (I&D) space is available on the PDP-11/44, 45, 50, 53, 55, 70, 73, 83, 84, 93, and 94. Digital does not recommend that systems with less than 256K words of memory (PDP-11/45, 50, or 55) use I&D space. If your system has more than 256K words of memory (PDP-11/44, 53, 70, 73, 83, 84, 93, or 94.), you may want to take advantage of this hardware feature which yields better performance from the following programs: TKB, MAC, STK, and REORDR.

Note that if you answer YES to this question, you must specify a SWAP MAX of 66K words to accommodate the larger amount of physical memory required by the tasks.

The system uses your response to this question later in the update when it asks whether you want to create a SWAP1.SYS file (see Task 1 of Phase 4). If you answer YES to this question, the system assumes a SWAP MAX of 66K words. Otherwise, the system assumes a SWAP MAX of 34K words.

Response—Type YES to receive the I&D versions of tasks. Type NO or press RETURN to receive the normal versions.

```
Use resident library version of RMS? <Y> RET

Use RMS resident libraries in DAP? <Y> RET

Use RMS resident libraries in PBS? <Y> RET

Use resident library version of EDT? <Y> RET
```

Explanation—If you choose RMS, DAP, PBS, or EDT, the system asks you to choose either the resident library or overlaid version. In general, the overlaid version requires less memory, but can severely impact performance. The resident library version requires less disk space, but requires more memory. Choose the resident library versions if your system has sufficient memory and you have more than one user accessing a program simultaneously.

Response—Type YES or press RETURN to use the resident library version. Type NO to use the overlaid version.

```
Account(s) to assign the OPER privilege to for OMS?  <[1,2]>
```

Explanation—If you choose OMS, the system asks you to supply the account(s) to assign the new OPER privilege to for OMS. This question only appears the first time you update your system from a V9.0 through V9.7 system.

Response—Enter the account, or a list of accounts separated by commas. Press RETURN to accept the default account [1,2].

```
During the build phase there will be further questions
for BASIC-PLUS and SORT/MERGE
```

Explanation—You see these messages if you specified the BASIC-PLUS and/or SORT/MERGE packages. You answer the BASIC-PLUS and SORT/MERGE questions in Phase 5 of Part 1.

```
     ** End of System Programs Section **

Are you ready to proceed? <yes> RET
```

Explanation—You are finished with the System Programs Section. This question asks if you are ready to continue. If you type YES or press RETURN, the dialogue continues. If you type NO, you see the $ prompt.

Response—Type YES or press RETURN to continue with the installation. You resume the installation procedure by typing PROCEED. In the example installation, the response is RETURN.

```
13-Sep-90 11:59 AM

     ** Starting Layered Products Section **

You may now transfer the layered product update components
from the installation kit.

Do you wish to do the transfer? <yes> RET
```

Explanation—This question asks if you want to transfer any layered product updates from the installation kit while it is still mounted. Answer YES to this question if you plan to install any layered products on your system. If you answer YES, you continue with the Layered Products Section.

Response—Type YES or press RETURN to continue the Layered Products Section. Type NO to skip the section. In the example installation, the response is YES.

If you answered YES to the previous question, go to Task 4.

If you answered NO to the previous question, go to Phase 4.

Task 4: Answer Layered Product Update Questions

You perform this task if you plan to update layered products on your RSTS/E system. A layered product, also called optional software, is software that you must purchase from Digital. Examples of layered products are BASIC-PLUS-2, COBOL-81, and DIBOL.

In this task, you specify which layered products you plan to update on your system, so that the installation procedure can transfer updates for those products from the installation kit.

NOTE

The RSTS/E Update Procedure does not perform a layered product installation. See the individual layered product installation guide for the procedures to perform the layered product update.

Terminal Session

This terminal session explains the layered product update questions and provides some possible responses.

```
13-Sep-90 12:05 PM

     ** Starting Layered Products Section **

You may now transfer the layered product update components
from the installation kit.

        BP2         C81         DECDX       DECNET
        DIBOL       DTR         FMS         FORTRAN
        FRTRN77     MAIL        MENU        PDPDBG
        PLXY        RJ2780      WPS         27803780
        3271

Do you wish to do the transfer? <yes>  RET
```

Explanation—You see this question at the end of Task 3.

Response—Type YES or press RETURN to begin the dialogue to transfer layered products updates. Type NO to skip this section.

```
Product updates to transfer:
```

Explanation—This question asks for the names of the layered product updates you want to transfer to your system.

Response—Type a ? to list the layered product packages that are available with RSTS/E.

Type a list of the product names, separated by commas. Remember, if you make a mistake you can type ^ to return to the previous question, or enter Ctrl/Z to return to the beginning of the section.

Type ALL to transfer all the updates. If you plan to transfer nearly all of the product updates, type:

ALL,NOnnnnnn,NOnnnnnn

where nnnnnn refers to a product update you want to exclude.

```
The following will be transferred:

        BP2         C81         DECDX       DECNET
        DIBOL       DTR         FMS         FORTRAN
        FRTRN77     MAIL        MENU        PDPDBG
        PLXY        RJ2780      WPS         27803780
        3271

You may answer "Yes" to accept this list, or "No" to change it.

Is this list OK? <yes> RET
```

Explanation—The system lists the product updates it will transfer to your system and then asks if you want to use this list. If you type NO, you return to the Product updates to transfer: prompt.

Response—Type YES or press RETURN to continue the layered product update transfer. Type NO if you want to specify a different list of layered product updates to transfer to your system.

```
Note: Any files currently in the PATCH ACCOUNT will be deleted

Since some layered products may require the Update package
(from the System Programs section), it will be included.
To install a layered product please refer to the individual
layered product installation guide.

Patch account <PATCH$:>
```

Explanation—Now you must specify the account in which you want the layered product update information placed. The default account is PATCH$:. Note that the update procedure deletes any existing files in the current PATCH account before it transfers the updates. If you have files in the PATCH account that you want to keep, specify a different account for PATCH$:.

After you complete the RSTS/E update, you must follow the update procedures outlined in the specific layered product installation guide to update a layered product. Some of the layered products use the BUILD program to perform the update. See Appendix E for a description of BUILD.

Response—Press RETURN to accept the default patch account, PATCH$. Or, specify a different account.

```
    ** End of Layered Products Section **
```

Explanation—You are finished with the Layered Products Section.

Go to Phase 4.

Phase 4
Generate New System

You are now ready to generate your updated RSTS/E system. In this phase, you create the new RSTS/E monitor and update the system programs you specified in Phase 3. See the appropriate installation guides for instructions on updating layered products such as COBOL-81 or DIBOL.

The tasks you perform in this phase are:

- Task 1: Create RSTS/E Monitor
- Task 2: Update System Programs and Transfer Layered Product Updates

Task 1: Create RSTS/E Monitor

The system now generates your new monitor according to the instructions you gave it in Phase 3.

Terminal Session

This terminal session explains the procedures that generate the RSTS/E monitor. The procedures will differ depending on your response to certain configuration questions in Phase 3.

```
You must now set the password for account _SY:[1,2]
New password:
New password again, for verification:
Password set for account _SY:[1,2]
```

Explanation—This question asks you to specify a password for the system library account, [1,2]. This is a precautionary measure to provide you with an account that you can log in to in case of unforeseen problems. Digital does not recommend that you log in to and use account [1,2] on a regular basis because of the importance of the files that reside in the account.

Response—Type a password from 6 to 14 characters. The password can be any combination of DEC MCS characters including the space character but not the ? character. The password is /NOLOOKUP by default. Retype the password when prompted.

```
This is the end of the DIALOGUE phase.

The next phase is the BUILD phase.

Are you ready to proceed? <yes>  RET
```

Explanation—This question asks if you are ready to generate your RSTS/E system. You are not ready to proceed if you need to mount a disk other than the system disk on which any of the software packages targeted for update reside. Before you proceed you must:

1. Physically mount the nonsystem disk
2. Issue the MOUNT command to logically mount the disk
3. Assign the appropriate system logicals

If you are ready to proceed, type YES or press RETURN. If you are not ready, type NO. You then see the $ prompt. When you are ready to proceed, type PROCEED.

Response—Type YES or press RETURN to proceed.

```
                    * Build phase *

13-Sep-90 - 12:18 PM

What size would you like SWAPMAX to be? <66>  RET
```

Explanation— This question is only displayed if you have I&D space hardware, otherwise SWAPMAX is set to 34.

The RSTS/E monitor moves jobs from memory to disk as needed. For a job to move to disk, a special file must exist to store the job. This file is called a swap file. The SWAP MAX or swap maximum is the maximum amount of disk storage space that a job can occupy in a swap file when the job is swapped from memory to disk during timesharing. The size of your SWAP MAX depends on the run-time systems you plan to use, and whether you plan to write programs using I&D space. You can specify a size up to 66K.

Response— Type the new SWAPMAX (a number from 34 to 66).

```
Do you want _SY0:SWAP1.SYS created (at xxxx blocks)? <yes>

Creating _SY0:[0,1]SWAP1.SYS at xxxx blocks
```

Explanation—The command procedure asks if you want to create a SWAP1.SYS file at a size large enough to hold all the jobs on your system. It creates SWAP1.SYS as close to the center of the system disk as possible. The system determines the size of SWAP1.SYS according to this formula:

(JOB MAX-1) * SWAP MAX * 4

where:

JOB MAX-1	is the number of jobs you specified in Task 6 of Phase 3 in Part 1, minus 1.
SWAP MAX	is the value given in answer to the SWAP MAX question, or is 34K words if you do not have I&D space hardware.

Response—Type YES or press RETURN to create SWAP1.SYS. Type NO to skip the creation of SWAP1.SYS. Type a ? if you want to know the size of SWAP1.SYS before you answer the question.

```
Creating RSTS/E monitor
```

Explanation—The command procedure now begins the RSTS/E monitor generation. The entire process should take 30 to 45 minutes, depending on the size of your monitor and the type of your CPU. If you have an 11/23 or an 11/24 CPU, this process may take up to three hours.

If your template monitor supports RJ2780 or you answered YES to the RJ2780 support? question in Phase 3 of Part 1, the program prompts you to mount the RJ2780 Software Kit at this time. Mount the RJ2780 kit when you see this prompt:

```
Please mount the RJ2780 installation kit and enter the name
and unit number of the device.
Valid device types are: 'MM', 'MS', 'MT', 'DM', 'DL' or 'SY'

Installation device <_dev:> :
```

You may have to dismount the installation media to make room for the RJ2780 kit, if you do not have a free drive available. The system prompts you to remount the installation media later. Remount the installation media on the indicated drive (dev: in the example) when you see this prompt:

```
Please ensure that the installation media is mounted
on dev: and press RETURN when ready:

%Small buffers lowered by xxx buffers
This will leave you with yyy buffers
```

Explanation—The command procedure checks whether the number of small buffers you specified in Task 6 of Phase 3 in Part 1 will fit on your system. If the number you specified is too high, the command procedure attempts to decrease the number of buffers so that the monitor fits on your system.

If the number of small buffers you specified is much too high for the maximum number allowed for your system, you see the message:

```
?LINK-F-Address space exceeded

Beginning of RSTS/E system generation
```

In general, this indicates that the system you configured is too big. Rather than make such a radical adjustment to your monitor by significantly decreasing the small buffers, the command procedure returns to the configuration questions in Phase 3 of Part 1. If you see this message, return to Phase 3 in Part 1 of this guide and answer the configuration questions. You may want to decrease the size of your system by changing the answers to some of the questions such as fewer devices. Also, specify a much smaller number to the Small buffers? question in Task 6. In general, 600 to 700 is a good response to the Small buffers? question.

See the BUFFERS suboption of DEFAULT in Part 5 of this guide for more information on small buffers.

```
This monitor has a valid buffer count
Monitor creation 20% complete.
Monitor creation 40% complete.
Monitor creation 60% complete.
Monitor creation 80% complete.

Directory of SIL V103  .SIL on 13-Sep-90 at 12:14 PM

Name      Ident     Load     Size    Transfer  Total

RSTS      10.00L   000000   116500    000001    20K
MVR       10.00L   120000   014100    000001    23K
    .
    .
    .
OV2       10.00L   002000   034000    000001   118K
DEFALT    10.00L   001000   003000    000001   119K

Maximum buffers available without using data space:
  415 general small buffers.
  90 FIP small buffers.

Maximum buffers available using data space:
  668 general small buffers.
  494 FIP small buffers.

If you choose to restart the update, you may
specify up to 573 small buffers for this system.
Doing so will increase the number of general buffers
available both with and without data space.

Monitor creation 100% complete.

Before attempting to start your new SIL, you must have swap
file space of 11264 blocks and if you use files other than
SWAP1.SYS you must also edit START.COM to install them.
```

Explanation—You see these messages if your new monitor is an acceptable size and the build progresses satisfactorily.

Go to Task 2.

Task 2: Update System Programs and Transfer Layered Product Updates

The update procedure now updates the system programs and layered products according to the instructions you gave in Phase 3.

Note that the time required for this process varies according to the type of your CPU and the size of your monitor. The following are some general guidelines for the time for this step:

- If you are updating the system programs and layered products on an 11/70, 11/73, 11/83, 11/84, 11/93 or an 11/94 CPU, this process could take up to 30 minutes.
- If you are updating the system programs and layered products on an 11/45, 11/50, 11/53, 11/55, or an 11/60 CPU, this process could take up to 1 hour.
- If you are updating the system programs and layered products on an 11/34, 11/35, or an 11/40 CPU, this process could take up to 2 hours.
- If you are updating the system programs and layered products on an 11/23 or an 11/24 CPU, this process could take up to 3 hours.

If the installation media contains multiple volumes, the program prompts you to change media at the appropriate time.

Terminal Session

This terminal session explains the procedures that update the system programs.

```
13-Sep-90 - 12:15 PM

Restoring the xxxxxx package from the Installation kit

There are no updates for the xxxxxx package
```

Explanation—The system now updates the system programs. As the system updates each system program package, it prints one of the above messages. In both messages, xxxxxx is the name of the specific software package.

```
Restoring xxxxxx update components from the Installation kit
```

Explanation—After the system completes the system program file transfers, it restores the layered product updates you specified in Phase 3. As the system transfers each layered product update, it prints the above message, where xxxxxx is the name of the layered product.

```
To install/update layered products, please see the individual layered
product installation guides.
```

Explanation—You see this message only if you transferred layered product updates to your system (see Task 4 of Phase 3).

See the installation instructions that came with each layered product for a complete description of the installation procedures.

```
    RSTS/E V10.0-L

13-Sep-90 12:20 PM
                    RSTS/E Software Update Procedure

13-Sep-90 12:20 PM

START.00L and LOGIN.00L in account [0,1] are the templates
```

```
for those .COM files. Your present .COM files should be
edited to reflect any changes.
```

Explanation— This message indicates that there are two templates available for you to edit to create START.COM and LOGIN.COM for your system as directed in Phase 6.

```
13-Sep-90 12:20 PM

Installing System packages
```

Explanation— The system now begins installing the system packages.

```
Beginning of RSTS/E Basic-Plus generation

The following is a list of the BASIC RTS's in [0,1]:

         File .Typ      Creation
        BAS4F .RTS      04-Oct-85
        BAS2F .RTS      04-Oct-85
        BAS4AL.RTS      22-Jun-88
        BASIC .RTS      30-Aug-89

BASIC-PLUS RTS's to Update ? <ALL>
```

Explanation—You see this question if you are updating BASIC-PLUS. You must now answer the BASIC-PLUS questions. See Task 4A of Phase 5 in Part 1 for a description of the dialogue. Otherwise, continue with this task.

```
Beginning SORT/MERGE installation
```

Explanation—You see this question if you are updating SORT/MERGE. You must now answer the SORT/MERGE questions. See Task 4B of Phase 5 in Part 1 for a description of the dialogue. Otherwise, continue with this task.

```
Finished installing system packages

13-Sep-90 12:35 PM

                The RSTS/E software update procedure is complete

Would you like to start your new monitor now? <Y> YES
```

Explanation— After the system packages are installed, you are asked if you want to start your new monitor now.

Response– Type YES or press RETURN to have the system start your new monitor. If you type NO, you will have to shut down the SYSGEN monitor and start your new monitor as directed in Phase 5.

```
Deleting all global symbols

Deassigning system logicals

13-Sep-90 12:37 PM

System tape label default set to DOS

_SY:[p,pn]INSTAL.LOG is a log file of this session

Please wait for system to re-boot itself...
```

Explanation—You have completed the update. The command procedure prints informational messages and reminds you that the INSTAL.LOG file is a record of the update. The procedure then automatically shuts down the SYSGEN monitor and starts your new monitor.

```
RSTS V10.0-L RSTS10 (DU0) INIT V10.0-L

13-Sep-90  12:45 PM

Memory allocation table:

   0K: 00000000 - 00413777 (  67K) : EXEC
  67K: 00414000 - 03367777 ( 379K) : USER
 446K: 03370000 - 03777777 (  66K) : XBUF
 512K: 04000000 - End              : NXM

Memory available to RSTS/E is 512K words.

Re-creating CRASH.SYS file with minimum size of 396 blocks
```

Explanation— The procedure then prints the current memory allocation table and checks that the CRASH.SYS file exists in account [0,1] on the system disk, is large enough for the installed RSTS/E monitor and extended buffer pool allocation, and is contiguous.

```
13-Sep-90  12:45 PM

8 devices disabled

Proceed with system startup? <YES>  RET

 Beginning RSTS/E system startup...

13-Sep-90 12:45 PM    Mounting disks
13-Sep-90 12:45 PM    Assigning logical names
13-Sep-90 12:45 PM    Starting error logging
13-Sep-90 12:45 PM    Setting system characteristics
13-Sep-90 12:45 PM    Installing run-time systems and libraries
13-Sep-90 12:45 PM    Starting OMS
13-Sep-90 12:45 PM    Setting terminal characteristics
13-Sep-90 12:46 PM    Defining system commands
13-Sep-90 12:46 PM    Setting printer characteristics
13-Sep-90 12:46 PM    Starting spoolers

Print/Batch Services started at 12:46 PM
```

Explanation— The procedure pauses for several seconds while it performs the necessary tasks to start timesharing. It then asks if you are ready to proceed with the start up.

Response– Type YES or press RETURN to start timesharing. Or, type NO if you are not ready to start timesharing. You then see the DCL $ prompt. In the example update, the response is RETURN.

```
*** From [1,2] on KB0: at 12:47 PM on 13-Sep-90

** RSTS/E is on the air...

 RET

RSTS V10.0-L 13-Sep-90 12:47 PM
User:
```

Explanation— You are finished with the update. You can now press RETURN to log in to the system. RSTS/E then prints its banner followed by the User: prompt.

Save System Disk Onto Another Disk or Tape

You may want to create a backup copy of your system disk. If so, use the Backup program to copy your system disk before you start your RSTS/E monitor.

Go to Phase 5.

Phase 5
Start New Monitor

This phase describes the tasks you must perform to start your new RSTS/E monitor if you did not choose to have the update procedure start your monitor in Phase 4.

The tasks in this phase are:

- Task 1: Shut Down SYSGEN Monitor (SHUTUP)
- Task 2: Start New RSTS/E Monitor (START)

Task 1: Shut Down SYSGEN Monitor (SHUTUP)

Now that you have built an updated RSTS/E monitor, you no longer need the SYSGEN monitor. To shut down your monitor, run the SHUTUP program.

You should install any paper patches at this time. Install the paper patches to your currently built monitor, not to your currently installed monitor. You want the patches to apply to your newly built monitor.

Use the ONLPAT commands found in [1,2] to install paper patches online if you want to install them before running SHUTUP. Use the PATCH option of INIT.SYS if you want to install patches after running SHUTUP.

Terminal Session

This terminal session explains how to use SHUTUP to shut down your SYSGEN monitor.

```
$ RUN $SHUTUP
```

Explanation—You see the DCL $ prompt on your screen. You can now shut down the SYSGEN monitor.

Response—Type RUN $SHUTUP to shut down the monitor.

```
SHUTUP V10.0-L RSTS V10.0-L <SYSGEN>
12:54 PM 13-Sep-90 ########     Set-up Dialogue Phase     ########

Type '^' to any query to backup one question
Minutes until system shutdown (0-99) <5>?
```

Explanation—SHUTUP asks you to type the minutes to wait before the RSTS/E monitor shuts down. This question is useful for giving system users fair warning when shutting down the system.

Response—Type a number from 0 to 99. Or, press RETURN to accept the default of 5 minutes.

```
Shutdown with automatic RESTART <NO>?  RET
```

Explanation— The system asks if you want an automatic RESTART to the system. The default response is NO.

Response— Press RETURN or type NO to accept the default response. You should never answer YES at this point in the update procedure. You must shutdown the system in order to start the new monitor.

```
12:55 PM 13-Sep-90 ########     Warning Message Phase     ########
Further LOGINs are now disabled
12:55 PM 13-Sep-90 ########   Initial Job Killing Phase   ########
12:55 PM 13-Sep-90 ########   Print/Batch Shutdown Phase  ########
Print/Batch Services shutdown complete at 12:55 PM.
12:55 PM 13-Sep-90 ########   ' EVTLOG ' Shutdown Phase   ########
12:55 PM 13-Sep-90 ########   ' ERRCPY ' Shutdown Phase   ########
12:55 PM 13-Sep-90 ########    Remove RTS/RES LIB Phase   ########
12:55 PM 13-Sep-90 ########     SWAP File Removal Phase   ########
12:55 PM 13-Sep-90 ########       Disk DISMOUNT Phase     ########
12:55 PM 13-Sep-90 ########      Final Shutdown Phase     ########
```

```
RSTS V10.0-L SYSGEN (dev:) INIT V10.0-L

dd-mmm-yy - hh:mm AM/PM

Start timesharing <Yes>?
```

Explanation—SHUTUP prints several messages before shutting down your system. It then returns to the Start timesharing? question. See the *RSTS/E System Manager's Guide* for more information on SHUTUP.

Go to Task 2.

Task 2: Start New RSTS/E Monitor (START)

In Task 1 you ran the SHUTUP program to shut down the SYSGEN monitor. Now you need to start your updated RSTS/E monitor. You must first decide whether to perform the additional preparatory task:

- Change monitor defaults (INIT.SYS DEFAULT option)

Change Monitor Defaults (DEFAULT Option)

When you start your new monitor, it will receive the standard monitor defaults.

Table 14 shows the defaults that INIT.SYS selects.

Table 14: INIT.SYS Selected Defaults

Default	Current Setting
Crash dump file	CRASH.SYS, if enough space is present
Extended buffer pool memory (XBUF)	15% of USER memory is allocated to XBUF, if the total amount of system memory exceeds 128K words. Otherwise, 10% of USER memory is allocated to XBUF. USER memory is memory that is not allocated to any other entity, such as the monitor or run-time system. The minimum size of XBUF in all configurations is 3K words. The maximum size is 496K words.
Small buffer pool memory	The maximum allowed for your system, over and above the minimum number you specified during system installation (see Part 1, Phase 3, Task 6). The size varies based on your hardware and software configurations.
System clock	KW11-L Line Time Clock

If you do not plan to change any of the defaults selected by INIT.SYS, then you do not need to use the DEFAULT option before you start timesharing under your RSTS/E monitor. See Part 5 of this guide for a complete description of DEFAULT.

If you need to perform additional preparatory tasks, go to Part 5 of this guide. Then continue with this task.

Terminal Session

To start your RSTS/E monitor, you must answer the START questions. This terminal session lists the questions, explains them, and gives you some possible responses. After you understand the question, type the response at your console terminal.

```
Start timesharing? <Yes> START <monitor name>
```

Explanation—You see this question at the end of Phase 4. This question asks if you are ready to start timesharing. If you answer YES to this question, INIT.SYS restarts timesharing under the currently installed monitor.

If you answer NO to this question, INIT.SYS prints its Option: prompt. You can then use the INIT.SYS offline options to perform additional preparatory tasks. Finally, when you are ready to start your RSTS/E monitor, use the INIT.SYS START option.

Response—Type START <monitor name>, where <monitor name> is the name of your new RSTS/E monitor.

If you do not specify a monitor name, START starts the monitor that was used in the previous timesharing session. The SYSGEN monitor was used in this case.

```
Memory allocation table:

   0K: 00000000 - 00413777 (  67K) : EXEC
  67K: 00414000 - 03367777 ( 379K) : USER
 446K: 03370000 - 03777777 (  66K) : XBUF
 512K: 04000000 - End              : NXM

Memory available to RSTS/E is 512K words.
```

Explanation—START prints the current memory allocation table. The sample memory allocation table is from the example installation in Part 1. These messages may be slightly different due to configuration differences. Then START checks that the SWAP.SYS file exists in account [0,1] on the system disk, is large enough to hold one job at the current SWAP MAX, and is contiguous. If the file does not exist, START attempts to create SWAP.SYS at the required size. If the file exists but is not contiguous or large enough, START deletes the current SWAP.SYS file and attempts to create a new SWAP.SYS file that is both contiguous and large enough (SWAP MAX * 4). If START cannot find enough free contiguous disk space to create a minimum SWAP.SYS file, it prints the following error message:

```
?Not enough contiguous disk space to create minimum SWAP.SYS file
```

START then attempts to create a SWAP.SYS file that is smaller than the one you specified yet still meets the minimum requirements. This may take up to one minute. If START finds it can create a SWAP.SYS file, it prints these messages:

```
SWAP.SYS can be created if SWAP MAX is reduced to xxK

New SWAP MAX <xxK>?
```

Press RETURN to accept the default value, indicated by xx in the example. Or, enter Ctrl/C to return to the Option: prompt. You can then use the FILE suboption of REFRESH to create more disk space.

If START cannot find enough contiguous disk space to create a minimum SWAP.SYS file, it prints these messages:

```
You must free some disk space to start timesharing.

Option:
```

Use the FILE suboption of REFRESH to create more contiguous disk space.

```
Re-creating CRASH.SYS file with minimum size of xxx blocks
```

Explanation—START now checks that the CRASH.SYS file exists in account [0,1] on the system disk, is large enough for the RSTS/E monitor and extended buffer pool allocation, and is contiguous. If the file does not exist, START attempts to create CRASH.SYS at the required size. If the file exists but is not contiguous or large enough, START deletes the current CRASH.SYS file and attempts to create a new CRASH.SYS file that is both contiguous and large enough. If START is successful it prints the previous message. If START is unsuccessful, it prints the following error messages:

```
?Not enough contiguous disk space to create minimum CRASH.SYS file

Crash dump automatically disabled
```

When a crash occurs, the RSTS/E monitor dumps the contents of the read/write area of monitor memory into CRASH.SYS. Because the crash dump facility preserves the state of the system at the time of the crash, CRASH.SYS contains important diagnostic information. For these reasons, Digital recommends that you always have crash dump enabled during timesharing. In general, SPRs

submitted on system crashes without crash dumps will be answered by Digital as "Insufficient information."

Therefore, if you see the error message Crash dump automatically disabled, follow these steps to enable crash dump:

1. After you begin timesharing, delete unnecessary files to create more contiguous disk space. Or, move some files to a nonsystem disk.
2. Shut down the RSTS/E monitor using the SHUTUP program.
3. Use the START option to start timesharing. If you do not see the Crash dump disabled message, you know that INIT.SYS was able to create the CRASH.SYS file.

```
    .
    .
    .
*** From [1,2] on KB0: at hh:mm AM/PM dd-mmm-yy
** RSTS/E is on the air...
RET

RSTS V10.0-L dd-mmm-yy hh:mm AM/PM
User:
```

Explanation—You are finished with the update. You can now press RETURN to log in to the system.

Remember, if you are updating layered products, see the individual layered product documentation for instructions on completing the installation.

Phase 6
Optional Tasks

This phase describes an optional task you may want to perform to tune your RSTS/E system to your needs.

The task in this phase is:

- Task 1: Perform a Selective Update

Task 1: Perform a Selective Update

You can use the UPDATE.COM command file to perform a selective RSTS/E update, without disturbing your existing system. UPDATE.COM resides in account [0,1]. You can use it to:

- Generate an updated monitor
- Update one or more system program packages
- Update layered products (integrated layered products only)
- Copy layered product updates to your system
- Perform a full system update

NOTE

You cannot perform a system update to V10.0 on a pre-V10.0 system. You must first perform a full V10.0 installation. For example, you cannot perform a V10.0 update on a V9.7 system.

In order for the update to succeed, you must be logged in to an account with the following privileges: MOUNT, INSTAL, TUNE, WREAD, WWRITE, and WACNT. In addition, if you have DATES privilege, the creation date of the new files will be the date the files were placed on the Installation kit. If you do not have DATES privilege, the file creation date will be the current date.

To access UPDATE.COM, use the following command format:

@[0,1]UPDATE function [package,...]

where:

@[0,1]UPDATE	invokes the UPDATE.COM command procedure.
function	specifies the operation to perform. Legal functions are: ALL (the default), MONITOR, SYSTEM_PROGRAMS, and LAYERED_PRODUCTS.
[package,...]	specifies the software package(s) to install when performing a SYSTEM_PROGRAMS, LAYERED_PRODUCTS, or COPYUP operation (see Table 15). See Phase 4 in Part 1 for a complete list of RSTS/E system program packages and layered products.

UPDATE.COM Entry Points

When you use UPDATE.COM to perform an update, you enter the update process at different points depending on the command format. Table 15 lists the UPDATE.COM commands and the resulting entry points into the update process. See the appropriate Phase and Task in Part 4 for details on the actual installation procedures.

When you use UPDATE.COM to perform an online installation, you first see this question:

```
Please mount the Installation media.

Installation device <_MSO:>?
```

This question asks for the location of your Installation media. The default is the device on which you booted the Installation media.

Response—Press RETURN to accept the default response. In the example installation, the response is MS0.

The question also prompts you to mount the Installation tape or disk. The default response is the device used during the last installation. See the example later in this section if you need help answering this question.

Table 15 lists the UPDATE.COM commands and the resulting entry points into the update process.

Table 15: UPDATE.COM Entry Points

Command	Update Entry Point	Comment
@[0,1]UPDATE	Phase 3, Task 1	Performs full update (same as UPDATE ALL).
@[0,1]UPDATE ALL	Phase 3, Task 1	Performs full update (the default).
@[0,1]UPDATE SYSTEM_PROGRAMS	Phase 3, Task 3	Begins system program update questions.
@[0,1]UPDATE SYSTEM_PROGRAMS [pkg,...]	Phase 4, Task 2	Updates specified package.
@[0,1]UPDATE MONITOR	Phase 3, Task 1	Begins monitor update section. Skips system program and layered product sections.
@[0,1]UPDATE LAYERED_PRODUCTS	—	Use this function when you are directed to do so by a specific layered product installation guide.
@[0,1]UPDATE LAYERED_PRODUCTS [pkg,...]	—	Use this function when you are directed to do so by a specific layered product installation guide.
@[0,1]COPYUP	Phase 3, Task 4	Begins dialogue to transfer layered product updates from the Installation kit.
@[0,1]COPYUP [pkg,...]	Phase 4, Task 2	Transfers specific layered product updates from the Installation kit.

Selective Update Example

This example uses UPDATE.COM to update the File Restore system program package. You would use UPDATE.COM to update packages that you did not update when you built your monitor. Before you run UPDATE.COM, you must mount the Installation media. Mount the tape or disk on a free drive. Follow the tape or disk mount instructions in Task 1 of Phase 2.

```
$  @[0,1]UPDATE SYSTEM_PROGRAMS RESTOR

Deleting all global symbols

                  RSTS/E Software Update Procedure

                       * Dialogue phase *

During this installation procedure you may:

Type '?' for help
Type '^' to go back to the previous question
Type CTRL/Z to return to the beginning of the present section

Please mount the RSTS/E Installation media and enter the name
and unit number of the device.
Valid device types are: 'MM', 'MS', 'MT', 'MU', 'DM', 'DL' or 'SY'
(a response of SY allows monitor only).

Installation device? <_MS0:>

Please enter the name and unit number of the disk to
which you want to update the software. This disk
should be physically mounted and write-enabled.

Target disk? <_SY:>  RET
```

```
Assigning system logicals
The following will be updated:
        RESTORE
You may answer "Yes" to accept this list, or "No" to change it.
Is this list OK? <yes>  RET
Do you want the I&D versions of tasks? <Y>  RET
    ** End of System Programs Section **
This is the end of the DIALOGUE phase.
The next phase is the BUILD phase.
Are you ready to proceed? <yes>  RET
                                * Build phase *

13-Sep-90 01:56 PM
```

At this point, if you are using an RL02 drive or an 800 BPI tape, you may be prompted to mount a second volume.

```
Restoring the File Restore package from the Installation kit
13-Sep-90 01:58 PM

Updating system packages
Finished updating system packages
               The RSTS/E Software Update Procedure is complete
Deleting all global symbols
Deassigning system logicals

13-Sep-90 01:59 PM

System tape label default set to DOS
_SY:[1,2]UPDATE.LOG is a log file of this session
$
```

You have successfully updated the File Restore package. You can now type DIR RESTOR$: to list the files in the directory.

Part 5
Offline Options

Offline Options

This part describes the offline INIT.SYS options you may need to use in the management and maintenance of your RSTS/E system.

Table 16 lists the offline INIT.SYS options and suboptions.

Table 16: INIT.SYS Options

Option	Suboption	Function
BOOT	None	Bootstrap magnetic tape and disk devices.
DATE	None	Reset the current date and time.
DEFAULT	Memory Table Suboptions: LIST PARITY LOCK UNLOCK RESET XBUF BUFFERS IDSPACE	Change RSTS/E monitor defaults (including system clock) or allocation of memory entities.
DSKINT	None	Initialize disks.
HARDWR	LIST DISABLE ENABLE CSR VECTOR RESET DM HERTZ SWITCH ECO DDNULL	Perform hardware-related tasks. Set non-standard CSR devices. Setting vectors for non-standard CR/CD or RX devices. Specify AC line frequency. List ECO information for DU and MU devices. Enable or disable diagnostic display idle pattern.
IDENT	None	Print INIT.SYS creation date plus list of patches.
REFRESH	LIST FILE BADS	Create and list system files; add bad blocks to the bad block file.
SAVRES	RESTORE IDENTIFY IMAGE	Reconstruct RSTS/E disks; make an image copy of a RSTS/E disk; extract label information from a SAVE set or a RSTS/E formatted disk.
START	None	Start a RSTS/E monitor; print a list of disabled devices. This option differs from answering YES to the Start timesharing question.

The offline options are arranged in alphabetical order, and each is presented in a separate section. In most cases, the common error messages associated with an option appear at the end of the option description. If your error message does not appear there, see Appendix A.

In general, these responses have special meaning when using INIT.SYS:

Response	Description
RET	Accept the default response
CTRL/C	Abort the operation and return to the Option: prompt
?	Obtain an online explanation of the question
Option: RET	Invoke the INIT.SYS START option

BOOT—Bootstrap Devices

The BOOT option bootstraps magnetic tape and disk devices. Use the BOOT option if:

- You need to bootstrap another disk or tape.
- You need to reload INIT.SYS after you have patched it on disk.

BOOT Dialogue

```
Option: BOOT
```

Response—Type BOOT or BO to the Option: prompt.

```
Boot device:
Boot unit:
```

Explanation—BOOT asks for the device designator and unit number of the tape or disk you want to boot.

Response— Type a ? in response to the Boot device: prompt to get a list of bootable devices. Or, press RETURN to bootstrap the system disk, in which case BOOT automatically determines the system device and unit number.

```
RSTS V10.0-L (dev) INIT V10.0-L

dd-mmm-yy - hh:mm AM/PM
Start timesharing? <Yes>
```

Explanation—After booting the device, INIT.SYS displays its banner, the date, and the time. INIT.SYS prints the device name within parentheses in the banner. If you booted a tape device, INIT.SYS prompts you for the date and time instead.

INIT.SYS then returns to the Start timesharing? prompt.

BOOT Error Messages

A list of the BOOT error messages follows. If your error message does not appear, see Appendix A.

NOT A VALID BOOT DEVICE

Explanation: The device you named is not a valid bootable device.

User Action: Type a question mark (?) for a list of devices that you can bootstrap.

SORRY, BUT THAT DEVICE DOESN'T EXIST

Explanation: The device name you typed is valid, but the device does not exist on your PDP-11.

DATE—Set the Date and Time Format

The DATE option sets the date and time. Use the DATE option if:

- You need to reset or display the date.
- You need to reset or display the time.
- You need to reset the 11/93 or 11/94 time of year clock.

DATE Dialogue

```
Option: DATE
```

Response—Type DATE or DA to the Option: prompt.

```
Today's date?

Current time?
```

Explanation—DATE asks for the new date and time. It prints the default format in brackets.

Response—Type the date and time. You can enter the date in either of these formats:

- DD-MMM-YY (day, month, year)
- YY.MM.DD (year, month, day)

You can enter the time in either of these formats:

- HH:MM AM/PM (hour, minute, AM or PM)
- HH:MM (24 hour clock)

```
Option:
```

Explanation—INIT.SYS returns to the Option: prompt.

DEFAULT—Change RSTS/E Monitor Defaults

You can set the following defaults for your RSTS/E monitor with the DEFAULT option of INIT.SYS:

- Memory for the extended buffer pool - INIT.SYS automatically allocates memory to the extended buffer pool. You can change the amount by adjusting the memory allocation table with the XBUF suboption.
- Memory for the small buffer pool - INIT.SYS automatically allocates as much memory as it can to the small buffer pool, depending on the monitor size. You can change the amount by adjusting the memory allocation table with the BUFFERS suboption.
- System clock - Choose the KW11-L line time clock or the KW11-P clock as the system clock if you have more than one clock.

DEFAULT Dialogue

```
Option: DEFAULT
```

Response—Type DEFAULT or DE to the INIT.SYS Option: prompt.

```
Any memory allocation changes?

Table suboption? LIST

Memory allocation table:

   0K: 00000000 - 00323777 (  53K) : EXEC
  53K: 00324000 - 03363777 ( 392K) : USER
 445K: 03364000 - 03777777 (  67K) : XBUF
 512K: 04000000 - End              : NXM

Memory available to RSTS/E is 512K words.
```

Explanation—DEFAULT prints the memory allocation table prompt. These messages may be slightly different due to configuration differences. At this point you may want to adjust the memory allocation table. If so, answer YES to this question, then go to the DEFAULT suboption sections that follow. You will be forced into the Table suboption (with a message) if DEFAULT requires changes that cannot be done automatically. Note that DEFAULT automatically allocates memory to the Extended Buffer Pool and Small Buffer Pool, based on the size and configuration of your system. Use the XBUF suboption to change the amount of memory allocated to the Extended Buffer Pool, and the BUFFERS suboption to change size of the Small Buffer Pool.

Response—Type YES if you want to use one of the memory table suboptions to list or change the memory allocation table. Type NO to accept the current table.

If you want to list the current table, type YES to this question and then type LIST at the Table suboption? prompt. Press RETURN at the Table suboption? prompt to continue with the DEFAULT dialogue.

```
Preferred clock <L>?
```

Explanation—Your hardware configuration can include one or both of these system clocks: the KW11-L line time clock or the KW11-P programmable real-time clock. The *KW11-L line time clock* divides system time into intervals based on the AC line frequency of the power source used to run your PDP-11 computer system. AC line frequency can be either 50 Hz (the standard in many European countries) or 60 Hz (the standard in the United States).

The *KW11-P programmable real-time clock* can use the AC line frequency of the power source to provide a system time base, or it can be set to provide a crystal-controlled time base independent of the power source. This clock is useful in areas where fluctuations in AC line frequency would adversely affect system timing.

Response—Press RETURN to accept the default. If you have both clocks and the default is not the clock you want, type L to use the KW11-L line time clock, or, type P to use the KW11-P programmable real-time clock. If you type L, DEFAULT goes to the Option: prompt.

```
Interrupt frequency?
```

Explanation — This question appears only if you chose the KW11-P programmable real-time clock. It asks for the frequency (AC line frequency or the crystal oscillator) you will use for the time base.

Response—Type LINE to use the AC line frequency, unless you live in an area where the line frequency is not accurately maintained by the power supplier (for example, if diesel generators supply the power). In many areas, the AC line frequency is more accurate than the crystal oscillator.

Or, type a number (a multiple of 50 ranging from 50 to 1000 interrupts/second) to use the KW11-P's crystal oscillator for the time base.

```
Option:
```

Explanation—After you specify defaults for your RSTS/E monitor, DEFAULT returns to the Option: prompt.

DEFAULT Suboptions—Adjust the Memory Allocation Table

The following sections describe the memory allocation suboptions of DEFAULT. These suboptions allow you to adjust the memory allocation table of your installed monitor.

If you install a new monitor, you may need to use the memory allocation suboptions again to adjust the new monitor's memory allocation table.

The memory allocation table suboptions of DEFAULT are:

- LIST - List the Memory Allocation Table
- PARITY - List the Parity Memory Configuration
- LOCK - Lock a Portion of Memory
- UNLOCK - Unlock a Portion of Memory
- RESET - Reset the Memory Allocation Table
- XBUF - Allocate Memory to the Extended Buffer Pool
- BUFFERS - Allocate Memory to the Small Buffer Pools
- IDSPACE - Enable or Disable Monitor's Use of I&D Space

LIST—List the Memory Allocation Table

The LIST suboption of DEFAULT lists the *memory allocation table*, which shows the allocation of each block of memory.

Use the LIST suboption if:

- You want to print the most current memory allocation table.
- You want to print the table after adjusting the memory allocation table with one of the other DEFAULT suboptions.

LIST Dialogue

```
Any memory allocation changes <NO>? YES
```

Explanation—This is one of the DEFAULT dialogue questions. If you answer YES, DEFAULT prompts for the table suboption.

Response—Type YES to adjust or list the memory allocation table. Or, type NO or press RETURN to continue with the DEFAULT dialogue.

```
Table suboption? LIST
```

Explanation—You see the Table suboption? prompt after you answer YES to the Any memory allocation changes? question.

