RT–11 Automatic Installation Guide

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This guide tells you how to install RT–11 distribution software by using the RT–11 automatic installation procedure.

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Chapter 1

Before Running the Automatic Installation Procedure

The RT–11 automatic installation procedure installs RT–11 by conducting an interactive dialogue at the console terminal. As you answer the dialogue questions, the procedure creates an RT–11 system. After you install the operating system, you can verify the installation by running the verification procedure. You can also then run the configuration procedure to customize your version of RT–11.

1.1 Requirements for the Procedure

The RT–11 automatic installation procedure requires:

1. RT–11 software distribution kit

   RT–11 is presently distributed for automatic installation from the following media:

   - RL02 cartridge disk
   - RX02 diskettes
   - RX50 diskettes
   - TK50 magtape cartridge

2. Unpacked, installed, and properly functioning hardware

   See your hardware manual for instructions on how to use your processor and peripherals. The following list of manuals describe how to use the MicroPDP–11 processors and the devices from which RT–11 software can be installed:

   - *MicroPDP–11 Systems Owner's Manual*
   - *MicroPDP–11 Systems Technical Manual*
   - *RL01/RL02 Disk Subsystem User's Guide*
   - *RX02 Floppy Disk System User's Guide*
   - *RX33 Technical Description Manual*
   - *RX50–D, –R Dual Flexible Disk Drive Subsystem Owner's Manual*
   - *TK50 Tape Drive Subsystem User's Guide*

   In addition to the preceding manuals, each PDP–11 processor has its own operation manual. These manuals typically describe bootstrap procedures and front panel operations. For specific questions, see the manual that came with your processor.

3. Valid hardware configuration

   The following hardware configuration is required for the automatic installation procedure:

Processor	PDP–11 processor with at least 48K bytes of memory. See the *RT–11 Software Product Description* for the automatic installation procedure's minimal memory requirements for your configuration.
Clock	A line time clock (if you want to run the installation verification procedure).
Boot ROM	A boot ROM so that the media can be automatically booted (or an explanation in your processor manual of how to boot from your installation device).
System console	A video or hardcopy terminal.
Mass storage	Any appropriate medium that can hold the distribution kit.

   If your configuration does not satisfy these requirements, you can:

   - Install your system by following the procedure described in the *RT–11 Installation Guide*.
   - Have Digital install your system.

   See your hardware user's guide or owner's manual for your hardware configuration requirements.

1.2 What You Do

The following is an outline of what you do for an automatic installation. These steps vary somewhat, depending on your processor, device drives, and distribution media:

1. Check for the required software.
2. Turn on your terminal and mount the RT–11 distribution volume(s).
3. Start your processor and boot the automatic installation procedure.

   Some processors will automatically boot the procedure for you when you start (or restart) them, depending on how they are set up.

4. Run the procedure by following the instructions presented on your terminal. These instructions tell you how to create a working system disk and how to run the installation verification procedure (VERIFY).

   A message on your terminal tells you when you have completed the installation procedure.

Chapter 2 describes these steps with instructions specific to your distribution media.

After installing the software, store your distribution kit in a safe place and do not modify its contents. You can recopy the distribution kit to create another system if your operating system is damaged.

CAUTION

Keep your media away from equipment that can generate magnetic fields, such as electric motors. See your device drive manual for other cautions.

1.3 What the Procedure Does

The major steps of the procedure are:

1. The RT–11 automatic installation procedure checks your system configuration.

   If it finds your configuration invalid, one of the following occurs:

   - If your distribution is multivolume, you are prompted to mount diskette 1; diskette 1 boots and refers you to the *RT–11 Installation Guide*.
   - If your distribution is a single volume (disk), the automatic installation procedure boots that volume and refers you to the *RT–11 Installation Guide*.
   - If your distribution is a TK50 magtape cartridge, the automatic installation procedure boots on device VM and refers you to the *RT–11 Installation Guide*.