Response—Type LIST or LI to see the memory allocation table. Type EXIT or press RETURN to continue with the DEFAULT dialogue.

```
Memory allocation table:

   0K: 00000000 - 00323777 (  53K) : EXEC
  53K: 00324000 - 03363777 ( 392K) : USER
 445K: 03364000 - 03777777 (  67K) : XBUF
 512K: 04000000 - End              : NXM

Memory available to RSTS/E is 512K words.

Table suboption?
```

Explanation—Your table may not show the same values as the one in the example. These messages may be slightly different due to configuration differences. You read this table as follows:

- Column one contains the start range (in K words) of memory. You read this column vertically. In the example, the range starts at 0K words and ends at 512K words.
- Columns two and three contain the starting and ending octal addresses for the range of memory. In the example, 00000000 to 00323777 are the starting and ending octal addresses for the RSTS/E monitor (EXEC).
- Column four contains the amount of memory this range occupies in K words. In the first line of the example, the RSTS/E monitor (EXEC) occupies 53K words of memory.
- Column five specifies what occupies a particular range of memory:
  - EXEC—Represents the RSTS/E monitor, which always starts at 0K words.
  - USER—Represents memory available for user jobs.
  - LOCKED—Represents memory unavailable for use (appears if you use the LOCK suboption).
  - XBUF—Represents memory reserved for the extended buffer pool
  - NXM—Represents memory that does not exist on this PDP-11.

Response—After DEFAULT lists the memory allocation table, it returns to the Table suboption? prompt. Press RETURN to continue with the DEFAULT dialogue. Or, type one of the other DEFAULT table suboptions.

PARITY—List the Parity Memory Configuration

The PARITY suboption of DEFAULT identifies and locates the types of parity memory. These types are parity memory, ECC memory and interleaved memory.

Use the PARITY suboption if you are a Digital Field Service representative who needs to verify the memory configuration during the installation of a PDP-11.

Parity memory is memory that can detect certain errors. *Interleaved memory* is memory in which alternate banks respond to sequential memory addresses, as in the following:

Parity Register	Parity Register
00	02
BANK 0 Addresses	BANK 1 Addresses
000000	000002
000004	000006
000010	000012

Note that parity register 00 responds to the first address (000000), parity register 02 responds to the next address (000002), and so forth.

Core memory might have interleaved parity memory because it is a destructive read-out device. The central processor or DMA device requests data. The RSTS/E monitor reads the requested data from a memory bank located in core memory. After the central processor or DMA device receives the requested data, this

memory bank remains busy until the memory hardware restores to it the original data. During this *restore cycle*, the RSTS/E monitor can perform other functions, including another read memory access in another bank.

If core memory has interleaved parity memory, the probability is low that the RSTS/E monitor will access the same bank of memory on the next memory cycle. This allows some overlap of memory read operations, resulting in faster program execution.

Some ECC MOS memory can be interleaved because on a write operation, it takes time for the memory controller to determine what error-correction bits to store with the data. After the memory bank has accepted the data and the RSTS/E monitor allows the central processor or DMA device to continue, the memory bank remains busy until it has stored the data and new ECC bits. Because ECC MOS memory exhibits the same characteristics as interleaved parity memory, the probability is low that the RSTS/E monitor will access the same bank of memory on the next memory cycle. This allows some overlap of memory write operations, thus resulting in faster program execution.

Nonparity memory is not supported by RSTS/E.

PARITY Dialogue

```
Table suboption? PARITY
```

Explanation—You see the Table suboption? prompt after you answer YES to the Any memory allocation changes? DEFAULT question.

Response—Type PARITY or PA.

```
Parity register usage:

  0K: 00000000 - 00777777 ( 128K) : 00(ECC)
128K: 01000000 - 01777777 ( 128K) : 02(ECC)
256K: 02000000 - 02777777 ( 128K) : 04(ECC)
384K: 03000000 - 03777777 ( 128K) : 06(ECC)

Table suboption?
```

Explanation—In the example, PARITY shows the memory configuration for a PDP-11/44. Your parity memory depends on the type of PDP-11 you have. After PARITY prints the parity memory configuration, it returns to the Table suboption? prompt.

The following defines the parity type codes you might see listed. The values nn and mm are the last two octal digits of the address of the parity register that controls that section of memory. Up to sixteen parity registers can exist. They are in the address range 772100 to 772136. When the system detects a parity error, the parity register responsible for that section of memory usually contains information on the location of the last error discovered. The code NA indicates that the parity register contains no error address information and that the monitor must examine the memory to determine where the error occurred.

Symbol	Meaning
NO	Nonparity memory
NXM	Nonexistent memory
nn/mm	Interleaved parity memory with address information
nn	Parity memory with address information
nn(NA)	Parity memory with no address information
nn(ECC)	Memory with ECC hardware
nn(ECC)/mm(ECC)	Interleaved memory with ECC hardware

Response—After DEFAULT lists the parity memory configuration, it returns to the Table suboption? prompt. Press RETURN to continue with the DEFAULT dialogue. Or, type one of the other DEFAULT table suboptions.

LOCK—Lock a Portion of Memory

The LOCK suboption of DEFAULT locks certain portions of memory, which prevents the use of that memory during timesharing.

Use the LOCK suboption only if:

- You need to lock a portion of defective memory. If sufficient undamaged memory remains, you can start the monitor for normal timesharing.
- You want to start the RSTS/E monitor with less memory than is physically available. This could be useful for developing applications that can run on a smaller memory configuration.

Four examples of using the LOCK suboption are provided later in this section.

LOCK Dialogue

```
Table suboption? LOCK
```

Explanation—You see the Table suboption? prompt after you answer YES to the Any memory allocation changes? DEFAULT question.

Response—Type LOCK or LO.

```
Lock address is? 90K+1
```

Explanation—LOCK asks you to specify the address or range of addresses you want to lock.

Response—Type the address as a decimal number followed by the letter K. The decimal number must in the range from 0 to 1919. In the example, the response is 90K+1.

Or, type the absolute address as a four- to eight-digit octal address. The octal number must be a multiple of $4000_{(8)}$ that is less than or equal to $16774000_{(8)}$.

Or, specify a range of addresses by typing either two addresses separated by a hyphen (for example, 45K-47K) or an address followed by a plus sign and a number that represents the size of the range (for example, 45K+3).

```
Table suboption?
```

Explanation—After you specify an address, LOCK returns to the Table suboption? prompt.

Response—Type LIST or LI to list the memory allocation table and check that you have locked the correct area of memory.

```
Memory allocation table:

   0K: 00000000 - 00323777 (  53K) : EXEC
  53K: 00324000 - 00547777 (  37K) : USER
  90K: 00550000 - 00553777 (   1K) : LOCK
  91K: 00554000 - 03363777 ( 354K) : USER
 445K: 03364000 - 03777777 (  67K) : XBUF
 512K: 04000000 - End              : NXM

Memory available to RSTS/E is 512K words.

Table suboption?
```

Explanation—The memory allocation table shows that 1K of memory is now locked. These messages may be slightly different due to configuration differences.

Response—After DEFAULT lists the memory allocation table, it returns to the Table suboption? prompt. Press RETURN to continue with the DEFAULT dialogue. Or, type one of the other DEFAULT table suboptions.

Using the LOCK Suboption

Certain types of memory failures affect only one word of memory; other types affect larger sections or even the entire hardware bank. You must carefully analyze any memory failure to determine the 1K section of memory to lock. Additionally, after you lock memory, list the memory allocation table to make sure that sufficient contiguous user memory is available to run your installation's programs.

Before you lock a portion of memory, you should be aware of the following restrictions:

- You cannot lock memory used by the monitor.
- You cannot lock memory currently reserved for the extended buffer pool (XBUF) until you relocate it to a usable area of memory.
- You cannot lock a full bank of memory, until you locate all of the 4, 8, 16, 32, 64, or 128 contiguous 1K sections that make up the hardware bank. If the bad memory is interleaved, you must lock an amount of memory equal to twice its length. On a PDP-11/70 with external interleaving, you must lock an amount of memory equal to four times its length.

If you attempt to lock any of these areas of memory, LOCK prints the error message: **Part of that area is already in use**.

RSTS/E can continue running with certain types of memory failures. The error handling routines in the monitor log parity errors when they are detected by the hardware. The recovery procedures depend on the use of the section of memory that failed. Consider the following four cases of memory failure and recovery procedures.

Case 1: A parity error occurs when the monitor is running. Since continued system operation would be risky, the monitor takes a crash dump (if the crash dump facility is enabled), and reloads the system. When the system restarts, you should use the ANALYS program to extract the error log information from the CRASH.SYS file.

The ERRDIS report, which the monitor automatically appends to the ANALYS report, provides sufficient information to identify the section that should be locked out. If the error occurred in the extended buffer area of memory, you can relocate these items and lock the section. If the error was in monitor memory, the hardware must be repaired or reconfigured. In either case, a hard failure may prevent the system from running at all; thus, you can run neither ANALYS nor ERRDIS. The only recourse in such cases is to run memory diagnostics to locate the problem. If the failure was transient, you can shut down the system to lock out memory or you can continue timesharing. If possible, you should run memory diagnostics to reproduce the failure.

Case 2: A parity error occurs when a user job is running. The parity error handling routines determine whether a single user job is affected (that is, resides in the malfunctioning section) or more than one user job is affected. If more than one user job is affected, the system is reloaded as Case 1 describes. If a single user job is affected, the system aborts that user job with the error message **?Memory parity failure**. The monitor logs the error, automatically locks out the section of memory from future use (for the duration of the timesharing session), and the system continues running. You should lock out the bad section of memory (until repaired), using the LOCK suboption the next time you start the system.

Case 3: Multiple parity errors occur in rapid succession. RSTS/E halts at location 54 (the program counter displays 56) if a second parity error occurs while the system is processing the first parity error. A Digital Field Service representative will use memory diagnostics to locate the failing memory.

Case 4: A memory cache parity error occurs. If the hardware memory cache malfunctions and causes a parity error, the hardware again retrieves the needed word from main memory and causes a warning parity trap to occur. RSTS/E logs this type of error. If the error occurs twice within one minute, RSTS/E disables the part of the cache causing the malfunction. RSTS/E continues running, but with degraded performance. The system does not print a message, but two successive errors within the same minute in the ERRDIS print-out should alert you.

On systems without parity or ECC memory, the software cannot detect or locate a memory failure. Programs may get incorrect results, memory management errors may occur, or any number of random problems may happen. At worst, the system may crash with misleading clues as to the cause. It is for these reasons that RSTS/E is not supported on systems that use nonparity memory.

UNLOCK—Unlock a Portion of Memory

The UNLOCK suboption of DEFAULT unlocks certain portions of memory to make the memory available for use during timesharing by user jobs, or by the extended buffer pool (XBUF).

Use the UNLOCK suboption after you repaired the memory you previously locked with the LOCK suboption.

UNLOCK Dialogue

```
Table suboption? UNLOCK
```

Explanation—You see the Table suboption? prompt after you answer YES to the Any memory allocation changes? DEFAULT question.

Response—Type UNLOCK or UN.

```
Unlock address is? 90K+1
```

Explanation—UNLOCK asks you to specify the address or range of addresses you want to unlock.

Response—Type the address as a decimal number followed by the letter K. The decimal number must be in the range from 0 to 1919. In the example, the response is 90K+1.

Or, type the absolute address as a four- to eight-digit octal address. The octal number must be a multiple of $4000_{(8)}$ that is less than or equal to $16774000_{(8)}$.

Or, specify a range of addresses by typing either two addresses separated by a hyphen (for example, 45K-47K) or an address followed by a plus sign and a number that represents the size of the range (for example, 45K+3.)

```
Table suboption? LIST
```

Explanation—After you specify an address, UNLOCK returns to the Table suboption? prompt.

Response—Type LIST or LI to list the memory allocation table and check that you have unlocked the correct area of memory.

```
Memory allocation table:

   0K: 00000000 - 00323777 (  53K) : EXEC
  53K: 00324000 - 03363777 ( 392K) : USER
 445K: 03364000 - 03777777 (  67K) : XBUF
 512K: 04000000 - End              : NXM

Memory available to RSTS/E is 512K words.

Table suboption?
```

Explanation—Note that UNLOCK removes the 1K area of memory that was locked in the previous example. These messages may be slightly different due to configuration differences.

Response—After DEFAULT lists the memory allocation table, it returns to the Table suboption? prompt. Press RETURN to continue with the DEFAULT dialogue. Or, type one of the other DEFAULT table suboptions.

RESET—Reset the Memory Allocation Table

The RESET suboption removes any changes made to the memory allocation table; for example, locked portions of memory and reserved memory for the extended buffer pool.

Use the RESET suboption only if you want to set up the memory allocation table in the following way:

- Release any memory previously allocated to the extended buffer pool (reduces the extended buffer pool to 3K words).
- Release any memory you previously locked.

RESET Dialogue

```
Table suboption? LIST
```

Explanation—You see the Table suboption? prompt after you answer YES to the Any memory allocation changes? DEFAULT question.

Response—Before you reset the memory allocation table, it is useful to list the current one. Type LIST or LI.

```
Memory allocation table:

   0K: 00000000 - 00327777 (  54K) : EXEC
  54K: 00330000 - 03363777 ( 392K) : USER
 445K: 03364000 - 03777777 (  67K) : XBUF
 512K: 04000000 - End              : NXM

Memory available to RSTS/E is 512K words.

Table suboption? RESET
```

Explanation—LIST shows a memory table for an example installation. These messages may be slightly different due to configuration differences. Note that the example table allocates 67K words of memory to XBUF.

Response—Type RESET or RE.

```
Table suboption? LIST
```

Explanation—DEFAULT immediately resets the memory allocation table and returns to the Table suboption? prompt.

Response—It is useful to list the current memory allocation table after you use the RESET suboption. Type LIST or LI.

```
Memory allocation table:

   0K: 00000000 - 00327777 (  54K) : EXEC
  54K: 00330000 - 03767777 ( 456K) : USER
 510K: 03770000 - 03777777 (   3K) : XBUF
 512K: 04000000 - End              : NXM

Memory available to RSTS/E is 512K words.

Table suboption?
```

Explanation—Note that RESET deallocated all memory previously allocated to XBUF and returned it to USER memory. These messages may be slightly different due to configuration differences.

Response—After DEFAULT lists the memory allocation table, it returns to the Table suboption? prompt. Press RETURN to continue with the DEFAULT dialogue. Or, type one of the other DEFAULT table suboptions.

XBUF—Allocate Memory to the Extended Buffer Pool

The XBUF suboption reserves memory for the extended buffer pool.

INIT.SYS automatically allocates memory to the extended buffer pool during system installation. INIT.SYS determines how much memory to allocate based on the amount of USER memory available on the system. USER memory is memory that is not allocated to any other entity. It contains memory that is not locked and not allocated to the monitor.

INIT.SYS determines the size and position of XBUF based on the following guidelines:

- If the amount of USER memory exceeds 128K words, then INIT.SYS allocates 15% of that memory (rounded down to the nearest whole number) to XBUF.
- If the amount of USER memory is less than 128K words, then INIT.SYS allocates 10% of that memory (rounded down to the nearest whole number) to XBUF.
- INIT.SYS first attempts to position XBUF at the highest possible memory address. If for some reason INIT.SYS cannot allocate a sufficient amount of contiguous high memory, it positions XBUF at the lowest possible address.
- The minimum amount of memory allocated to XBUF is 3K words. The maximum is 496K words.
- The legal ranges for locating XBUF are between 16K and 511K (words), 528K and 1023K, 1040K and 1535K, and 1542K and 2043K.

If you are not familiar with the use of extended buffers on RSTS/E you should read the section, Extended Buffer Pool Background Information, before proceeding.

XBUF Dialogue

```
Table suboption? XBUF
```

Explanation—You see the Table suboption? prompt after you answer YES to the Any memory allocation changes? DEFAULT question.

Response—Type XBUF.

```
Enter new extended buffer address size (3-496K) <8K>? 67K
```

Explanation—XBUF asks for the amount of memory you want to reserve for the extended buffer pool (XBUF). You do not need to specify the location of XBUF, because INIT.SYS automatically positions it according to the guidelines given at the beginning of this section.

Response—Specify the new size of XBUF, followed by K to indicate K words. In the example, the response is 67K. To release previously allocated memory for the extended buffer pool to user memory, type RESET.

```
Table suboption? LIST
```

Explanation—After DEFAULT adjusts the memory allocation table, it returns to the Table suboption? prompt.

Response—Type LIST or LI to list the memory allocation table and check that you have reserved the correct area in memory.

```
Memory allocation table:

   0K: 00000000 - 00323777 (  53K) : EXEC
  53K: 00324000 - 03363777 ( 392K) : USER
 445K: 03364000 - 03777777 (  67K) : XBUF
 512K: 04000000 - End              : NXM

Memory available to RSTS/E is 512K words.

Table suboption?
```

Explanation—The memory allocation table shows the size and location of the memory you have reserved for the extended buffer pool. These messages may be slightly different due to configuration differences. For example, in this table 67K words are reserved for XBUF.

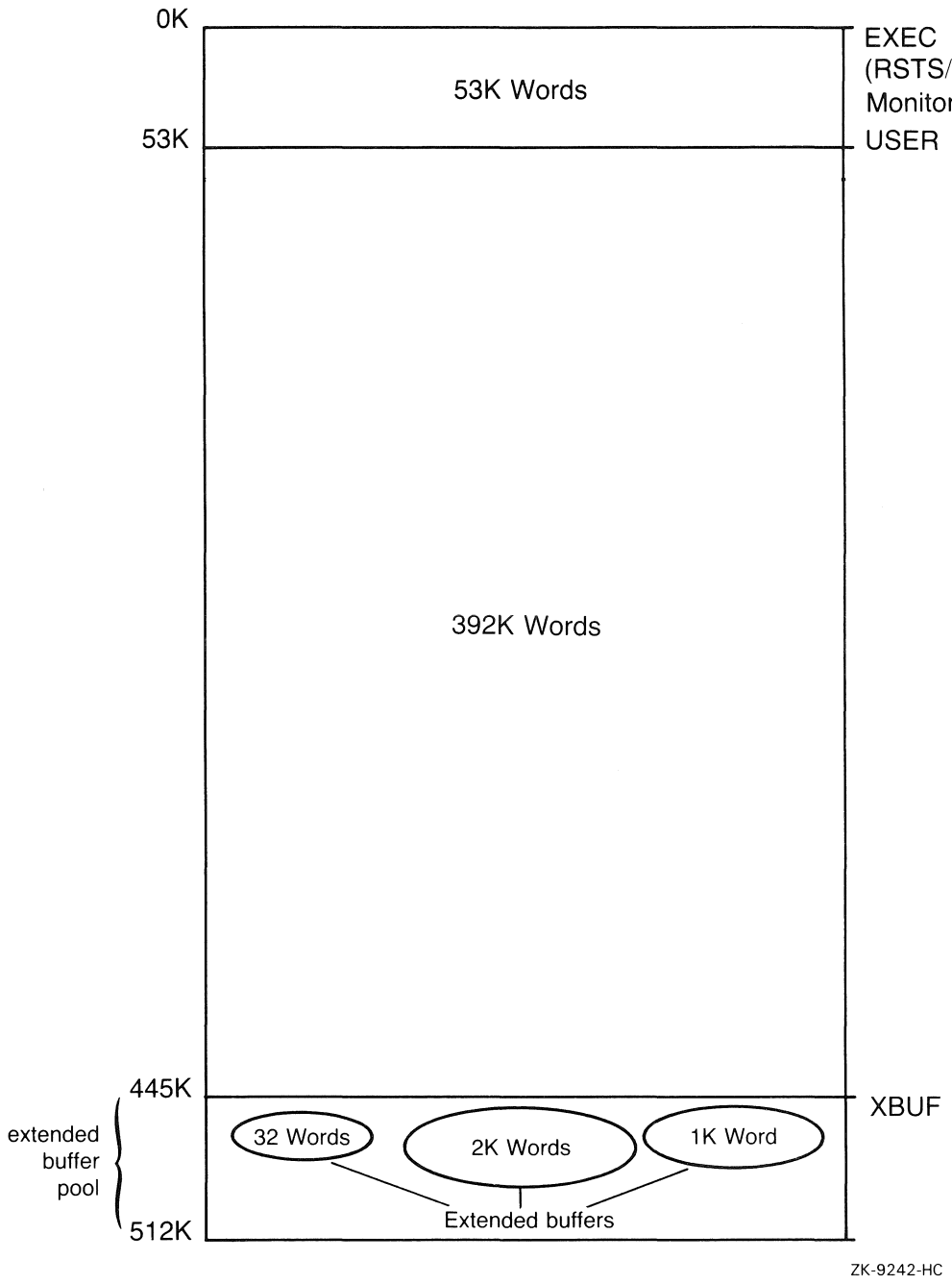
Response—After DEFAULT lists the memory allocation table, it returns to the Table suboption? prompt. Press RETURN to continue with the DEFAULT dialogue. Or, type one of the other DEFAULT table suboptions.

Extended Buffer Pool Background Information

Figure 7 shows an example RSTS/E system. It shows that memory is divided into:

- *Monitor memory (EXEC)* - an area of memory reserved for your RSTS/E monitor. Monitor memory in the example occupies 53K words.
- *User memory (USER)* - an area of memory reserved for user jobs. In the example, user memory occupies 392K words.
- *Extended buffer pool (XBUF)* - an area of user memory reserved for *extended buffers*. An extended buffer is a block of storage located in the extended buffer pool that can range in size from 32 words to the maximum size of the extended buffer pool. In the example, the size of the extended buffer pool is 67K words. The extended buffer pool occupies USER memory; thus, releasing 64K words from the extended buffer pool would increase USER memory to 456K words. You cannot release all of XBUF because a minimum of 3K words is required.

Figure 7: Extended Buffer Pool for Example RSTS/E System



When the monitor needs an extended buffer to store information, it looks in the extended buffer pool. When the information stored in the extended buffer is no longer needed, the monitor returns the buffer to the extended buffer pool for reuse.

The size of the extended buffer pool depends on the type of processing and the amount of memory on your system. Allocating enough memory to the extended buffer pool increases the number of available extended buffers, which has the following advantages:

- The monitor can cache more data and/or directory information. This means the monitor stores certain data and directory-related information in the extended buffers. This reduces the number of disk accesses which results in improved system response.
- The monitor can output more line printer data reducing the stalling frequency of the line printer when printing data.
- The monitor can store some kinds of information in either extended buffers or in general small buffers (see the following BUFFERS suboption). Because the number of general small buffers is limited, the monitor uses extended buffers whenever they are available to reduce the demand for general small buffers.

The following only use XBUF:

- DECnet/E
- LOAD/INDEX
- LOAD/OVERLAY
- Statistics
- Command/log files

Keep the following memory constraints in mind when you are deciding how much memory to allocate to the extended buffer pool:

- You should be able to fit at least two jobs at SWAP MAX (or the average job size, if known) in memory. If you cannot do this, then you may have to reduce the amount of memory you allocated to the extended buffer pool.
- During start-up, INIT.SYS uses a 12K word area of memory to complete the loading of the monitor. This 12K word area is allocated from USER (see the memory allocation table) and must be above the INIT.SYS image. If INIT.SYS cannot find an 12K word area of memory above the INIT.SYS image (72K words) and below 135K words (this value may be less depending on the size of memory on your system), it prints an error message of the following format: **Please allocate 12K words of memory for user space between xxxK and yyyK**. Please note that the values for xxxK and yyyK are determined dynamically by your system. These values may differ from the values of 72K and 135K shown here.

The following sections discuss guidelines for determining the amount of user memory you should reserve for the extended buffer pool with respect to:

- Message send/receive code
- Line printers
- Data caching
- Loaded indexes
- File I/O window turns

- DCL indirect command file I/O and/or terminal logging
- System logicals
- DECnet/E software
- LAT
- RJ2780 software
- 2780/3780 software
- Statistics
- Quota information
- Resident overlay code

Message Send/Receive Code

The RSTS/E monitor uses extended buffers to store messages generated by programs that use the message send/receive code. You might want to use the following as a guide in determining how many messages are generated for a typical system:

- Error logger - 2 messages
- OPSER-based spooling package:
  - OPSER - 2 messages
  - QUEMAN - 2 messages
  - 1 line printer spooler - 2 messages
  - 1 batch spooler - 2 messages
- Print/Batch services package - 3 messages
- Operator/Message Services (OMS) - 3 messages

Each message requires N words of extended buffers where N is the length of the message in words plus 4 words, rounded to the next multiple of 32 words. A message always uses at least 32 words of extended buffers. Each message can range from 32 to 288 words.

Line Printers

The RSTS/E monitor uses extended buffers (or general small buffers) to store characters awaiting printing on a line printer. You should allow 2.5K words of memory for the extended buffer pool for each line printer.

Data Caching

The monitor uses extended buffers to store the activities resulting from data caching. *Data caching* is a software feature that reduces the number of data transfers from disk to memory, thereby improving response times.

A general guideline is to allocate about 15% of total USER memory to the extended buffer pool to accommodate data caching. However, the monitor cannot use more than the following maximum values. If you allocate more memory than the maximum amount, it is used by LPDVR, DECnet, RJ2780, logicals, DCL command/log buffers, or others from the previous list.

Cache Cluster Size	Maximum XBUF Usage
1	130K words
2	257K words
4	496K words
8	496K words

NOTE

The monitor uses extended buffers for caching only when they are not needed for other purposes.

Loaded Indexes

During timesharing you can optionally load the System Allocation Table (SAT) for each disk (except read only) into memory. RSTS/E use extended buffers (XBUF) to store these tables.

To improve system performance, you need to allocate more XBUF to store the SATs. The amount of XBUF required for each disk SAT depends on the disk size and the disk pack cluster size. Use the following formula to calculate, in K words, the XBUF required:

(disk size in blocks/pack cluster size)/16384

File I/O Window Turns

The monitor uses extended buffers when processing file I/O window turns. This can improve system performance, particularly on larger memory systems that allocate large amounts of XBUF and that have moderately fragmented files.

The actual amount of XBUF used at any given time is variable. You should initially allocate 2K words for storing file I/O window turns. Later, you can adjust the amount of XBUF if required. Use the SHOW CACHE command to display the largest amount of XBUF (in K words) used for file I/O window turns since the system was started. If file I/O window turns is using more than 4K words, increase XBUF.

DCL Indirect Command File I/O and Terminal Logging

The monitor uses extended buffers to store messages generated by indirect command file I/O and terminal logging. You should allow 1/4K word per simultaneous command file I/O and/or terminal logging.

System Logicals

The monitor uses extended buffers to store system logicals. You should allow 1K word per 320 logicals.

DECnet/E Software

The monitor uses extended buffers to store messages generated by DECnet/E software. See the *DECnet/E Installation Guide* for information on how much memory to reserve for the extended buffer pool.

LAT Usage

The monitor uses extended buffers to store messages generated by LAT. LAT requires 1.3K words to start. Creating the first session from a given terminal server requires an additional 1K word. No additional extended buffers are required for additional sessions from that server. Local LAT ports created by the CREATE/PORT command requires 64 words for each port.

RJ2780 Software

The monitor uses extended buffers to store messages generated by the RJ2780 software. This software requires 1K word of memory for the extended buffer pool.

2780/3780 Software

See the 2780/3780 documentation for extended buffer pool considerations.

Statistics

The monitor uses approximately 1K word per 14 disk units. If insufficient extended buffer space is available at system startup, the monitor disables statistics with no message.

Quota Information

The monitor requires 1K word of extended buffer space for every 96 different accounts for which there are open files or to which a user is logged in, on a per user basis. Note that the monitor considers a logged-in user as an open file on the system disk.

Resident Overlay Code

The monitor uses extended buffer space for resident overlay code. The amount can vary, depending on the overlay. After you load an overlay, use the SHOW CACHE command to see the extended buffer usage, and adjust XBUF accordingly.

Extended Buffer Pool Worksheet

Figure 8 summarizes the items requiring extended buffers, and the approximate amounts of memory each requires. Space is provided to enter the size needed for your system. Use this worksheet as a guide to reserving memory for the extended buffer pool. Remember, you can determine the optimal size only through experimentation. Use the SHOW CACHE command to show some of the extended buffer pool usage for your system.

Figure 8: Extended Buffer Pool Worksheet

Items Requiring Extended Buffers	Your Size
Contents of messages sent and waiting to be received*	
Line printer driver*	
Data caching	
DCL indirect command file I/O and terminal logging	
System logicals	
DECnet/E	
LAT	
RJ2780	
2780/3780 software	
Statistics	
Quota information	
Resident overlay code	
Total**	

*The RSTS/E monitor can also use general small buffers to store these items.

**Reduce the extended buffer pool if two jobs at SWAP MAX will not fit in the USER area of memory.

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BUFFERS—Allocate Memory to the Small Buffer Pool

The BUFFERS suboption reserves more memory for the small buffer pool. Use the BUFFERS suboption if your RSTS/E monitor needs more small buffers to run efficiently.

Before you decide whether to change the amount of memory allocated to the small buffer pool, you should read the information in the section, Small Buffer Pool Background Information.

Consider the following when deciding when to increase the memory reserved for the small buffer pool:

- You should provide an adequate supply of small buffers for periods of heavy system use. Thus, you should assume that the system is using the maximum number of jobs, all terminals, and all printers.
- The number of small buffers a program uses depends on what it is doing. For example, a program that opens 12 files at once requires more buffers than other programs. This guide offers guidelines, which you must follow and adjust according to the needs of your installation.
- Some software features use buffers momentarily, but it is difficult to calculate how many small buffers you will need for momentary use. Digital recommends that you add 100 to 150 small buffers to your final figure. Seventy-five of these buffers go towards keeping the number above 75 most of the time.

BUFFERS Dialogue

```
Table suboption? BUFFERS
```

Explanation—You see the Table suboption? prompt after you answer YES to the Any memory allocation changes? DEFAULT question.

Response—Type BUFFERS or BU.

```
How many K-words of extra buffer space (0K-2K) <0K>? 2K
You have 472 general + 132 FIP small buffers.
Adjusting memory table

Memory allocation table:

   0K: 00000000 - 00333777 (  55K) : EXEC
  55K: 00340000 - 03363777 ( 390K) : USER
 445K: 03364000 - 03777777 (  67K) : XBUF
 512K: 04000000 - End              : NXM

Memory available to RSTS/E is 512K words.

Table suboption?
```

Explanation—BUFFERS prints the range you can specify for your system. These messages may be slightly different due to configuration differences. In the example, the range is 0K words to 2K words. The default value depends on the memory size you have when you answer this question for the first time. The next time you select the BUFFERS suboption, the default value is the value you selected the last time you answered the question.

The range is larger for systems with processors that have data space. If you have data space, you can use the BUFFERS suboption to increase the memory reserved for the small buffer pool to accommodate more general and FIP small buffers. If you do not have data space, you can increase the memory reserved for the small buffer pool to accommodate only FIP small buffers. (You must perform another

system installation to add more general small buffers if you do not have data space.)

Response—Type the number of K words to reserve for the small buffer pool. Digital recommends you specify the maximum. You can lower this later if you discover your system continually has over 250 free general small buffers.

After your response, BUFFERS prints the number of general and FIP small buffers that your system will have available for use during timesharing. Of the memory added, BUFFERS creates as many general small buffers as it can (if you have data space) and gives the remaining space to FIP small buffers. In the example, the response of 2K accommodates 132 FIP small buffers.

When you increase memory for the small buffer pool, the size of the monitor increases and the size of USER memory decreases. DEFAULT then lists the new memory allocation table.

The following should help you further in answering this question. Remember that in Task 6 of Phase 3 in Part 1 you answered the Small buffers? configuration question. The question printed a default response, which indicated how many general small buffers you currently had. Because the size of the RSTS/E monitor is always rounded up to a multiple of 1K word, there is usually some extra space. The RSTS/E monitor fills this extra space with FIP small buffers.

Typing ? at this prompt produces a buffer table that shows how many general and FIP small buffers you currently have. In addition, the table tells you how many you can add. Figure 9 shows a sample table. The table tells how many general and FIP small buffers you can add if you have data space or how many FIP small buffers you can add if you do not have data space. Because the PDP-11 in this example installation has data space, it can increase memory for the FIP small buffer pool to accommodate more FIP small buffers.

Figure 9: Example of a Small Buffer Table Printed During System Installation

```
     Number of buffers
K-words         General   FIP
-----------------------------------------------
0K                  444     2
1K                  472    36
2K                  472   100
3K                  620    18
4K                  648    52
5K                  648   116
6K                  648   180
7K                  648   244
8K                  648   308
9K                  648   372
10K                 648   436
11K                 648   494
```

A K word is equal to 64 small buffers; however, when you select the maximum number, the last K word generally contains fewer than the 64 maximum. When selecting the amount of extra buffer space, you should determine how many buffers the last K word contains and decide if you want to allocate 1K word of memory for the number of buffers you gain. For example, if the difference between specifying 2K or 3K words of extra buffer space gives you only 10 more small buffers, it may not be worth the cost of 1K word of physical memory.

```
Table suboption?
```

Response—After DEFAULT lists the memory allocation table, it returns to the Table suboption? prompt. Press RETURN to continue with the DEFAULT dialogue. Or, type one of the other DEFAULT table suboptions.

Small Buffer Pool Background Information

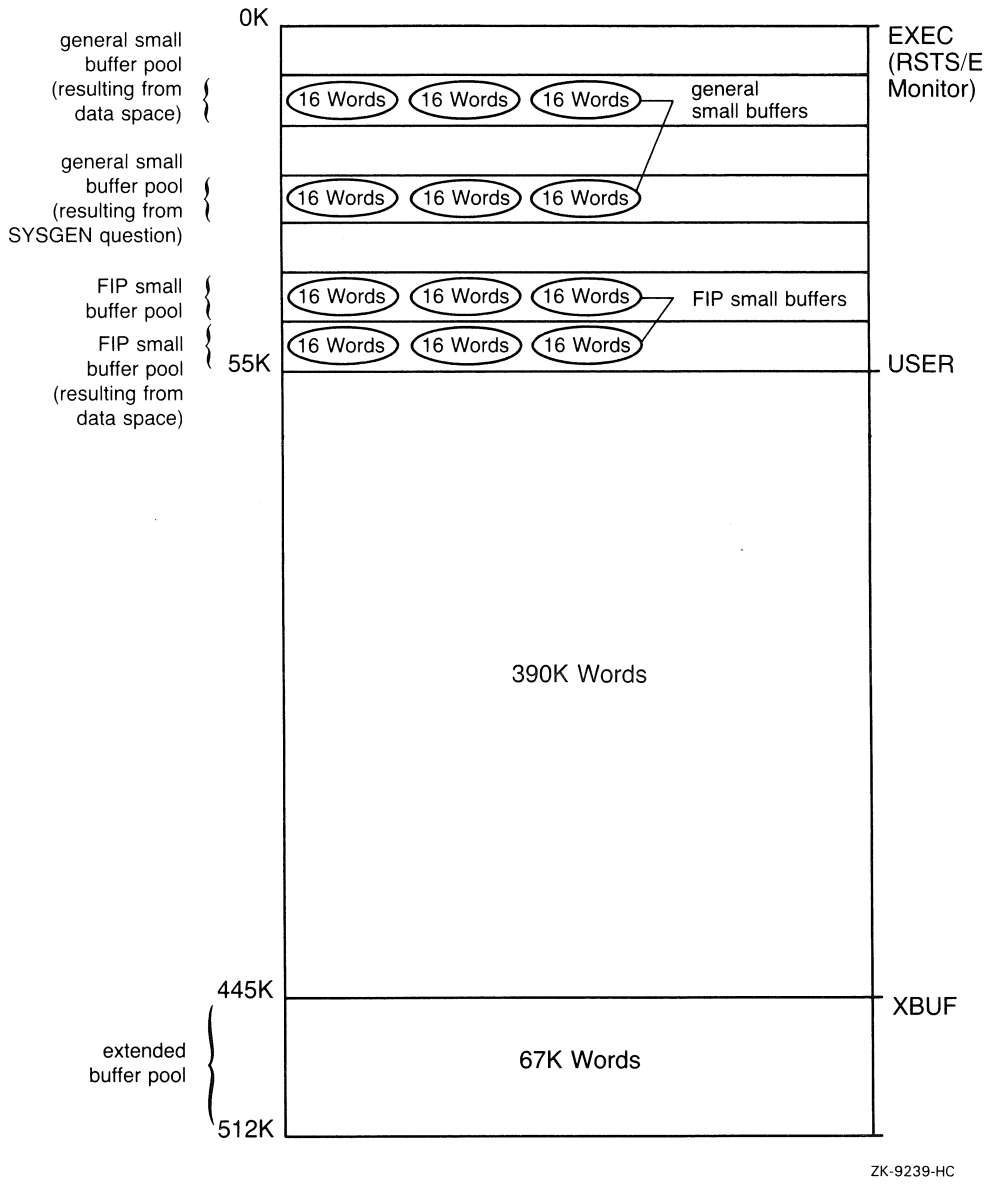
Figure 10 shows an example RSTS/E installation. It shows that memory is divided into the following categories:

- Monitor memory (EXEC) - An area of memory reserved for the RSTS/E monitor. Monitor memory in the example installation occupies 53K words. Note that the size of the monitor increases to 55K words after the example installation allocates 2K words for the FIP small buffer buffer pool. The size of your monitor may differ.
- User memory (USER) - An area of memory reserved for user jobs. In the example installation, USER memory occupies 392K words. Note that the size of USER memory decreases to 390K words after the example installation allocates 2K words for the FIP small buffer pool. The size of your USER memory may differ.
- Extended buffer pool (XBUF) - An area of memory reserved for the extended buffer pool. In the example, XBUF memory occupies 67K words. (See the previous section for a discussion of the extended buffer pool.)

Figure 10 also shows that monitor memory contains the following buffer pools:

- *General small buffer pool* - an area of monitor memory that contains *general small buffers*. Note that there are two types of general small buffer pools: one that is created as a result of answering the Small buffers? configuration question in Phase 3 of Part 1, and one that is created using the BUFFERS suboption. You can create this second small buffer pool only if you have a hardware feature on your CPU called *Instruction and data space*. Data space is available on the PDP-11/44, 11/45, 11/50, 11/53, 11/55, 11/70, 11/73, 11/83, 11/84, 11/93, or 11/94.
- *FIP small buffer pool* - an area of monitor memory that contains *FIP small buffers*. There are also two types of FIP small buffer pools: one that you can create with the BUFFERS suboption alone, and the other you can create with the BUFFERS suboption and with data space. Figure 10 illustrates these two FIP small buffer pools.

Figure 10: General and FIP Small Buffer Pools



The RSTS/E monitor uses general small buffers as a temporary storage area for such things as:

- Character input and output
- Data transfers
- Send/receive messages
- File processing requests
- Information on open files and DCL file information
- CCL command definitions
- Asynchronous I/O requests
- Run-time system and library descriptions
- LAT connections
- DECnet connections

In contrast to general small buffers, FIP small buffers are used only to store open files information, CCL command definitions, resident library attachment information, and open channel status. When the monitor needs a small buffer for one of the above, it looks in the FIP small buffer pool for a FIP small buffer. This leaves the supply of general small buffers free to store other kinds of activity that the FIP small buffers cannot handle. If there are no free FIP small buffers, then the monitor uses general small buffers to store open files information, CCL command definitions, resident library attachment information, and open channel status. When the information stored by either small buffer is no longer needed, the monitor returns the small buffer to the appropriate small buffer pool for reuse.

The general small buffer supply is critical to your system's performance. The number of free general small buffers varies from second to second. When this number is less than 75, the following occurs:

- Jobs begin to stall, until some small buffers become available to process the jobs' requests. Thus, performance begins to suffer.
- The monitor discards error information destined for the error logger.
- The error message **?Logins are disabled - please try again later** appears when users try to log in. (This happens when the number of general small buffers falls below 40.)
- Batch jobs do not start. (This happens when the number of general small buffers falls below 40.)
- Programs begin to fail with the message **?No buffer space available**.
- DECnet or LAT connections are rejected.

The number of general small buffers should stay well above 75 for good system performance. Because FIP small buffers reduce the demand on general small buffers, the number of FIP small buffers may drop to zero without any loss to system performance.

The SHOW BUFFERS command gives the same display as the SYSTAT program. The *RSTS/E Utilities Reference Manual* describes SYSTAT. The /F (Free) switch of the SYSTAT program displays the number of available general small buffers and FIP small buffers as well as other system statistics.

The rest of this section discusses guidelines for determining how many small buffers you need with respect to:

- Jobs
- CCL command definitions
- Auxiliary run-time systems
- Resident libraries
- Open files and DCL file information
- Message receivers
- List of messages sent and waiting to be received
- Contents of messages sent and waiting to be received
- Terminals
- Line printers
- EMT logger
- Outstanding I/O requests
- BACKUP program
- LAT connections
- Dynamic Pseudo-Keyboards
- Margin of safety

Jobs

The monitor uses general and FIP small buffers to store information about each job. Allow two general and one FIP or general small buffers per job.

CCL Command Definitions

The monitor uses general or FIP small buffers to store CCL command definitions. Allow one general or FIP small buffer for each defined CCL command. See the *RSTS/E System Manager's Guide* for a description of CCL command definitions and the DCL DEFINE command, which you use to define CCL commands.

Auxiliary Run-Time Systems

The monitor uses general small buffers to store information about auxiliary run-time systems that you add with the DCL INSTALL command. Allow one general small buffer for each auxiliary run-time system.

Resident Libraries

The monitor uses general small buffers to store information about resident libraries. Allow one general small buffer for each resident library and each dynamic region. Allow one to four general or FIP small buffers for each program that uses libraries. Allow two general or FIP buffers for programs that use RMS libraries.

Open Files and DCL File Information

The monitor uses general or FIP small buffers to store descriptions of open files. The monitor uses FIP small buffers first, if they are available. A program can open a file on more than one I/O channel, and more than one program can open the same file at the same time.

For each program allow:

- One general or FIP small buffer for each open file, including files opened by DCL, command files, and log files.
- One general or FIP small buffer for each channel on which the file is open; however, you need two general or FIP small buffers for each channel on which the file is open if you use update mode. See the *RSTS/E Programming Manual* for a discussion of update mode.
- One FIP or general small buffer per open file on DCL's I/O channel.
- One FIP or general small buffer for each active command file or terminal command file.

List of Message Receivers

The monitor uses general small buffers to store a list of message receivers. Many system programs (including Print/Batch Services, QUEMAN, ERRCPY, OPSER, and OMS) receive messages through the send/receive system function calls. These system function (SYS) calls need one general small buffer for each message receiver.

Messages Sent and Waiting To Be Received

You need one general small buffer for each message waiting to be received including DECnet messages. This buffer does not store the contents of the message.

Contents of Error Logger Messages Sent and Waiting to be Received

The monitor stores the contents of error logger messages sent in general small buffers. The number of messages that the monitor can store in the general small buffer pool depends on the size of the messages and the speed with which the receiving job processes them.

You need N general small buffers for each message

where:

N = (length of message in bytes + 8) / 32

For example, you might figure that the average message contains 25 to 56 bytes, which occupies two general small buffers. If your system processes many messages, you can improve system performance by allocating memory to the extended buffer pool for these messages.

Terminals

The monitor uses general small buffers to store:

- Characters written by a job and awaiting display on a terminal
- Characters typed by a user and waiting to be read by a job
- Characters written by a job and awaiting printing on a hard-copy terminal
- The current line while it is being edited

You should allow:

- Five general small buffers for each interactive terminal, several more if you use echo control and FMS
- Ten general small buffers for each hard-copy terminal

Line Printers

The RSTS/E monitor uses general small buffers (or the extended buffer pool) to store characters awaiting printing on a line printer. If you reserved memory in the extended buffer pool for line printers, you need not specify any small buffers. If you need general small buffers for this purpose, specify 20 for each line printer.

EMT Logging

The monitor uses general small buffers to store messages generated by EMT logging. (You are concerned with this only if you answered YES to the EMT logging? question in Phase 3 of Part 1.) You should specify 1 general small buffer if you have EMT logging.

Outstanding Asynchronous I/O Requests

Each outstanding asynchronous I/O request needs one small buffer plus the following driver requirements:

- MS and MU tape drivers - one general small buffer per outstanding request
- Disk drivers - at least one general small buffer per request. The number may be higher if the request is for multiple disk blocks, depending on the fragmentation of the directory structure.

Synchronous I/O requests require a varying number of buffers per request. The number varies according to the device. Allow 30 buffers for this purpose.

BACKUP Program

BACKUP makes extensive use of asynchronous I/O and therefore general small buffers. Depending on the qualifiers used and the device speed, BACKUP can use hundreds of buffers.

LAT connections

Creating the first session from a given terminal server requires 8 small buffers. Each additional session from that server requires 4 more small buffers. After creation, the session uses small buffers in the same manner as any terminal. Creating a local LAT port requires an additional four small buffers.

Dynamic Pseudo-Keyboards

Creating dynamic pseudo-keyboards requires three small buffers. After creation, dynamic pseudo-keyboards use small buffers in the same manner way as any terminal.

Margin of Safety

After you finish calculating how many small buffers you will need, you should add 100 to 150 general small buffers to assure that the number of general small buffers remains above 75.

General and FIP Small Buffer Pool Worksheet

Figure 11 summarizes the items requiring general and/or FIP small buffers and the approximate number each requires. Space is provided to enter the number you need for your installation. Use the worksheet as a guide for calculating the number of general and FIP small buffers. You can determine the optimal number only through experimenting with your system.

NOTE

During start-up, INIT.SYS uses a 12K word area of memory to complete the loading of the monitor. This 12K word area is allocated from USER (see the memory allocation table) and must be above the INIT.SYS image. If INIT.SYS cannot find an 12K word area of memory above the INIT.SYS image (72K words) and below 135K words (this value may be less depending on the size of memory on your system), it prints an error message of the following format: **Please allocate 12K words of memory for user space between xxxK and yyyK**. Please note that the values for xxxK and yyyK are determined dynamically by your system. These values may differ from the values of 72K and 135K shown here.

Figure 11: General and FIP Small Buffer Pool Worksheet

Items Requiring General or FIP Small Buffers	Your Number
Jobs	
CCL commands	
Auxiliary run-time systems	
Resident libraries	
Open files and DCL file information	
List of message receivers	
List of messages sent by one job waiting to be received by another job	
Contents of messages sent and waiting to be received*	
Terminals	
Line printers*	
Paper tape reader/punch	
EMT logging	
Outstanding I/O requests	
BACKUP program	
LAT connections	
Dynamic Pseudo-Keyboards	
Margin of safety	
Total	

*The RSTS/E monitor can also use extended buffers to store these items.

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IDSPACE—Enables or Disables Monitor's Use of I&D Space

The IDSPACE suboption of DEFAULT is used if there are custom monitor modifications that cannot use I&D space. You would use IDSPACE to turn off the monitor's use of I&D space and also to turn it back on.

If you type IDSPACE in response to the Table suboption? prompt, you are requested to type either ON to enable or OFF to disable use of monitor D- space. Or, press RETURN to continue with the DEFAULT dialogue.

DSKINT—Initialize RSTS/E Disks

The DSKINT option initializes a RSTS/E disk. DSKINT:

- Optionally formats the disk - DSKINT writes timing and sense marks on some disks and destroys any previously stored information.
- Optionally checks the disk for bad blocks - DSKINT locates bad blocks on the disk and allocates them to the *bad block file (BADB.SYS)*.
- Writes a minimum RSTS/E file structure on the disk - The minimum *RSTS/E file structure* contains a pack label and three directories:
  - The Master File Directory (MFD).
  - The Group File Directory (GFD) for group 0.
  - The User File Directory (UFD) for account [0,1].
- Prepares the disk to accept RSTS/E system and other files.

For the DSKINT option, these responses have special meaning:

Response	Description
RET	Accept the default response
?	Obtain an online explanation of the question
^	Return to the previous question
CTRL/Z	Restart DSKINT dialogue
CTRL/C	Abort DSKINT and return to the Option: prompt

DSKINT Dialogue

```
Option: DSKINT
```

Response—Type DSKINT to the INIT.SYS Option: prompt.

```
dd-mmm-yy - hh:mm AM/PM
Disk?
```

Explanation—DSKINT prints the current date and time, and then asks for the device designator of your disk.

Response—Type the device designator of the drive on which your disk is mounted.

NOTE

If the message "Performing limited hardware scan." was printed during this boot and you try to initialize or copy to a nonexistent disk, then you will receive the following error messages:

```
That disk was not found during limited hardware scan.
Do you wish to perform a reboot with full hardware scan <YES>?
```

Response—If the user answers YES, then the distribution device will be rebooted and the "Performing limited hardware scan." message will NOT reappear.

```
Unit?
```

Explanation—DSKINT asks for the unit number of the disk drive on which your disk is mounted.

Response—Type the device unit number.

Response—If the user answers YES, then the distribution device will be rebooted and the "Performing limited hardware scan." message will NOT reappear.

```
This disk appears to be a RSTS/E formatted
disk with the following characteristics:

Pack ID:                PATTIE
Pack Cluster Size:      8
Pack is currently:      Private,
                        Update access date on writes.
                        Level: 1.1
Pack ID?
```

Explanation—After you type the unit number, DSKINT prints the disk's pack label information, if the disk has been initialized before. If the disk has not been initialized before, DSKINT does not print this identifying information. The pack label information lists:

- Pack ID
- Pack cluster size
- Pack status (public or private)
- Whether files are catalogued with the date they were last modified (written to) or accessed (read, opened, closed, and so forth)
- New files first information
- Whether the disk is read-only
- Format level

This private disk could be a system disk; DSKINT cannot determine whether a private disk is also a system disk. In the example, the pack ID is PATTIE, the pack cluster size is 8, the pack status is private, the files are catalogued with the date they were last written to, and the format level is RDS1.1.

This information lets you decide whether to initialize the disk. When you initialize a disk, you destroy any information stored on it.

After printing the pack label information, DSKINT asks for a pack ID. The pack ID is a system-wide logical name. You must specify this pack ID when you logically mount the disk.

Response—Type a pack ID. The pack ID can be any combination of alphanumeric characters up to 6 characters long.

```
Pack cluster size <4>?
```

Explanation—A cluster is a fixed number of 512-byte blocks of storage area allocated contiguously on a disk. The pack cluster size is the minimum number of blocks that your RSTS/E monitor can allocate to a file on the disk.

Your answer to this question depends on the type of processing and the disk requirements of your system. The pack cluster size affects disk space and speed of file creation and access. A large pack cluster size improves access time to programs and user files because the monitor allocates space for data in cluster units. For example, if the pack cluster size is 16, the monitor allocates 16 blocks at a time. However, if the pack cluster size is two, the monitor allocates only two blocks at a time. Thus, more disk accesses are needed to allocate the same amount of space.

On the other hand, a large pack cluster size may waste disk space. For example, if you assign a pack cluster size of 16, the monitor allocates one cluster of 16 contiguous blocks (8,192 bytes) to a file that contains only one block (512 bytes) of information. Fifteen blocks (7,680 bytes) are wasted. Likewise, the monitor allocates one cluster of 16 contiguous blocks to a 15-block (7,680 bytes) file. In this case, only one block (512 bytes) is wasted.

Response—Type one of the disk pack cluster sizes shown in Table 17. Or, press RETURN to accept the default value (4, in this example).

Table 17: Disk Pack Cluster Sizes

Disk Type	Pack Cluster Size
RA60	8, 16, 32, 64
RA70	16, 32, 64
RA80	4, 8, 16, 32, 64
RA81	16, 32, 64
RA82	32, 64
RA90	64
RC25	1, 2, 4, 8, 16, 32, 64
RD31	2, 4, 8, 16, 32, 64
RD32	2, 4, 8, 16, 32, 64
RD51	1, 2, 4, 8, 16, 32, 64
RD52	1, 2, 4, 8, 16, 32, 64
RD53	4, 8, 16, 32, 64
RD54	8, 16, 32, 64
RK05[1]	1, 2, 4, 8, 16, 32, 64
RK05F[1]	1, 2, 4, 8, 16, 32, 64
RK06	1, 2, 4, 8, 16, 32, 64
RK07	1, 2, 4, 8, 16, 32, 64
RL01	1, 2, 4, 8, 16, 32, 64
RL02	1, 2, 4, 8, 16, 32, 64
RM02	4, 8, 16, 32, 64
RM03	4, 8, 16, 32, 64
RM05	8, 16, 32, 64
RM80	4, 8, 16, 32, 64
RP04	4, 8, 16, 32, 64
RP05	4, 8, 16, 32, 64
RP06	8, 16, 32, 64
RX33[1]	1, 2, 4, 8, 16, 32, 64
RX50[1]	1, 2, 4, 8, 16, 32, 64

[1] — You cannot use these disks as system disks.

```
MFD cluster size <16>?
```

Explanation—The master file directory (MFD) stores information about all groups on a disk. The monitor accesses the MFD each time you add accounts and rarely when you add or delete files from the disk.

This question asks for the MFD cluster size, which is the maximum number of 512-byte blocks that each cluster allocated to the MFD can contain. The MFD can have a maximum of seven clusters (if you answer YES to the Pre-extend directories? question later), and each directory is the size that you specify here.

The MFD cluster size must be greater than or equal to the pack cluster size unless the pack cluster size is 32 or 64. If the pack cluster size is 32 or 64, then the MFD cluster size must be 16. Legal values for the MFD cluster size are 4, 8, or 16.

Response—Press RETURN to accept the default response, (16, in this example). Or, specify the value 4, 8, or 16.

```
SATT.SYS base <13543>?
```

Explanation—The *SATT.SYS file* controls the use of storage space on a disk through a storage allocation table (SAT). The monitor accesses this file each time you extend or delete files. This question asks where you want to position this file on the disk. It is advantageous to position the SATT.SYS file near the center of the disk to reduce average seek times for the disk heads. On the other hand, if you use only the first half of a disk or need to create large contiguous files or use LOAD/INDEX, you may want to locate SATT.SYS in a place other than the center. This reduces fragmentation of the disk.

The number that appears within brackets is the center of the disk as calculated by DSKINT (13543, in this example). The device cluster number can range from 1 to the total device size divided by the device cluster size. See Table 18 for a list of device cluster sizes and total device sizes.

Response—Press RETURN to have DSKINT position the file near the center of the disk.

Or, type the device cluster number where you want the file placed.

Table 18: Device Cluster Sizes and Total Device Sizes

Disk Type	Device Cluster Size	Total Available Blocks [2]
RA60	8	400,168
RA70	16	547,040
RA80	4	237,208
RA81	16	891,056
RA82	32	1,216,640
RA90	64	2,376,128
RC25	1	50,901 per unit; 2 units per spindle
RD31	2	41,559
RD32	2	83,204
RD51	1	21,599
RD52	1	60,479
RD53	4	138,668
RD54	8	311,200
RK05[1]	1	4800
RK05F[1]	1	4800 per unit; 2 units per drive

[1]You cannot use these disks as system disks.
[2]Total available blocks represent the number of blocks when the disk is initialized at the device cluster size. The number of blocks on the RA/RC/RD class disks is subject to change with new revisions of these disks.

Table 18 (Cont.): Device Cluster Sizes and Total Device Sizes

Disk Type	Device Cluster Size	Total Available Blocks [2]
RK06	1	27,104
RK07	1	53,768
RL01	1	10,220
RL02	1	20,460
RM02	4	131,648
RM03	4	131,648
RM05	8	500,352
RM80	4	242,572
RP04	4	171,796
RP05	4	171,796
RP06	8	340,664
RX33[1]	1	2400
RX50[1]	1	800

[1]You cannot use these disks as system disks.
[2]Total available blocks represent the number of blocks when the disk is initialized at the device cluster size. The number of blocks on the RA/RC/RD class disks is subject to change with new revisions of these disks.

```
Pre-extend directories <NO>?
```

Explanation—This question asks if you want DSKINT to automatically allocate a maximum of seven clusters to the system account [0,1], the LB: library account [1,1], the system library account [1,2], and the MFD and GFDs for groups 0 and 1. The number of blocks each of these seven clusters contains depends on how you answered the cluster size questions for each of these accounts. For example, if you specify 16 as the cluster size for account [1,2] and answer YES to this question, DSKINT allocates the maximum of seven clusters to this account. Each cluster is 8,192 bytes (16 times 512 bytes).

Response—Type YES to have DSKINT automatically allocate a maximum of seven adjacent clusters to these accounts. Or, type NO or press RETURN if you want DSKINT to allocate only the minimum of 0 or 1 clusters.

```
PUB, PRI, or SYS <PRI>?
```

Explanation—This question asks you to designate the disk you are initializing as either public, private, or system. The system disk is the disk on which the RSTS/E monitor resides. It always contains account [1,2].

Response—Type PUB, PRI, or SYS.

```
Create [1,1] account <NO>?
```

Explanation—This question appears only if you type PUB or PRI to the previous question. It asks if you want to create account [1,1]. DSKINT automatically creates account [1,1] if you typed SYS to the previous question.

Response—Type YES to create this account. DSKINT then prints the next question.

Or, type NO or press RETURN if you do not want to create account [1,1] at this time. DSKINT then skips the next question. You can also use the CREATE/ACCOUNT command to create, pre-extend, and position account [1,1] on line during timesharing.

```
[1,1] cluster size <16>?
```

Explanation—This question asks for the cluster size of the User File Directory (UFD) for account [1,1]. The UFD is an area on the disk that stores information about the files created under a particular user account number. The cluster size for account [1,1] is the maximum number of 512-byte blocks that each cluster allocated to this account can contain.

Response—Press RETURN to accept the default response of 16.

Or, type the cluster size for account [1,1]: 1,2,4,8, or 16. It must be greater than or equal to the pack cluster size unless the pack cluster size is 32 or 64. If the pack cluster size is 32 or 64, then the UFD cluster size must be 16.

Digital recommends a cluster size of 16 to improve disk access time.

```
Create [1,2] account <NO>?
```

Explanation—This question appears only if you type PUB or PRI to the PUB, PRI, or SYS? question. It asks if you want to create account [1,2]. DSKINT automatically creates account [1,2] if you typed SYS to the PUB, PRI, or SYS? question.

Response—Type YES to create this account. DSKINT then prints the next question. Or, type NO or press RETURN if you do not want to create account [1,2] at this time. DSKINT then skips the next question. You can also use the CREATE/ACCOUNT command to create, pre-extend, and position account [1,2] on line during timesharing.

```
[1,2] cluster size <16>?
```

Explanation—This question asks for the cluster size of the UFD for account [1,2]. The cluster size for account [1,2] is the maximum number of 512-byte blocks that each cluster allocated to this account can contain.

Response—Type the cluster size for account [1,2]: 1,2,4,8, or 16. It must be greater than or equal to the pack cluster size unless the pack cluster size is 32 or 64. If the pack cluster size is 32 or 64, then the UFD cluster size must be 16.

Press RETURN to accept the default response of 16 if the pack cluster size equals 32 or 64. Digital recommends a cluster size of 16 to improve disk access time.

```
[1,1] and [1,2] account base <13541>?
```

Explanation—This question asks whether you want to place accounts [1,1] and [1,2] near the center of the disk or in some other place. The number that appears within brackets is the position of SATT.SYS, that is, the number you specified to the SATT.SYS base? question, or the middle of the disk as calculated by DSKINT if you specified RETURN to that question (13541, in the example). DSKINT may show a different number for your disk.

Response—Press RETURN to place these accounts near the center of the disk.

Or, type the device cluster number where you want these files placed. The device cluster number can range from 1 to the total device size divided by the device cluster size. See Table 18 for a list of device cluster sizes and total device sizes.

```
Date last modified <YES>?
```

Explanation—This question asks whether you want to retain the date on which files were last modified (written to) or last accessed (written to, opened, read from, closed, and so forth).

Response—Type YES or press RETURN to retain the date on which files were last modified. This response is useful if you plan to use the BACKUP system program to back up files that have changed since the last backup. This response also decreases disk activity because the RSTS/E monitor updates the date only if the files are written to.

Or, type NO to retain the date on which files were last accessed. This response is useful for reordering the files, so the most frequently accessed files can be placed at the beginning of the directory. This response increases disk activity because the RSTS/E monitor updates the date no matter how the file is accessed for reads or writes.

```
New files first <NO>?
```

Explanation—This question asks if you want newly created files placed at the beginning or end of the directory of the account in which they are created.

Response—Digital recommends that you type NO or press RETURN to place newly created files at the end of the directory, giving you overall faster access time.

Or, type YES to place newly created files at the beginning of the directory. This response is useful when you have a private disk on which the files you most frequently access are new files.

```
Read-only <NO>?
```

Explanation—This question asks if you want this disk to be by default a read-only or a read/write device when it is logically mounted. You can write to a read-only disk when you logically mount it with the /WRITE qualifier.

Response—Press RETURN to make the disk read/write.

```
Use previous bad block info <YES>?
```

Explanation—This question does not appear if you are initializing a new disk. The question asks if you want DSKINT to create a new bad block file (BADB.SYS) in system account [0,1] by using information from the existing bad block file. DSKINT checks each block on the disk (if you answer 1, 2, or 3 to the Patterns? question that comes later). If DSKINT finds unreliable blocks, it allocates the pack cluster in which the block resides to the BADB.SYS file.

Response—Digital recommends that you type YES or press RETURN to create the new bad block file, using information from the existing bad block file.

Or, type NO to have DSKINT ignore the current bad block file when creating the new one. For example, you may want to answer NO if you are reinitializing a disk to decrease the pack cluster size. In this case, you will also obtain new bad block information using 3 patterns as explained in the Patterns? question later.

```
Format <NO>?
```

Explanation—This question asks if you need to format your disk. Formatting a disk means that DSKINT writes timing and sense marks onto the disk and destroys any information that previously existed on the disk. You must format the following disks if you are initializing them for the first time: RK05, RK05F, RP04, RP05, RP06, RX33.

You can optionally reformat these disks: RK06, RK07, RM02, RM03, RM05.

You cannot format or reformat (in which case this question would not appear) these disks: RL01, RL02, RA60, RA70, RA80, RA81, RA82, RA90, RC25, RCF25, RM80, RD31, RD32, RD51, RD52, RD53, RD54, and RX50.

NOTE

If you are formatting a disk, Digital recommends that you mount the disk on the drive and leave it spinning for 20 to 30 minutes before initializing it. This ensures that the disk temperature is stable and uniform during the formatting. Failure to do this may cause unreliable data storage on the disk.

Response—Type YES to format the disk. Or, type NO or press RETURN if you do not need to format the disk.

```
Patterns <3>?
```

Explanation—This question asks for the number of patterns DSKINT should use in checking for bad blocks. DSKINT writes a pattern to the disk, and then reads it to check that the data was written correctly. The time DSKINT takes to run these pattern checks for bad blocks depends on the disk you are initializing. Type a ? to have DSKINT print the approximate time (in minutes) required for the different disks to complete one format check for bad blocks.

Response—Type the number of patterns, from 0 to 3. Digital recommends you run 3 to fully check for all bad blocks. Three patterns offer the greatest probability of finding all bad blocks on the disk. Any bad blocks discovered during pattern checking are added to the bad block file (BADB.SYS) so that data will not be written to these blocks. If you specify 0, DSKINT then asks the next question.

```
Erase disk <YES>?
```

Explanation—This question, which appears only if you answered 0 to the Patterns? question, asks if you want to erase the disk. If you answer YES, DSKINT wipes out all data on the disk: this is usually done for security purposes.

If you answer NO, DSKINT writes only the basic RSTS/E file structure on the disk. Use the NO response under the following conditions:

- You are initializing a disk that has been initialized before.
- You answered YES to the Use previous bad block info? question.
- You are confident no additional bad blocks are on the disk.
- You are not concerned about the security of old data that could still be accessed.

Response—Type YES or press RETURN to erase the disk. Or, type NO to write only the basic RSTS/E file structure on the disk.

```
Proceed (Y or N)?
```

Explanation—This question allows you to check your responses to the dialogue questions and abort the initialization if you have made any errors.

Response—Type Y to proceed with the disk initialization.

Or, type N to abort the initialization and return to the Option: prompt.

```
Option:
```

Explanation—INIT.SYS completes the disk initialization. Then it prints the Option: prompt.

A list of the DSKINT error messages follows. If your error message does not appear, see Appendix A.

BLOCK NUMBER TOO BIG

Explanation: The block number you typed is greater than or equal to the maximum logical block number for the disk.

?DRIVE NOT READY:

Explanation: The initialization cannot proceed because the disk to be initialized is not on line and ready.

User Action: You can make the drive ready and press [RETURN] to proceed, or you can press Ctrl/C to abort the initialization.

?DSKINT NOT LEGAL ON SYSTEM DISK

Explanation: You specified the disk from which the initialization code was bootstrapped. You cannot initialize this disk now because the initialization code would be destroyed.

FORMATTING FAILURE:

Explanation: The disk could not be formatted.

User Action: Mount the disk on the drive and leave it spinning for 20-30 minutes before formatting the disk. If you still receive the same error message after one retry, then use a new disk.

?ILLEGAL DISK NAME

Explanation: The string you typed is not the name of a valid RSTS/E disk device.

User Action: Enter a valid name.

?ILLEGAL NUMBER OF PATTERNS

Explanation: The number of patterns must be 0 through 3.

?ILLEGAL NUMBER, TRY AGAIN

Explanation: The number you typed is not a valid octal number between 1 and 177777.

?ILLEGAL PACK ID

Explanation: The pack ID must consist only of characters from "A" to "Z" or "0" through "9."

?SORRY, BUT THAT DISK DOESN'T EXIST

Explanation: The string you typed is a valid RSTS/E disk name, but that disk controller or the unit number does not exist on this system.

THAT DISK WAS NOT FOUND DURING LIMITED HARDWARE SCAN

Explanation: You tried to initialize or copy to a nonexistent DU type disk.

User Action: If you answer YES to the "Do you wish to perform a reboot with full hardware scan ?", then the distribution device will be rebooted and the "Performing limited hardware scan." message will NOT reappear.

?UNABLE TO READ BAD BLOCK TRACK DATA

Explanation: The manufacturer's bad block information could not be read.

User Action: Either run 3 patterns on the pack or try a different pack.

HARDWR—Adjust the Hardware Configuration

The HARDWR option performs tasks related to the hardware your RSTS/E monitor supports. The following sections describe the HARDWR suboptions. These suboptions affect your system disk, not your installed monitor. Thus, if you add or remove nonstandard hardware, you may need to use these suboptions again. However, if you only install a different monitor, you do not need to use these suboptions again. You must repeat the HARDWR option each time you install a new version of RSTS.

The HARDWR suboptions are:

- HARDWR LIST - List the Hardware Configuration Table
- HARDWR ECO - Show Revision Level of Controllers for which the Information is Available
- HARDWR DISABLE - Disable a Device Controller
- HARDWR ENABLE - Enable a Device Controller
- HARDWR CSR - Declare a Nonstandard Controller Address
- HARDWR VECTOR - Declare a Nonstandard Vector Assignment for a Card Reader or Floppy
- HARDWR RESET - Set All Controller Addresses and Vector Assignments to the Standard, and Enable All Devices
- HARDWR DM - Declare DM11-BB and DH11 Associations
- HARDWR HERTZ - Specify AC Line Frequency
- HARDWR SWITCH - Specify CPU Switch Register Characteristics
- HARDWR LIGHTS - Specify Numeric Light Null Job Characteristics

HARDWR LIST—List the Hardware Configuration Table

The LIST suboption lists the *hardware configuration table*. This table shows the current hardware configuration and allows you to verify any changes you have made.

Use the LIST suboption if:

- You want to list the current hardware configuration table.
- You need to list the table to see what changes you have made to your hardware configuration.

LIST Dialogue

```
Option: HARDWR
```

Response—Type HARDWR or HA to the INIT.SYS Option: prompt.

```
HARDWR suboption? LIST
```

Response—Type LIST or LI to list the hardware configuration table.

```
Name   Address Vector  Comments

TT0:   177560    060
RK:    177400    220   Units: 0(RK05) 1(RK05)
RL:    174400    160   Units: 0(RL02)
RM:    177440    210   Units: 2(RK07)
RR:    176700    254   Units: 0(RM02 DP)
RU0:   172150   P340   UDA50   Units: 2(RA80)
TU0:   172440    224   Units: 0(TU16 @TM02 #0)
LP0:   177514    200
DE0:   175610    300
DE1:   175620    510
KG0:   170700
DM0:   170500    320   DH0
DH0:   160020    310
D10:   160070    330
XM0:   160120    340   Type: DMC, Local
XM1:   160130    35    Type: DMC, Local
XM2:   160140    360   Type: DMC, Remote
XM3:   160150    370   Type: DMC, Remote
XM4:   160160    400   Type: DMR, Remote DMC Mode integral modem
DZ0:   160200    420   Sub-lines: 8
XK0:   160220    420
XD0:   160400    430   Type: DMP, Low speed, Programmable
                       mode, Boot enable
XE0:   174510    120   DEUNA Address: 08-00-2B-01-0B-7F

KW11L 177546    100

SR     177570
DR     177570

Hertz = 60.

Other: FPU, CIS, 22-Bit, Data space, Cache, 11/44 CPU

HARDWR suboption?
```

Explanation—In this example, taken from a PDP-11/44, LIST prints the hardware configuration. (Note that LIST prints only a partial list of the hardware configuration table if you have not installed a monitor.)

If you have changed any of the configured hardware, LIST prints the number of changes that HARDWR will make when you exit from the option. When you exit from the HARDWR suboption? prompt, INIT.SYS scans the entire hardware configuration and reboots the disk. Because there are no changes pending in the example, LIST does not print anything.

The hardware configuration table contains one line for each device controller that exists on the system. The table also contains an additional line, printed in parentheses, for each controller that has changes pending. This line appears whether or not the controller has a listing line. Thus, if you declare a nonstandard characteristic for a controller that does not yet exist on the system, HARDWR prints a parenthetical change line noting the change. In addition, the table contains a line for controllers that are currently disabled or nonexistent.

Each line has four columns:

Name	The name and number of the device controller
Address	The address of the controller's CSR set
Vector	The controller's vector address. If the device has two vectors, HARDWR prints the lower address; an asterisk (*) precedes a nonstandard CSR or vector address. An uppercase "P" precedes a programmable vector, which indicates that the initialization code assigned the vector address.
Comments	Information about the controller or devices on that controller. Table 19 summarizes the comments that may be in the listing for each controller.

In a parenthetical change line, the Address column contains either a nonstandard address or the word SYSTEM. SYSTEM means that INIT.SYS will find the CSR set according to the standard fixed and floating address rules when it bootstraps the system disk. (See Appendix B for a discussion of fixed and floating address rules.) The Vector column in a change line is blank or contains the nonstandard vector address that you specified.

Following the hardware configuration table, LIST prints several lines of information. The information reported depends on what hardware your system supports. Table 20 summarizes what you might see on your hardware configuration table.

Response—Type EXIT or press RETURN to return to the Option: prompt.

Table 19: Hardware Comments Table

Device	Comment and Meaning
ALL	Disabled Device is (or will be) disabled.
ALL	Not found Device was not found.
RK	units:m(RK05,RKO5F) . . . t(RKO5,RKO5F) m through t are unit numbers of drives that exist on the controller (8 are possible). The disk type appears in parentheses after each unit number.
RL	units: m(RL01,RL02) . . . p(RL01,RL02) m through p are unit numbers of drives that exist on the controller (4 are possible). The disk type appears in parentheses after each unit number.
RM	units: m(RK06,RK07) . . . t(RK06,RK07) m through t are unit numbers of drives that exist on the controller (8 are possible). The disk type appears in parentheses after each unit number.
RP	units: m(RP02,RP03) . . . t(RP02,RP03) m through t are unit numbers of RP03 and write-protected or spinning RP02's that exist on the controller (8 are possible). RP03 and write-protected or spinning RP02's are listed.
RB,RR	BAE=+xxx BAE indicates that the device controller supports 22-bit addressing and has a Bus Address Extension register at the specified offset from its CSR base. units: m(RM02, RM03, RM05, RM80, RP04, RP05, RP06) . . . t(RM02, RM03, RM05, RM80, RP04, RP05, RP06) m through t are unit numbers of drives that exist on the controller (8 are possible). The disk type appears in parentheses after each unit number. Following the disk type is DP, if that unit is a dual-ported disk.
RU	UDA50, UDA50A, or KDA50 units: m(RA60, RA70, RA80, RA81, RA82, RA90) . . . t(RA60, RA70, RA80, RA81, RA82, RA90)

Table 19 (Cont.): Hardware Comments Table

Device	Comment and Meaning
	RC25 units: m(RCF25,RC25) . . . t(RCF25, RC25)
	RQDX units: m(RD31, RD32, RD51, RD52, RD53, RD54, RX33, RX50) . . . t(RD31, RD32, RD51, RD52, RD53, RD54, RX33, RX50)
	m through t are unit numbers of drives that exist on the controller (4 are possible). The disk type appears in parentheses after each unit number.
MU	TK50 unit: m(TK50) TU81 unit: n(TU81)
	m through n are unit numbers of drives that exist on the controller. The disk type appears in parentheses after each unit number.
TS	units: m(TS11,TK25,TS05,TU80) . . .
	m is the unit number of the drive that exists on the controller. The tape type appears in parenthesis after the drive type.
TU	BAE=+xxx
	BAE indicates that the device controller supports 22-bit addressing and has a Bus Address Extension register at the specified offset from its CSR base.
	units: m(TU16@TM02#x) . . . t(TU16@TM02#x)
	m through t are unit numbers of drives that exist on the controller (8 are possible). The tape type, formatter type, and the formatter number appear in parentheses after each unit number. TU16, TE16, TU45, and TU77 represent the valid device types for the TU controller and TM02 and TM03 are the valid formatter types. The formatter number (#x) can be any number from 0 to 7.
DM	DHn
	DH11 controller number n is logically associated with this DM11-BB unit.
	No DH11
	No DH11 controller is logically associated with this DM11-BB unit.
DZ	sublines: (4, 8)
	This DZ type device has either 4 or 8 terminal ports.
VH	sublines: (8, 16)
	This DHV/DHU type device has either 8 or 16 terminal ports.
XD	Type: DMP or DMV.
	You will either see DMP or DMV listed for the first entry because the DMP11 devices are UNIBUS devices while the DMV11 devices are QBUS devices.
XE	DEUNA or DELUA Address: 08-00-03-01-0B-7F
	The XEn device will be reported as a DEUNA or as a DELUA device depending on which device exists on your controller. These devices will only exist on UNIBUS machines. The address is the "Ethernet Hardware Address" which is the 48-bit address built into the controller. This address ensures that the device will always have a unique address on any Ethernet it inhabits. For further information, see the *RSTS/E Programming Manual* or the DECnet documentation.
XH	DEQNA or DELQA Address: 08-00-03-AA-0C-4D

Table 19 (Cont.): Hardware Comments Table

Device	Comment and Meaning
	The XHn device will be reported as a DEQNA or as a DELQA device depending on which device exists on your controller. These devices will only exist on a QBUS machine. The address is the "Ethernet Hardware Address" which is the 48-bit address built into the controller. This address ensures that the device will always have a unique address on any Ethernet it inhabits. For further information, see the *RSTS/E Programming Manual* or the DECnet documentation.
XM	Type: DMC or DMR A DMC device has one of the following options: (Remote), (Local), (Local Micro, Remote Line), or (Remote Micro, Local Line). A DMR device is a more versatile device that the DMC. It has the following additional options: • DMR mode, 1 megabaud, less than 1 megabaud, Local DMC mode, or Remote DMC mode. • Integral Modem - the DMR uses coax. • RS232/423 Interface, RS422 Interface, unknown Interface, or CCITT V.35.
RX	units: n(RX01,RX02)

Table 20: Summary Hardware Configuration Table

Mnemonic	Line and Meaning
KW11-L	177546 100 Reports the address and vector of the KW11-L line clock if the clock exists on the system.
KW11-P	172540 104 If the system has a KW11-P clock, reports its address and vector.
SR	177570 VOLATILE DISABLED If the CPU has a switch register, reports its address. If you have used the SWITCH suboption to specify that the switch register is VOLATILE or DISABLED, it reports that choice.
SR	VOLATILE DISABLED The CPU does not have a switch register, but you have used the SWITCH suboption to ENABLE or DISABLE it.
(SR	DISABLED) ENABLED VOLATILE There is a pending change from the SWITCH suboption.
DR	177570 If the CPU has a display register, its address is reported.
HERTZ 50 60	The system's AC line frequency is reported (unless the 11/73/83/84/93/94 800Hz clock has been selected).
(HERTZ = 50) 60	There is a pending change to the system's AC line frequency.
CIS	The CPU has the Commercial Instruction Set (CIS) option.
FPU with FPA	The CPU has the Floating Point Processor (FPP) option. FPA indicates that the CPU also includes the Floating Point Accelerator. You only see the with FPA on J11 or F11 CPUs.
FIS	The CPU has the Floating Instruction Set (FIS) option (PDP-11/35 and 11/40 only).

Table 20 (Cont.): Summary Hardware Configuration Table

Mnemonic	Line and Meaning
SL	The CPU has a stack limit register.
MED	The CPU has the Maintenance Examine/Deposit instruction (PDP-11/60 only).
CACHE	The CPU has main memory cache.
CACHE W/ADDRESS	The CPU retains address information on a memory fault.
22-BIT	The CPU supports more than 124KW of memory.
SYSTEM ID = nnnnn	The contents of the CPU identification register are reported, if the register exists.
F11 CPU	The processor type is F11 (PDP-11/23 or 11/24).
J11 CPU	The processor type is J11 (PDP-11/53, 11/73, 11/83, 11/84, 11/93 or 11/94).
11/44 CPU	The processor type is a PDP-11/44.
DATA SPACE	The CPU has Instruction and Data Space.

HARDWR ECO—Show revision level of MSCP and TMSCP controllers

The ECO suboption lists the hardware and software (microcode) revision levels for all controllers on your system for which this information is available. This is used by Field Service to ensure that your controllers are at current revision level.

ECO Dialogue

```
Option: HARDWR
```

Response—Type HARDWR or HA to the INIT.SYS Option: prompt.

```
HARDWR suboption? ECO
```

Response—Type ECO to list MSCP/TMSCP revision levels.

```
        Name     Address      SW Rev     HW Rev
        RU0:     172520          3        None
        MU0:     160334          4           2

HARDWR suboption?
```

NOTE

This is just an example. These numbers do NOT represent the actual revisions for any current hardware.

Explanation—The first column of this list contains the controller name; MSCP disks are shown as "RU" and TMSCP tapes are shown as "MU." The second column shows the CSR address for this controller. The third column shows the software (microcode) revision level of this controller, and the fourth column shows the hardware revision level of this controller.

On some controllers, the hardware or software revision levels (or perhaps both) are not program-readable. In this case, the word "None" appears in the appropriate place.

If, during system autosizing, it was discovered that a controller is so far out of revision so as to be unusable by RSTS/E, then the phrase "Not supported" will appear under the "SW Rev" and "HW Rev" columns.

If there are no MSCP or TMSCP controllers on the system, a message stating so will be printed instead of the table above.

Response—Type EXIT or press RETURN to return to the Option: prompt.

HARDWR DISABLE—Disable a Device Controller

The DISABLE suboption disables a device controller; that is, makes it unavailable for use. For example, the RM controller controls all RK06 and all RK07 disk drives. If you disable the RM controller, you disable all RK06 and RK07 disk drives.

Use the DISABLE suboption if:

- You need to disable a controller that needs repairs.
- You need to disable an erroneously detected controller. For example, you may have installed a TS11 magnetic tape drive at a nonstandard CSR address of 177170. However, INIT.SYS expects to find the RX01/RX02 flexible diskette controller at this address. If you do not use the CSR suboption to declare the TS11 as having a nonstandard CSR, then you must disable the device by disabling the RX (really TS11) controller.

  In some cases, INIT.SYS interprets a nonstandard device (a device not supported by RSTS) as a normal PDP-11 device. This means INIT.SYS enables the nonexistent PDP-11 device.
- Your configuration contains too many devices to start timesharing. RSTS/E includes many features which are based on the presence of hardware. If too much hardware is present, you may exceed your memory limits or RSTS/E software limits.

DISABLE Dialogue

```
Option: HARDWR
```

Response—Type HARDWR or HA to the the INIT.SYS Option: prompt.

```
HARDWR suboption? DISABLE
```

Response—Type DISABLE or DI to disable a controller.

```
Controller to disable?
```

Explanation—DISABLE asks for the name of the controller to disable. Before you do that, however, it may be useful to list the valid controller names.

Response—Type LI to list the valid controller names.

```
Controller to disable? LI

Name Max no Description
```

```
TT     1    Console terminal
RF     1    RF11 fixed head disk
RS     1    RS03/RS04 fixed head disk
RK     1    RK05/RK05F disk
RL     1    RL01/RL02 disk
RM     1    RK06/RK07 disk
RP     1    RP02/RP03 disk
RB     1    RP04/RP05/RP06 disk
RR     1    RM02/03/05/80 disk
RZ     1    GPK-3xx floppy disk
RW     1    GPK-3xx hard disk
RU     4    MSCP Class disk
MU     4    TMSCP Class tape
TS     8    TS11/TS05/TU80/TK25 magtape
TM     1    TU10/TE10/TS03 magtape
TU     1    TU16/TE16/TU45/TU77 magtape
TC     1    TC11/TU56 DECtape
PR     8    Paper tape reader
PP     8    Paper tape punch
LP     8    Line printer
RX     4    RX01/RX02 floppy disk
CR     8    CR11/CM11 card reader
CD     8    CD11 card reader
KL    16    KL11/DL11A/DL11B single line interface
DL    31    DL11C/DL11D single line interface
DE    31    DL11E single line modem interface
DD     4    TU58 DECtape II
DC     2    DC11 single line interface
DP     2    DP11 synchronous line interface
XN    16    DN11 automatic calling unit interface
BS     4    DT07 Bus switch
KG     8    KG11 CRC arithmetic unit
KJ     4    KXJ11 microprocessor
DM    16    DM11-BB modem control for DH11
DJ    16    DJ11 16 line multiplexer
DH    16    DH11 16 line multiplexer
DU    16    DU11 single line synchronous interface
D1    16    DUP11 single line synchronous interface
XM    16    DMC11/DMR11 interprocessor link
DZ    16    DZ11/DZV11/DZQ11/DFA01 4/8 line multiplexer
XK    16    KMC11 microprocessor
XA    16    DR11/DRV11 interprocessor link
XD    16    DMP11/DMV11 interprocessor link
VH    16    DHV/DHU/DHQ/DHF/CXA/CXB/CXY 8/16 line multiplexer
XE     4    UNA Ethernet interface
XH     4    QNA Ethernet interface

Controller to disable?
```

Explanation—The first column of this list contains the name of the controller. The second column shows the maximum number of each type of controller that a RSTS/E monitor can support. The third column describes the devices controlled by the controller.

After DISABLE prints the list of valid controllers, it asks for the name of the controller to disable.

Response—Type the two-character name and unit number of the controller you need to disable. Controllers are numbered from 0 to the maximum number possible, minus 1. You can omit the controller number only if the maximum number of that controller is 1. For example, you could type RL to this question rather than RL0 because the maximum number of RL controllers that a RSTS/E monitor can support is 1. On the other hand, if you need to disable the line printer controller, you have to include the number because the RSTS/E monitor can support more than one line printer controller.

Press Ctrl/Z or the RETURN key to exit from this suboption without specifying a controller name.

```
HARDWR suboption?
```

Explanation—HARDWR does not immediately disable the controller specified in the previous question, but returns to the HARDWR suboption? prompt. This lets you check your responses by listing the current hardware configuration table.

Response—Type LIST or LI. Type EXIT or press RETURN to return to the Option: prompt. Press Ctrl/C to cancel any changes and return to the Option: prompt.

HARDWR makes the indicated changes, bootstraps your system disk, and prints one of three messages:

```
Option:
```

The Option: prompt indicates you have made no hardware changes or that INIT.SYS has previously completed a scan of the hardware configuration.

```
nn changes being made
Rebooting  . . .
```

The value nn represents the number of changes that INIT.SYS will make after it bootstraps the system disk. INIT.SYS scans the entire hardware configuration as it reboots the system disk.

```
Enabling all devices.
nn changes pending
Rebooting  . . .
```

This message indicates that INIT.SYS previously completed only a partial scan of the hardware configuration. The value nn represents the number of changes you have indicated (or it means you have used the RESET suboption). INIT.SYS makes the changes and scans the entire hardware configuration as it reboots the system disk.