2. If your configuration meets the hardware requirements, the procedure lists the valid output device(s) that reside on your system and queries you on which output device you want to install the distribution kit.
3. The procedure examines the specified output device.

   - If the output device is not on line or the output media is not mounted, the procedure prompts you to place the device on line or to mount the output media.
   - If the output media contains an RT–11 file structure with files, the procedure warns you and gives you the opportunity to continue or stop the procedure.
   - If the output media contains a file structure different from that of RT–11, the procedure warns you and gives you the opportunity to continue or stop the procedure.

4. The procedure initializes the media in the output device.
5. The procedure copies the RT–11 operating system from the input to the output media. If your distribution kit is multivolume, you are prompted to mount the next volume.
6. After the distribution kit files are copied, the procedure boots the system from the new working system volume.

7. Finally, the procedure displays the file V5NOTE.TXT. This file contains the following information:

   - Tells you how to run the installation verification procedure and recommends you run that procedure.
   - Suggests you run the configuration procedure.
   - Recommends you read the on-line release notes (V5NOTE.TXT) and modify your system startup procedure.

1.4 Completing the Installation

After running the installation procedure, your RT–11 system is installed and should work properly. However, Digital recommends you complete the installation by:

- Running the installation verification procedure to test your system.
- Configuring your system to remove system files not applicable to your system.
- Editing your system startup procedure to suit your needs.
- Reading the printed and on-line release notes (*RT–11 System Release Notes* and V5NOTE.TXT).
- Installing any other software products (software that runs on the operating system—languages, applications, and so on) you might have ordered.

1.4.1 Verifying Your Installation

To run the verification procedure, type the following command:

```
IND VERIFY RET
```

The verification procedure takes a few minutes and does the following, if a printer is part of your configuration:

1. Loads the LP or LS handler and runs QUEUE as a foreground program.
2. Prints the on-line RT–11 system release notes addenda (V5NOTE.TXT).
3. Assembles, links, and runs the terminal identification program IVP.MAC.
4. Prints the program listing and link map for IVP.MAC.
5. Terminates QUEUE and unloads it and the LP or LS handler.

If a printer is not part of your configuration, the verification procedure only assembles, links, and runs the terminal identification program IVP.MAC.

If the verification fails, the procedure issues a warning message.

1.4.2 Configuring Your System

Configuring your system involves two steps:

1. Checking the device CSR and VECTOR addresses
2. Running the configuration procedure

1.4.2.1 Checking Device CSR and VECTOR Addresses

Digital recommends you make sure your devices are installed at their proper CSR and VECTOR addresses, both if you want the devices to function and if you want the automatic configuration procedure to know about them.

Field service representatives who install your hardware system should provide you with a written record of the CSR and VECTOR addresses at which each device is installed.

To check whether devices are installed at their proper CSR and VECTOR addresses, use the following command:

```
SHOW DEVICES
```

To change the CSR or VECTOR associated with a device, use the SET command. The format is:

SET device-name CSR=csr-address, VECTOR=vector-address

For example:

```
SET LS CSR=176510,VECTOR=310
```

Remember: You must unload the LS handler before you change its CSR or VECTOR address. See the *RT–11 System Generation Guide* for a listing of the default CSR addresses.

1.4.2.2 Running the Configuration Procedure

To run the configuration procedure, type the following command:

```
IND CONFIG RET
```

CAUTION

Since the configuration procedure deletes files, you should configure your working system, not the distribution media itself.

You can stop and exit this procedure at any time. To do so, press CTRL/C twice, that is, while pressing the CTRL key, press the C key twice.

The configuration procedure first asks you in which of three modes you would like to configure your system:

- **Query**

In *Query* mode, the procedure asks a series of questions. The default answers are determined from the currently booted system's characteristics and represent a reasonable guess of a good configuration.