HARDWR ENABLE—Enable a Device Controller

The ENABLE suboption of HARDWR enables a device controller; that is, makes it available for use. For example, the RM controller controls all RK06 and RK07 disk drives. If you enable the RM controller, you enable all RK06 and RK07 disk drives.

This suboption is related to the HARDWR DISABLE suboption. Just as you use the ENABLE suboption to enable a controller, you use the DISABLE suboption to disable a controller.

Use the ENABLE suboption only if you need to enable a controller that was previously disabled.

ENABLE Dialogue

```
Option: HARDWR
```

Response—Type HARDWR or HA to the INIT.SYS Option: prompt.

```
HARDWR suboption? ENABLE
```

Response—Type ENABLE or EN to enable a controller.

```
Controller to enable?
```

Explanation—ENABLE asks for the name of the controller to enable. Before you do that, however, it may be useful to list the valid controller names by typing LI. The list you receive contains the name of the controller, the maximum number of each type that the RSTS/E monitor can support, and a description of the controller. See the DISABLE Dialogue section for an example of this list, or print it on your console terminal.

Response—Type the two-character name of the controller you need to enable. Controllers are numbered from 0 to the maximum number possible, minus 1. You can omit a controller number only if the maximum number supported by the RSTS/E monitor is 1. For example, you could type RL to this question rather than RL0 because the maximum number of RL controllers that a RSTS/E monitor can support is 1. On the other hand, if you need to enable the line printer controller, you have to include the number because the RSTS/E monitor can support more than 1 line printer controller.

Or, press Ctrl/Z to exit from this suboption without specifying a controller name.

```
HARDWR suboption?
```

Explanation—HARDWR does not immediately enable the controller, but returns to the HARDWR suboption? prompt. This lets you check your responses by listing the current hardware configuration table.

Response—Type LIST or LI to see the current hardware configuration table. Type EXIT or press RETURN to return to the Option: prompt. Press Ctrl/C to cancel any changes and return to the Option: prompt.

After you type EXIT or press RETURN, HARDWR makes the specified changes, bootstraps your system disk, and prints one of three messages (see the previous section, Disable a Device Controller).

HARDWR CSR—Declare a Nonstandard Controller Address

The CSR suboption of HARDWR sets a nonstandard controller address for a device controller's *Control Status Register (CSR)* set. The CSR set is the unique set of addresses on the UNIBUS associated with a particular device controller.

When you bootstrap the INIT.SYS program, it checks the number of each type of controller on the system by applying standard rules for locating the CSR set. See Appendix D for a discussion of the checks performed by INIT.SYS.

Use the CSR suboption only if:

- You need to install a controller at another address because you have nonstandard hardware.
- You need to rearrange device controller addresses.
- You need to change a controller unit number.

However, in general it is not a good idea to assign controllers nonstandard addresses. Perform this task only as a temporary measure until you have the address assignment corrected.

CSR Dialogue

```
Option: HARDWR
```

Response—Type HARDWR or HA to the INIT.SYS Option: prompt.

```
HARDWR suboption? CSR
```

Response—Type CSR to specify a nonstandard address for a device controller.

```
Controller with non-standard address?
```

Explanation—This question asks for the name of the controller that requires a nonstandard CSR address.

Response—Type the two-character controller name and its number. Controllers are numbered from 0 to the maximum possible number of controllers, minus 1. You can omit the controller number only if the maximum number of that controller is 1.

You can also type LI to have HARDWR print a list of valid controller names. This list contains the name of the controller, the maximum number of each type that the RSTS/E monitor can support, and a description of the devices controlled by the controller. (See the section, Disable a Device Controller, for an example of this list, or print it on your console terminal.)

```
New controller address?
```

Explanation—This question asks for the nonstandard CSR address for the controller you specified in the previous question.

Response—Type the address of the lowest register in the controller's CSR set. The address must be an even 6-digit octal number greater than 160000.

Or, type REMOVE or RE to remove the nonstandard address (if you have used this option before) and return to the standard setting.

Press Ctrl/Z to return to the HARDWR suboption? prompt without specifying a new CSR address.

```
HARDWR suboption?

Option:
```

Explanation—HARDWR does not immediately assign the address you specified to the nonstandard controller, but returns to the HARDWR suboption? prompt. This lets you check your responses by listing the current hardware configuration table.

Response—Type LIST or LI to list the current hardware configuration table. Type EXIT or press RETURN to return to the Option: prompt.

After you type EXIT or press RETURN, HARDWR makes the specified changes, bootstraps your system disk, and prints one of three messages (see the previous section, Disable a Device Controller).

HARDWR VECTOR—Declare a Nonstandard Vector Assignment

The VECTOR suboption of HARDWR specifies a nonstandard vector address for CR:, CD:, or RX: devices.

NOTE

This task is for Digital Field Service representatives who might have to perform it during hardware installation or during new version updates.

Use the VECTOR suboption only if:

- The hardware configuration includes more than one card reader.
- The hardware configuration includes a card reader that has a nonstandard vector.
- The hardware configuration includes an RX01/RX02 that is normally powered off, and thus will not interrupt.

In all other circumstances, INIT.SYS attempts to find the correct interrupt vector for the device and uses what it finds.

For controllers that contain a programmable vector register (MSCP and TMSCP class controllers), INIT.SYS assigns the first unused vector in the floating vector range to that controller.

A controller's vector address directs the central processor to the proper routines when that controller requests an interrupt. When you bootstrap the system, INIT.SYS checks each device controller's vector address assignment by forcing each device to interrupt. INIT.SYS checks these addresses against a table of reserved locations. If a device does not respond, INIT.SYS prints a message at your console terminal and disables the device.

INIT.SYS also checks whether more than one device has the same vector address. If so, INIT.SYS prints a message:

```
Vector for Device XXn: (vvv) already in use - device disabled.
```

where vvv represents the octal address of the incorrect vector.

Table 21 lists the locations reserved for hardware. You cannot use these locations as device vector assignments.

Table 21: Reserved Hardware Locations

Address	RSTS/E Usage
0-2	Detection of jumps to 0 and traps to 0
4-36	System trap vectors
40-56	Reload start addresses, failure HALT
100-102	KW11-L line frequency clock vector
104-106	KW11-P programmable crystal clock vector
110-112	Jump to 0 handling
114-116	Memory parity trap vector
144-146	Crash dump handling
234-236	Statistics handling
240-242	PIRQ trap vector
244-246	FPP or FIS exception trap vector
250-252	Memory Management Unit trap vector

VECTOR Dialogue

```
Option: HARDWR
```

Response—Type HARDWR or HA to the INIT.SYS Option: prompt.

```
HARDWR suboption? VECTOR
```

Response—Type VECTOR or VEC.

```
Controller with non-standard vector?
```

Explanation—This question asks for the name of the controller that requires a nonstandard vector address.

Response—Type the two-character controller name of the card reader or floppy controller.

```
New vector address?
```

Explanation—This question asks for the nonstandard vector address for the controller you specified in the previous question.

Response—Type the nonstandard vector address, which is the 3-digit octal address of the lowest vector for the device controller. The address must be an even number. See Table 21 for the reserved addresses.

Or, type REMOVE or RE to remove a nonstandard vector address and return to the standard address.

Press Ctrl/Z to return to the HARDWR suboption? prompt without specifying a new vector address.

```
HARDWR suboption?
```

Explanation—HARDWR does not immediately assign the nonstandard vector address to the controller, but returns to the HARDWR suboption? prompt. This lets you check your responses by listing the current configuration table.

Response—Type LIST or LI to list the current hardware configuration table. Type EXIT or press RETURN to return to the Option: prompt.

After you type EXIT or press RETURN, HARDWR makes the specified changes, bootstraps your system disk, and prints one of three messages (see the section, Disable a Device Controller).

HARDWR RESET—Set All Vector and CSR Addresses to the Standard, and Enable All Devices

The RESET suboption of HARDWR causes INIT.SYS to reboot your system disk and perform a complete hardware scan. Thus, INIT.SYS returns all CSR and vector addresses to their standard addresses, enables all devices, and associates each DM11-BB unit with the DH11 multiplexer that has the same unit number.

Use the RESET suboption only if you have made no changes to your hardware; that is, you have not assigned any nonstandard CSR or vector addresses.

RESET Dialogue

```
Option: HARDWR
```

Response—Type HARDWR or HA to the INIT.SYS Option: prompt.

```
HARDWR suboption? LIST
```

Explanation—Before using RESET, always list the current hardware configuration to see if there are any CSR or VECTOR changes. See the section, HARDWR LIST, for an example of the hardware configuration table.

Response—Type LIST or LI. Or, type EXIT or press RETURN to return to the Option: prompt.

```
HARDWR suboption? RESET
```

Explanation—After LIST prints the current hardware configuration, it returns to the HARDWR suboption? prompt.

Response—Type RESET or RE.

```
HARDWR suboption?
```

Explanation—RESET returns all device characteristics to the standard CSR and VECTOR addresses. Then it returns to the HARDWR suboption? prompt.

Response—Type LIST or LI to list the current hardware configuration table. See the section, HARDWR LIST, for an example of the hardware configuration table. After you list the hardware configuration table, type EXIT or press RETURN to return to the Option: prompt.

HARDWR DM—Declare DM11-BB and DH11 Associations

The DM suboption of HARDWR associates each DM11-BB modem controller with the correct DH11 multiplexer.

Use the DM suboption if the DM11-BB modem controllers are not associated with the correct DH11 multiplexers.

The DH11 multiplexer allows you to connect from 1 to 16 terminals to your PDP-11. In other words, the DH11 multiplexer has 16 lines, numbered from 0 to 15.

The DM11-BB modem controller allows you to connect a dial-up telephone to the DH11 multiplexer. A DM11-BB modem controller also has 16 lines. A one-to-one relationship exists between these two pieces of hardware; thus, a PDP-11 can have only as many DM11-BB modem controllers as there are DH11 multiplexers. Therefore, a PDP-11 can support a maximum of 16 DH11 multiplexers.

DM11-BB modem controllers and DH11 multiplexers must meet the following conditions:

- A DM11-BB controller's lines can be connected to modem lines on only one DH11 multiplexer. For example, you could not connect the DM11-BB controller lines to DH11 units 0 and 1.
- A DM11-BB controller's line numbers must be the same as the line numbers of its associated DH11 multiplexer. For example, DM11-BB line number 4 can be connected only to DH11 line number 4.

The RSTS/E monitor cannot determine which DM11-BB modem controller is associated with a specific DH11 multiplexer (assuming of course that there is more than one DH11 multiplexer). Therefore, the RSTS/E monitor assumes that DM11-BB unit number 0 is associated with DH11 multiplexer unit 0. The RSTS/E monitor does not require that DM11-BB and DH11 unit numbers be the same. For example, you could connect DM11-BB unit number 2 to DH11 unit number 4.

DM Dialogue

```
Option: HARDWR
```

Response—Type HARDWR or HA to the INIT.SYS Option: prompt.

```
HARDWR suboption? DM
```

Response—Type DM.

```
DH for DM0 (0, NX)?
```

Explanation—This question asks for the unit number of the DH11 multiplexer you want to associate with DM11-BB unit 0. NX means that the unit is nonexistent. The DM suboption requests DH11 unit numbers for all 16 possible DM11-BB units, whether or not the system includes 16 units. Therefore, you can logically associate a DH11 unit number with a DM11-BB unit that is not on the system, but is expected in the future.

Response—Type the unit number or press RETURN to accept the default.

Or, press Ctrl/Z to return to the HARDWR suboption? prompt without declaring any DM11-BB and DH11 associations.

```
HARDWR suboption?
```

Explanation—DM does not immediately assign the unit numbers of any DH11 multiplexers to their associated DM11-BB modem controllers, but returns to the HARDWR suboption? prompt. It is useful to list the hardware configuration table to verify that these changes will occur.

Response—Type LIST or LI to list the current hardware configuration table. (The hardware configuration table is not repeated here.) After you list the hardware configuration table, type EXIT or press RETURN to have DM make the changes and return to the Option: prompt.

HARDWR HERTZ—Specify AC Line Frequency

The HERTZ suboption of HARDWR specifies AC line frequency for your system.

Use the HERTZ suboption only if INIT has not determined the correct AC line frequency and you need to specify the correct AC line frequency for your system.

HERTZ Dialogue

```
Option: HARDWR
```

Response—Type HARDWR or HA to the INIT.SYS Option: prompt.

```
HARDWR suboption? LIST
```

Explanation—HARDWR prints the HARDWR suboption? prompt. Before using HERTZ, always list the current hardware configuration to see if the AC line frequency is correct for your installation. (See the section, HARDWR LIST, for an example of the hardware configuration table.)

Response—Type LIST or LI. Or, type EXIT or press RETURN to return to the Option: prompt.

```
HARDWR suboption? HERTZ
```

Explanation—If the table shows an incorrect AC line frequency for your installation, then you must correct it. The AC line frequency is the basis for all system timing.

Response—Type HERTZ or HE.

```
New AC line hertz?
```

Explanation—The question asks for the AC line frequency for your installation.

Response—Type 50 if your AC line frequency is 50 Hz (commonly used in Europe); type 60 if your AC line frequency is 60 Hz (commonly used in the United States).

If you have both a KW11L and KW11P clock, INIT.SYS automatically determines the frequency of your power.

If you have an 11/73, 11/83, 11/84, 11/93, or an 11/94, INIT.SYS also automatically determines the frequency of your power.

On other systems, the line frequency ALWAYS defaults to 60 Hz when you install a new monitor. If your installation requires an AC line frequency of 50 Hz, then every time you install a new monitor, you need to use the HERTZ suboption to change the frequency from 60 to 50 Hz.

```
HARDWR suboption?
```

Explanation—After you indicate the AC line frequency, you should list the hardware configuration table, to verify that the change will occur.

Response—Type LIST or LI to list the hardware configuration table. Type EXIT or press RETURN to return to the Option: prompt.

HARDWR SWITCH—Specify CPU Switch Register Characteristics

The SWITCH suboption of HARDWR specifies the characteristics of your CPUs console switch register. The console switch register controls the automatic restart feature of RSTS/E during system crashes.

When the monitor crashes, except for power failures, it looks at the switch register. If bit 0 is set to 1, the system performs an autorestart. If bit 0 is not set to 1, (regardless of the setting of the other switches), the system does not start automatically.

Use the SWITCH suboption only if you want to specify the characteristics of your CPUs console switch register.

SWITCH Dialogue

```
Option: HARDWR
```

Response—Type HARDWR or HA to the INIT.SYS Option: prompt,

```
HARDWR suboption? SWITCH
```

Response—Type SWITCH or SW.

```
Switch register?
```

Explanation—Because some CPUs do not have switch registers or have switch registers that cannot retain the original register contents after a power failure, SWITCH lets you put the switch register contents in one of three logical positions: ENABLE, DISABLE, or VOLATILE.

The response you select and your console switch register setting determine how your system recovers after a system crash. Systems that crash due to power failure have restart capabilities only if they are configured with both *nonvolatile memory* - memory that is not destroyed during power failure - and a nonvolatile switch register.

Response—Type DISABLE, ENABLE, or VOLATILE:

- DISABLE means RSTS/E does not look at the switch register. This means your system, by default, automatically restarts.
- ENABLE means that when the system crashes, RSTS/E looks at the switch register after the crash to see if it should restart.
- VOLATILE has the same meaning as ENABLE except that when power fails, RSTS/E always tries to restart automatically. The ability to restart a RSTS/E system after a power failure depends on the hardware memory configured on your system. Systems with volatile memory cannot perform autorestart, regardless of the switch contents. By specifying VOLATILE, systems with a volatile switch register but with nonvolatile memory can perform restarts after power failure.

```
HARDWR suboption?
```

Explanation—After you specify the switch register characteristics, you should list the hardware configuration table to verify that the change will occur.

Response—Type LIST or LI to list the hardware configuration table. Type EXIT or press RETURN to return to the Option: prompt.

HARDWR DDNULL—Enable or Disable Diagnostic Display Idle Pattern

The DDNULL suboption of HARDWR allows you to select whether or not RSTS/E will display the "countdown" pattern in the Diagnostic Display on 11/73, 11/83, 11/84, 11/93 and 11/94 processors when the system is idle.

DDNULL Dialogue

```
Option: HARDWR
```

Response—Type HARDWR or HA to the INIT.SYS Option: prompt,

```
HARDWR suboption? DDNULL
```

Response—Type DDNULL or DD.

```
Idle display?
```

Explanation—On 11/73, 11/83, 11/84, 11/93 and 11/94 systems, there is a two digit numeric display called the Diagnostic Display that RSTS/E uses to display a running "countdown" pattern when the null job is running (that is, when the system is otherwise idle). Many sites use this pattern to gauge system activity. However, some sites may find the pattern confusing and choose to disable it.

Response—Type DISABLE or ENABLE:

- DISABLE means RSTS/E will not display a pattern in the Diagnostic Display. The display is cleared when the system disk is bootstrapped, and will remain blank during normal timesharing.
- ENABLE means that the countdown pattern is displayed in the Diagnostic Display when the null job is running.

```
HARDWR suboption?
```

Response—Type EXIT or press RETURN to return to the Option: prompt.

HARDWR Error Messages

A list of the error messages for the various HARDWR suboptions follows. If your error message does not appear, see Appendix A.

ADDRESS MUST BE AN EVEN OCTAL NUMBER GREATER THAN 160000.

Suboption: CSR

Explanation: You specified an invalid address.

User Action: Type an address that meets the requirements.

CANNOT DISABLE CONSOLE TERMINAL

Suboption: DISABLE

Explanation: You tried to disable the console terminal.

CONTROLLER ALREADY DISABLED

Suboption: DISABLE

Explanation: You tried to disable a disabled controller.

CONTROLLER NOT DISABLED

Suboption: ENABLE

Explanation: You tried to enable an enabled controller.

CONTROLLER NUMBER MISSING

Suboption: DISABLE, ENABLE, CSR, VECTOR

Explanation: You did not specify a controller number for a device that has multiple controllers.

CONTROLLER NUMBER MUST BE LESS THAN nn

Suboption: DISABLE, ENABLE, CSR, VECTOR

Explanation: The controller number you typed is larger than the maximum of nn.

DH11 ALREADY ASSIGNED TO A DM11-BB

Suboption: DM

Explanation: The DH11 unit you specified is already assigned to a DM11-BB.

INVALID CONTROLLER NAME

Suboption: DISABLE, ENABLE, CSR, VECTOR

Explanation: The first two characters you typed did not name a valid device controller.

User Action: Type ? to obtain a list of valid controller names and try again.

INVALID CONTROLLER NUMBER

Suboption: DISABLE, ENABLE, CSR, VECTOR

Explanation: The controller number you typed is not an integer.

User Action: Type the number in the correct format.

INVALID RESPONSE

Suboption: DM

Explanation: The unit number you specified is not a decimal number from 0 to 15.

VECTOR MUST BE AN EVEN OCTAL NUMBER LESS THAN 1000.

Suboption: VECTOR

Explanation: You specified an invalid address.

User Action: Type an address that meets the requirements.

IDENT—List the Version Number and Patch Information

The IDENT option lists the INIT.SYS version number and information about the patches installed on your system. Use the IDENT option if you are submitting an SPR to Digital and need to obtain this information.

IDENT Dialogue

```
Option: IDENT
```

Response—Type IDENT or ID to the INIT.SYS Option: prompt.

```
INIT V10.0-L [Built DD-MMM-YY]

Option:
```

Explanation—IDENT prints the INIT.SYS version number, then returns to the Option: prompt.

PATCH—Install a Patch

The PATCH option provides a method for altering RSTS/E system code. Use the PATCH option if you need to correct errors in the system code. Use the PATCH option only as directed by Digital.

Patching makes permanent changes to the code on disk and has no effect on the code currently in memory. Therefore, after patching the initialization code, you must bootstrap the system disk to load the corrected initialization code into memory.

Digital publishes mandatory corrections to code in the *RSTS/E Release Notes* if the changes are concurrent with the release of the distribution kits. Between releases, patches are published in the monthly *RSTS/E Software Dispatch*. The following procedures describe the PATCH option in detail. In general, however, published patches include the necessary instructions.

When you install a new RSTS/E system, refer to the *RSTS/E Release Notes* and the *RSTS/E Software Dispatch* for patches and patching information. Unless instructed otherwise, you should install all required patches immediately after installing your RSTS/E monitor.

PATCH Dialogue

```
Option: PATCH
```

Response—Type PATCH or PA to the INIT.SYS Option: prompt.

```
File to patch?
```

Explanation—PATCH asks for the file to patch. You can patch any file in account [0,1]. This directory includes the initialization code (INIT.SYS) and any .SIL, .RTS, .LIB file, .TSK, or .SAV files.

Response—Type the name and extension of the file that requires patching. Or, press RETURN to patch the installed monitor SIL.

```
Module name?
```

Explanation— The module name designates the SIL module to be patched only if you are patching a monitor. If you are not patching a monitor, this question will not appear.

Response—Type the module name you want to patch.

```
Base address?
```

Explanation—The base address defines the actual locations to be patched.

Response—Type the base address of the file you want to patch. Responses can be numbers or expressions. Valid octal numbers are 0 to 177777, and leading zeros are optional. Valid decimal numbers are 0. to 65535., and are distinguished from octal numbers by the presence of a trailing decimal point.

```
Offset address?
```

Explanation—The offset address is the first location to be patched relative to the specified base.

Response—Type the offset address of the file you want to patch. See the previous response for a description of legal values.

```
 Base    Offset    Old       New?
 126466  001010    000034    ?
```

Explanation—After you specify the base and offset addresses, PATCH opens the specified locations, prints the old contents, and accepts input. If the old contents do not match what is shown under "Old" in the published patch, then you may have made an error. Remove any changes you have already made and try again.

Response—Table 22 summarizes the possible responses to this prompt.

Table 22: Possible Input to the PATCH Option

Input	Meaning
Number, symbol, or expression	Enter the number, symbol, or expression as the new contents of the current location.
RET	Advance to the next location without altering the contents of the current location.
^ (circumflex)	Return to the previous location without altering the contents of the current location.
CTRL/Z	Return to the previous question.
CTRL/C	Finish all patching and return to the Option: prompt.

PATCH makes each specified change immediately after you press RETURN. Therefore, if you make an error, you must patch the location again to correct your mistake.

To check that an entire patch is correct, type Ctrl/Z to return to the Offset address? question. Type the same offset, then press RETURN to examine all the patched locations. If the old contents listed for any location do not match the "New" column in the published patch, restore all locations to their original contents and install the patch again. If you have followed the published patch procedures correctly and the old contents do not match the published patch, consult your software support representative.

```
126466  001012   010523   ? ^C
Option: <Start>
```

Explanation—You terminate a PATCH operation by entering Ctrl/C. PATCH then finishes all patching and returns to the Option: prompt.

If you patch the initialization code, you must reboot the system. Rebooting loads the changed version of the initialization code into memory. To perform the bootstrap procedure, follow the instructions in the published patch and use the INIT.SYS BOOT option.

Response—Type Ctrl/C when you have finished the PATCH operation

PATCH Error Messages

A list of the PATCH error messages follows. If your error message does not appear, see Appendix A.

ADDRESS ABOVE MODULE BOUNDS

Explanation: The address you specified exceeds the upper bound of the module.

ADDRESS BELOW MODULE BOUNDS

Explanation: The address you specified is below the lower bound of the module.

BLOCK OFFSET BEYOND EOF

Explanation: The block offset address you typed is greater than or equal to the number of blocks in the file.

FILE NOT FOUND

Explanation: The initialization code did not find the file you specified in account [0,1] on the system disk.

ILLEGAL FILE NAME

Explanation: The file name you typed is in an incorrect format. Or, you pressed RETURN and no monitor SIL is installed.

INVALID MODULE NAME

Explanation: The module name you typed is in an incorrect format. The name must a combination of alphanumeric characters up to 6 characters long.

INVALID CHARACTER

Explanation: The expression line contains an illegal character.

INVALID EXPRESSION

Explanation: The expression contains an illegal symbol name or an invalid operator. Symbol names must be a combination of alphanumeric characters up to 6 characters long. Valid operators are +, -, *, and /.

INVALID SIL FORMAT

Explanation: The file you specified does not contain a valid SIL directory.

User Action: If the file is not a SIL, append the /N qualifier to the file name.

MODULE NOT FOUND IN SIL

Explanation: The module you specified is not in the SIL.

User Action: Type a ? in response to the MODULE NAME question for a directory of SIL modules.

SYMBOL NOT FOUND IN STB

Explanation: A symbol you typed is not in the symbol table for the module.

REFRESH—Perform File-Related Tasks

The REFRESH option performs tasks associated with system files. System files are files that are of particular use to the system itself. They reside in account [0,1]. The following sections describe the REFRESH suboptions.

The REFRESH suboptions are:

- REFRESH LIST - List File Status Table
- REFRESH FILE - Change Account [0,1] File Characteristics
- REFRESH BADS - Expand the Bad Block File

System File Background Information

System files need contiguous space on the disk. It is better to create system files during system installation when there is sufficient contiguous space on the disk. If you initialized a nonsystem disk, you can create some of these files on the nonsystem disk, freeing space on the system disk.

This section explains the system files. It groups the files into two sets: those files that are automatically created during system installation, and those optional files that you can create according to the needs of your installation.

Automatically created during installation

- SWAP.SYS
- SWAP1.SYS
- BUFF.SYS
- CRASH.SYS

Optional

- SWAP0.SYS
- SWAP3.SYS
- OVR.SYS
- ERR.SYS

Use the INSTALL/SWAP_FILE, the INSTALL/ERROR_FILE, or the INSTALL/OVERLAY_FILE commands (see the *RSTS/E System Manager's Guide*) if you need to recreate some files at different sizes, or create optional files according to the needs of your particular installation.

Table 23 shows the system files, whether they are automatically created or optional, their optimal location, and a formula for calculating the size. The following sections explain this table in more detail.

Table 23: Summary of System File Creation

System File	Status	Location	Size
	Automatically Created Files		
SWAP.SYS	INIT.SYS creates this file at the minimum size. (See Task 2 of Phase 7 in Part 1.)	First available location, starting from beginning of disk.	1 job * SWAP MAX* 4
SWAP1.SYS	INSTAL.COM creates this file at a size large enough to hold all the jobs on your system. (See Task 1 of Phase 5 in Part 1.)	Near SATT.SYS file, usually center of system disk.	(# of jobs - 1) *SWAP MAX * 4
CRASH.SYS	INIT.SYS creates this file. (See Task 2 of Phase 7 in Part 1.)	First available location on system disk.	Sum of low core data region, XBUF pool, FIP buffer pool, monitor regions (cannot be calculated)
	Optional Files		
SWAP0.SYS	Optional	Center of nonsystem disk.	# of highly interactive jobs * SWAP MAX * 4
SWAP3.SYS	Optional	Center of nonsystem disk.	# of event-driven jobs * SWAP MAX * 4
OVR.SYS	Optional	Center of nonsystem disk.	Maximum of 150 blocks
ERR.SYS	Optional	Center of system or nonsystem disk.	Same size as ERR.ERR (16 blocks)

The SWAP.SYS File

Definition—The *SWAP.SYS file* is one of four available swap files, which stores jobs transferred out of memory.

Status—The SWAP.SYS file is required. Without this file, the monitor cannot swap jobs out of memory; your system will not work. INIT.SYS automatically creates a minimum SWAP.SYS file during system installation at a size large enough to hold 1 job. (See Task 2 of Phase 7 in Part 1.)

Location—INIT.SYS positions the SWAP.SYS file on the system disk at the first available location, starting at the beginning of the disk.

Size—The size of the SWAP.SYS file is:

1 job * SWAP MAX * 4

The SWAP1.SYS File

Definition—The SWAP1.SYS swap file performs the same function as SWAP.SYS. The monitor uses this file to store *highly interactive jobs* – jobs that get transferred in and out of memory frequently.

Status—The INSTAL.COM command file automatically creates a SWAP1.SYS file during system installation (see Task 1 of Phase 5 in Part 1).

Location—INSTAL.COM places this file as close to the SATT.SYS file as possible, usually the center of the system disk.

Size—INSTAL.COM creates the SWAP1.SYS file at a size large enough to hold all the jobs on your system, according to this formula:

(# of jobs - 1) * SWAP MAX * 4

Reasons for Creating—This file provides enough swap file space to accommodate all the jobs on your system. When the monitor transfers a highly interactive job out of memory, it places the highly interactive job in the first available space in a swap file, starting with SWAP0.SYS. If it does not find any space (or SWAP0.SYS does not exist), the monitor looks for space on SWAP1.SYS, then SWAP.SYS, then SWAP3.SYS.

The CRASH.SYS File

Definition– The *CRASH.SYS file* stores information about the read/write area of the monitor and the extended buffer pool (often called XBUF) when a system crash occurs.

Status—You must have CRASH.SYS to enable the crash dump feature. This feature causes the read/write area of the monitor and the extended buffer pool to be dumped into CRASH.SYS when a system crash occurs. INIT.SYS automatically creates this file during system startup. (See Task 2 of Phase 7.)

Location—INIT.SYS positions the CRASH.SYS file at the first available location on the system disk.

Size—INIT.SYS creates CRASH.SYS at a size equal to R/W areas that the monitor may access.

Planning the SWAP0.SYS File

Definition—The SWAP0.SYS swap file performs the same function as SWAP1.SYS. The monitor uses this file to store highly interactive jobs.

Status—SWAP0.SYS is an optional system file.

Location—This file is usually located at the center of a nonsystem disk.

Reasons for Creating—Create this file if you have a system and a nonsystem disk, and you want more swap file space. There is no point in having this file on the system disk. When the monitor transfers a highly interactive job out of memory, it places the highly interactive job in the first available space in a swap file, starting with SWAP0.SYS. If it does not find any space (or SWAP0.SYS does not exist), the monitor looks for space on SWAP1.SYS, then SWAP.SYS, then SWAP3.SYS.

Thus, you can increase the speed of swapping highly interactive jobs by creating SWAP0.SYS at the center of the nonsystem disk. The SWAP1.SYS file would then not need to exist on your system disk, freeing valuable space and balancing the I/O load on your disks.

Size—Estimated # of highly interactive jobs * SWAP MAX * 4

Planning the SWAP3.SYS File

Definition—SWAP3.SYS is a swap file that performs the same function as SWAP.SYS. The monitor uses this file to store event-driven jobs—jobs that do not get transferred in and out of memory frequently. Examples of event-driven jobs are QUEMAN, ERRCPY, OPSER, SPOOL, PBS, and OMS.

Status—The SWAP3.SYS file is an optional system file.

Location—This file is usually located at the center of a nonsystem disk.

Reasons for Creating—Create SWAP3.SYS if you have a system and a nonsystem disk, and you want more swap file space. There is no point in creating this file on the system disk. The monitor uses a different method to swap event-driven jobs than it does for highly interactive jobs. Instead of starting with SWAP0.SYS, the monitor places the event-driven job in the first available space starting with SWAP3.SYS. If it does not find any space, the monitor looks for space on SWAP.SYS, then SWAP1.SYS, then SWAP0.SYS.

Thus, you can speed up the swapping of event-driven jobs by creating SWAP3.SYS at the center of the nonsystem disk. The SWAP1.SYS file would then not need to exist on your system disk, freeing valuable space and balancing the I/O load on your disks.

Size—Estimated # of event-driven jobs * SWAP MAX * 4

Table 24 shows the approximate amount of time in seconds needed to transfer different size job images for different disks. Use this information to create swap files on the disks that you feel will give you optimum performance.

Table 24: Swap Times

Disk	Job Size (in words)			
	16K	28K	32K	64K
RA60	.07	.08	.08	.11
RA70	.05	.07	.07	.12
RA80	.06	.08	.09	.14
RA81	.05	.06	.07	.10
RA82	.05	.06	.06	.09
RA90	.04	.05	.05	.07
RC25	.06	.07	.08	.13
RD31/32	.05	.06	.06	.09
RD51	.14	.17	.19	.29
RD52	.10	.14	.15	.26
RD53/54	.09	.13	.14	.24
RK05	.25	.38	.43	.78
RK06/07	.11	.15	.17	.29
RL01/02	.13	.18	.19	.32
RM02/RP04/05/06	.08	.11	.12	.20
RM03/05/80	.06	.08	.09	.14

The swap times for each disk were calculated using the formula:

Swap time = Avg access time + ((Job size * 2)/Transfer speed)

where:

Average access time	measured in seconds, is defined as the sum of the average seek time and the average latency time.
Transfer speed	is measured in kilo-bytes per second (KB/S).
Job size	is measured in kilo-words (KW).

See the appropriate Peripherals Handbook for the average access time and transfer speed of a particular disk.

Planning the OVR.SYS File

Definition—The *OVR.SYS file* can store a copy of certain parts of the currently installed monitor save image library (SIL).

Status—You do not need to create OVR.SYS. It is an optional system file.

Location—You can create OVR.SYS on either the system or nonsystem disk. You should locate OVR.SYS as close as possible to the center of the disk, so that the monitor can access it quickly.

Reasons for Creating OVR.SYS—OVR.SYS stores part of the monitor code that is located in the installed monitor SIL. Since the installation procedure tries to locate your RSTS SIL at the center of the disk, the OVR.SYS file is not usually useful. Create it only if you are concerned that free space near the center of the disk is not available or create it in the center of a nonsystem disk to balance the I/O load.

Size—The maximum size of the OVR.SYS file is 150 blocks.

Planning the ERR.SYS File

Definition—The *ERR.SYS file* stores a copy of the system error messages, which are located in the ERR.ERR file. You copied ERR.ERR to your system disk in Phase 2 of Part 1.

Status—You do not need to create ERR.SYS; it is an optional system file.

Location—Create ERR.SYS on a nonsystem disk if you have one. Otherwise, create ERR.SYS on the system disk. Locate ERR.SYS as close as possible to the center of the system or nonsystem disk to improve access and response time for error messages.

Reasons for Creating ERR.SYS—ERR.SYS is merely a copy of ERR.ERR, but ERR.ERR may be located at the beginning of the disk rather than at the center. Files, on average, are more quickly accessed when they are located in the center of the disk. You cannot move ERR.ERR, but you can locate ERR.SYS as close to the center of the disk as possible. Thus, when the monitor needs to access system error messages, it will access ERR.SYS instead of ERR.ERR, thereby increasing system performance.

If you are not worried about error messages taking a few milliseconds longer, then you do not need to create ERR.SYS.

Size—ERR.SYS should be the same size as ERR.ERR. Use the LIST suboption of REFRESH to see the size of ERR.ERR (16 blocks).

Figure 12 provides a system file creation worksheet that allows you to write the sizes and locations of the system files you need to create or change. Note that the formula for calculating the center of the disk for these files is based on the assumption that you placed the SATT.SYS file at the center of your disk during disk initialization.

```
FORMULA FOR LOCATION:

(STARTING LBN FOR SATT.SYS) - (X TOTAL BLOCKS) = STARTING LOCATION OF FILES
                              ----------------
                                      2
```

where:

STARTING LBN FOR SATT.SYS	is the starting logical block number for the SATT.SYS file. You can find this by looking at the file status table in the LBN column.
X TOTAL BLOCKS	is the total number of blocks for the system files you want to create on that disk.

Figure 12: System File Creation Worksheet

System File	Size (in blocks)	Location
SWAP.SYS	_____	_____
SWAP0.SYS	_____	_____
SWAP1.SYS	_____	_____
SWAP3.SYS	_____	_____
OVR.SYS	_____	_____
ERR.SYS	_____	_____
BUFF.SYS	_____	_____
CRASH.SYS	_____	_____

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REFRESH LIST—List File Status Table

The LIST suboption of REFRESH lists the file status table. The *file status table* lists all the files that can reside in account [0,1] of your system and nonsystem disk. You should list the file status table before and after creating or changing any system files.

LIST Dialogue

```
Option: REFRESH
```

Response—Type REFRESH or RE to the INIT.SYS Option: prompt.

```
dd-mmm-yy - hh:mm AM/PM

Disk?
```

Explanation—REFRESH prints the current date and time, then asks for the device designator of your disk.

Response—Possible responses for your disk are: DK, DL, DM, DR, DB, or DU.

```
Unit?
```

Explanation—This question asks for the number of the drive on which your system disk is mounted.

Response—Type the unit number of the drive on which your disk is mounted.

```
Rebuild?
```

Explanation—This question asks if you want to force a rebuild of a disk that you think might be corrupt. The *rebuild* feature of REFRESH rebuilds the SATT.SYS file and checks the consistency of directories. Normally, you rebuild a disk if it was dismounted improperly.

Response—Type YES to force a rebuild of the disk; type NO if you do not want to force a rebuild of the disk. Even if you type NO, REFRESH rebuilds the disk if it is necessary.

```
REFRESH suboption? LIST
```

Explanation—You are now finished with the questions asked by REFRESH and are at the REFRESH suboption? prompt. Now you can list the file status table for the system disk.

Response—Type LIST or LI.

```
  File                    File          Current  Minimum   Start
  Name       Required?    Flags  Status   Size     Size      LBN

System files:

  SWAP   .SYS    YES     NOD CTG      OK       264       264     1409
  SWAP0  .SYS     NO                  OK
  SWAP1  .SYS     NO         CTG      OK      4992                4865
  SWAP3  .SYS     NO                  OK
  OVR    .SYS     NO                  OK                 131
  ERR    .SYS     NO                  OK                  16
  BUFF   .SYS     NO                  OK
  CRASH  .SYS     NO     NOD CTG      OK       708       708     1537

Others:

  BADB   .SYS            NOD                   20
  SATT   .SYS            NOD CTG                4              26873
  ERR    .ERR            NOD CTG               16                 49
  BACKUP.TSK                 CTG               138
  INIT   .SYS            NOD CTG               618                165
  SYSGEN.SIL                 CTG               681                721
  DCL    .RTS                CTG               114               1281
  UPDATE.COM                 CTG                 2
  RT11   .RTS                CTG                20               1873
  RSX    .RTS            NOD CTG                 6               1893
  ODT    .SYS                CTG                14
  INSTAL.COM                 CTG                24               1917
  SYSINI.COM                 CTG                 3

  RSTS10.SIL             NOD CTG               574              12417

  START  .COM                CTG                13               4061
  LOGIN  .COM                CTG                 4
  BASIC  .RTS                CTG                73              11201
    .
    .
    .
REFRESH suboption? RET

Option:
```

Explanation—LIST prints the file status table, which has seven columns:

- File Name - This column lists all of the files that can or currently reside in account [0,1]. The table lists the files in two categories: System Files and Others.
- Required? - This column has two possible entries: YES, which means the files are required for the operation of the current monitor; NO, which means the files are not required for the operation of the current monitor. This column is always blank for nonsystem files, which are listed under the Others column. The System File Background section explains how to determine what system files you need to create.
- File Flags - This column has two possible entries: NOD, which means you cannot delete the file during timesharing; CTG, which means the file is contiguous on the disk.
- Status - This column has three possible entries: OK, which means you do not have to change the file's characteristics; CRE, which means you must create the file; D/C, which means you must delete and then recreate the file.
- Current Size - This column shows the current file size in blocks. If the column is blank, it means the file has not been created. The column also shows the current size of the nonsystem files.
- Minimum Size - This column shows the minimum sizes, in blocks, of the system files.
- Start LBN - This column shows the logical block number n at which each contiguous file starts. Disk logical blocks are numbered from 0 to the disk size minus 1. If the column is blank, it means either the file is not contiguous, or if it is contiguous, it might be extended and become noncontiguous.

Response—After LIST prints the file status table, it returns to the REFRESH suboption? prompt. Type EXIT or press RETURN to return to the Option: prompt.

REFRESH FILE—Change Account [0,1] File Characteristics

The FILE suboption of REFRESH creates, deletes, or marks as deletable (or nondeletable) the files that reside in account [0,1].

Use the FILE suboption if:

- You need to delete obsolete run-time system files (files with file types of RTS).
- You need to mark other files (usually application files that you create) as deletable or nondeletable. You can also do this on line with the /DELETABLE and /NODELETABLE qualifiers of the SET FILE command.

NOTE

You can never modify the characteristics of the INIT.SYS, ERR.ERR, and installed monitor SIL files, which are located on the system disk.

FILE Dialogue

```
Option: REFRESH

dd-mmm-yy - hh:mm AM/PM

Disk?
Unit?
Rebuild?

REFRESH suboption? FILE
```

Explanation—Answer the preliminary REFRESH questions. You then see the REFRESH suboption? prompt.

Response—Type FILE or FI.

```
File name?
File exists. Delete it?
```

Explanation—The next question asks for the name of the file whose characteristics you want to change.

Response—Respond with a file name and type. If the file exists in account [0,1], FILE asks if you want to delete it. Type YES or NO. If your response is NO, FILE asks the next question.

```
Size?
```

Response—To retain the current size, type OLD or press RETURN. Note that if you type any other response to this question, REFRESH may reallocate the file and you will lose the data.

```
Base?
```

Response—To retain the current location, type OLD or press RETURN. Note that if you type any other response to this question, REFRESH may reallocate the file and you will lose the data.

```
Deletable?
```

Explanation– This question asks if you want to mark a file as deletable or nondeletable. This feature is useful for installations that need to create other files. For example, you may want to mark some important accounting files as nondeletable.

During day-to-day system management you use the SET FILE/DELETABLE and SET FILE/NODELETABLE commands to mark files. See the *RSTS/E System Manager's Guide* for details.

Response—Type NO if you want to mark the file as nondeletable; type YES if you want to mark the file as deletable. Or, type OLD or press RETURN to retain the current status.

```
File name?  RET

REFRESH suboption?
```

Response—Type another file name or press RETURN to return to the REFRESH suboption? prompt. Press RETURN once more to return to the Option: prompt. Or, specify another REFRESH suboption.

REFRESH BADS—Expand the Bad Block File

The BADS suboption of REFRESH lists the bad blocks currently in the bad block file (BADB.SYS) and adds bad blocks to this file.

Use the BADS suboption if you need to remove blocks from service because they have gone bad.

BADS Dialogue

```
Option: REFRESH

dd-mmm-yy - hh:mm AM/PM

Disk?
Unit?
Rebuild?

REFRESH suboption? BADS
```

Explanation—Answer the preliminary REFRESH questions. You then see the REFRESH suboption? prompt.

Response—Type BADS, BAD, or BA.

```
Bads? LIST
```

Explanation—This question asks if you want to list the bad blocks or add bad blocks to the bad block file.

Response—To list the current contents of BADB.SYS, type LIST. BADS prints the contents or a message declaring that there are no bad blocks on the disk.

```
Bads?
```

Explanation—BADS returns to the Bads? question.

Response—Type ADD to add bad blocks to BADB.SYS.

```
Block number?
```

Response—BADS then asks for the bad block number. Type the logical block number (in decimal) of the bad block. This number can range from 2 to the disk size minus 1. You can obtain the logical block number of a bad block from the ERRDIS printout of the disk error.

```
Really add logical block XXXX to BADB.SYS?
```

Response—This question asks if the number you specified is the one you want added to BADB.SYS. Type YES to add it. If your response is YES, BADS allocates the pack cluster in which the block resides to BADB.SYS. Use caution, because the allocation of a cluster to BADB.SYS is irrevocable.

Type NO if you do not want to add it to this file. If you type NO, BADS repeats the Block numbers? question.

```
Bads? RET

Disk is being rebuilt - wait ...

REFRESH suboption?
```

Response—Press RETURN to exit the BADS suboption. Press RETURN again to return to the Option: prompt. If you added any bad blocks, REFRESH rebuilds the disk. The rebuilding operation allows you to delete all files that contain bad blocks.

REFRESH Error Messages

A list of the REFRESH error messages follows. If your error message does not appear, see Appendix A.

CANNOT REFRESH THIS DISK

User Action: Rerun DSKINT and then try REFRESH again.

CANNOT CHANGE OR MOVE .RTS OR .SIL WITH REFRESH

Explanation: You cannot move or change any files with a .RTS or .SIL file type.

ILLEGAL DISK NAME

Explanation: The response you typed is not a valid disk name. Valid disk names are DK, DL, DM, DR, DB, and DU.

User Action: Press RETURN to use the system disk.

ILLEGAL SUBOPTION

Explanation: The response you typed is not a valid suboption name.

SORRY, BUT THAT DISK DOESN'T EXIST

Explanation: The disk device or unit number you specified does not exist on this PDP-11.

User Action: Use the HARDWR option to list the hardware configuration.

THAT FILE CANNOT BE CHANGED

Explanation: You cannot modify the file.

THAT FILE IS THE CURRENTLY INSTALLED SIL AND CANNOT BE MOVED OR DELETED

Explanation: You cannot move or delete the installed monitor SIL.

TOO MANY BAD BLOCKS

Explanation: There can be no more than 161 clusters in the bad block file.

SAVRES—Restore and Copy Disks

NOTE

The purpose of this option is to recover data from SAVE sets created by SAVRES prior to V10.0. Bootable backup media are created using the RECOVR.COM procedure. See the *RSTS/E System Manager's Guide.*

In the following discussions of the SAVRES options, all references to SAVE sets and operations apply to pre-V10.0 tapes and disks.

The SAVRES option is a disk restore and copy utility. SAVRES has three operational functions:

- RESTORE - Recreate a like disk from pre-V10.0 tape or disk Save set
- IMAGE - Make a copy of a disk to a like disk
- IDENTIFY - Extract label information from a SAVRES volume or RSTS/E disk.

SAVRES provides a nonselective restore and copy capability that requires operator responses during the operational dialogue. Unlike the DCL BACKUP utility, SAVRES processes entire volumes only and does not allow selective file transfers. You **cannot** use SAVRES on a disk with a pack cluster size of 32 or 64. When SAVRES encounters bad blocks, it requires no operator intervention. Use SAVRES when you need to restore a previously created or pre-V10.0 SAVE set.

To understand SAVRES, you should know these terms:

SAVE format	The format of the output written by a SAVE operation and read by a RESTORE operation.
SAVE set	The set of magnetic tapes or disks created by a SAVE operation. A SAVE set must be composed entirely of disks or tapes; it cannot be a combination of the two device types. However, you can mix different drive types within one set, for example, two RK05's and one RK06.
SAVE volume	One of the magnetic tapes or disks of a SAVE set.
SAVE set name	One-six alphanumeric characters used to identify a SAVE set. By default, the SAVE set name is the same as the pack ID from which it was created. However, you can specify another name for the SAVE set.
Like disks	Like disks are units of the same device size (that is, the same number of data blocks.) SAVRES considers the following devices alike: – Two RP06 disks – An RM02 and an RM03 – An RP04 and an RP05 – An RK05 (RK05J) and one unit of an RK05F Therefore, if you copied an RM02 to a SAVE set, the SAVE set can later be restored either to an RM03 or another RM02.

Normally, you use the SAVRES program off line while running INIT.SYS. You can also use SAVRES on line, during timesharing. See the *RSTS/E System Manager's Guide* for more information about running SAVRES on line.

NOTE

You must run SAVRES off line to copy (IMAGE) or restore (RESTORE) the system disk with which you are currently running on line. To restore the system disk, you must boot the save set or image copy and select the SAVRES option.

SAVRES prints messages on your terminal during an operation to tell you its status. Some messages are for information only; other messages are error conditions that may require your attention during the dialogue, mount, transfer, or verification phases of SAVRES.

When the program encounters an error during a dialogue or mount operation, it asks you to correct the problem and to retype the appropriate command. Such errors never affect the integrity of the data being transferred.

Errors that occur while SAVRES is transferring or verifying data can, however, jeopardize data. In this case, SAVRES resolves the problem, aborts the run, or asks you to continue or to abort the program. The program gives you information to help you protect your data by printing informational messages and error messages on your terminal. When SAVRES completes a RESTORE or IMAGE operation, it prints an optional summary report. This report describes:

- The operation performed
- Device information
- Start date and time statistics
- Run total statistics

The run statistics include the number of errors encountered during the operation.

If you are not familiar with SAVRES or want more detailed information about it, see the *RSTS/E System Manager's Guide*.

RESTORE—Recreate a Disk From Tape or Disk

The RESTORE function recreates a RSTS/E file-structured disk from a pre-V9.7 SAVE set. Because SAVRES writes the SAVE set in the SAVE format, no other RSTS/E software can perform this rebuild process. Before transferring any data, SAVRES tries to extract bad block information from the destination disk and, if it finds any bad blocks, incorporates them into the new BADB.SYS file.

NOTE

When using RESTORE, you must ensure that the disks from which the data came and that which you are restoring to are **like disks**.

The SAVRES program may encounter bad blocks during a RESTORE operation. If it does, it scans the SATT.SYS file to determine if there is a place where the block corresponding to a bad block can be relocated. If a large enough area exists on the destination disk, the program simply moves the data to the new location and modifies the directory information accordingly.

The relocation of blocks may require RESTORE to change a file's characteristics. This can occur, for example, if the program encounters a bad cluster while transferring a contiguous file. To relocate the cluster that falls on the bad block, RESTORE must make the file noncontiguous. Changes of this type can cause a few problems, but RESTORE preserves the data and informs you of these adjustments.

The operation ends if there is no way RESTORE can relocate the data cluster. This can occur if:

- No unallocated pack cluster remains on the disk.
- The file cluster size is larger than the pack cluster size and there is not an equivalent number of contiguous pack clusters left on the disk.

When SAVRES creates a SAVE set, it includes on the output volume an extra set of directory blocks in case some directory blocks are found to be bad during a RESTORE operation. These additional blocks were reflected in the total block count for a SAVE Summary Report. Because the extra blocks are needed only when bad blocks are encountered during a RESTORE operation, it is unnecessary for SAVRES to transfer these blocks to the restored volume.

Thus, you will notice a discrepancy between the number of blocks transferred for the original SAVE operation and the number transferred during a RESTORE. Furthermore, because the extra directory blocks are not transferred to the restored volume, under certain circumstances you may restore your data to one less volume than existed in the SAVE set.

The following example illustrates the restoration of an RM03 disk from a tape SAVE set named SAVSET. The two SAVE set volumes are mounted on drives MM1: and MM2:, write-locked. The destination disk is mounted on drive DR1:, write-enabled.

RESTORE Dialogue

```
Option: SAVRES
```

Response—Type SAVRES to the INIT.SYS Option: prompt.

```
SAV/RES Function: RESTORE
```

Explanation—SAVRES asks for the particular function you want to use.

Response—Type RESTORE to begin the RESTORE operation. The example plans to recreate an RM03 disk from a tape SAVE set.

```
From device? MM1:
```

Explanation—RESTORE prints the From device? question. Specify the device name and the unit number of the SAVE set medium. If you include a SAVE set name in the device specification, RESTORE checks it against the name already on the set. If they do not match, RESTORE issues a warning message informing you of the discrepancy.

Response—Type the device name and unit number of the input medium. In the example, the response is MM1: because the input medium is tape mounted on drive 1.

```
*** SAVE Set Name/default Pack ID is SAVSET
```

Explanation—RESTORE reads the SAVE set name from the input medium and displays it. Normally, RESTORE uses the name of the input SAVE set as the Pack ID of the output volume. If you want to use a different pack ID, you can include a new pack ID in your answer to the next question.

```
To RSTS Disk? DR1:TSTPAK
```

Explanation—RESTORE asks for the output disk of the RESTORE operation. DR indicates the device mnemonic of the RM03 disk.

NOTE

You cannot use SAVRES on a disk with a pack cluster size of 32 or 64. If you attempt to use SAVRES on a disk with these cluster sizes, the following messages will appear:

```
SAVRES cannot be used with disks of cluster size greater than 16.

 Dismount Device:   MM1:
        Set Name:   SAVSET
           Seq #:   1

   Creation date:   Friday, 13-Sep-90
 Expiration date:   Sunday, 1-Dec-90
```

Response—Type the device name, unit number, and pack ID of your output disk (if you want to change the pack ID name). In the example, the response is DR1:TSTPAK because it is recreating an RM03 disk mounted on drive 1. The new pack ID is TSTPAK.

Note—If the message "Performing limited hardware scan." was printed during this boot and you try to initialize or copy to a nonexistent disk, then you will receive the following error messages:

```
That disk was not found during limited hardware scan.

Do you wish to perform a reboot with full hardware scan <YES>?
```

Response—If the user answers YES, then the distribution device will be rebooted and the "Performing limited hardware scan." message will NOT reappear.

```
*** The volume on DR1: is a RSTS disk

*** Pack ID is MYPAK

*** Pack will be reinitialized

Mount it anyway <NO>? Y

*** Pack ID is TSTPAK
```

Explanation—RESTORE checks the pack ID of the output disk. It then prints a message showing you that the disk is a RSTS/E disk, has a Pack ID of MYPAK, and that RESTORE will reinitialize it. RESTORE issues a mount question that gives you the option to mount the disk or not.

Response—Type Y to mount the disk and reinitialize it. Type N or press RETURN to cancel the instruction. RESTORE then returns to the To RSTS Disk? question. In the example, the response is Y because the data on the disk is no longer valuable. RESTORE then initializes the disk and prints a message showing the new pack ID.

```
Verify (Yes or No) <NO>? RET
```

Explanation—RESTORE asks if you want to verify the accuracy of the data transfer. When RESTORE verifies the transferred data, it performs two operations rather than one. That is, the program performs two passes on the data: once for the transfer and once for the comparison.

Response—Type N or press RETURN to skip the verify pass. Or, type Y to perform the data verification. In the example, the response is RETURN because the comparison of the input data to the data already transferred to the destination disk is not essential during this particular run.

```
Proceed (Yes or No)? Y
```

Explanation—RESTORE asks if you are ready to proceed.

Response—Type Y to proceed. Or, type N to cancel the operation and return to the SAV/RES Function: prompt. In the example, the response is Y.

```
*** Begin RESTORE from MM1: to DR1: at 08:28 PM
 Dismount Device:       MM1:
        Set Name:       SAVSET
           Seq #:       1
         Density:       800

   Creation date:       Friday, 13-Sep-90
 Expiration date:       Sunday, 1-Dec-90

Mount volume # 2 of SAVE Set SAVSET
Device ? MM2:
Proceed (Yes or No)? Y
*** Begin RESTORE from MM2: to DR1: at 08:32 PM
 Dismount Device:       MM2:
        Set Name:       SAVSET
           Seq #:       2
         Density:       800

   Creation date:       Friday, 13-Sep-90
 Expiration date:       Sunday, 1-Dec-90

 Dismount Device:       DR1:
         Pack ID:       TSTPAK
Pack Clustersize:       8

   Creation date:       Friday, 13-Sep-90
```

```
      Please label this volume!
--- RESTORE operation completed at 08:37 PM
```

Explanation—RESTORE displays a message to indicate it has begun the transfer. If the transfer involves multiple volumes, RESTORE transfers the first volume, prints input medium information and prompts you for the next volume. After you mount the next volume, specify its device location, and type Y at the Proceed? prompt, RESTORE continues with the data transfer. RESTORE continues in this manner for each SAVE set volume. When RESTORE finishes the final volume, it prints an output dismount message and informs you that the operation is completed.

Response—Mount the additional Save set volumes when prompted. Type the device location and unit number of the drive on which the next volume is mounted. Type Y to the Proceed? prompt when you are ready to continue.

In the example, volume 2 of SAVE set SAVSET is mounted on tape drive MM2:. Volume two is the final volume in the SAVE set.

```
            Summary Report
RESTORE of SAVE Set SAVSET to DR1:TSTPAK
    Input Device:       Magtape
        Set Name:       SAVSET
    # of volumes:       2
         Density:       800

   Creation date:       Friday, 13-Sep-90
 Expiration date:       Sunday, 1-Dec-90

   Output Device:       DR1:
         Pack ID:       TSTPAK
Pack Clustersize:       8

   Creation date:       Friday, 13-Sep-90
RESTORE started on Friday, 13-Sep-90, at 08:28 PM
```

Explanation—The Summary Report prints the SAVE set name, the pack ID, and label information for both the input and output medium, in addition to the date and time of the RESTORE operation.

```
          Run Statistics
Transfer Totals:
     Total of 54184 blocks transferred
Error Totals:
     Total of     0 new bad blocks encountered on destination.
     0 files structurally altered.
Timing Totals:
     Total elapsed time:   0 hrs.,   9 mins.,  36 secs.
     Total wait    time:   0 hrs.,   0 mins.,  16 secs.
     Total process time:   0 hrs.,   9 mins.,  20 secs.
SAV/RES Function: RET
Option:
```

Explanation—The Run Statistics Report prints the number of blocks transferred, the number of bad blocks encountered, and the times required to perform various operations. RESTORE returns to the SAV/RES Function: prompt when the operation has ended.

Response—Press RETURN or Ctrl/Z to return to the INIT.SYS Option: prompt.

NOTE

If you are using the output of a RESTORE operation as a system disk, you must use the INIT.SYS START option to reinstall the desired monitor Save Image Library (SIL). Before you use START, you must also redo any necessary HARDWR suboptions (such as changing Hertz) because the SAVE option clears various items set up by the HARDWR suboptions. This procedure is necessary because a disk can be saved with SAVE from one system disk and restored with RESTORE on a system with a different hardware configuration.

IDENTIFY—Extract Label Information

The IDENTIFY function obtains label information from a SAVE set volume or a RSTS/E file-structured disk.

The following example lists the label characteristics of both a SAVE set and a RSTS/E disk. The SAVE set volume is mounted on drive MM1:, write-locked. The RSTS/E disk is mounted on drive DR1:, write-locked.

IDENTIFY Dialogue

```
Option: SAVRES
```

Response—Type SAVRES to the INIT.SYS Option: prompt.

```
SAV/RES Function: IDENTIFY
```

Explanation—SAVRES asks for the particular function you want to use.

Response—Type IDENTIFY or ID to begin the IDENTIFY operation. The example plans to identify a SAVE set volume mounted on drive MM1:.

```
From device? MM1:
```

Explanation—IDENTIFY prints the From device? question. Specify the device name and the unit number of the SAVE set you want to identify. If you include a SAVE set name or pack ID in the device specification, IDENTIFY checks it against the name already on the set. If the names do not match, RESTORE issues a warning message informing you of the discrepancy and then prints the From device? question again.

Response—Type the device name and unit number of the medium you want to identify. In the example, the response is MM1:, because the input medium is tape, mounted on drive number 1.

```
        Device:      MM1:
      Set Name:      SAVSET
         Seq #:      1
       Density:      1600

 Creation date:      Friday, 13-Sep-90
Expiration date:     Sunday, 1-Dec-90
```

Explanation—IDENTIFY prints label information for the tape SAVE set.

```
SAV/RES Function: IDENTIFY DR1:
```

Explanation—IDENTIFY returns to the SAV/RES Function: prompt.

Response—Type the name of the next medium to identify. You can also include the device name and unit number of the medium in your response. IDENTIFY then skips the From Device? question.

If you do not need to identify any more media, press RETURN to return to the INIT.SYS Option: prompt.

In the example, the response is IDENTIFY DR1:. This requests SAVRES to identify the disk pack mounted on DR1:.

```
            Device:       DR1:
          Pack ID:        TSTPAK
  Pack Clustersize:       8
     Creation date:       Friday, 13-Sep-90

SAV/RES Function: RET

Option:
```

Explanation—IDENTIFY prints the label information of the disk pack mounted on DR1:. IDENTIFY returns to the SAV/RES Function: prompt when the operation has ended.

Response—If you do not need to identify any more media, press RETURN or Ctrl/Z to return to the INIT.SYS Option: prompt.

IMAGE - Make a Copy of a Disk

The IMAGE function makes an equivalent copy of a RSTS/E file-structured disk; however, only transfers from disk to like disk are legal when using the IMAGE operation. Like disks are units that have exactly the same device size. The SAVRES program handles bad block recovery during an IMAGE operation in the same way as RESTORE.

NOTE

If you are using the output of an IMAGE operation as a system disk, you must use the INIT.SYS START option to reinstall the desired monitor Save Image Library (SIL). Before you use START, you must also redo any necessary HARDWR suboptions (such as changing Hertz) because the IMAGE option clears various items set up by the HARDWR suboptions. This procedure is necessary because a disk can be saved with IMAGE from one system disk and carried to a system with a different hardware configuration.

The following example shows an IMAGE operation that copies an RP04 disk to an RP04 disk and verifies the transfer in the same pass. The source disk is mounted on drive DB0:, write-locked. The destination disk is mounted on drive DB1:, write-enabled.

```
Option: SAVRES
```

Response—Type SAVRES to the INIT.SYS Option: prompt.

```
SAV/RES Function: IMAGE/NOERROR
```

Explanation—SAVRES asks for the particular function you want to use.

Response—Type IMAGE to begin the IMAGE operation. The /NOERROR switch causes SAVRES to end the operation whenever the program encounters a run-time error. Before the program aborts, it prints an error message indicating the source of the problem.

```
From RSTS disk? DB0:
```

Explanation—IMAGE prints the From RSTS disk? question. Specify the disk from which you want to copy the data. If you include a pack ID in the device specification, SAVRES checks to see if it matches the actual pack ID on the disk. If the pack IDs do not match, SAVRES issues a warning message and prints the From RSTS Disk? question again.

NOTE

You cannot use SAVRES on a disk with a pack cluster size of 32 or 64. If you attempt to use SAVRES on a disk with these cluster sizes, the following messages will appear:

SAVRES cannot be used with disks of cluster size greater than 16.

```
 Dismount Device:   MM1:
        Set Name:   SAVSET
           Seq #:   1

   Creation date:   Friday, 13-Sep-90
 Expiration date:   Sunday, 1-Dec-90
```

Response—Type the device name and unit number of the disk you want to copy. In the example, the response is DB0: because the source disk is mounted on drive DB0:.

```
*** Input Pack ID/default Output Pack ID is SOURCE
```

Explanation—IMAGE reads the pack ID from the input disk and displays it on your terminal.

```
To RSTS DB: Disk? DB1:NICOLA
```

Explanation—IMAGE requests the device name and unit number of the output disk. DB indicates the device mnemonic of the RP04 disk.

Response—Type the device name, unit number, and pack ID of your output disk (if you want to change the pack ID name). In the example, the response is DB1:NICOLA because it is copying to an RP04 disk mounted on drive 1. The new pack ID is NICOLA.

```
*** The volume on DB1: is a RSTS disk
*** Pack ID is OUTPUT
*** Pack will be reinitialized
Mount it anyway <NO>? Y
*** Output Pack ID is NICOLA
```

Explanation—IMAGE checks the pack ID of the output disk. It then prints a message showing you that the disk is a RSTS/E disk, has a pack ID of OUTPUT and that IMAGE will reinitialize it. IMAGE issues a mount question that gives you the option to mount the disk or not.

Response—Type Y to mount the disk and reinitialize it. Type N or press [RETURN] to cancel the instruction. IMAGE then returns to the To RSTS DB: Disk? question. In the example, the response is Y because the data on the disk is no longer valuable. IMAGE then initializes the disk and prints a message showing the new pack ID.

```
Verify (Yes or No) <NO>? Y
```

Explanation—IMAGE asks if you want to verify the accuracy of the data transfer. When IMAGE verifies the transferred data, it performs two operations rather than one. That is, the program performs two passes on the data, once for the transfer and once for the comparison.

Response—Type N or press [RETURN] to skip the verify pass. Or, type Y to perform the data verification. In the example, the response is Y.

```
Proceed (Yes or No)? Y
```

Explanation—IMAGE asks if you are ready to proceed.

Response—Type Y to proceed. Or, type N to cancel the operation and return to the SAV/RES Function: prompt. In the example, the response is Y.

```
Begin IMAGE copy from DB0: to DB1: at 11:02 AM

Begin VERIFY pass from DB0: to DB1: at 11:04 AM

0 differences found

 Dismount Device:       DB1:
        Set Name:       NICOLA
Pack clustersize:       8
   Creation date:       Friday, 13-Sep-90

        Please label this volume!

--- IMAGE copy operation completed at 11:07 AM
```

Explanation—IMAGE displays a message when it begins to transfer data and when it begins the verify pass. After completing the data comparison, IMAGE prints the number of differences found between the two devices. It then issues the output device dismount message. Immediately after IMAGE prints the dismount request, it prints a message to show you the copy operation ended successfully.

```
            Summary Report

IMAGE copy of DB0:SOURCE to DB1:NICOLA

    Input Device:       DB0:
        Set Name:       SOURCE
Pack clustersize:       8
   Creation date:       Friday, 13-Sep-90

   Output Device:       DB1:
         Pack ID:       NICOLA
Pack Clustersize:       8
   Creation date:       Friday, 13-Sep-90

RESTORE started on Friday, 13-Sep-90, at 11:02 AM
```

Explanation—IMAGE prints the Summary Report unless you suppress it by using the /NOSTATS switch. The report includes the pack ID and label information of each disk, in addition to the date and time that the IMAGE operation was run.

```
          Run Statistics
Transfer Totals:
     Total of 24400 blocks transferred
Error Totals:
     Total of     0 bad compares.
     Total of     0 new bad blocks encountered on source.
     Total of     0 new bad blocks encountered on destination.
     0 files structurally altered.
Timing Totals:
     Total elapsed time:   0 hrs.,   5 mins.,  22 secs.
     Total wait    time:   0 hrs.,   0 mins.,  0 secs.
     Total process time:   0 hrs.,   5 mins.,  22 secs.
SAV/RES Function:  RET
Option:
```

Explanation—The Run Statistics Report prints the number of blocks transferred, the number of bad blocks encountered, and the times required to perform various operations. IMAGE returns to the SAV/RES Function: prompt when the operation has ended.

Response—Press RETURN or Ctrl/Z to return to the INIT.SYS Option: prompt.

Refer to the *RSTS/E System Manager's Guide* for a description of SAVRES error messages.

START—Start a RSTS/E Monitor

The START option activates a RSTS/E monitor. Use the START option if you need to start timesharing.

START Dialogue

```
Option: START
```

Response—Type START or START <monitor name> to the INIT.SYS Option: prompt.

If you do not specify a monitor name or press RETURN to the Option: prompt, START starts the monitor that was used in the previous timesharing session.

If you are starting timesharing for the first time on this system disk, INIT.SYS searches the list of monitors, which are stored in account [0,1] with the file type of .SIL. SIL stands for save image library, which is a file that stores the monitor code.

If INIT.SYS finds only one SIL, it installs that SIL and prints the message:

```
Starting xxxxxx monitor
```

If INIT.SYS finds more than one SIL, it prompts for the monitor name instead:

```
Monitor name to START <xxxxxx>?
```

Type the name of the monitor you want to install.

START now checks that the SWAP.SYS file exists in account [0,1] on the system disk, is large enough to hold one job at the current SWAP MAX, and is contiguous. If the file does not exist, START attempts to create SWAP.SYS at the required size. If the file exists but is not contiguous or large enough, START deletes the current SWAP.SYS file and attempts to create a new SWAP.SYS file that is both contiguous and large enough (SWAP MAX * 4). If START cannot find enough free contiguous disk space to create a minimum SWAP.SYS file, it prints the following error message:

```
?Not enough contiguous disk space to create minimum SWAP.SYS file
```

START then attempts to create a SWAP.SYS file that is smaller than the one you specified yet still meets the minimum requirements. This may take up to one minute. If START finds it can create a SWAP.SYS file, it prints these messages:

```
SWAP.SYS can be created if SWAP MAX is reduced to xxK

New SWAP MAX <xxK>?
```

Press RETURN to accept the default value, indicated by xx in the example. Or type Ctrl/C to return to the Option: prompt. You can then use the FILE suboption of REFRESH to create more disk space.

If START cannot find enough contiguous disk space to create a minimum SWAP.SYS file, it prints these messages:

```
You must free some disk space to start timesharing.

Option:
```

Use the FILE suboption of REFRESH to create more contiguous disk space.

```
Any memory allocation changes?
```

Explanation—START asks if you want to make changes to the memory allocation table for this timesharing session. You can be forced to make memory allocation changes.

Response—Type YES to make changes to the memory allocation table. (See the section, DEFAULT Option.) Type NO or press RETURN if you do not want any changes.

START now checks that the CRASH.SYS file exists in account [0,1] on the system disk, is large enough for the installed RSTS/E monitor and extended buffer pool allocation, and is contiguous. If the file does not exist, START attempts to create CRASH.SYS at the required size. If the file exists but is not contiguous or large enough, START deletes the current CRASH.SYS file and attempts to create a new CRASH.SYS file that is both contiguous and large enough. If START is unsuccessful it prints these error messages:

```
?Not enough contiguous disk space to create minimum CRASH.SYS file

Crash dump automatically disabled
```

When a crash occurs, the RSTS/E monitor dumps the contents of the read/write area of monitor memory into CRASH.SYS. Because the crash dump facility preserves the state of the system at the time of the crash, CRASH.SYS contains important diagnostic information. For these reasons, Digital recommends that you always have crash dump enabled during timesharing. In general, SPRs submitted on system crashes without crash dumps will be answered by Digital as "Insufficient information."

Therefore, if you see the Crash dump automatically disabled message, follow these steps to enable crash dump:

1. After you begin timesharing, delete unnecessary files to create more contiguous disk space. Or, move some files to a nonsystem disk.
2. Shut down the RSTS/E monitor using the SHUTUP program.
3. Use the START option to start timesharing. If you do not see the Crash dump disabled message, you know that INIT.SYS was able to create the CRASH.SYS file.

```
dd-mmm-yy  hh:mm AM/PM
```

Explanation—START prints the current date and time. Then it pauses for several seconds to prepare the system for timesharing. START performs many preparatory tasks, among the more important being:

- Verify that all configured hardware exists and that it responds properly.
- Disable any device it cannot find or that you have disabled with the HARDWR option. If this is the case, START prints the devices it disables.
- Enable all configured terminal controllers and disable any that do not respond.
- Set up monitor, cache, and device tables.
- Load the installed monitor into memory.

START then transfers control to the SYSINI.COM command file, which executes the START.COM command file. See the *RSTS/E System Manager's Guide* for details about START.COM.

Refer to Appendix A for the description of START error messages.

Part 6
Appendixes

Appendix A
System Installation Error Messages

Initialization Code Error Messages

The RSTS/E system initialization code routines make many checks to ensure the consistency of system structures. Initialization routines compare existing structures with their definitions and with references in other parts of the system. The checks must be successful; if not, the routines detect a consistency error, which indicates that the system is corrupted.

The initialization routines may also encounter errors while attempting to execute initialization options. The error text for many of these errors is preceded by the message FATAL RSTS/E SYSTEM INITIALIZATION ERROR. The initialization code prints a descriptive error message and returns to the Option: prompt. If such an error occurs, follow the error recovery procedures listed below. If these procedures are unsuccessful, consult your Digital Software Support Specialist.

For many of the errors, no recovery procedures exist. If such an error occurs, you should submit a Software Performance Report (SPR) as noted.

ACCOUNT [1,2] MISSING FROM OUTPUT DISK

User Action: Reinitialize the disk as a system disk and create the library account.

A PARITY ERROR HAS OCCURRED WHILE CHECKING MEMORY
RANGE OF FAILING ADDRESS IS nnK.

Explanation: Memory has failed at the specified address (n).

User Action: Call your Digital Field Service engineer.

BAD [0,1] DIRECTORY

User Action: Reboot the system disk and retry the operation. If the retry fails, use DSKINT to reinitialize the disk.

BADB.SYS NOT FOUND - RESULTS UNPREDICTABLE

User Action: Reboot the system disk and retry the operation. If the retry fails, use DSKINT to reinitialize the disk.

BUFF.SYS NOT FOUND OR TOO SMALL - DECTAPE DISABLED

Explanation: Warning message only.

User Action: Shut down the system and use REFRESH to create the file at the required size.

CANNOT REFRESH THIS DISK

User Action: Reinitialize the disk.

CAN'T RESET MEMORY TABLE - NOT ENOUGH ROOM

User Action: Regenerate a smaller monitor to reduce the number of small buffers selected.

CANNOT START WITH THIS SWAP MAX AND MEMORY TABLE

User Action: Use DEFAULT to change the SWAP MAX and/or memory allocation table.

CLUSTER 1 (REQUIRED FOR PACK LABEL) CONTAINS A BAD BLOCK

User Action: If the pack cluster size for the disk is greater than the device cluster size, use DSKINT to reinitialize the disk with a lower pack cluster size. If the error recurs, use a different disk.

CLUSTER ALLOCATED TO [P,PN] filnam.typ IS NOT ON A PACK CLUSTER BOUNDARY

User Action: REBUILD asks whether to delete the file, then confirms your response.

[P,PN] CLUSTER MAP IN UFD DISAGREES WITH MFD

User Action: REBUILD asks whether to zero the account and confirms your response.

[P,PN] CLUSTER SIZE IS INCORRECT

User Action: REBUILD asks whether to delete the account and confirms your response.

DEFAULTS CORRUPTED. RESETTING DEFAULTS...

Explanation: INIT found some defaults to be invalid. It will pick new values to be used.

DEFAULTS CANNOT BE SET - NOT A VALID SYSTEM DISK

User Action: Use the COPY option to copy the files from the distribution device to this disk.

DEVICE xx: DOES NOT INTERRUPT - DEVICE DISABLED

Explanation: The device may be broken or configured incorrectly.

User Action: Call your Digital Field Service engineer. If the device is an RC25 or a TU81, a cable may be disconnected.

DEVICE CONTROLLER TABLE (DDCTBL) DECLARES TOO MANY UNITS FOR CONTROLLER
SIL CANNOT BE INSTALLED

User Action: Submit an SPR with a copy of the SIL and INIT.SYS.

DEVICE CONTROLLER TABLE (DDCTBL) HAS AN ILLEGAL FORMAT
SIL CANNOT BE INSTALLED

User Action: Submit an SPR with a copy of the SIL and INIT.SYS. You may have a corrupt Distribution Kit.

DEVICE ERROR WHEN TRYING TO BOOTSTRAP DEVICE

User Action: Make sure that the device is on line and ready. If the error recurs, try a different device.

DEVICE HUNG OR WRITE-LOCKED

User Action: Make sure that the device is on line and ready. If the error recurs, try a different device.

DEVICE XDn: CSR MUST BE DECLARED WITH HARDWR, CSR SUB-OPTION - DEVICE DISABLED

Explanation: The XD device is not located at a Digital standard CSR assignment.

User Action: Use the CSR suboption of HARDWR to set the correct CSR address for XDn:.

DEVICE XDn: INTERNAL MICRO-DIAGNOSTIC FAILURE - DEVICE DISABLED

Explanation: The error message indicates that INIT encountered a device micro-diagnostic error.

User Action: Call your Digital Field Service engineer.

DEVICE XEn: MICRO-DIAGNOSTIC FAILURE, CODE nnn
DEVICE XHn: MICRO-DIAGNOSTIC FAILURE, CODE nnnnnn

Explanation: These failures indicate that the specified device failed the micro-diagnostic test with the failure code shown. In most cases, the device should be checked by your field service representative. Some of the failure codes are interpreted by INIT. These codes display the additional message:

Device not connected to transceiver

DEVICE VHn: INTERNAL MICRO-DIAGNOSTIC FAILURE, CODE xxxx - DEVICE DISABLED

Explanation: The error message indicates that INIT encountered a device micro-diagnostic error.

User Action: Call your Digital Field Service Engineer.

DIRECTORY ENTRY FOR [P,PN] filnam.typ CONTAINS PACK CLUSTER NUMBER WHICH IS TOO BIG

User Action: REBUILD asks whether to delete the file and confirms your response.

DIRECTORY ERROR DETECTED IN RDB

User Action: Reinitialize the disk.

DIRECTORY ERROR - FILE NOT FOUND

User Action: Reinitialize the disk.

DIRECTORY ERROR - [0,1] NOT FOUND

User Action: Reinitialize the disk.

[0,1] DIRECTORY NOT FOUND

User Action: Reinitialize the disk.

DISK BLOCK 0 (REQUIRED FOR BOOTSTRAPS) IS BAD

User Action: Reinitialize the disk. If the error recurs, use a different disk.

DISK ERROR DURING DSKINT BUILD PHASE

User Action: Reinitialize the disk. If the error recurs, use a different disk.

DISK HUNG OR DATA ERROR DURING OVERLAY

User Action: Make sure that the device is on line and ready. If the error recurs, try a different device.

DISK STRUCTURE CANNOT BE REBUILT

User Action: Reinitialize the disk.

DOUBLY ALLOCATED BLOCK FOUND AT DEVICE CLUSTER nn. THE BLOCK IS ALLOCATED TO [p,pn] filnam.typ AND [p,pn] filnam.typ

User Action: REBUILD lets you choose the file to delete, then confirms your response.

?DRIVE NOT READY:

User Action: Make sure that the disk drive is on line and READY. Press RETURN to retry the operation. Type any other character to abort the operation.

DSKINT ERROR - ATTEMPT TO FORMAT UNFORMATTABLE DISK

User Action: Submit an SPR and a copy of INIT.SYS and console output.

DSKINT OR SYSGEN ERROR - DSKINT ALLOCATION FAILURE

User Action: Submit an SPR and a copy of INIT.SYS and console output.

ENABLE CLOCK CSR VIA THE BOOT ROM SETUP

User Action: Use the 11/73/83/84/93/94 Boot ROM to enable the clock. Save the new setup configuration. Then reboot the system.

EOF READING INIT.SYS

User Action: Submit an SPR and a copy of INIT.SYS and console output.

ERR FILE INVALID

User Action: Copy the file ERR.ERR from the distribution medium to the system disk.

ERR FILE NOT FOUND

User Action: Copy the file ERR.ERR from the distribution medium to the system disk.

ERROR FILE HAS AN INVALID FILE FORMAT

Explanation: The error message file you specified is not exactly sixteen blocks long.

User Action: Make sure you copied from the correct RSTS/E Distribution Kit.

ERROR DETECTED WHILE READING ERROR RECORD SECTOR #n

Explanation: Warning message only. Error occurred during reading of factory error records.

User Action: Disregard the error message.

ERROR-NO SETUP FOR DISK xx:

User Action: Regenerate your monitor. If the problem recurs, submit an SPR, your monitor .SIL file, and a copy of INIT.SYS and console output.

ERROR-UNKNOWN DISK xx:

User Action: Regenerate your monitor. If the problem recurs, submit an SPR and a copy of INIT.SYS, your .SIL file, and console output.

EXCESSIVE BAD CLUSTERS

User Action: If you need to use the current disk, use DSKINT to increase the pack cluster size. If the error recurs, use a different disk.

FATAL DISK ERROR DURING CONTROL RESET

User Action: Retry the DSKINT. If the error recurs, call the Digital Field Service engineer to repair the disk drive.

FATAL ERROR - NO SMALL BUFFERS LEFT

User Action: Regenerate the system and configure more small buffers or use the Default Buffers sub-option to increase the number of small buffers available.

FATAL - ETHERNET PHASE EXCEEDS AN APR SIZE

User Action: Submit an SPR and include a copy of your monitor .SIL file.

FATAL - FIP PHASE EXCEEDS AN APR PHASE

User Action: Submit an SPR and include a copy of your monitor .SIL file.

FATAL - DEFBUF NOT ALIGNED - INIT LINK BUG

User Action: Submit an SPR and a copy of INIT.SYS and console output.

FATAL - FIBUF NOT ALIGNED - INIT LINK BUG

User Action: Submit an SPR and a copy of INIT.SYS and console output.

FATAL - INSBUF NOT ALIGNED - INIT LINK BUG

User Action: Submit an SPR and a copy of INIT.SYS and console output.

FATAL - SATBUF NOT ALIGNED - INIT LINK BUG

User Action: Submit an SPR and a copy of INIT.SYS and console output.

FATAL I/O DURING OVERLAY

User Action: Make sure that the device is on line and ready. If the error recurs, try a different device.

FILE NOT CONTIGUOUS

Explanation: The file you specified is not contiguous on disk. The error message file must be contiguous.

FILE NOT FOUND

Explanation: The initialization code did not find the file you specified on disk.

xxx FILE NOT FOUND WHEN REMOVING IT

Explanation: Warning message only. xxx is SIL or ERR. The initialization code did not find a file when trying to make it deletable.

[P,PN] filnam.typ HAS A BAD BLOCK

User Action: REBUILD asks whether to delete the file and confirms your response.

[P,PN] filnam.typ HAS FIRST DCN OUT OF RANGE

User Action: REBUILD asks whether to zero the account and confirms your response.

[P,PN] filnam.typ HAS INVALID ACCOUNTING ENTRY LINK

User Action: REBUILD asks whether to delete the file and confirms your response.

filnam.typ HAS INVALID FORMAT AND CANNOT BE COPIED

User Action: Submit an SPR including a copy of INIT.SYS, CONFIG.SYS, and your monitor .SIL file if Digital supplied the file on the distribution medium. Regenerate your system monitor if the system installation process created the file.

FORMATTING FAILURE

Explanation: This error may indicate a bad disk pack or a bad disk drive.

User Action: Press RETURN to retry. Type anything else to abort the DSKINT and return to the Option: prompt. Make sure that the disk drive is write enabled.

GETCFG IS MISPLACED

User Action: Submit an SPR and include a copy of INIT.SYS, CONFIG.SYS, and your monitor .SIL file.

[P,PN] HAS A BAD BLOCK

User Action: REBUILD asks whether to delete the account and confirms your response.

[P,PN] HAS CLUSTER NUMBER IN MAP WHICH IS TOO BIG

User Action: REBUILD asks whether to delete the account and confirms your response.

[P,PN] HAS HOLES IN CLUSTER MAP

User Action: REBUILD asks whether to zero the account and confirms your response.

[P,PN] HAS INCONSISTENT CLUSTER MAPS

User Action: REBUILD asks whether to zero the account and confirms your response.

[P,PN] HAS INVALID CLUSTER SIZE

User Action: REBUILD asks whether to delete the account and confirms your response.

ILLEGAL FILE NAME

Explanation: The file name you specified is not one to six alphanumeric characters.

User Action: Specify the correct file name.

INIT BUG - BAD DISK INDEX

User Action: Submit an SPR and a copy of INIT.SYS and console output.

INIT BUG - CAN'T ALLOCATE FILE 2ND TIME

User Action: Submit an SPR and a copy of INIT.SYS and console output.

INIT BUG - CAN'T CHECK PARITY

User Action: Submit an SPR and a copy of INIT.SYS and console output.

INIT BUG - CAN'T FIND [0,1] AGAIN

User Action: Submit an SPR and a copy of INIT.SYS and console output.

INIT BUG - CAN'T FIND FILE TO DELETE

User Action: Submit an SPR and a copy of INIT.SYS and console output.

INIT BUG - DIDN'T GET SAME CLUSTER 2ND TIME

User Action: Submit an SPR and a copy of INIT.SYS and console output.

INIT BUG - DIDN'T GET SAME FILE CLUSTER 2ND TIME

User Action: Submit an SPR and a copy of INIT.SYS and console output.

INIT BUG - FAILED TO CREATE FILE

User Action: Submit an SPR and a copy of INIT.SYS and console output.

INIT BUG - FAILED TO FIND FILE AGAIN

User Action: Submit an SPR and a copy of INIT.SYS and console output.

INIT BUG - FAILED TO FIND FILE JUST CREATED

User Action: Submit an SPR and a copy of INIT.SYS and console output.

INIT BUG - FILE EXISTS WHEN TRYING TO CREATE

User Action: Submit an SPR and a copy of INIT.SYS and console output.

INIT BUG - xxx - FILE NOT FOUND 2ND TIME

User Action: Submit an SPR and a copy of INIT.SYS and console output.

INIT BUG - xxx - FILE NOT FOUND WHEN REMOVING IT

User Action: Submit an SPR and a copy of INIT.SYS and console output.

INIT BUG - FILE SIZE COMPUTED WRONG

User Action: Make sure that the system device you are using contains valid system files from the distribution medium. If so, submit an SPR and a copy of INIT.SYS and console output.

INIT BUG - FLOAT TABLE ERROR

User Action: Submit an SPR and a copy of INIT.SYS and console output.

INIT BUG - INSTALL NOT SYNCHRONIZED at xxxxxx

User Action: Submit an SPR and a copy of INIT.SYS and console output.

INIT BUG - MONITOR LAYOUT SCREWED UP

User Action: Submit an SPR and include a copy of your monitor .SIL file.

INIT BUG - NO SATT.SYS AT WIPEOUT TIME

User Action: Submit an SPR and a copy of INIT.SYS and console output.

INIT BUG - NO UFD FOUND IN CREATE

User Action: Submit an SPR and a copy of INIT.SYS and console output.

INIT BUG - REBUILD FAILED TO FIND ALLOCATION ERROR

User Action: Submit an SPR and a copy of INIT.SYS and console output.

INIT BUG - RNB TO WRONG DISK

User Action: Submit an SPR and a copy of INIT.SYS and console output.

INIT BUG - SATT.SYS NONEXISTENT AT TIME OF WOMP

User Action: Submit an SPR and a copy of INIT.SYS and console output.

INIT BUG - SETNEW TABLE TOO SMALL

User Action: Submit an SPR and a copy of INIT.SYS and console output.

INIT BUG - START LINKED TOO LOW

User Action: Submit an SPR and a copy of INIT.SYS and console output.

INIT BUG - UNKNOWN BAE DEVICE

User Action: Submit an SPR and a copy of INIT.SYS and console output.

INIT CANNOT CONTINUE

Explanation: INIT cannot continue until previously displayed error has been corrected.

INIT LINK BUG - DSTBL TOO LOW

User Action: Submit an SPR and a copy of INIT.SYS and console output.

INIT LINK BUG - HIGH LIMIT >157000

User Action: Submit an SPR and a copy of INIT.SYS and console output.

INIT.SYS NOT FOUND - RESULTS ARE UNPREDICTABLE

User Action: Reboot the system disk and retry the operation. If the retry fails, reinitialize the disk.

INPUT FILE MISSING FROM SYSTEM DEVICE

User Action: Retry the procedure that generated the error. If the error recurs, submit an SPR and a copy of INIT.SYS and console output.

INSTALLED MONITOR DOES NOT SUPPORT THIS SYSTEM DISK

User Action: Regenerate a monitor that supports the system disk or use the COPY option to transfer the monitor to a disk it supports.

INSTALLED SIL INVALID

Explanation: The installed SIL is invalid as a monitor SIL.

User Action: Use the START option to install a valid SIL.

INVALID DATA IN ERROR RECORD SECTOR #n

Explanation: Warning message only. The error occurred during reading of factory error records.

User Action: Disregard the error message.

INVALID GROUP [255,*] FOUND IN MFD - ENTRY DELETED

Explanation: Informational message only.

INVALID RETRIEVAL ENTRIES FOR FILE [p,pn] filnam.typ - FIXED

Explanation: Warning message. REBUILD truncates the file.

INVALID SIL FORMAT - INIT AND MONITOR ARE DIFFERENT VERSIONS

User Action: Start a SIL that has the correct RSTS/E version number.

INVALID SIL FORMAT - MONITOR IS MISSING REQUIRED MODULES

User Action: Regenerate your monitor. If the problem recurs, submit an SPR and a copy of INIT.SYS, your monitor .SIL file, and console output.

I/O TO UNOPENED FILE

User Action: Submit an SPR and a copy of INIT.SYS and console output.

[P,PN] IS NOT A VALID ACCOUNT NUMBER

User Action: REBUILD asks whether to delete the account and confirms your response.

KW11-L DOESN'T WORK

User Action: Either install a KW11-P or have the KW11-L repaired.

KW11-P DOESN'T WORK

User Action: Call your Digital Field Service engineer to repair the KW11-P.

LABEL ID FIELDS FOR [p,pn] FIXED

Explanation: Warning message only.

LINE CLOCK BROKEN - USING 60HZ

User Action: Call your Digital Field Service engineer. RSTS/E will continue using the 60Hz crystal clock until the line clock can be repaired.

LINK TO NAME BLOCK FOR [p,pn] IS BAD

User Action: Delete the account.

MAGTAPE ERROR OR INVALID FORMAT ON TAPE

User Action: Make sure that the tape drive heads are clean and correctly aligned. If the error recurs, try using a different drive.

MEMORY ADDRESSING PROBLEM

Explanation: Either the memory subsystem or the memory management hardware failed.

MFD NAME ENTRY CONTAINS A BAD LINK. ALL [1,1] FILES AND ACCOUNTS BEYOND [p,pn] filnam.typ WILL BE DELETED

User Action: REBUILD confirms your response.

MONITOR SIL CHANGED - REINSTALL IT

User Action: Use the START option to install the monitor SIL.

MONITOR SIL NOT FOUND

User Action: Use the START option again to install the SIL. If the error recurs, submit an SPR and a copy of INIT.SYS and console output.

MODULE xxxxxx HAS INVALID LENGTH

User Action: Regenerate your monitor. If the problem recurs, submit an SPR and a copy of INIT.SYS, your monitor .SIL file, and console output.

MODULE xxxxxx HAS INVALID TRANSFER ADDRESS

User Action: Regenerate your monitor. If the problem recurs, submit an SPR and a copy of INIT.SYS, your monitor .SIL file, and console output.

MODULE xxxxxx HAS WRONG LOAD ADDRESS

User Action: Regenerate your monitor. If the problem recurs, submit an SPR and a copy of INIT.SYS, your monitor .SIL file, and console output.

MODULE xxxxxx IS AN UNKNOWN NON-GENERIC PHASE

User Action: Regenerate your monitor. If the problem recurs, submit an SPR and a copy of INIT.SYS, your monitor .SIL file, and console output.

MODULE xxxxxx IS MISSING A REQUIRED SYMBOL

User Action: Regenerate your monitor. If the problem recurs, submit an SPR and a copy of INIT.SYS, your monitor .SIL file, and console output.

MODULE xxxxxx IS NOT ALIGNED ON A BLOCK BOUNDARY

User Action: Regenerate your monitor. If the problem recurs, submit an SPR and a copy of INIT.SYS, your monitor .SIL file, and console output.

MODULE xxxxxx NOT FOUND IN SIL

User Action: Regenerate your monitor. If the problem recurs, submit an SPR and a copy of INIT.SYS, your monitor .SIL file, and console output.

MODULE xxxxxx TOO LARGE

User Action: Regenerate your monitor. If the problem recurs, submit an SPR and a copy of INIT.SYS, your monitor .SIL file, and console output.

MODULE xxxxxx TOO SMALL

User Action: Regenerate your monitor. If the problem recurs, submit an SPR and a copy of INIT.SYS, your monitor .SIL file, and console output.

MODULE xxxxxx TOTALLY MAPPED PORTION TOO LARGE

User Action: Regenerate your monitor. If the problem recurs, submit an SPR and a copy of INIT.SYS, your monitor .SIL file, and console output.

MOVC DIDN'T WORK! RSTS/E WILL NOT USE CIS

User Action: The CIS instruction MOVC did not work properly. RSTS/E will continue without using CIS instructions. Call Digital Field Service to have it repaired.

MUx: CONTROLLER TYPE IS UNSUPPORTED BY RSTS/E - DEVICE DISABLED

Explanation: During initialization, a controller identified itself as a type that RSTS/E does not support.

MUx: DOES NOT RESPOND TO DISK OR TAPE CONNECTS - DEVICE DISABLED

Explanation: The controller has identified itself as one that supports MSCP disks or TMSCP tapes, and yet does not respond correctly when we attempt to bring the disks or tapes online.

MUx: INTERNAL MICRO-DIAGNOSTIC FAILURE, CODE nnnnnn - DEVICE DISABLED

Explanation: The controller has failed its self-diagnostic tests and is not usable by RSTS/E. The code "nnnnnn" is an octal number that describes the cause of the failure.

MUn: IS MISSING THE FOLLOWING FCO: TQK50-I001 (EQ-1442-01)

Explanation: This message indicates that your TQK50 tape drive requires a hardware update in order to properly work under time-sharing.

User Action: Have your field service representative upgrade your TQK50 to the latest revision level.

MUx: TIMEOUT DURING INITIALIZATION, STEP nnnnnn - DEVICE DISABLED

Explanation: The controller did not complete its self-diagnostic tests within the required time period. The step number "nnnnnn" is for Digital Field Service use.

MUx: TIMEOUT DURING TAPE SCC - DEVICE DISABLED

Explanation: The controller did not complete a Set Controller Characteristics command within the required time period. The message that appears depends on the type of controller (MSCP disk or TMSCP tape).

MUL DIDN'T WORK!

User Action: The MULtiply instruction did not produce the correct result. Call Digital Field Service to correct the problem.

[P,PN] NAME BLOCK SPECIFIES WRONG PPN

User Action: Delete the account.

NO LIBRARY ACCOUNT ON THIS DISK

User Action: Reinitialize the disk and create a library account, or create account [1,2] on the disk.

NO ROOM FOR DIRECTORY ON OUTPUT DISK

User Action: Delete files, reinitialize the disk to create sufficient contiguous space on the disk for the file, or use a different disk.

NO ROOM FOR FILE ON OUTPUT DISK

User Action: Delete files, reinitialize the disk to create sufficient contiguous space on the disk for the new file, or use a different disk.

??? NO VALID V10.x MONITOR FILES IN [0,1]

User Action: Copy the required SIL to the system disk from the installation media.

NOT ENOUGH MEMORY FOR REQUIRED XBUF!

User Action: Regenerate a smaller monitor and reduce the number of small buffers selected.

NOT ENOUGH ROOM IN LOW MEMORY FOR MONITOR

Explanation: INIT cannot find enough contiguous, physical memory to place the monitor in low memory. Before printing this message, INIT attempts to position the monitor in the memory table, tries to reset the table, and prints the message ADJUSTING MEMORY TABLE at your terminal. When INIT cannot find enough space for the monitor, it prints the "NOT ENOUGH ROOM" message and returns to the Option: prompt.

User Action: Regenerate a smaller monitor and reduce the number of small buffers selected.

ONE OR MORE SYSTEM FILES MISSING

User Action: Use the COPY option to copy the files from the distribution media to [0,1] on this disk.

OPTION ATTEMPTED DURING BOOTSTRAP PHASE

User Action: Reboot the system and retry the operation. If the retry fails, submit an SPR and a copy of INIT.SYS and console output.

OPTION NOT AVAILABLE

Explanation: The option you requested is not available until you bootstrap the system disk.

OUTPUT DISK IS NOT A SYSTEM DISK

User Action: Reinitialize the disk as a system disk.

OVERLAY HANDLER IN ERROR

User Action: Submit an SPR and a copy of INIT.SYS and console output.

OVR NOT IN SIL

User Action: Regenerate the monitor.

PACK CLUSTER SIZE IS NOT 1, 2, 4, 8, 16, 32, OR 64

User Action: Reinitialize the disk.

PARITY CSR FOUND, BUT NOT RELATING TO MEMORY

User Action: Call your Digital Field Service engineer to properly configure the memory on the system.

PARITY CSR CONTROLS MORE THAN 31K

User Action: Call your Digital Field Service engineer to properly configure the memory on the system.

PRIORITY OF xx: INTERRUPT (PRn) IS TOO HIGH - DEVICE DISABLED

User Action: Call your Digital Field Service engineer to install the device correctly.

QUESTION ATTEMPTED DURING AUTO-RESTART

User Action: If the system disk needs rebuilding, start the system by typing START or pressing RETURN, thereby rebuilding the disk. If any other problem occurs, submit an SPR and a copy of INIT.SYS and console output.

REQUESTED DISK DRIVE NOT FOUND

User Action: Request a disk that is on the system.

REQUIRED SYMBOL xxxxxx MISSING FROM MONITOR

User Action: Regenerate your monitor. If the problem recurs, submit an SPR and a copy of INIT.SYS, your monitor .SIL file, and console output.

RLV DISK MUST BE STRAPPED FOR 22-BIT ADDRESSING

Explanation: The Q-BUS system has more than 256KB of memory, thus requiring 22-bit addressing. The system also contains an RL disk controller, but the controller is not set up for 22-bit addressing. The controller must be an RLV12, and it must be strapped for 22-bit addressing.

RSTS/E REQUIRES AT LEAST 124K WORDS OF MEMORY

Explanation: Your configuration is too small to run RSTS/E.

RSTS/E REQUIRES EIS!

User Action: Correct the hardware configuration to include EIS instructions.

RSTS/E REQUIRES A CLOCK

User Action: Correct the hardware configuration to include a KW11-P or KW11-L clock.

RSTS/E REQUIRES A CLOCK, ENABLING KW11-L AT 60HZ

User Action: INIT found the clock turned off an an 11/73/83/84/93/94 and turned it on. The clock should also be turned on in the Boot Rom setup and saved.

RUx: CONTROLLER TYPE IS UNSUPPORTED BY RSTS/E - DEVICE DISABLED

Explanation: During initialization, a controller identified itself as a type that RSTS/E does not support.

RUx: DOES NOT RESPOND TO DISK OR TAPE CONNECTS - DEVICE DISABLED

Explanation: The controller has identified itself as one that supports MSCP disks or TMSCP tapes, and yet does not respond correctly when we attempt to bring the disks or tapes online.

RUx: INTERNAL MICRO-DIAGNOSTIC FAILURE, CODE nnnnnn - DEVICE DISABLED

Explanation: The controller has failed its self-diagnostic tests and is not usable by RSTS/E. The code "nnnnnn" is an octal number that describes the cause of the failure.

RUx: TIMEOUT DURING INITIALIZATION, STEP nnnnnn - DEVICE DISABLED

Explanation: The controller did not complete its self-diagnostic test within the required time period. The step number "nnnnnn" is for Digital Field Service use.

RUx: TIMEOUT DURING TAPE SCC - DEVICE DISABLED

Explanation: The controller did not complete a Set Controller Characteristics command within the required time period. The message that appears depends on the type of controller (MSCP disk or TMSCP tape).

[0,1] SATT.SYS IS NOT CONTIGUOUS

User Action: Reinitialize the disk.

SATT.SYS IS OVER 16 BLOCKS LONG

User Action: If the file structure on the disk is sound, submit an SPR and the disk. Otherwise, reinitialize the disk.

[0,1] SATT.SYS IS TOO SMALL FOR SAT

User Action: Reinitialize the disk.

SATT.SYS NON-EXISTENT AT TIME OF READ

User Action: If the file structure on the disk is sound, submit an SPR and a copy of INIT.SYS and console output. Otherwise, reinitialize the disk.

SATT.SYS NOT FOUND - RESULTS UNPREDICTABLE

User Action: Reboot the system and retry the operation. If the error recurs, reinitialize the disk.

filnam.SIL NOT FOUND - PLEASE INSTALL A SIL

Explanation: The SIL that you previously installed is not on the disk.

User Action: Use the START option to install a monitor SIL.

SWAP.SYS NOT CONTIGUOUS OR TOO SMALL

User Action: Re-create SWAP.SYS using the Refresh option.

SWAP.SYS NOT PRESENT IN [0,1]

User Action: Re-create SWAP.SYS using the Refresh option.

SYMBOL xxxxxx NOT FOUND IN MONITOR SYMBOL TABLE

User Action: Regenerate your monitor. If the problem recurs, submit an SPR and a copy of INIT.SYS and console output.

THE ERROR HAS OCCURRED WITHIN A SECTION OF MEMORY OCCUPIED BY INIT

User Action: Call Digital Field Service to correct the problem.

THE ERROR HAS OCCURRED AT AN UNKNOWN ADDRESS

User Action: INIT cannot continue until the previously listed errors are corrected.

THIS K-WORD OF MEMORY WILL BE MARKED NON-EXISTENT, CONTINUING BOOTSTRAP PROCEDURE

User Action: Call Digital Field Service at your earliest convenience to correct the problem.

TOO MANY BAE DEVICES

User Action: Submit an SPR and a copy of INIT.SYS, your monitor .SIL file, and console output.

TOO MANY BLOCKS IN DEVICE CONFIGURATION TABLE

User Action: Regenerate your monitor. If the problem recurs, submit an SPR, a copy of INIT.SYS and console output.

TOO MANY xx: CONTROLLERS GENERATED

User Action: Make sure that any edits to CONFIG.MAC are correct. If there are no editing errors, regenerate the system.

TOO MANY RH OR UNIBUS DEVICES

User Action: Submit an SPR and a copy of INIT.SYS and console output.

TOO MANY UNIBUS DEVICES ON THIS 11/70

User Action: First, disable unnecessary devices with HARDWR or SET. If the error condition persists, use DEFAULT to lock all memory addresses above 124K. (The computer runs in 18-bit addressing mode instead of 22-bit addressing mode.) If the error condition is present after you lock memory, or if the computer has 124K or fewer words of memory, submit an SPR.

TOO MUCH MODIFICATION TO MONITOR REQUIRED

User Action: Regenerate to produce a monitor that is more closely configured to your system hardware.

TWO MAGTAPE UNITS HAVE THE SAME UNIT NUMBERS

User Action: Examine unit switches on magnetic tape drives and make sure that no two have the same unit number.

UFD HAS SIZE TOO LARGE FOR FILE [P,PN] filnam.typ - CHANGED TO xxx

Explanation: Warning message only. REBUILD corrects the condition.

UFD HAS SIZE TOO SMALL FOR FILE [P,PN] filnam.typ - CHANGED TO xxx

Explanation: Warning message only. REBUILD corrects the condition.

[0,1] UFD NOT FOUND

User Action: Reinitialize the disk.

UNABLE TO CREATE REQUESTED FILE(S)

User Action: Delete some files and retry the procedure, or request smaller files. Also, try using the FILE suboption of REFRESH to create files one at a time.

UNEXPECTED OVERLAY TRAP

User Action: Submit an SPR and a copy of INIT.SYS and console output.

UNEXPECTED INTERRUPT THROUGH THE VECTOR AT nnn

Explanation: An interrupt remained on the bus after a RESET instruction.

User Action: Call Digital Field Service to correct the problem.

UNIBUS MEMORY IS NOT SUPPORTED ON THIS SYSTEM

Explanation: RSTS/E does not support 11/84 or 11/94 systems that contain UNIBUS memory.

User Action: UNIBUS memory must be removed from the system.

UNKNOWN CPU TYPE

Explanation: RSTS/E could not determine on which type of CPU the system was booted. INIT will assume it is a UNIBUS type system and proceed.

UNKNOWN DEVICE BOOTED

User Action: This error is of the result of a hardware failure. If this device has successfully booted this version of RSTS/E before, call your Digital Field Service engineer to correct the hardware problem.

UNKNOWN RH CONTROLLER PRESENT

User Action: Call your Digital Field Service engineer to correct the hardware configuration.

UNRECOVERABLE DISK ERROR ON xxn:

User Action: Make sure that the disk is mounted and write enabled (if necessary). If the disk is properly mounted, this error indicates a fatal disk error. Reformat and reinitialize the disk, or use a different disk.

This error is often caused by a hardware failure. If this seems to be the case, contact your Digital Field Service engineer.

USER-DEFINED ADDRESS FOR DEVICE xxn: NOT FOUND - DEVICE DISABLED

User Action: Use HARDWR to set the correct CSR address for xx:, or call your Digital Field Service engineer.

USING KW11-L CLOCK

Explanation: Warning message only. The installed SIL's defaults indicate a KW11-P clock is preferred, but the KW11-P clock is not present. RSTS/E uses the KW11-L clock instead.

USING KW11-P CLOCK AT LINE FREQUENCY

Explanation: Warning message only. The installed SIL's defaults indicate a KW11-L clock is preferred, but the KW11-L clock is not present. RSTS/E uses the KW11-P clock instead.

VECTOR FOR DEVICE xx: (nnnn) ALREADY IN USE - DEVICE DISABLED

User Action: Use HARDWR to set the correct vector address for xx:, or call your Digital Field Service engineer.

VECTOR TABLE FULL

User Action: Submit an SPR and a copy of INIT.SYS and console output.

WARNING - BAD BLOCK DOUBLY ALLOCATED TO BADB.SYS

Explanation: Warning message only.

WARNING - BOOTED DEVICE IS AT A NON-STANDARD CSR ADDRESS

Explanation: The initialization code successfully bootstrapped the device. The device is at a non-standard CSR address, but the device has not been declared at the non-standard CSR address.

Explanation: Before starting your RSTS/E monitor, use CSR (a HARDWR suboption) to declare this device at the non-standard address.

WARNING - DCN IN BADB.SYS TOO BIG

Explanation: Warning message only. The file structure on the disk being rebuilt appears invalid.

WARNING - DBn: IS DUAL PORTED

Explanation: Warning message only.

WARNING - DCN IN BADB.SYS NOT ON PACK CLUSTER BOUNDARY

Explanation: Warning message only.

WARNING - xxx FILE NOT FOUND - PLEASE SET DEFAULTS

Explanation: The SIL you are installing specifies a primary run-time system or error message file that is not present.

User Action: Use the DEFAULT option to specify a valid file.

WARNING - FILE filnam.typ NOT FOUND WHEN REMOVING OLD SIL

Explanation: Warning message only.

WARNING - LINK IN BADB.SYS IS BAD. BAD BLOCKS MAY BE LOST.

Explanation: Warning message only.

WARNING - MAIN MEMORY (cache) DISABLED AT STARTUP. RSTS/E WILL NOT USE (cache). SYSTEM MAY RUN SLOWLY.

Explanation: Warning message only. (cache) is CACHE, CACHE GROUP 0, or CACHE GROUP 1.

User Action: As this may cause your system to run slowly, contact your Digital Field Service engineer.

WARNING - MAIN MEMORY (cache) IS FAILING REPEATEDLY. RSTS/E WILL NOT USE (cache). SYSTEM MAY RUN SLOWLY.

Explanation: Warning message only. (cache) is CACHE, CACHE GROUP 0, or CACHE GROUP 1.

User Action: As this may cause your system to run slowly, contact your Digital Field Service engineer.

WARNING - NO SET UP FOR DEVICE xx

Explanation: You may have either a corrupt distribution kit or incompatible versions of INIT.SYS and the monitor .SIL.

User Action: Submit an SPR and a copy of INIT.SYS and console output.

XDn: DISABLED - LINE EXCEEDS CONTROLLER (XDn:) MAXIMUM

Explanation: This is an informational message only. No action is necessary. With the XD controller, it is possible to generate a monitor with DMPs and run the monitor on a system that has DMVs instead of DMPs. While the DMV physically supports a maximum of 12 lines, any RSTS/E system that was generated with DMPs could exceed this maximum. This error message tells you that the limit was exceeded.

XEn: TRANSCEIVER POWER FAILURE

XEn: PORT/LINK CABLE PROBLEM

Explanation: These failures point to a specific piece of the DEUNA/DELUA which is broken.

XHn: INITIALIZATION FAILURE

Explanation: This indicates that a checksum of either the hardware address registers or the micro-diagnostic ROM failed.

Appendix B
Address and Vector Assignments

The RSTS/E system initialization code performs a hardware configuration check each time the system disk (or distribution medium) is bootstrapped. In the absence of any information to the contrary, the initialization code assumes that all devices attached to the UNIBUS have been assigned addresses according to the manufacturing standards. The initialization code determines interrupt vectors automatically by forcing each supported device to interrupt. Although the HARDWR initialization option allows you to declare nonstandard address and vector assignments, Digital recommends that you follow the standard configuration rules whenever possible.

Several devices have floating addresses. This means that the presence or absence of any floating address device will affect the assignment of addresses to other floating address devices. Similarly, many devices have floating vectors. According to the standard, interrupt vectors must be assigned in a specific sequence and the presence of one type of device will affect the correct assignment of interrupt vectors for other devices. Finally, there are many options that have fixed addresses and vectors. The following sections present the algorithms for assignment of floating addresses and vectors. Also included are the fixed assignments for devices supported by RSTS/E.

Floating Addresses

Currently the floating address devices include the devices listed in Table 25. Note that RSTS/E does not currently support all the devices listed. The following ground rules apply to these devices and future floating address devices:

- Only new devices will be assigned floating addresses. Devices now in production will keep their old addresses.
- Future devices may float both their address and interrupt vectors.
- The floating address space starts at 760010(8) and proceeds upward to 764000(8).
- A gap in the address space (no SLAVE SYNC) implies that a device does not exist.
- The first address of a new device type will always be on a 2^N word boundary, where N is the first integer greater than or equal to LOG2 M and M is the number of device registers.

Number of Registers in Device	Possible Boundaries
1	Any Word
2	XXXXX0,XXXXX4
3,4	XXXXX0
5,6,7,8	XXXX00,XXXX20,XXXX40,XXXX60
9 thru 16	XXXX00,XXXX40

- A "gap" of at least one word will be left after each type of device, starting on the same boundary as the device. Note that the gap must be at least one word in length but may be longer than one word. Gap length is determined by the boundary on which the next device must be addressed contiguously.

Address 760010 is reserved for the first DJ11. Since the DJ11 has four registers, additional DJ11s are assigned addresses modulo 10 (base 8) immediately following the first DJ11 (for example, 760010, 760020, and so forth). The modulo 10 (base 8) address following the last DJ11 is left empty and is known as the DJ11 gap. If there are no DJ11s, the gap is at 760010. If there is one DJ11, the gap will be at 760020. All gaps must be at least one word in length.

After all DJ11 addresses and the DJ11 gap are defined, the address for the first DH11 can be assigned. DH11s have eight registers, which implies a modulo 20 (base 8) boundary. The address of the first DH11 is the first modulo 20 address following the DJ11 gap. If there are no DJ11s (DJ11 gap at 760010), the first DH11 is assigned address 760020. Similarly, if there is one DJ11, the DJ11 gap will begin at 760020 and the next available modulo 20 boundary is 760040. All additional DH11s are assigned addresses modulo 20 immediately after the first DH11. The DH11 gap begins on the 20 boundary following the last DH11.

After all DH11 addresses and the DH11 gap are defined, DQ11, DU11, DUP11, LK11, DMC11, DZ11, and KMC11 through DMV11-AD addresses and the required gaps can be assigned in sequence by their rank. Addresses for any future floating address devices will be assigned in a similar manner.

Floating Address Worksheet

The algorithm for assignment of floating addresses is confusing for a configuration that consists of several types of floating address devices. The floating address worksheet, shown in Figure 13, is a graphic aid that allows you to quickly assign floating addresses to a device without referring to the formal rules. The floating address worksheet consists of 33 columns. The first column contains the floating addresses, from 760010 to 762000. The worksheet continues on for four pages, to accommodate all of the addresses. Note that the last address on the worksheet also appears as the first address of the worksheet on the following page. For example, the last address of the first worksheet is 760400. The first address of the worksheet on the next page is 760400. This allows you to carry over the information from the previous page.

NOTE

The floating address area continues to address 764000. If your configuration continues to this address, you can create an addition to the worksheet by adding 2000 to the last address listed on the worksheet, which is 762000.

Columns 2 through 33 contain the floating address device names. To the right of the worksheet is a List of Devices. Here you can enter the number of devices in your configuration. Below the List of Devices is a Record of Floating Addresses. Here you can record the device, the unit number, and the floating address.

You can also produce the information contained in this worksheet by running the FLOAT program. The FLOAT program is contained in the Unsupp system program package (see Phase 4 in Part 1).

Using the Worksheet

To use the worksheet:

1. In the spaces provided in the List of Devices, record the quantity of each type of floating address device in your configuration. For example, if you have two DJ11 and two DH11 devices, enter 2 in the space provided adjacent to the DJ11 and the DH11 in the List of Devices.
2. Begin at address 760010 of the worksheet under the DJ11 column and record the unit number for all DJ11s in your configuration. Begin with unit 0 and end with unit n-1, where n represents the number of DJ11s in your configuration. For example, if you have two DJ11 devices, enter a device unit of 0 in the unshaded box to the right of address 760010. Enter a device unit of 1 in the unshaded box to the right of address 760020. Use only the unshaded boxes when you enter the device unit number. The shaded boxes represent illegal addresses for a particular device unit.

   NOTE

   Where you begin in the worksheet depends upon what devices you have in your configuration. Suppose you have LPP11 and DWR70 devices. In this case you would start at address 760130 under the first unshaded box under the LPP11 column.

3. Immediately below the last device unit, mark an X for the required address gap. For example, the last DJ11 unit in the previous example is at address 760020. You would mark an X in the unshaded box to the right of address 760030. Use only the unshaded boxes when you mark the address gap. The shaded boxes also indicate an illegal address gap.
4. To the immediate right of the address gap, mark a Y. For example, you would enter Y in the shaded box to the right of the X at address 760300. When you mark a Y to the right of an address gap, use either the shaded or the unshaded boxes, depending on which is to the right of the address gap. If there are no units of a particular device type, enter an X to indicate the gap addresses; then enter a Y to the right of this. For example, if you have no DJ11 devices, you mark an X in the unshaded box to the right of address 760010. You would then mark a Y to the right of this. The Y is a marker that tells you which address to start at for the next device.
5. Continue below the Y in the previous column and enter the unit number of the next device in your configuration. Start with unit 0 and continue to unit n-1. (The first MSCP controller has a fixed address. This means you should fill in floating addresses starting with controller 1, not controller 0.) Skip the shaded boxes in numbering down the column. In the first unshaded box below the last DH11 unit, mark an X for the DH11 gap. Then mark a Y to the right of the address gap.

6. Continue with the remaining floating address devices. In each case, number the units from 0 to n-1 down the column, beginning in the first unshaded box below the X. Mark an X in the next unshaded box below the last unit and a Y in the box immediately to the right of the last unit.
7. After you complete the worksheet, you can record the device, the unit number, and its associated floating address in the spaces provided in the Record of Floating Addresses (to the right of the worksheet).

Figure 13: Floating Address Worksheet

DEVICE

ADDRESS	DJ11	DH11	DQ11	①	DUP11	LK11	DMC11	②	KMC11	LPP11	VMV21	VMV31	DWR70	RL11	LPA11	KW11	Rsrvd	RX11	DR11W	DR11B	DMP11	DPV11	ISB11	DMV11	UNA	③	DMF32	KMS11	VS100	④	KMV11	⑤
760000																																
760004																																
760010																																
760014																																
760020																																
760024																																
760030																																
760034																																
760040																																
760044																																
760050																																
760054																																
760060																																
760064																																
760070																																
760074																																
760100																																
760104																																
760110																																
760114																																
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760144																																
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760164																																
760170																																
760174																																
760200																																
760204																																
760210																																
760214																																
760220																																
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760334																																
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760344																																
760350																																
760354																																
760360																																
760364																																
760370																																
760374																																
760400																																
	DJ11	DH11	DQ11	①	DUP11	LK11	DMC11	②	KMC11	LPP11	VMV21	VMV31	DWR70	RL11	LPA11	KW11	Rsrvd	RX11	DR11W	DR11B	DMP11	DPV11	ISB11	DMV11	UNA	③	DMF32	KMS11	VS100	④	KMV11	⑤

① = DU11, DUV11
② = DZ11, DZV11, DZQ11
③ = MSCP devices
④ = TMSCP devices
⑤ = DHU11, DHV11

LIST OF DEVICES

DJ11 ___
DH11 ___
DQ11 ___
DU11 DUV11 ___
DUP11 ___
LK11 ___
DMC11 ___
DZ11 DZV11 DZQ11 ___

KMC11 ___
LPP11 ___
VMV21 ___
VMV31 ___
DWR70 ___
RL11 ___
KW11 ___
RX11 ___

DR11–W ___
DR11–B ___
DMP11 ___
DPV11 ___
ISB11 ___
DMV11 ___
UNA ___
MSCP ___

DMF32 ___
KMS11 ___
VS100 ___
TMSCP ___
KMV11 ___
DHU11 DHV11 ___

RECORD OF FLOATING ADDRESSES

DEVICE	UNIT	ADDRESS

DEVICE	UNIT	ADDRESS

(continued on next page)

Figure 13 (Cont.): Floating Address Worksheet

DEVICE

ADDRESS	DJ11	DH11	DQ11	①	DUP11	LK11	DMC11	②	KMC11	LPP11	VMV21	VMV31	DWR70	RL11	LPA11	KW11	Rsrvd	RX11	DR11W	DR11B	DMP11	DPV11	ISB11	DMV11	UNA	③	DMF32	KMS11	VS100	④	KMV11	⑤
760400																																
760404																																
760410																																
760414																																
760420																																
760424																																
760430																																
760434																																
760440																																
760444																																
760450																																
760454																																
760460																																
760464																																
760470																																
760474																																
760500																																
760504																																
760510																																
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760520																																
760524																																
760530																																
760534																																
760540																																
760544																																
760550																																
760554																																
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760564																																
760570																																
760574																																
760600																																
760604																																
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760674																																
760700																																
760704																																
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760744																																
760750																																
760754																																
760760																																
760764																																
760770																																
760774																																
761000																																
	DJ11	DH11	DQ11	①	DUP11	LK11	DMC11	②	KMC11	LPP11	VMV21	VMV31	DWR70	RL11	LPA11	KW11	Rsrvd	RX11	DR11W	DR11B	DMP11	DPV11	ISB11	DMV11	UNA	③	DMF32	KMS11	VS100	④	KMV11	⑤

① DU11, DUV11
② DZ11, DZV11, DZQ11
③ MSCP devices
④ TMSCP devices
⑤ DHU11, DHV11

RECORD OF FLOATING ADDRESSES

DEVICE	UNIT	ADDRESS

DEVICE	UNIT	ADDRESS

(continued on next page)

Figure 13 (Cont.): Floating Address Worksheet

DEVICE

ADDRESS	DJ11	DH11	DQ11	①	DUP11	LK11	DMC11	②	KMC11	LPP11	VMV21	VMV31	DWR70	RL11	LPA11	KW11	Srvd	RX11	DR11W	DR11B	DMP11	DPV11	ISB11	DMV11	UNA	③	DMF32	KMS11	VS100	④	KMV11	⑤
761000																																
761004																																
761010																																
761014																																
761020																																
761024																																
761030																																
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761064																																
761070																																
761074																																
761100																																
761104																																
761110																																
761114																																
761120																																
761124																																
761130																																
761134																																
761140																																
761144																																
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761170																																
761174																																
761200																																
761204																																
761210																																
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761274																																
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761354																																
761361																																
761364																																
761370																																
761374																																
761400																																
	DJ11	DH11	DQ11	①	DUP11	LK11	DMC11	②	KMC11	LPP11	VMV21	VMV31	DWR70	RL11	LPA11	KW11	Srvd	RX11	DR11W	DR11B	DMP11	DPV11	ISB11	DMV11	UNA	③	DMF32	KMS11	VS100	④	KMV11	⑤

① DU11, DUV11
② DZ11, DZV11, DZQ11
③ MSCP devices
④ TMSCP devices
⑤ DHU11, DHV11

RECORD OF FLOATING ADDRESSES

DEVICE	UNIT	ADDRESS

DEVICE	UNIT	ADDRESS

(continued on next page)

Figure 13 (Cont.): Floating Address Worksheet

DEVICE

ADDRESS	DJ11	DH11	DQ11	①	DUP11	LK11	DMC11	②	KMC11	LPP11	VMV21	VMV31	DWR70	RL11	LPA11	KW11	Srvd	RX11	DR11W	DR11B	DMP11	DPV11	ISB11	DMV11	UNA	③	DMF32	KMS11	VS100	④	KMV11	⑤
761400																															
761404																															
761410																															
761414																															
761420																															
761424																															
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761500																															
761504																															
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761574																															
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761604																															
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761674																															
761700																															
761704																															
761710																															
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761744																															
761750																															
761754																															
761761																															
761764																															
761770																															
761774																															
762000																															
	DJ11	DH11	DQ11	①	DUP11	LK11	DMC11	②	KMC11	LPP11	VMV21	VMV31	DWR70	RL11	LPA11	KW11	Srvd	RX11	DR11W	DR11B	DMP11	DPV11	ISB11	DMV11	UNA	③	DMF32	KMS11	VS100	④	KMV11	⑤

① DU11, DUV11
② DZ11, DZV11, DZQ11
③ MSCP devices
④ TMSCP devices
⑤ DHU11, DHV11

RECORD OF FLOATING ADDRESSES

DEVICE	UNIT	ADDRESS

DEVICE	UNIT	ADDRESS

ZK-9248-HC

Floating Vectors

Many devices have floating vectors. The vector assignment sequence is normally the same sequence as that in which the devices enter production. A vector for a new hardware option is not inserted before the vector for a device already in production. Gaps in the vector assignments are not required. The floating vectors begin at address 300 and proceed in ascending order.

Table 25 lists the vector assignment sequence for current devices.

Table 25: Device Vector Assignments

Device	First Address	Next Addr.	Vector Size	Max Units	BR Level	RSTS/E Notes
DC11	174000	+10	10	32	BR5	Not supported
DL11A,B	176500	+10	10	16	BR4	Non-console
DP11	174770	-10	10	32	BR5	Not supported
DM11A	175000	+10	10	16	BR5	Not supported
DN11	175200	+10	4	16	BR5	Not supported
DM11BB	170500	+10	4	16	BR4	DH11 modem control
DR11A,C	167770	-10	10[1]	32	BR5	Not supported
PA611 Reader	172600	+4	4[1]	16	BR4	Not supported
PA611 Punch	172700	+4	4[1]	16	BR4	Not supported
LPD11			10			Not supported
DT11 (DT03_FP)	174200	+2	10[1]	8	BR7	Not supported
DX11	176200	+40	10[1]	4	BR4	Not supported
DL11C,D,E	175610	+10	10[1]	31	BR4	
DJ11	FLOAT	+10	10[1]	16	BR5	Not supported
DH11	FLOAT	+20	10[1]	16	BR5	
GT40	172000		20[1]		BR5	Not supported
VSV11	172000	+10	20			Not supported
LPS11	170400	+40	30[1]	14	BR5,6	Not supported
DQ11	FLOAT	+10	10[1]	16	BR5	Not supported
KW11W	172400	NA	10[1]	1		Not supported
DU11/DUV11	FLOAT	+10	10[1]	16	BR5[2]	2780 only
DUP11	FLOAT	+10	10[1]	16	BR5[2]	2780, HP2780, 3271
DV11	175000	+40	20[1]	4	BR5,6	Not supported
LK11	FLOAT	+10	10[1]	1	BR4	Not supported
DMC11/DMR11	FLOAT	+10	10[1]	16	BR5	
DZ11/DZV11/ DZQ11	FLOAT	+10	10[1]	8	BR5	
KMC11	FLOAT	+10	10[1]	16	BR5	
LPP11	FLOAT	+10	10			Not supported
VMV21	FLOAT	+10	10			Not supported

[1]—The first vector for the first device of this type must always be on a 10(8) boundary.
[2]—Also supported at BR6 under RSTS/2780.

Table 25 (Cont.): Device Vector Assignments

Device	First Address	Next Addr.	Vector Size	Max Units	BR Level	RSTS/E Notes
VMV31	FLOAT	+20	10			Not supported
VTV01	172600		10	2		Not supported
DWR70	FLOAT	+10	10			Not supported
RL11	FLOAT	+10	4		BR5	Not supported after 1st
TS11	172520	+4	4	4	BR5	
LPA11-K	170460		10	1		Not supported
IP11	171000		4	2		Not supported
KW11-C	FLOAT	+10				Not supported
RX11, RX211, RXV11	FLOAT	+10	4	4	BR5	After 1st only
DR11-W	FLOAT	+10	4			Not supported
DR11-B	FLOAT	+10	4			Not supported
DMP11	FLOAT	+10	10	16	BR5	DECnet/E only
DPV11	FLOAT	+10	10		BR5	Not supported
ML11	176400		4	1		Not supported
ISB11	FLOAT	+10	10			Not supported
DMV11	FLOAT	+20	10	16	BR5	DECnet/E only
DHV11/DHU11/ DHQ11/CX	FLOAT	+20	10	16	BR5	

Fixed Addresses and Vectors

Table 26 lists the devices supported under RSTS/E that have fixed addresses and vectors.

Table 26: Devices with Fixed Addresses and Vectors

Device	Address	Vector	BR Level	RSTS/E Notes
MSCP	172150	[1]	BR5	1st controller only
TMSCP	174500	[1]	BR5	1st unit only
RF11	177460	204	BR5	Not supported
RS03/RS04	172040	204	BR5	Not supported
RK05/RK05F[2]	177400	220	BR5	Up to 8 drives
RL01/RL02	174400	160	BR5	Up to 4 drives
RK06/RK07	177440	210	BR5	Up to 8 drives
RP02/RP03	176710	254	BR5	Not supported
Second RH11/70 RM02/RM03/RM05/RM80 RP04/RP05/RP06	176300	150	BR5	Up to 8 drives

[1]—These controllers have programmable vectors; INIT.SYS finds an available vector address and assigns it to them.

[2]—Each RK05F must be counted as two drives.

Table 26 (Cont.): Devices with Fixed Addresses and Vectors

Device	Address	Vector	BR Level	RSTS/E Notes
First RH11/70 RP04/RP05/RP06 RM02/RM03/RM05/RM80	176700	254	BR5	Up to 8 drives
RX01/RX02	177170	264	BR5	First only
DECtape	177340	214	BR6	Not supported
TU10/TE10/TS03/TS11	172520	224	BR5	First TS11 drive only
TU16/TE16/TU45/TU77[3]	172440	224	BR5	Up to 8 drives
LP11 (LP0)	177514	200	BR4	
(LP1)	164004	170	BR4	
(LP2)	164014	174	BR4	
(LP3)	164024	270	BR4	
(LP4)	164034	274	BR4	
(LP5)	164044	774	BR4	
(LP6)	164054	770	BR4	
(LP7)	164064	764	BR4	
CR11,CM11	177160	230	BR5	
CD11	177160	230	BR4	
KW11L	177546	100	BR6	
KW11P	172540	104	BR6	
KG11	170700	NONE	NONE	2780 only
DL11A,DL11B	177560	60	BR4	Console interface
DEQNA,DELQA XH0	774440	[1]	BR5	
XH1	774460	[1]	BR5	Not supported
DEUNA,DELUA XE0	774510	120	BR5	

[1]—These controllers have programmable vectors; INIT.SYS finds an available vector address and assigns it to them.
[3]—Maximum of 4 TU77's

RH70 BAE and CS3 Addresses

Table 27 lists the four possible RH70 High Speed I/O Controller addresses, their Bus Address Extension (BAE) and Control addresses, their BAE Control Status 3 (CS3) addresses, and their uses.

Table 27: RH70 BAE and CS3 Addresses

Device	Address	BAE	CS3	RSTS/E Notes
RS03/RS04	172040	172070	172072	Not supported
TU16/TE16/TU45/TU77	172440	172474	172476	
Mixed/nonstandard	176300	176350	176352	
RP04/RP05/RP06 or RM02/RM03/RM05/RM80	176700	176750	176752	

Appendix C
RSTS/E System Files

RSTS/E System Files

This section shows a directory listing of the RSTS/E system programs. The directory listing for your installation may differ, depending on the packages you selected.

Account [0,1]

```
 Name .Typ     Size     Prot     Name .Typ     Size     Prot     SY:[0,1]
BADB  .SYS       8 P  < 63>    SATT  .SYS      14CP  < 63>
ERR   .ERR      16CP  < 40>    SYSGEN.SIL     681CP  < 60>
DCL   .RTS     114C   <232>    PKG001.MSG       8C   < 40>
PKG002.MSG       7C   < 40>    RSX   .RTS       6C   < 60>
INIT  .SYS     618CP  < 60>    CONFIG.SYS       1CP  < 60>
GETSYS.TSK      55C   <124>    BACKUP.TSK     139C   <232>
RT11  .RTS      20C   < 60>    ODT   .SYS      14    < 60>
CSP100.LIB      41C   < 60>    CSPLIB.LIB      41C   < 60>
REMESC.TSK      13C   <124>    SYSDIE.TSK      36C   <124>
NETCHK.TSK      13C   <124>    INSTAL.COM       3C   <124>
UPDATE.COM       3C   <124>    COPYUP.COM       2C   <124>
SYSINI.COM       8C   <124>    RECOVR.COM      11C   <124>
CSPHLP.COM       9C   <104>    SETPAS.COM       2C   <104>
LPRES .COM      13C   <104>    LISTER.COM       8C   <104>
CHECK .COM       3C   <104>    MONITR.COM      16C   <104>
CSPLNG.COM      24C   <104>    ASSLOG.COM      13C   <104>
MONBLD.COM      15C   <104>    VOLCHK.COM       4C   <104>
INSPKG.COM      14C   <104>    NETDEL.COM       9C   <104>
DELLOG.COM       4C   <104>    CSP   .HLP       2C   <104>
CSP1  .HLP       1C   <104>    CSP2  .HLP       2C   <104>
LP    .HLP       1C   <104>    LPX   .HLP       1C   <104>
LP1   .HLP       1C   <104>    LPX1  .HLP       1C   <104>
LP2   .HLP       1C   <104>    CSPLST.DAT       2C   <104>
MICRO .HLP       2    < 60>    CSPRES.COM      17C   <104>
BEGIN .COM      27C   <104>    CSP   .COM      36C   <104>
LP    .COM      22C   <104>    MAIN  .COM      22C   <104>
SWAP1 .SYS    2376CPL < 60>    RSTS  .SIL     640C   < 60>
LOGIN .COM       4C   <104>    START .COM      21C   <124>
BASIC .RTS      65C   < 60>    SWAP  .SYS     264CP  < 63>
CRASH .SYS    1236CP  < 63>

Total of 6749 blocks in 59 files in SY:[0,1]
```

Help Package

Name .Typ	Size	Prot	Name .Typ	Size	Prot	SY:[0,2]
DCALLO.HLP	7	< 40>	DCAPPE.HLP	8	< 40>	
DCASSI.HLP	3	< 40>	DCASPO.HLP	6	< 40>	
DCASQU.HLP	2	< 40>	DCASSY.HLP	4	< 40>	
DCAT .HLP	3	< 40>	DCATTA.HLP	4	< 40>	
DCBACK.HLP	36	< 40>	DCBASI.HLP	3	< 40>	
DCBCOP.HLP	25	< 40>	DCBIMA.HLP	22	< 40>	
DCBP2 .HLP	2	< 40>	DCBROA.HLP	5	< 40>	
DCBYE .HLP	3	< 40>	DCCCL .HLP	3	< 40>	
DCCLOS.HLP	2	< 40>	DCCLLG.HLP	2	< 40>	
DCCLQU.HLP	2	< 40>	DCCOPY.HLP	21	< 40>	
DCCRAC.HLP	18	< 40>	DCCREA.HLP	8	< 40>	
DCCRPO.HLP	8	< 40>	DCCRVI.HLP	6	< 40>	
DCDAPO.HLP	2	< 40>	DCDEAL.HLP	2	< 40>	
DCDEAS.HLP	3	< 40>	DCDEPO.HLP	3	< 40>	
DCDETA.HLP	4	< 40>	DCDSQU.HLP	3	< 40>	
DCDSSY.HLP	1	< 40>	DCDEFI.HLP	1	< 40>	
DCDELE.HLP	11	< 40>	DCDEVI.HLP	3	< 40>	
DCDFCM.HLP	1	< 40>	DCDFCS.HLP	11	< 40>	
DCDIBO.HLP	2	< 40>	DCDIFF.HLP	5	< 40>	
DCDIRE.HLP	11	< 40>	DCDISM.HLP	1	< 40>	
DCDLAC.HLP	8	< 40>	DCDLCM.HLP	1	< 40>	
DCDLCS.HLP	2	< 40>	DCDLEN.HLP	3	< 40>	
DCDLQU.HLP	2	< 40>	DCDLRQ.HLP	10	< 40>	
DCDLSB.HLP	3	< 40>	DCDLSV.HLP	2	< 40>	
DCDMDK.HLP	3	< 40>	DCDMMT.HLP	3	< 40>	
DCDUMP.HLP	1	< 40>	DCDPSY.HLP	2	< 40>	
DCEDIT.HLP	9	< 40>	DCEOD .HLP	3	< 40>	
DCEXIT.HLP	3	< 40>	DCFOFO.HLP	3	< 40>	
DCFORC.HLP	5	< 40>	DCFORT.HLP	2	< 40>	
DCF77 .HLP	3	< 40>	DCGOSU.HLP	5	< 40>	
DCGOTO.HLP	3	< 40>	DCHANG.HLP	2	< 40>	
DCHELP.HLP	5	< 40>	DCIF .HLP	4	< 40>	
DCINDK.HLP	15	< 40>	DCINER.HLP	6	< 40>	
DCINIT.HLP	2	< 40>	DCINIQ.HLP	22	< 40>	
DCINLI.HLP	9	< 40>	DCINMT.HLP	6	< 40>	
DCINOV.HLP	6	< 40>	DCINQU.HLP	8	< 40>	
DCINRU.HLP	11	< 40>	DCINST.HLP	2	< 40>	
DCINSV.HLP	13	< 40>	DCINSW.HLP	11	< 40>	
DCLINK.HLP	5	< 40>	DCLOAD.HLP	1	< 40>	
DCLOGI.HLP	6	< 40>	DCLOID.HLP	3	< 40>	
DCLOGO.HLP	5	< 40>	DCLOOV.HLP	4	< 40>	
DCMACR.HLP	2	< 40>	DCMOUN.HLP	1	< 40>	
DCMTDK.HLP	10	< 40>	DCMTMT.HLP	5	< 40>	
DCON .HLP	9	< 40>	DCONCC.HLP	5	< 40>	
DCOPEN.HLP	10	< 40>	DCOPLG.HLP	10	< 40>	
DCOPQU.HLP	2	< 40>	DCPRIN.HLP	20	< 40>	
DCREAD.HLP	5	< 40>	DCRECA.HLP	10	< 40>	
DCREER.HLP	2	< 40>	DCREJO.HLP	3	< 40>	
DCRELI.HLP	2	< 40>	DCREMO.HLP	2	< 40>	
DCREOV.HLP	2	< 40>	DCRERU.HLP	2	< 40>	
DCRENA.HLP	12	< 40>	DCREQU.HLP	8	< 40>	
DCRESW.HLP	2	< 40>	DCREST.HLP	36	< 40>	
DCRETU.HLP	5	< 40>	DCRPLY.HLP	7	< 40>	
DCRUN .HLP	4	< 40>	DCSET .HLP	3	< 40>	
DCSEAC.HLP	14	< 40>	DCSECA.HLP	8	< 40>	
DCSECO.HLP	1	< 40>	DCSEDA.HLP	4	< 40>	
DCSEDT.HLP	2	< 40>	DCSEDV.HLP	2	< 40>	
DCSEEC.HLP	3	< 40>	DCSEEN.HLP	9	< 40>	
DCSEFI.HLP	8	< 40>	DCSEHO.HLP	3	< 40>	
DCSEJO.HLP	6	< 40>	DCSELG.HLP	2	< 40>	
DCSENC.HLP	2	< 40>	DCSEND.HLP	3	< 40>	
DCSENE.HLP	3	< 40>	DCSENO.HLP	2	< 40>	
DCSENV.HLP	2	< 40>	DCSEON.HLP	1	< 40>	
DCSEOS.HLP	2	< 40>	DCSEPA.HLP	3	< 40>	
DCSEPN.HLP	9	< 40>	DCSEPO.HLP	8	< 40>	

DCSEPR.HLP	9	< 40>	DCSEPT.HLP	4	< 40>
DCSEQU.HLP	13	< 40>	DCSESV.HLP	9	< 40>
DCSESY.HLP	19	< 40>	DCSETE.HLP	47	< 40>
DCSETI.HLP	2	< 40>	DCSEVE.HLP	3	< 40>
DCSHAC.HLP	10	< 40>	DCSHAL.HLP	3	< 40>
DCSHBU.HLP	3	< 40>	DCSHCA.HLP	7	< 40>
DCSHCM.HLP	1	< 40>	DCSHCS.HLP	2	< 40>
DCSHDA.HLP	1	< 40>	DCSHDK.HLP	6	< 40>
DCSHDT.HLP	1	< 40>	DCSHDV.HLP	3	< 40>
DCSHEN.HLP	9	< 40>	DCSHFI.HLP	2	< 40>
DCSHFO.HLP	2	< 40>	DCSHFS.HLP	5	< 40>
DCSHJO.HLP	5	< 40>	DCSHLB.HLP	1	< 40>
DCSHLO.HLP	5	< 40>	DCSHLS.HLP	1	< 40>
DCSHMY.HLP	1	< 40>	DCSHNT.HLP	1	< 40>
DCSHOS.HLP	3	< 40>	DCSHOW.HLP	3	< 40>
DCSHPO.HLP	7	< 40>	DCSHPR.HLP	2	< 40>
DCSHPV.HLP	2	< 40>	DCSHQU.HLP	12	< 40>
DCSHQT.HLP	3	< 40>	DCSHRQ.HLP	13	< 40>
DCSHRT.HLP	1	< 40>	DCSHRV.HLP	1	< 40>
DCSHSB.HLP	2	< 40>	DCSHSV.HLP	14	< 40>
DCSHSY.HLP	2	< 40>	DCSHTE.HLP	10	< 40>
DCSHTI.HLP	1	< 40>	DCSHUS.HLP	8	< 40>
DCSTAR.HLP	2	< 40>	DCSTOP.HLP	3	< 40>
DCSTOS.HLP	7	< 40>	DCSTQM.HLP	7	< 40>
DCSTQU.HLP	2	< 40>	DCSPOS.HLP	4	< 40>
DCSPQU.HLP	3	< 40>	DCSPQM.HLP	4	< 40>
DCSPSV.HLP	7	< 40>	DCSTSV.HLP	8	< 40>
DCSUBM.HLP	20	< 40>	DCTYPE.HLP	8	< 40>
DCUNID.HLP	2	< 40>	DCUNLI.HLP	3	< 40>
DCUNLO.HLP	2	< 40>	DCUNOV.HLP	3	< 40>
DCUNRU.HLP	2	< 40>	DCWRIT.HLP	6	< 40>
ACCNTS.HLP	30	< 40>	ADVANC.HLP	20	< 40>
BPCHLP.HLP	4	< 40>	BPCOMM.HLP	12	< 40>
BPCREF.HLP	6	< 40>	BPFUNC.HLP	14	< 40>
BPHELP.HLP	2	< 40>	BPSTAT.HLP	19	< 40>
COPHLP.HLP	4	< 40>	COMREC.HLP	7	< 40>
COPY .HLP	3	< 40>	CTRLT .HLP	9	< 40>
DATES .HLP	7	< 40>	DCL .HLP	2	< 40>
DCMAIL.HLP	3	< 40>	DIRECT.HLP	4	< 40>
DIRHLP.HLP	4	< 40>	DISKS .HLP	15	< 40>
ENTRYS.HLP	11	< 40>	ERRDIS.HLP	7	< 40>
ERRHLP.HLP	7	< 40>	EXPRES.HLP	6	< 40>
FILES .HLP	19	< 40>	FIT .HLP	11	< 40>
FITHLP.HLP	11	< 40>	FORMS .HLP	18	< 40>
FUNCTN.HLP	28	< 40>	HELP .TSK	29C	<232>
HELP .HLP	8	< 40>	KEYS .HLP	13	< 40>
LABELS.HLP	4	< 40>	LEVELS.HLP	6	< 40>
LINEED.HLP	6	< 40>	MAGTAP.HLP	12	< 40>
OPERAT.HLP	7	< 40>	PASSWD.HLP	10	< 40>
PRIVS .HLP	12	< 40>	PROGRM.HLP	2	< 40>
PIPHLP.HLP	31	< 40>	PIPDIR.HLP	3	< 40>
PIPSAV.HLP	31	< 40>	PLEHLP.HLP	6	< 40>
PLEBAT.HLP	4	< 40>	PLEQUE.HLP	4	< 40>
PLESPL.HLP	6	< 40>	QUEHLP.HLP	8	< 40>
QUEUES.HLP	20	< 40>	QUOTAS.HLP	11	< 40>
RSX .HLP	3	< 40>	RT11 .HLP	13	< 40>
RUNTIM.HLP	9	< 40>	SERVRS.HLP	7	< 40>
SYMBOL.HLP	14	< 40>	SYSHLP.HLP	22	< 40>
TERMNL.HLP	4	< 40>	TIMES .HLP	7	< 40>
TECHLP.HLP	5	< 40>	TECOFL.HLP	6	< 40>
TECOMD.HLP	12	< 40>	TYPHLP.HLP	3	< 40>
UTLHLP.HLP	12	< 40>	VTEDKP.HLP	6	< 40>
VTEHLP.HLP	3	< 40>	DCSHOD.HLP	1	< 40>
DCSEOD.HLP	1	< 40>	DCCRSV.HLP	1	< 40>
DCSEVL.HLP	1	< 40>	DCSHVL.HLP	1	< 40>
DCDESV.HLP	1	< 40>	DCSHCO.HLP	1	< 40>
DCSENL.HLP	7	< 40>	DCSTLA.HLP	2	< 40>
DCSHNL.HLP	2	< 40>	DCCRSL.HLP	2	< 40>

```
DCSESL.HLP        2   < 40>    DCSHSL.HLP        2   < 40>
DCDESL.HLP        2   < 40>    DCSHCL.HLP        4   < 40>
DCSHTL.HLP        2   < 40>    DCSHSS.HLP        3   < 40>
DCSPLA.HLP        2   < 40>    DCWAIT.HLP        4   < 40>
DCLSRT.HLP       31   < 40>    DCLMGE.HLP       26   < 40>

Total of 1857 blocks in 276 files in SY:[0,2]
```

Error Reporting Package

```
 Name .Typ     Size     Prot      Name .Typ     Size     Prot     SY:[0,3]
ERRDAT.FIL      67C   < 60>     MSCPER.FIL      97C   < 60>
ERRINT.TSK      18C   <232>     ERRCPY.TSK      15C   <232>
ERRDIS.TSK      44C   <232>     ERRDET.TSK      52C   <232>
ANALYS.TSK      57C   <124>     ANALY1.TSK      82C   <124>
ANALY2.TSK      71C   <124>     ANALY3.TSK      58C   <124>

Total of 561 blocks in 10 files in SY:[0,3]
```

Update Package

```
 Name .Typ     Size     Prot      Name .Typ     Size     Prot     SY:[0,4]
PA0307.001       2   < 60>     PA0301.001       2   < 60>
PA0410.006       1   < 60>     PA0410.005       1   < 60>
PA0410.004       1   < 60>     PA0410.003       3   < 60>
PA0401.009       1   < 60>     PA0401.007       1   < 60>
PA0401.006       1   < 60>     PA0401.005       1   < 60>
PA0401.004       1   < 60>     PA0401.003       1   < 60>
PA0401.002       1   < 60>     PA0401.001       2   < 60>
PA0303.001       3   < 60>     PA0303.002       2   < 60>
BUILD .TSK      59C   <124>     CPATCH.TSK      24C   <124>
AUTOED.TSK      27C   <124>     UTILTY.TSK      48C   <124>

Total of 182 blocks in 20 files in SY:[0,4]
```

Device Testing Package

```
  Name .Typ     Size     Prot      Name .Typ     Size     Prot     SY:[0,5]
DSKSEK.TSK      18C   <124>     DSKEXR.TSK      21C   <124>
LPEXER.TSK      14C   <124>     DXEXER.TSK      21C   <124>
CPEXER.TSK      28C   <124>     CPUTST.TSK      28C   <124>
KBEXER.TSK      17C   <124>     MTEXER.TSK      26C   <124>

Total of 173 blocks in 8 files in SY:[0,5]
```

Print/Batch Services Package

```
 Name .Typ     Size     Prot      Name .Typ     Size     Prot     SY0:[0,6]
PBS   .TSK     103C   <232>     PBSMGR.TSK     316C   <232>
PBSERR.ERR      57    < 40>     FORMS .SYS       2    < 40>
PBS   .SYS      32    <188>

Total of 510 blocks in 5 files in SY:[0,6]
```

File Restore Package

```
 Name .Typ     Size     Prot      Name .Typ     Size     Prot     SY:[0,7]
BACKUP.HLP      12    < 60>     RESTOR.TSK      51C   <252>
BACLST.TSK      55C   <252>     BACCON.TSK      30C   <252>
BACDIR.TSK      56C   <252>     BACMNT.TSK      61C   <252>
BACLAB.TSK      45C   <252>     BACDSK.TSK      37C   <252>
BACCOM.TSK      47C   <252>     BACLOD.TSK      51C   <252>
BACENT.TSK      41C   <252>     BACFRM.TSK      52C   <252>
BACKUP.PRM       5    < 60>

Total of 543 blocks in 13 files in SY:[0,7]
```

OPSER-based Spooling Package

```
 Name .Typ     Size     Prot      Name .Typ     Size     Prot     SY:[0,8]
CHARS .QUE       2    < 60>     BATCH .DCD      12C   < 60>
QUEMAN.TSK      61C   <232>     QUMRUN.TSK      89C   <232>
OPSER .TSK      51C   <232>     OPSRUN.TSK      60C   <232>
SPOOL .TSK      83C   <232>     SPLIDL.TSK      90C   <232>
SPLRUN.TSK      90C   <232>     BATCH .TSK      80C   <232>
BATIDL.TSK      79C   <232>     BATDEC.TSK      93C   <232>
BATRUN.TSK      88C   <232>     QUE   .TSK      87C   <232>
PLEASE.TSK      40C   <232>

Total of 1005 blocks in 15 files in SY:[0,8]
```

Unsupported Utility Package

```
 Name .Typ     Size     Prot      Name .Typ     Size     Prot     SY:[0,9]
DSKDMP.BAS      19    < 60>     STATUS.B2S      92    < 60>
QSTATS.B2S      59    < 60>     DSKPEK.OBJ       1    < 60>
BPDA  .BAS      59    < 60>     DSKDMP.HLP      26    < 40>
LQSTAT.BAS      19    < 60>     QSTATS.DOC      32    < 60>
MEMORY.BAS      15    < 60>     FLOAT .BAS      19    < 60>
CONNEC.BAS      46    < 60>     DIALER.BAS      85    < 60>
DIALER.DOC      63    < 60>     EMTCPY.BAS     104    < 60>
RSTSFL.OBJ      42    < 60>     RSTSFL.OLB     102C   < 60>
RSTSFL.DOC       2    < 60>     RSTSFL.HLP       6    < 60>
MEMORY.TSK      13C   <124>     FLOAT .TSK      21C   <124>
B2CREF.TSK     113C   <104>     B2CREF.HLP      12    < 60>
B2CREF.DOC       2    < 40>     RNO   .TSK      72C   <104>
RNO   .RNO      85    < 60>     RNOBLD.CMD       6    < 60>
RNOBLD.ODL       2    < 60>     RNPRE .MAC       5    < 60>
COMND .MAC       7    < 60>     CMTAB .MAC      11    < 60>
ERMSG .MAC      10    < 60>     FMTCM .MAC      26    < 60>
HYPHEN.MAC      54    < 60>     INDEX .MAC      11    < 60>
PINDX .MAC       9    < 60>     RNCMD .MAC      22    < 60>
RNFIO .MAC       9    < 60>     RNORSX.MAC       5    < 60>
RUNOFF.MAC      71    < 60>     START .MAC       8    < 60>
EMS   .COM       6C   <104>     DUMP  .SAV      10C   <104>
DSKDMP.TSK      18C   <104>     BPDA  .TSK      37C   <104>
CONNEC.TSK      29C   <104>     DIALER.TSK      44C   <104>
EMTCPY.TSK      38C   <124>     STATUS.TSK      56C   <124>
QSTATS.TSK      24C   <124>     LQSTAT.TSK      22C   <124>
SRCCOM.SAV      17C   <104>

Total of 1666 blocks in 51 files in SY:[0,9]
```

RMS-11 Package

```
 Name .Typ     Size     Prot      Name .Typ     Size     Prot     SY:[0,10]
RMSBCK.TSK      93C   <104>     RMSRST.TSK     111C   <232>
RMSDEF.TSK      77C   <104>     RMSDSP.TSK      75C   <104>
RMSCNV.TSK      83C   <104>     RMSDES.TSK     120C   <104>
RMSIFL.TSK      85C   <104>     RMSRES.LIB      20C   < 60>
RMSLBA.LIB      18C   < 60>     RMSLBB.LIB      15C   < 60>
RMSLBC.LIB      14C   < 60>     RMSLBD.LIB      10C   < 60>
RMSLBE.LIB      14C   < 60>     RMSLBF.LIB      18C   < 60>
DAPRES.LIB      43C   < 60>     DAPENV.LIB       7C   < 60>
RMSRES.TSK      18    < 40>     RMSRES.STB       3    < 40>
RESLIB.00K       0    < 60>

Total of 824 blocks in 19 files in SY:[0,10]
```

EDT Package

```
 Name .Typ     Size     Prot      Name .Typ     Size     Prot     SY:[0,11]
EDT52 .DOC       3    < 40>     EDT100.DOC       3    < 40>
EDT200.DOC       4    < 40>     EDTKIT.DOC      39    < 40>
EDT   .LIB     166C   < 60>     EDT   .TSK      48C   <104>

Total of 263 blocks in 6 files in SY:[0,11]
```

SYSGEN Components and BASIC-PLUS Package

```
 Name .Typ     Size     Prot      Name .Typ     Size     Prot     SY:[0,12]
MONITR.CMD        1    < 60>    RJ2780.CMD       25    < 60>
RSXRTS.CMD        1    < 60>    HOOK  .SAV       28C   <124>
CHECK .MAC       22    < 60>    TBL   .MAC      120    < 60>
KBDEF .MAC       44    < 60>    RSTS  .OBJ     1076    < 60>
CRA   .OBJ        8    < 60>    DSK   .OBJ        5    < 60>
MCP   .OBJ        3    < 60>    BBR   .OBJ        3    < 60>
OPN   .OBJ        3    < 60>    XVR   .OBJ        2    < 60>
KVR   .OBJ        3    < 60>    MVR   .OBJ        3    < 60>
XTR   .OBJ        2    < 60>    EMT   .OBJ        3    < 60>
EM2   .OBJ        3    < 60>    GEN   .OBJ        3    < 60>
GRD   .OBJ        3    < 60>    RSX   .OBJ        2    < 60>
FIPLRG.OBJ        2    < 60>    FMS   .OBJ        3    < 60>
NOD   .OBJ        4    < 60>    DHPORT.OBJ        2    < 60>
DLPORT.OBJ        2    < 60>    DZPORT.OBJ        2    < 60>
VHPORT.OBJ        2    < 60>    PKPORT.OBJ        4    < 60>
PDVVEC.OBJ        1    < 60>    TERCLS.OBJ       15    < 60>
KBD   .OBJ        4    < 60>    KBX   .OBJ        2    < 60>
KIN   .OBJ        3    < 60>    LAT   .OBJ        3    < 60>
SES   .OBJ        2    < 60>    NSP   .OBJ        3    < 60>
TRN   .OBJ        3    < 60>    RDM   .OBJ        2    < 60>
EVL   .OBJ        2    < 60>    DMP   .OBJ        2    < 60>
UNA   .OBJ        4    < 60>    QNA   .OBJ        4    < 60>
OVRLRG.OBJ        4    < 60>    OV2   .OBJ        2    < 60>
OVLHD .OBJ        1    < 40>    DEFALT.SAV        4C   <124>
DEFALT.STB        1    < 60>    BUFCHK.TSK       21C   <124>
SYSGEN.SAV      104C   <124>    BASIC .CMD        1    < 60>
BPLGEN.TSK       42C   <124>    RTS   .OBJ       74    < 60>
MA2   .OBJ       16    < 60>    MA2I  .OBJ       14    < 60>
MA2F  .OBJ       14    < 60>    MA4   .OBJ       19    < 60>
MA4F  .OBJ       16    < 60>    MA4D  .OBJ       14    < 60>
XL2   .OBJ        3    < 60>    XL2I  .OBJ        3    < 60>
XL2F  .OBJ        2    < 60>    XL4   .OBJ        4    < 60>
XL4F  .OBJ        2    < 60>    XT2   .OBJ        3    < 60>
XT2I  .OBJ        3    < 60>    XT2F  .OBJ        2    < 60>
XT4   .OBJ        3    < 60>    XT4F  .OBJ        2    < 60>
SF    .OBJ        6    < 60>    IO    .OBJ        6    < 60>
PU    .OBJ        5    < 60>    MX    .OBJ        8    < 60>
SN    .OBJ        2    < 60>    DBG   .OBJ        2    < 60>
VE    .OBJ        2    < 60>    DI    .OBJ        1    < 60>
LA    .OBJ       10    < 60>    LAD   .OBJ       10    < 60>
M18   .OBJ        1    < 60>    RC    .OBJ       29    < 60>
EC    .OBJ        4    < 60>    SC    .OBJ        2    < 60>
SU    .OBJ        2    < 60>    TR    .OBJ       20    < 60>
ED    .OBJ       16    < 60>    RX    .OBJ        1    < 60>
BASIC .COM       2C   <104>

Total of 1937 blocks in 89 files in SY:[0,12]
```

TECO Package

```
 Name .Typ     Size    Prot      Name .Typ     Size    Prot     SY:[0,13]
TECO  .RTS      48C  < 60>     TECO  .TEC      10C  <104>
TYPE  .TEC       7C  <104>     VTEDIT.TEC      24C  <104>
VTEDIT.DOC     119   < 40>     TECORN.DOC     108   < 40>
TECO  .DOC     995   < 40>     TECO  .INI       8   < 40>
TECKBM.TEC       3C  <104>     LOCAL .TEC       3C  <104>
SEARCH.TEC       5C  <104>     SQU   .TEC      10C  <104>
FMTMAC.TEC       1C  <104>     TECO  .TES      28   < 40>
TYPE  .TES      17   < 40>     VTEDIT.TES      34   < 40>
FMTMAC.TES       9   < 40>     TECOIN.TES      18   < 40>
TECKBM.TES       3   < 40>     LOCAL .TES       3   < 40>
SEARCH.TES       9   < 40>     SQU   .TES      15   < 40>
TECOLB.OBJ      68   < 60>     GEXIT .OBJ       3   < 60>
SCREEN.OBJ      15   < 60>     SCRINS.OBJ       4   < 60>
SCROLL.OBJ       4   < 60>     CRTRUB.OBJ       5   < 60>
CRTRUB.MAC      65   < 60>

Total of 1641 blocks in 29 files in SY:[0,13]
```

Auxiliary Library Package

```
 Name .Typ     Size    Prot      Name .Typ     Size    Prot     SY:[0,14]
ODT   .TSK      38C  <104>     COPY  .TSK      25C  <104>
QUOLST.TSK      49C  <232>     TALK  .TSK      12C  <232>
GRIPE .TSK      17C  <232>     DISPLY.TSK      70C  <232>
FIT   .TSK      60C  <232>     PMDUMP.TSK      52C  <104>
BPCREF.TSK      25C  <104>     BPCRF1.TSK      51C  <104>
RUNOFF.TSK      59C  <104>     DSKCVT.TSK      58C  <124>

Total of 516 blocks in 12 files in SY:[0,14]
```

SORT/MERGE Package

```
 Name .Typ     Size    Prot      Name .Typ     Size    Prot     SY:[0,15]
V96BUG.FIX       1   < 60>     SRTLIB.OLB     216   < 60>
SRTUTL.ODL      11   < 60>     MGELIB.OLB     196   < 60>
MGEUTL.ODL      10   < 60>     SRTFIL.ODL      11   < 60>
SRTREC.ODL      11   < 60>     MGEFIL.ODL      10   < 60>
MGEREC.ODL       9   < 60>     SRTSHR.OLB     220   < 60>
MGESHR.OLB     201   < 60>     RELEAS.NOT       3   < 60>
MGTST1.DAT      33   < 60>     MGTST2.DAT      48   < 60>
SORT  .COM      11C  <104>     SRTUTL.TSK     389C  <104>
MGEUTL.TSK     368C  <104>     SRTTRN.TSK     103   <104>

Total of 1851 blocks in 18 files in SY:[0,15]
```

SOURCE Package

```
 Name .Typ     Size    Prot      Name .Typ     Size    Prot     SY:[0,17]
ATPK  .BAS      97   < 60>     DIRECT.BAS      99   < 60>
DISPLY.BAS     151   < 60>     HELP  .BAS     100   < 60>
LOGIN .BAS      79   < 60>     LOGOUT.BAS      32   < 60>
SHUTUP.BAS     138   < 60>     SYSTAT.BAS     138   < 60>

Total of 834 blocks in 8 files in SY:[0,17]
```

OMS Package

```
 Name .Typ     Size    Prot      Name .Typ     Size    Prot     SY:[0,20]
OMS   .TSK      87C  <252>     OMSMGR.TSK     106C  <232>
OMS   .SYS     144   <188>

Total of 337 blocks in 3 files in SY:[0.20]
```

RSX Utilities Package

```
 Name .Typ     Size     Prot      Name .Typ     Size     Prot     SY:[1,1]
CSP100.STB       8C   < 40>    CSP100.TSK      34C   < 60>
SYSLIB.OLB      265   < 40>    RSXMAC.SML      271   < 40>
BP2    .LNK       3   < 40>    C81    .LNK       2   < 40>
F77    .LNK       3   < 40>    RSX11  .LNK       2   < 40>
RMSMAC.MLB      189   < 40>    RMSLIB.OLB      222   < 40>
RMSDAP.OLB      102   < 40>    RMSFUN.OBJ        9   < 60>
RMS11  .ODL      85   < 40>    R0RMS1.MAC       12   < 40>
RMS11S.ODL        3   < 40>    RMS12S.ODL        3   < 40>
RMS11X.ODL        5   < 40>    RMS12X.ODL        4   < 40>
RMSRLX.ODL        2   < 40>    RMSSLX.ODL        2   < 40>
DAP11X.ODL        5   < 40>    DAPRLX.ODL        2   < 40>
DAPSLX.ODL        2   < 40>    RMSRES.TSK        6   < 40>
RMSRES.STB        3   < 40>    DAPRES.TSK       39   < 40>
DAPRES.STB        2   < 40>    RMSDES.HLP      142   < 40>
RMS    .00L       0   < 60>    ODT    .OBJ       8   < 40>
ODTID  .OBJ      13   < 40>    EDTHEL.HLP      223   < 40>
DCLC81.HLP        1   < 40>    SRTLIB.OLB      216   < 40>
MGELIB.OLB      197   < 40>    SRTFIL.ODL       11   < 40>
SRTREC.ODL       11   < 40>    MGEFIL.ODL       10   < 40>
MGEREC.ODL        9   < 40>    STMGFL.ODL       16   < 40>
STMGRC.ODL       15   < 40>

Total of 2157 blocks in 41 files in SY:[1,1]
```

System Library Package

```
 Name .Typ     Size     Prot      Name .Typ     Size     Prot     SY:[1,2]
UTLMGR.TSK     316C  <232>    DSKINT.TSK     110C  <232>
ONLCLN.TSK     111C  <232>    ACTMGR.TSK     282C  <232>
SHUTUP.TSK      72C  <232>    DCLAUX.TSK      55C  <232>
SILUS  .SAV     40C  <104>    PIP    .SAV     61C  <232>
MACRO  .SAV     63C  <104>    CREF   .SAV      6C  <104>
LINK   .SAV     57C  <104>    LIBR   .SAV     28C  <104>
ERR    .STB      3   < 40>    SYSLIB.OBJ      75   < 40>
ONLPAT.SAV      71C  <104>    COMMON.MAC      39   < 40>
KERNEL.MAC     162   < 60>    DCLUTL.TSK      26C  <232>
VER00K.SYS       0   < 60>    LOGIN  .TSK     46C  <232>
LOGOUT.TSK      22C  <232>    DIRECT.TSK      58C  <232>
SYSTAT.TSK      63C  <232>    FILCOM.TSK      48C  <104>
SWITCH.TSK      11C  <232>    ATPK   .TSK     30C  <232>
SYSMAC.SML      46   < 40>    SAVRES.SAV     209C  <124>
TERMGR.TSK     137C  <232>    LATMGR.TSK     104C  <232>
PAT    .SAV     11C  <104>    REORDR.TSK      86C  <232>
MAKSIL.TSK      52C  <104>    TKB    .TSK     221C  <104>
STK    .TSK     221C  <104>    MAC    .TSK     100C  <104>
LBR    .TSK      66C  <104>    PAT    .TSK      55C  <104>
CRF    .TSK      47C  <104>    PRELIN.TSK      46C  <232>
RSX    .00K       0   < 60>    UTILTY.TSK       5C  <124>
BUILD  .TSK       5C  <124>    AUTOED.TSK       5C  <124>
CPATCH.TSK        5C  <124>    QUE    .TSK      5C  <232>
PLEASE.TSK        5C  <232>    BPLGEN.COM       3   < 60>
SRTUTL.MAP      226   < 60>    INSTAL.LOG      34   < 60>

Total of 3549 blocks in 50 files in SY:[1,2]
```

Appendix D
Bootstrapping the Distribution Medium

The distribution medium is the tape or disk on which Digital supplies the RSTS/E system. To bootstrap the distribution medium, use the switches on the Central Processing Unit (CPU) or type a command to the console emulator to activate a hardware loader that contains machine instructions for reading the first record of the distribution medium into memory. This record, called a bootstrap record, is a program that loads additional program code from the distribution medium into memory and executes that code. The code then prints a message on the console terminal, marking the successful completion of the bootstrap procedure. For example:

```
Performing limited hardware scan.

RSTS V10.0-L (MT0) INIT V10.0-L

Today's date?

Current time?

Installing RSTS on a new system disk? <Yes>
```

For the bootstrap operation to succeed, the distribution medium must be on line, ready, and write-protected; the medium accessed must contain a proper bootstrap record; and the console terminal must be on line. The following two sections describe the bootstrap procedures for each of the distribution media. The third section details hardware bootstrap procedures.

Bootstrapping Magnetic Tape Distribution

The operation of the magnetic tape devices is described in the *RSTS/E System User's Guide*. To bootstrap the magnetic tape, do the following:

1. Physically mount the system installation tape on unit 0 with the write enable ring removed.

   NOTE

   The 9-track, 800 bpi magnetic tape bootstrap in the system initialization code will not use a TU16, TE16, TU45, or TU77 tape drive if a TU10, TE10, or TS03 drive is present. Therefore, if your system includes drives of both types (TU10/TE10/TS03 and TU16/TE16/TU45/TU77), bootstrap the 800 bpi distribution tape on the TU10, or TE10 drive. Similarly, the 1600 bpi magnetic tape bootstrap will not use a TU16, TE16, TU45, or TU77 tape drive if a tape is mounted and on line on a TS11 drive.

2. Make sure that the tape is at its load point. (The BOT indicator light comes on.) The computer does not bootstrap the device unless the tape is at its load point.

3. Set the ONLINE/OFFLINE switch on the tape unit to ONLINE and make sure that the RDY indicator is lighted.
4. Make sure that the console terminal is on line.
5. Follow the bootstrap instructions in the section, Hardware Bootstrap Procedures, for the type of hardware bootstrap device that is on the system.

NOTE

The tape drive MUST be write-protected and online for the installation to proceed properly.

Bootstrapping Disk Distribution

To bootstrap the disk cartridge, proceed as follows:

1. Insert the disk cartridge in a free unit, either 0 or 1. RLO2 disks can use any unit number.
2. Make sure that the RDY light is on.
3. Make sure that the WR PROT light is on.
4. Make sure that the console terminal is on line.
5. Follow the instructions in the section, Hardware Bootstrap Procedures, for the type of hardware bootstrap device that is on the system.

Hardware Bootstrap Procedures

Bootstrapping a device involves using the Central Processor Unit (CPU) console switches or typing a command to the console emulator to access and activate a hardware loader. The hardware loader contains machine instructions for reading a bootstrap record from the device. The bootstrap record is transferred into memory and executes a specially designed software program. For the bootstrap operation to succeed, the device accessed must be on line and ready; the medium accessed must contain a proper bootstrap record; and the console terminal must be on line.

The PDP-11 console switches and their use are described in the various processor handbooks. The bootstrap procedure that you should use depends upon the type of hardware bootstrap device on the system.

Table 28 summarizes the addresses needed to bootstrap each device. The detailed procedures to bootstrap a device are presented according to the types of hardware bootstrap devices available.

Table 28: Summary of Hardware Bootstrap Addresses

	UNIBUS Bootstrap Type				
Device to Bootstrap	**M9301-YA**	**M9301-YB**	**M9301-YC**	**M9301-YF**	**M9312**
RK05 disk cartridge unit 0	DK	DK	30	DK	DK
RP04/RP05/RP06/RM02/ RM03/RM05/ or RM80 disk pack unit 0 at 176700 CSR		DB	70	DB	DB
RK05 disk (unit n)	DKn	DKn	30+n	DKn	DKn
RL01/RL02 disk (unit n)					DLn
RK06 disk (unit n)				DMn	DMn

Table 28 (Cont.): Summary of Hardware Bootstrap Addresses

	UNIBUS Bootstrap Type				
Device to Bootstrap	**M9301-YA**	**M9301-YB**	**M9301-YC**	**M9301-YF**	**M9312**
RK07 disk (unit n)					DMn
RP04/RP05/RP06/RM02/ RM03/RM05 or RM80 disk (unit n) at 176700 CSR		DBn	70+n	DBn	DBn
TU10/TE10 and TS03 magnetic tape	MT	MT	10	MT	MTn
TU16/TE16/TU45/TU77 magnetic tape		MM	60	MM	MMn
TS11 or TU80 magnetic tape					MSn
MSCP devices[1] at 172150 CSR					DUn
TMSCP devices [2] at 174500 CSR					MUn

[1]—MSCP devices include the RA60, RA70, RA80, RA81, RA82, RA90, RC25, RCF25, and RX50 disk drives.
[2]—TMSCP devices include the TK50, TU81, and TU81-PLUS tape drives.

BM873-YA Procedure

If the BM873-YA Restart/Loader is on the system, perform the following steps:

1. Move the CPU Console ENABLE/HALT switch to its HALT position and back to its ENABLE position.
2. Set the CPU Switch Register to one of the following values:

   773010 for RK05 disk cartridge
   773050 for TU10/TE10/TS03 magnetic tape
3. Press the CPU LOAD ADRS switch.
4. Press the CPU START switch.

BM873-YB Procedure

If the BM873-YB Restart/Loader is on the system, perform the following steps:

1. Move the CPU Console ENABLE/HALT switch to its HALT position and back to its ENABLE position.
2. Set the CPU Switch Register to one of the following values:

   773030 for RK05 disk cartridge
   773320 for RP04, RP05, RP06, RM02, RM03, RM05, or RM80 disk pack
   773032 for RK05 disk unit specified in the Switch Register
   773322 for RP04, RP05, RP06, RM02, RM03, RM05, or RM80 disk unit specified in Switch Register
   773110 for TU10/TE10/TS03 magnetic tape
   773150 for TU16/TE16/TU45/TU77 magnetic tape
3. Press the CPU LOAD ADRS switch.

4. If necessary, set the CPU Switch Register to the unit number of the disk drive being bootstrapped.
5. Press the CPU START switch.

H324 Pushbutton Panel Procedure

If the system includes the H324 Pushbutton Panel option for the BM873 Restart/Loader, perform the following steps:

1. Move the CPU Console ENABLE/HALT switch to its HALT position and back to its ENABLE position.
2. While holding down the UNLOCK switch, press the appropriate switch to bootstrap the desired device. The Digital Field Service engineer who installed the computer should have informed you of the device that each switch bootstraps.

MR11-DB Procedure

If the MR11-DB Bulk Storage Loader is on the system, perform the following steps:

1. Move the CPU Console ENABLE/HALT switch to its HALT position and back to its ENABLE position.
2. Set the CPU Switch Register to one of the following values:

   773110 for RK05 disk cartridge
   773136 for TU10/TE10/TS03 magnetic tape
3. Press the CPU LOAD ADRS switch.
4. Press the CPU START switch.

BM792-YB Procedure

If the BM792-YB Hardware Loader is on the system, perform the following steps:

1. Move the CPU Console ENABLE/HALT switch to its HALT position and back to its ENABLE position.
2. Set the CPU Switch Register to 773100.
3. Press the CPU LOAD ADRS switch.
4. Set the CPU Switch Register to 777406 for RK05 disk cartridge.
5. Press the CPU START switch.

M9301-YA and M9301-YB Procedures

If the M9301-YA or M9301-YB Bootstrap Terminator is on the system, perform the following steps:

1. While holding down the CTRL switch, press the BOOT switch on the front of the computer.

   The bootstrap prints the contents (in octal) of registers R0, R4, and the Stack Pointer, and the Program Counter at the console terminal. It then prints a dollar sign ($) prompt.

2. In response to the prompt, type the two-character device code and the unit number of the device to be bootstrapped. Terminate your response by pressing the RETURN key.

Table 29 describes the device codes.

Table 29: Device Codes for M9301-YA and M9301-YB Bootstraps

Device	Code
TU10/TE10/TS03 Magnetic Tape	MT
TU16/TE16/TU45/TU77 Magnetic Tape[1]	MM
RK05 Disk Cartridge	DK
RP04/RP05/RP06/RM02/RM03/RM05/RM80 Disk Pack[1]at 176700 CSR	DB

[1]—M9301-YB Bootstrap Terminator only.

M9301-YC Procedure

If the M9301-YC bootstrap is on the system, perform the following steps:

1. Move the CPU ENABLE/HALT switch to its HALT position and back to its ENABLE position.
2. Set the start address of 17765000 in the console switches.
3. Press the CPU LOAD ADDR switch.
4. Set the device unit number in switches 0 through 2.
5. Set the device code for the device to be bootstrapped in switches 3 through 6. Table 30 lists the device codes.
6. Make sure that switches 7 through 21 are off (down).
7. Press the CPU START switch.

Table 30: Device Codes for M9301-YC Bootstrap

Device	Code	Notes
TU10/TE10/TS03 Magnetic Tape	1	
RK05 Disk Cartridge	3	
RK06 Disk Cartridge	5	Not RK07
TU16/TE16/TU45/TU77 Magnetic Tape	6	
RP04/RP05/RP06/RM02/RM03/RM05/RM80 Disk Pack at 176700 CSR	7	

NOTE

Before the M9301-YC bootstrap actually bootstraps the system, it performs CPU tests, instruction and addressing tests, and memory and cache tests. If a hardware failure is detected, the diagnostic program halts. The lights contain the ROM address of the halt. If this occurs, call your Digital Field Service engineer.

It may, however, be possible to continue with the bootstrap operation if the lights contain the address 1773764, which indicates a cache failure. To continue in this case, press CONT. This is the ONLY case in which it is possible to continue bootstrapping after the diagnostic program detects an error.

M9301-YF Procedure

If the M9301-YF Bootstrap Terminator is on the system, perform the following steps:

1. While holding down the CTRL switch, press the BOOT switch on the front of the computer.

   The bootstrap prints the contents (in octal) of registers R0, R4, the Stack Pointer, and R5 at the console terminal. It then prints a dollar ($) prompt.
2. In response to the prompt, type the two-character device code and the unit number of the device to be bootstrapped. Terminate your response by pressing the RETURN key.

Table 31 lists the device codes.

Table 31: Device Codes for M9301-YF Bootstrap

Device	Code	Notes
TU10/TE10/TS03 Magnetic Tape	MT	
TU16/TE16/TU45/TU77 Magnetic Tape	MM	
RK05 Disk Cartridge	DK	
RK06 Disk Cartridge	DM	Not RK07
RP04/RP05/RP06/RM02/RM03/RM05/RM80 Disk Pack at 176700 CSR	DB	

M9312 Procedure

The M9312 Bootstrap Module has five sockets that accommodate one CPU ROM and up to four peripheral boot ROMs. Each CPU and boot device has a unique ROM developed for it. The CPU ROM plugs into a specific socket location within the module. The peripheral ROMs, however, may be placed in any of the four peripheral socket locations as long as the sockets are filled in sequential order with no vacancies between loaded ROM sockets. Since a particular peripheral ROM has a different boot start address in each of the four sockets, it is sometimes important to know the locations of the ROMs in the bootstrap module. The ROM configuration is a diagram of where specific boot ROMs are located. This information must be known before the bootstrap procedure can begin. The following sections explain how to determine the ROM configuration if it is not known, and how to bootstrap a device when the ROM configuration is known.

Table 32 shows the ROM arrangement for the M9312 Bootstrap Module.

Table 32: M9312 ROM Arrangement

CPU ROM
BOOT #1 ROM
BOOT #2 ROM
BOOT #3 ROM
BOOT #4 ROM

If the M9312 Bootstrap/Terminator is on the system, perform one of the following procedures:

- If you have the M9312 console emulator on your system, follow the procedures in the section Using the M9312 Console Emulator (PDP-11/60s and PDP-11/70s usually do not have console emulators). If that procedure does not work, perform the next step to verify that you have a console emulator.
- If you have a CPU equipped with switch registers and do not know what devices the M9312 will boot, perform the procedures in the section Determining the M9312 Bootstrap ROM Configuration.
- If you have a CPU equipped with switch registers, know what device ROMs are on the M9312 Bootstrap Module, but do not have a console emulator, follow the procedures in the section Bootstrapping With the M9312.
- If you do not have the M9312 Bootstrap/Terminator Module on your system and need to boot the RL01, RL02, or the RK07 disk device, perform the manual load routine described in the section Load Program Bootstrap for the RL01/RL02 and RK07.

Using the M9312 Console Emulator

The M9312 console emulator can be initiated in two ways depending on the type of CPU (pushbutton or switch register) on the system.

1. Pushbutton boot procedures with the M9312 console emulator.

   While holding down the CTRL button, press the BOOT button on the CPU.

   The bootstrap prints the contents (in octal) of registers R0, R4, the Stack Pointer, and R5 at the console terminal. It then prompts you with the commercial at sign (@).

   In response to the @ character, type the two-character device code and the unit number of the device to be bootstrapped. Terminate your response by pressing the RETURN key. If the unit number is not entered, it is assumed to be zero. Table 35 contains the device codes.

   Successful completion of these pushbutton bootstrap procedures produces header information on the console terminal, similar to the following example:

```
Performing limited hardware scan.

RSTS V10.0-L (MT0) INIT V10.0-L

Today's date?

Current time?

Installing RSTS on a new system disk? <Yes>
```

   Begin the system installation process in Phase 2, Prepare System Disk.

2. Switch register boot procedures with the M9312 console emulator.

   Move the CPU console ENABLE/HALT switch to its Halt position, then back to its ENABLE position.

Set the CPU switch register to 765020.

Press the start switch. The bootstrap prints the contents (in octal) of registers R0, R4, the Stack Pointer, and R5 at the console terminal. It then prompts you with the commercial at sign (@).

In response to the @ character, type the two-character device code (in uppercase) and the unit number of the device to be bootstrapped. Terminate your response by pressing the [RETURN] key. If the unit number is not entered, it is assumed to be zero. Table 35 contains the device codes.

NOTE

The @ sign returns at this point if the correct boot ROM was not installed, or if a nonexistent device code is entered. If the contents of the registers R0, R4, the Stack Pointer, and R5 appear before the @ sign, this indicates that at least one boot ROM socket is empty and can accommodate another boot ROM.

Successful completion of the switch register bootstrap procedure produces header information on the console terminal, similar to the example given for the pushbutton bootstrap. After the message appears, begin the system installation process in Phase 2, Prepare System Disk.

Determining the M9312 Bootstrap ROM Configuration

If you do not know the M9312 ROM configuration, it can be determined by using Tables 33 and 35 and performing the instructions that follow Table 33.

Table 33: ROM Locations

ROM Address	ROM Location
765774	Diagnostic ROM
773000	ROM 1
773200	ROM 2
773400	ROM 3
773600	ROM 4

Repeat the following steps for each of the ROM addresses shown in Table 33. After you have completed this process, you will know the M9312 bootstrap ROM configuration of your system. With this information, you can boot any device having a boot ROM in the M9312 Bootstrap Module.

Table 34 lists the M9312 bootstrap ROM configurations.

Table 34: M9312 Bootstrap ROM Configuration

ROM Location	Bootable Device	Device Mnemonic
Diagnostic ROM	_____	_____
ROM 1	_____	_____
ROM 2	_____	_____
ROM 3	_____	_____
ROM 4	_____	_____

If you do not know the M9312 ROM configuration, use Tables 33, 34, and 35 and follow these instructions:

1. Select a six-digit ROM address from Table 33.
2. Set the CPU switches to the selected number.
3. Press the LOAD ADRS switch to set the ROM address.
4. Press the EXAM switch. The contents of the ROM address just loaded will appear in the CPU data register.
5. Match the octal number represented in the CPU data register with the octal data number shown in Table 35.
6. Locate the device mnemonic in Table 35 and the device name associated with the matching number. The ROM you have just investigated can boot the device(s) you located in Table 35. Write the retrieved device information from Table 35 with the appropriate ROM location in Table 34. For example, if you selected a six-digit ROM address for ROM 1 from Table 33, place the device mnemonic and name you located in Table 35 with ROM 1 in Table 34. Documenting the ROM configuration in Table 34 will prevent performing the above procedure again.

Table 35: Device Name and Mnemonic

Device to Be Booted	Mnemonic	Unit	Octal Data
RL01	DL	0-3	042114
RK06/RK07	DM	0-7	042115
RX01	DX	0-1	042130
RX02	DY	0-1	042131
RP04/RP05/RP06	DB	0-7	
RM02/RM03/RM05/RM80 at CSR 176700	DB[1]		
RK05	DK	0-7	042113
TU16/TE16/TU45/TU77	MM	0-7	046515
TU10/TE10/TS03	MT	0-7	046524
TS11/TU80	MS	0-3	046523
TK50/TU81/TU81-PLUS (TMSCP devices) at CSR 174500	MU	0	046525
RA60/RA70/RA80/RA81/RA82/RA90 RC25/RX50/RCF25 (MSCP controller devices) at CSR 172150	DU	0-7	042125
Console Emulator CPU ROM	A0	N/A	040460
Diagnostic ROM PDP-11/60/70	B0	N/A	041060
			177776[2]
			xxx777[3]

[1]—Type DB rather than DR if you are booting the RM02, RM03, or RM05 disk.
[2]—This is a continuation ROM of a multiple ROM boot.
[3]—Bad ROM or NO ROM present.

After you have determined the ROM configuration, perform the procedures in the previous section, Using the M9312 Console Emulator, if you find you have a console emulator; otherwise, perform the procedures in the following section, Bootstrapping With the M9312. It explains how to bootstrap with the M9312 module using a switch register controlled CPU.

The following procedure describes how a device is bootstrapped when the M9312 bootstrap ROM configuration is known. Table 36 provides the data needed to bootstrap a device.

1. Locate the name of the device to be booted in Table 36.
2. Determine from the ROM configuration in Table 34 the location (ROM 1/2/3/4) of the device boot ROM.
3. Select the three-digit Switch Register Code (SWR) from Table 36 for the particular ROM location.
4. Move the CPU console Enable/Halt switch to its Halt position, then back to its Enable position.
5. Set the CPU switch register to 765744 (or 17765744 for PDP-11/70).
6. Press the CPU LOAD ADRS switch.
7. Set the Switch Register Code (SWR) selected from Table 36 in CPU switches 0-8, as shown in Table 37.
8. Set the unit number of the boot device in CPU switches 9-11 (see Table 37).
9. Press the CPU START switch.

Successful completion of this process boots the device. A message, similar to the following example, appears on the console terminal. At this point, you may begin the system installation process in Phase 2, Prepare System Disk.

```
Performing limited hardware scan.

RSTS V10.0-L (MT0) INIT V10.0-L

Today's date?

Current time?

Installing RSTS on a new system disk? <Yes>
```

Table 36: Switch Register Codes (SWR)

	Switch Register Code (SWR)			
Device to Be Booted	**ROM 1**	**ROM 2**	**ROM 3**	**ROM 4**
RL01/RL02	012	212	412	612
RK06/RK07	012	212	412	612
RX01	012	212	412	612
RX02	012	212	412	612
RP04/RP05/RP06/RM02/RM03 /RM05/RM80 at CSR 176700	056	256	456	656
RA70/RA90/RA80/RA81/RA82/RA60/ RC25/RX50(MSCP controller devices) at CSR 172150	012	212	412	612
TK50/TU81/TU81-PLUS (TMSCP devices) at CSR 174500	012	212	412	612
RK05	012	212	412	612
TU16/TE16/TU45/TU77	012	212	412	612
TU10/TE10/TS03	012	212	412	612

Table 37: Console Switch Register Settings

15-12	11-09	08-00
—	Octal Unit Number	Switch Register Code (SWR) from Table D-8

Load Program Bootstrap for the RL01/RL02 and RK06/RK07

To bootstrap an RL01, RL02, RK06, or RK07 device when the system does not have the M9312 Bootstrap Module, you must manually enter a bootstrap load routine using the CPU console. The following procedure describes the manual load process using the PDP-11/34. A similar procedure is followed using the CPU LOAD ADRS, DEP, and EXAM switches for the PDP-11/70 computer.

1. While holding down the CTRL button, press the HLT/SS button on the CPU.
2. Set address 1000 in the console register by using the numbered console buttons.
3. Press the LAD (load address) button.
4. Press the CLR button to clear the register.
5. Load the contents that appear in Table 38 into memory, using the numbered buttons and the DEP button. Press the CLR button after you have placed the contents in the CPU register and pressed the DEP button.

Table 38: Bootstrap Routines for the RL01/RL02 and the RK06/RK07

Address	RL01/RL02 Bootstrap Routine Contents	RK06/RK07 Bootstrap Routine Contents
1000	12700	12700
1002	174400	177440
1004	12760	12760
1006	13	0[1]
1010	4	10
1012	12701	12701
1014	4[2]	2003[3]
1016	10110	10110
1020	105710	105710
1022	100376	100376
1024	12760	12760
1026	177601	177400
1030	4	2
1032	5721	62701
1034	10110	16
1036	105710	10110
1040	100376	105710
1042	12760	100376

[1]—Select drive number 0-7 for the RK07

[2]—Load 4 for unit 0, 404 for unit 1, 1004 for unit 2, and 1404 for unit 3.

[3]—Load 3 for RK06.

Table 38 (Cont.): Bootstrap Routines for the RL01/RL02 and the RK06/RK07

Address	RL01/RL02 Bootstrap Routine Contents	RK06/RK07 Bootstrap Routine Contents
1044	177400	5710
1046	6	100001
1050	5060	0
1052	4	5007
1054	62701	
1056	6	
1060	10110	
1062	105710	
1064	100376	
1066	5710	
1070	100001	
1072	0	
1074	5007	

After the contents are loaded, perform the following steps:

1. Place address 1000 in the console register again by using the numbered buttons.
2. Press the CPU LAD (load address) button to load the address.
3. While holding the CTRL button down, press the START button on the CPU to boot the device.
4. You can verify the accuracy of the load routine by using the CPU EXAM button. Place address 1000 in the register and press the LAD button. Press the EXAM button to reveal the contents of address 1000. It should be 12700 for both the RL01/RL02 and RK07 routines. Continue to press the EXAM button to check the contents of the remaining addresses in the load routine. Use the LAD and the DEP buttons to correct any erroneous contents.

Load Program Bootstrap for the TU10, TE10, or TS03

To bootstrap a TU10/TE10/TS03 magnetic tape when the system does not have a bootstrap that handles it, you must manually enter a load routine into memory using the CPU Console Switch Register and the DEP switch. You can only boot unit 0.

To load the routine, perform the following steps:

1. Move the CPU Console ENABLE/HALT Switch to its HALT position and back to its ENABLE position.
2. Set the CPU Switch Register to 010000.
3. Press the CPU LOAD ADRS switch.
4. Load the following contents into memory using the Switch Register and DEP switch.

Address	Contents
010000	012700
010002	172524
010004	005310
010006	012740
010010	060011
010012	105710
010014	100376
010016	005710
010020	100767
010022	012710
010024	060003
010026	105710
010030	100376
010032	005710
010034	100777
010036	010001
010040	005000
010042	005007

5. Set the Console Switch Register to 010000.
6. Press the CPU LOAD ADRS switch.
7. Press the CPU START switch.

If the system reads the tape but halts at address 010034, the magnetic tape generated a parity error. Try another drive and make it unit 0. If the system appears to take no action and halts, verify the accuracy of the routine by using the CPU Console EXAM switch. Use the Switch Register and the DEP switch to correct any erroneous contents. Rewind the tape to its load point before executing the routine again. If no recovery is successful, you should have a Digital Field Service representative check the device. If the hardware is working properly, you should use a new magnetic tape reel.

Bootstrap Procedures for the 11/73, 11/83, or 11/84

The following procedure describes how to bootstrap the 11/73, 11/83, or 11/84.

1. Move the toggle switch on the front panel to the "Restart" position.
2. The bootstrap code will execute a processor and memory self-test.

```
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
```

3. At this point, type the command "BOOT" and press the RETURN key.

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

4. The bootstrap code will then ask for the name of a device to boot. Enter the device name and unit number, such as "MU0." (It is not necessary to enter a colon as part of the name.)

```
Enter device name and unit number then press the RETURN key:
```

Note: If an error message is printed, either the bootstrap doesn't know how to boot that particular device or the device is defective. Call Field Service for assistance.

If the device is not at a standard address, follow the device name with /A and specify the address when prompted. For example:

```
Enter device name and unit number then press the RETURN key: DU3/A CSR
address      =760354

Trying DU3

Starting system from DU3
```

5. If the bootstrap does read the device, it will verify that it is a bootable volume and start the device.

```
Trying MU0

Starting system from MU0
```

Bootstrap Procedures for the 11/83 or 11/94

The following procedure describes how to bootstrap the 11/93 or 11/94 using a hard-copy terminal:

1. Move the toggle switch on the front panel to the "Restart" position.
2. The bootstrap code will execute a processor and memory self-test.

```
KDJ11-E Monitor  Version 1.0  23-Feb-1990
Licensed to Digital Equipment Corporation

Memory     2044 KW
EEprom        4 KW
Time      16:01:06 27-Mar-90  Tue
```

3. At this point, type the command "BOOT" and press the RETURN key.

```
Commands are: [Boot, Diagnostic, Help, List, Map, Setup, Toy]
Type a command then press the RETURN key:
```

4. The bootstrap code will then ask for the name of a device to boot. Enter the device name and unit number, such as "MU0." (It is not necessary to enter a colon as part of the name.)

```
Enter device name and unit number then press the RETURN key:
```

Note: If an error message is printed, either the bootstrap doesn't know how to boot that particular device or the device is defective. Call Field Service for assistance.

If the device is not at a standard address, follow the device name with /A and specify the address when prompted. For example:

```
Enter device name and unit number then press the RETURN key: DU3/A CSR
address      =760354

Trying DU3

Starting system from DU3
```

5. If the bootstrap does read the device, it will verify that it is a bootable volume and start the device.

```
Trying MU0

Starting system from MU0
```

The following procedure describes how to bootstrap the 11/93 or 11/94 using a video terminal:

1. Move the toggle switch on the front panel to the "Restart" position.
2. The bootstrap code will execute a processor and memory self-test.

```
KDJ11-E Monitor  Version 1.0  23-Feb-1990
Licensed to Digital Equipment Corporation

Memory     2044 KW                              Memory Intern                4MB
EEprom        4 KW                              Rom on 173000                Yes
Time      16:14:11 27-Mar-90  Tue                Rom on 165000                 No
                                                 Power-up Mode              Trap24
Boot Dev. Unit Address                           Restart Mode                 Rom
 1   DU      3  160354  Do                       Power-on Selftests           Yes
 2   DL      0  Default Do                       Select Selftests            Edit
 3   MU      0  Default Do                       User Boot                   Edit
 4   DU      0  Default Do                       Alternate Boot Block          No
 5                  Do                           LTC Register                 Yes
 6                  Do                           Force Clock Interrupt         No
                                                 Clock Frequency              60Hz
Lines  Address/Vec  Baud   Data  Stop  Par       Halt on Break                Yes
Line 1  176600/400   9600   8     1     Dis      Trap on Halt                  No
Line 2  176610/410   9600   8     1     Dis      Ignore Battery                No
Line 3  176620/420   9600   8     1     Dis      Lines on                  176600
Line 4  176630/430   9600   8     1     Dis
Line 5  176640/440   9600   8     1     Dis      Map                           Do
Line 6  176650/450   9600   8     1     Dis      Factory Setting               Do
Line 7  176660/460   9600   8     1     Dis      Save                          Do
```

3. The cursor is positioned on the first line of the device options. Use the arrow keys to select the option with which to boot the device and press the RETURN key.

Appendix E
Additional System Installation-Related Programs

This section contains programs you may need to use during your installation or update. It also contains programs related to patching RSTS/E code. The BUILD program performs system installation-related tasks. The DSKCVT program converts a disk to RDS1.2 format and converts passwords for security purposes. The ONLPAT program allows you to patch binary code.

Using the BUILD/PATCH Program

The BUILD program installs some older layered products and application software. The /PATCH qualifier of the BUILD program automatically installs updates as you build new software. (If there are no update files for the software you build, then BUILD does not attempt the update procedure.)

BUILD is a privileged program that is installed with a protection code of <232>. To use the various BUILD functions, you need all privileges except:

- SYSMOD
- EXQTA
- USER1-8

The BUILD program requires that the patches and replacement modules be on disk. If your media is tape, you must first use the layered product installation procedures. See Part 3 for more information.

To run BUILD, type:

```
$ RUN UPDATE$:BUILD
```

BUILD then asks the following questions:

```
BUILD  V10.0-A RSTS V10.0-L

Input device <SY:> ?
Output device <SY0:> ?
Control File is ?
Function (Build/Patch, Patch, Build) <Build/Patch> ?
Patch file input location <PATCH$:>
        .
        .
        .
.!*** BUILD Complete ***

!*** Processing ended on 13-Sep-90 at 11:13 AM ***
```

During most installations, BUILD asks additional questions specific to the individual layered product. See the installation guide for the individual product for guidelines on answering specific questions.

You can create a log file of the build procedure and also specify that the build is to run detached, in the format shown after the Input device? prompt in the BUILD dialogue:

logfile=dev:/det

For example:

```
Input device <SY:>: ? <file name>=MM0:/DET
```

Note that the Input device? prompt also accepts a /DOS or /ANSI qualifier.

Using the DSKCVT Program

The DSKCVT (Disk Convert) utility converts V8.0 and older disks to the new V9.0 RDS1.2 format and converts passwords. Specifically, DSKCVT performs the following functions:

- Convert RDS0.0 disks to RDS1.2 format
- Convert RDS1.1 disks to RDS1.2 format
- Convert accounts with "LOOKUP" passwords to "NOLOOKUP" at any time, on any RDS1.2 disk (optional)

To run DSKCVT, you must start with a disk that does not need rebuilding. (Use the MOUNT command if necessary to rebuild the disk first.) As a precaution, Digital recommends that you back up any disk before conversion.

DSKCVT requires some work space if the pack being converted is RDS0.0 format. Therefore, you must make sure that there are 32 blocks times the number of different group numbers used on the pack, in order to allow conversion. (For example, if there are ten group numbers, then the pack should have 320 blocks of free space for conversion.)

DSKCVT accepts either logically mounted or logically dismounted packs. However, the pack should not be in use when you run DSKCVT. To verify that no one is using the pack, DSKCVT dismounts and remounts it at the start of processing.

The following is an example of the DSKCVT program:

```
$ run auxlib$:DSKCVT

DSKCVT V10.0-A  RSTS V10.0-L SYSTEM:

Disk to convert? DM0:

** CURRENT DISK ATTRIBUTES **

    Disk:      _DM0:

   Label:      SYSDSK

   Level:      1.1

Convert accounts to NOUSER <NO>?
Convert passwords to NOLOOKUP <YES>?
Display accounts <YES>?
Proceed (YES or NO)? YES
```

```
Converting disk _DM0: to level 1.2 ...
Account [  0,1  ] converted
Account [  0,3  ] converted
Account [  0,16 ] converted
Account [  0,200] converted
Account [  1,1  ] converted
Account [  1,2  ] converted
Account [100,100] converted
Account [207,1  ] converted

Converting disk _DM0: passwords to NOLOOKUP ...
Account [  0,1  ] password is already NOLOOKUP
Account [  0,3  ] is a NOUSER account
Account [  0,16 ] is a NOUSER account
Account [  0,200] is a NOUSER account
Account [  1,1  ] password is invalid (contains ?'s)
Account [  1,2  ] password is already NOLOOKUP
Account [100,100] password is already NOLOOKUP
Account [207,1  ] password is already NOLOOKUP

Disk _DM0: conversion completed on 13-Sep-90 at 10:39 AM
```

In the example, DM0: is the disk pack to convert to RDS1.2. When you type DM0: in response to the prompt, DSKCVT displays the pack ID DM0:SYSDSK. This lets you verify that you are converting the proper pack. If the pack was already converted, DSKCVT displays an error message and then repeats the Disk to convert: prompt. Otherwise, DSKCVT continues with the dialogue.

When you answer Y to the Proceed (Y or N)? prompt, DSKCVT begins the conversion. DSKCVT processes the accounts in ascending order. When the pack is converted, DSKCVT dismounts it and updates the pack label. The pack is now in RDS1.2 format. If the pack was mounted when DSKCVT started, it will be mounted once again with the pack ID as its logical name.

DSKCVT will not lose data even if the program aborts because of lack of work space, a system crash, or a disk hardware problem. If there is a problem during the conversion, you need only correct the problem and rerun the conversion. In such a case, it is not necessary to restore the pack from a backup pack.

If the conversion proceeded far enough that DSKCVT was able to convert the pack, it is then necessary only to mount it. Otherwise, DSKCVT restarts the conversion from the beginning, after deleting the work files that were left behind from the first attempt at conversion.

When you convert an RDS0.0 (pre-V8.0) disk, DSKCVT makes two passes. In the first pass, DSKCVT converts the RDS0.0 pack to RDS1.1. The second pass converts the RDS1.1 pack to RDS1.2.

In converting RDS1.1 disks to RDS1.2 format, DSKCVT adds several new attribute blocks to each account. Since some of the new attributes are only relevant on system disks, DSKCVT asks you whether the disk being converted is a system disk. DSKCVT adds the following new attribute blocks:

- Disk quota/usage block
- Privilege block, for system disks
- Non-disk quota block, for system disks

In creating the privilege attribute block, DSKCVT uses the following rules:

- For account [1,1], it assigns all privileges, except EXQTA
- For all other [1,*] accounts, it assigns all privileges, except SYSMOD and EXQTA
- For accounts not in the [1,*] group, it assigns no privileges.

This scheme assigns privileges that are compatible with previous versions of RSTS/E.

Using the ONLPAT Program to Patch RSTS/E Binary Code

You still have to use ONLPAT to make emergency corrections, as directed by the *RSTS/E Release Notes* and the *RSTS/E Software Dispatch* articles.

The ONLPAT.SAV program allows you to patch binary code. You can run ONLPAT in either the keyboard mode or the command file mode. In the keyboard mode, you enter patch information on your terminal. In the command file mode, the patch information is read from a command file. Not all patches can be installed with ONLPAT. See the Software Dispatch article for restrictions and further information.

Using ONLPAT in Keyboard and Command File Mode

ONLPAT gives you a choice. You can make patches to the software by entering the corrections manually at your keyboard or you can use a previously created command file to apply the patches for you. You make the choice at the beginning of the ONLPAT dialogue when the program asks for the name of the command file you want to use (if one exists). Your response determines how ONLPAT gets the patch information.

If you enter a command file name, ONLPAT uses the command to make the corrections. When you press the RETURN key, ONLPAT assumes the patch information comes from the keyboard. ONLPAT expects keyboard input when you enter a file name followed by an equal sign (=) symbol. This indicates you want ONLPAT to create a log file of the patch. The remainder of this section describes how to patch software using either of these methods.

When you enter patches at the keyboard, follow procedures similar to those you use for the PATCH option of INIT.SYS. Unlike the PATCH option, ONLPAT does not install a patch until you enter a circumflex-C (^C) at the end of the last line in the patch. Do not press Ctrl/C unless you want to abort the patching operation. Because the program waits while you enter all the patch information, you can review the entire patch and make changes before installing the patch.

To install a published patch, you must first look in the *RSTS/E Maintenance Notebook* or the *RSTS/E Software Dispatch* for the article containing the patch you want to install. After reading the article thoroughly, you can create a command file or install the patch manually.

An ONLPAT example follows:

```
$ RUN $ONLPAT                          (Invoke the ONLPAT program)
Command file name?                     (Press return here for manual patching)
File to patch? RSTS.SIL                (Give the name of the program to patch)
File found in account [0,1]            [A confirmation from the system]
Module name? GAR                       (Proceed exactly as in patch. Be sure
Base address? CIA                      that you verify that the numbers in the
Offset address? 5522                   Base, Offset, and Old columns match the
 Base   Offset  Old     New?           numbers in the patch. Note that if a
131322  005522 122700  ? 22700         printed patch includes ? characters,
131322  005524 000216  ? 46216         do not check for matching.)
131322  005526 001403  ? 1003
131322  005530 010003  ? 10300
131322  005532 020001  ? ^C            (Type Circumflex-C to exit)
Patch complete                         [Confirmation by the system]
1 patch installed                      [Additional confirmation]
```

NOTE

This is an example; it is not a real patch. Do not attempt to apply this example patch.

Note that the instructions for installing off-line patches are slightly different; read the patch instructions for more information.

Table 39 lists and describes the types of responses ONLPAT accepts in the program dialogue.

Table 39: Responses to ONLPAT Questions

Response	Meaning
Number	Enter an octal number from 0 to 177777; leading zeros are optional. Or, enter a decimal number in the range 0. to 65535., making sure to include a trailing decimal point to distinguish it from an octal number. The octal or decimal number you enter becomes the new contents of the current location.
Symbol	Substitute a global symbol name for an octal number as the new contents of the current location. The symbol table for the module being patched is part of the SIL file. It contains that module's global symbol names and their values. A global symbol name must be a combination of alphanumeric characters up to 6 characters long and must be defined in the symbol table for the current module.
Expression	Use an expression as a substitute for an octal number. An expression consists of one or more numbers or global symbols, separated by arithmetic operators (+,-, and *). You can use parentheses to group portions of an expression.
RETURN or LINE FEED key	Advance to the next location without altering the contents of the current location.
circumflex	Return to the previous location without altering the contents of the current location.
Ctrl/Z	Enter Ctrl/Z to return to the previous question.
Ctrl/C	Enter Ctrl/C to abort all patching and return to the program prompt.

COMMAND FILE NAME?

User Action: Enter a command file name to have ONLPAT install patches using commands in the command file. You can have ONLPAT make a record of the patches as well as install them if you include a log file name with the command file name in the command line:

Command file name? log file = command file name

If you do not include a file type for the command file, ONLPAT selects .CMD. The default file type for the log file is .LOG.

Press the RETURN or LINE FEED key if you do not have a command file to apply the patches. ONLPAT assumes you want to enter the patches manually from the keyboard. If you want a record of the patches that you apply manually from the keyboard, include only the log file name in the command line:

Command file name? log file =

You must place an equal sign after the log file name to make sure ONLPAT does not interpret the file you specify as being a command file. Again, ONLPAT uses .LOG as the file type if you do not specify one with the file name.

FILE TO PATCH?

User Action: Press the RETURN key if you are applying a patch to the installed monitor SIL. However, another response may be necessary. If so, enter the response suggested either by the *RSTS/E Maintenance Notebook* or the *RSTS/E Software Dispatch* article.

MODULE NAME?

User Action: Enter the module name included with the patch described either in the *RSTS/E Maintenance Notebook* or the *RSTS/E Software Dispatch* article.

BASE ADDRESS?

User Action: Type the base address included with the patch described either in the *RSTS/E Maintenance Notebook* or in the *RSTS/E Software Dispatch* article.

OFFSET ADDRESS?

User Action: Type the offset address included with the patch described either in the *RSTS/E Release Notes* article or the *RSTS/E Software Dispatch* article. The offset address is the first location to be patched relative to the specified base. The response suggested in the patch article will be a number, symbol, or expression as described in Table E-1.

Use the information described above and the following procedures to apply patches manually:

1. Gather the articles that contain the patches you need. You can find the articles either in the *RSTS/E Maintenance Notebook* or the *RSTS/E Software Dispatch*.
2. Run the ONLPAT program by typing RUN $ONLPAT. The program begins by displaying the first of a set of dialogue questions:

   ```
   Command file name?
   ```

   At this point you:

   a. Press the [RETURN] key to enter the patch manually from your terminal.
   b. Type the name of a file, followed by an equal sign (=) symbol. This instructs ONLPAT to create a log file of the patch. The patch is also displayed on your terminal.
   c. You then answer the remaining ONLPAT dialogue questions, following the instructions in the *RSTS/E Maintenance Notebook* or the *RSTS/E Software Dispatch*. Remember that ONLPAT does not install the patch until you type ^C (not Ctrl/C) to end the program. Typing ^C is entirely different than entering Ctrl/C: ^C ends the patch successfully; Ctrl/C stops execution of ONLPAT without making any patches.
   d. After installing the patch, ONLPAT displays a message informing you that the patch has been installed:

      ```
      PATCH COMPLETE
      1 PATCH INSTALLED
      ```

   ONLPAT then returns to the command file question. You can then either exit the program or enter another patch.

To install a patch with a command file:

1. Create a command file. See the section, Building ONLPAT Command Files.
2. Run the ONLPAT program by typing RUN $ONLPAT, and then pressing the RETURN key. The program displays a question asking for the name of the command file that contains the patches. Enter a command file in the following format:

   log file=command file

   If you want a record of the patch, type the name of a log file. The default file type for a log file is .LOG. ONLPAT does not create a log file by default.
3. Type the name of the file that contains the commands ONLPAT uses to install the patch. The default file type for a command file is .CMD. ONLPAT then executes the command file. If you did not include in the command file the name of the file you want to patch, ONLPAT pauses, letting you enter the file name.
4. When ONLPAT finishes processing, the program displays a summary of the patches installed and any patches skipped, and then returns to your keyboard monitor.

Patching a Running Monitor with ONLPAT

Usually you can patch the installed monitor Save Image Library (SIL). The monitor is modified on disk, and only after you shut down, and then restart the system, do the patches become effective. However, patches to monitor overlay code (OVR or OV2) are a special case. If you use patched code from OVR or OV2 along with an unpatched monitor in memory, your system may crash or not work properly. This is because monitor overlays are read in from the monitor SIL (from disk) as they are needed, and changes to the monitor do not take place until the system is brought down and then restarted.

When ONLPAT detects that the file being patched is the installed monitor SIL, the program imposes certain restrictions:

- Installs the patch if the patch does not involve OVR or OV2. That is, ONLPAT applies the patch to the monitor image on disk. The patch takes affect only after you shut down the system and then restart it.
- If only one block of OVR or OV2 is involved in the patch, ONLPAT installs the patch. Because the patch affects only one block, ONLPAT can make all monitor modifications with a single disk write.
- If the patch involves more than one OVR block, ONLPAT does not modify the monitor, and displays the following error message:

  ```
  ?Patch to module ovr too long for installed sil
  ```

- If the patch involves both OVR and some other module of the monitor, ONLPAT displays the following error message:

  ```
  ?Patch to installed sil spans ovr and other module(s)
  ```

  The way to install a patch of this type is to copy your installed SIL, patch the copy, shut down the system, start the patched copy, and delete the old unpatched SIL.

Building ONLPAT Command Files

Create ONLPAT command files as follows:

1. Run ONLPAT from any logged-in terminal by typing RUN $ONLPAT. The program then displays the COMMAND FILE NAME? question.
2. Respond to the command file question in the following format:

   Patchfile = KB:

   First type the file name of the patch file you want to create and then KB: to indicate you are creating the patch file from the keyboard.
3. Press the RETURN key after you finish entering the command string. ONLPAT then asks:

   ```
   FILE TO PATCH?
   ```

   Type the name of the file you want to patch, press the RETURN key, and enter the text of the patch described in the *RSTS/E Maintenance Notebook* or the *RSTS/E Software Dispatch* article.

After creating the command file, you may want to modify it. If modifications are necessary, apply the following rules:

- End each individual command in the patch by pressing RETURN.
- When ONLPAT executes the command file, the program changes all lowercase characters to uppercase and reduces all tabs and spaces to a single space.
- Blanks are significant. Use them exactly as shown for individual command lines.
- You can include comment lines at the beginning of a patch. A comment line must begin with an exclamation mark (!).
- You must include a line that specifies the file you want to patch. The format of this line is:

  FILE TO PATCH? filename.type

  Type the name of the file that you want ONLPAT to patch. If you do not include a file name, ONLPAT prompts you for the file name during program execution. ONLPAT uses the file name to specify any subsequent patches in the command file that do not specify the file name.
- Subsequent command lines in a patch are identical to the formats used in the *RSTS/E Software Dispatch* or the *RSTS/E Maintenance Notebook*. The following command line is optional, but must appear with spacing exactly as shown in the *RSTS/E Software Dispatch* or the *RSTS/E Maintenance Notebook* articles:

  ```
  BASE    OFFSET  OLD       NEW?
  ```

  Also, do not use any parenthetical comments.
- You must use the following notation:

^Z	is a circumflex, then Z; or Ctrl/Z
^C	is a circumflex, then C; not Ctrl/C
LF	is the LINE FEED key

Appendix F
Mixed Disk Drives on the Same Controller

RSTS/E V10.0 supports many types of mixed disk configurations. Usually, each type of disk requires a separate controller. Frequently, however, similar disks may share the same controller. The following sections describe the level of support for each possible disk combination. The RP04/RP05/RP06 drives all use the RH11 interface (RH70 for PDP-11/70s). You can mix up to eight of these drives on a given controller, as long as each drive in the combined set has a unique drive number. The RSTS/E monitor distinguishes which type of disk is on a given controller and uses it appropriately. The RP05 is functionally identical to the RP04.

Mixing RK06 and RK07 Drives on the Same Controller

The RK06 and RK07 drives use the RK611 and RK711 controllers. You can mix up to eight of these drives on a given controller, as long as each drive in the combined set has a unique drive number. The RSTS/E monitor distinguishes which type of disk is on a given controller and uses it appropriately. (Some older RK611 controllers need an ECO to have this capability.)

Mixing RL01 and RL02 Drives on the Same Controller

The RL01 and RL02 drives use the RL11 or RLV12 controllers. You can mix up to four of these drives on a given controller, as long as each drive in the combined set has a unique drive number. The RSTS/E monitor distinguishes which type of disk is on a given controller and uses it appropriately.

Mixing RM02/RM03/RM05/RM80 Drives on the Same Controller

The RM02, RM03, RM05, and RM80 disks are very similar to the RP04, RP05, and RP06 disks. They also use the RH controllers. The RM02 disk uses the RH70 (for PDP-11/70s) or the RH11 interface (for other PDP-11s). The RM03, RM05, and RM80 disks only use the RH70 interface and are supported only on PDP-11/70 systems.

On a PDP-11/70 system, RM02, RM03, RM05, and RM80 disks may share the same RH70 controller. You can mix up to eight of these drives on a given controller, as long as each drive in the combined set has a unique drive number. The RSTS/E monitor distinguishes which type of disk is on a given controller and uses it appropriately.

Mixing RM02/RM03/RM05/RM80 and RP04/RP05/RP06 Drives on Separate Controllers

To use both the RM and RP disks on a single system configuration, Digital recommends using a separate RH controller for each kind of disk. The normal arrangement is to have the RH controller for the RP disks at the standard CSR address of 176700 and the RH controller for the RM disks at the nonstandard CSR address of 176300. However, with this arrangement, you cannot bootstrap the RM disks with any hardware bootstraps, although you can use the BOOT option of INIT.SYS.

If you would rather use the hardware bootstrap with the RM disks, you should reverse the CSR assignments so that the RP disk controller is at the nonstandard address (176300) and the RM disk controller is at the standard address (176700).

Note that if the hardware bootstrap requires you to type a device name at the console keyboard, typing either DB (the name used for RP disks) or DR (the name used for RM disks) will bootstrap a disk controlled through the standard CSR address, regardless of which type it actually is. However, most bootstraps require that you type DB, regardless of the actual type of drive.

Mixing RM02/RM03/RM05/RM80 and RP04/RP05/RP06 Drives on the Same Controller

It is possible to mix RM02/RM03/RM05/RM80 drives with RP04/RP05/RP06 drives on the same RH controller. Up to eight drives are allowed per RH, and each drive must have a unique drive number. The monitor knows which type of disk is on a given drive and uses it appropriately. Note that RM03, RM05, and RM80 disks are supported only on PDP-11/70s.

The unusual aspect of this arrangement is the device naming scheme. The lowest numbered drive on the RH determines whether all drives on this RH are known as DBn: or DRn:. For example, if the lowest numbered drive is an RP04, RP05, or RP06, then the device name DB is used for all drives. If the lowest numbered drive is an RM02, RM03, RM05, or RM80, then the device name DR is used for all drives. The RSTS/E monitor can determine the identity of the disks, although the naming scheme is not obvious.

Multiple RH Controllers for the Same Type of Disk

RSTS/E supports two similar RH controllers on the same system. These two RH controllers can both be controlling the same kind of disk, either RP or RM. Only one of these two RH controllers can be at the standard CSR address. The other controller must be at the nonstandard CSR address. Each RH can control up to eight drives, giving a possible combined total of 16 drives.

The naming scheme for the above arrangement is as follows: the drives interfaced at the standard CSR address are known by the device name that corresponds to the lowest numbered drive type (DB or DR). The drives interfaced at the nonstandard CSR addresses are known by the other name.

Random Mixing of RP and RM Disks on Multiple Controllers

RSTS/E supports two RH controllers with a combination of RP and RM disks on both RH controllers. If the respective lowest numbered drives on the two RH controllers are of different types, then the previous rule of "lowest numbered drive determines the device name" applies. If both lowest numbered drives are of the same type, then the deciding rule is: the RH at the standard CSR address gets the device name that corresponds to the lowest numbered drive type, and the RH at the nonstandard CSR address gets the other device name.

Booting Mixed RM02/RM03/RM05/RM80 and RP04/RP05/RP06 Disks

RSTS/E supports mixed RP and RM disk combinations as described in the previous section. However, you can hardware boot disks only at the primary controller address (176700). You can use the INIT.SYS BOOT option to boot all disks.

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