- **SomeQuery** (the default)

  In *SomeQuery* mode, the procedure asks questions only when it cannot determine the answer from testing the hardware configuration. For example, you could be asked if you want the files for automatic installation to be retained? Or, if you need the SL handler, you could have either a modem or a printer connected to your serial port. So, you could be asked if the device connected to the serial port is a printer.

- **NoQuery**

  In *NoQuery* mode, the procedure asks no questions, simply taking defaults for the questions it would ask in the other modes.

After you choose a mode, the procedure deletes unnecessary files in the manner indicated by the mode description chosen.

1.4.3 Editing Your System Startup Procedure

Sample system startup procedures are provided for the SJ, FB, and XM monitors. Delete the comment character (!) from any command in the sample startup file that you want and add any other commands you feel appropriate. See the *Introduction to RT–11* for an explanation on how to edit and use your startup command file.

1.5 Reading the On-Line Release Notes Addenda

Although RT–11 has a manual of printed system release notes, it is important that you read the information in the on-line release notes (V5NOTE.TXT), which contain system information unavailable at the time the manuals were published.

1.6 Installing Other Software

To install other software products on the operating system, follow the directions given with those products.

Chapter 2
Running the Automatic Installation Procedure

The RT–11 installation procedure is automated, mostly self-explanatory, and varies slightly, depending on the media on which your software is distributed.

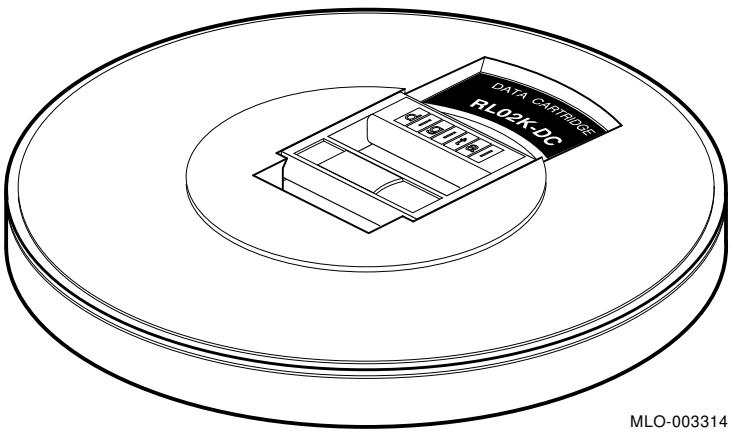
Each of the following sections describes how to automatically install RT–11 from a different distribution medium:

- RL02 Disk
- RX02 Diskettes
- RX50 Diskettes
- TK50 Magtape

You should see your appropriate hardware manual for explanations on how to start or restart your processor, how to boot an operating system on your processor, how to mount or dismount your media on your device drives, and how to care for your media. That information is hardware specific and, for the most part, is not in this guide. See Section 1.1 for a list of manuals that describe how to use the MicroPDP–11 processors and the devices and media from which RT–11 software can be installed.

2.1 RL02 Disk

Figure 2–1: RL02 Disk



This section tells you how to install RT–11 software distributed on an RL02 disk. You should be able to complete the installation procedure within one-half hour with backup.

Digital recommends that you back up your distribution disk. However, the copying of the media takes only a few minutes; and if you omit the optional backup (making a reserve copy of the distribution kit) during the procedure, you can complete the installation in a few minutes.

Procedure:

1. **Check** for the required software.

   You need one RL02 cartridge disk containing RT–11 distribution software and an optional RL02 disk for backup.

   You can do the automatic installation procedure from one RL02 disk drive without having a second RL02 disk drive for media backup, though this is not recommended.

2. **Turn on** your terminal and processor.
3. **Remove** all disks in the RL02 disk drives.
4. **Mount** your distribution disk, write-enabled. You may use either drive 0 or 1.
5. **Restart** your processor.
6. **Boot** the installation procedure from the device containing the RT–11 distribution disk. Follow the boot instructions specific to your hardware.
7. **Run** the automatic installation procedure by following the instructions presented on your terminal.

   A message displayed on your terminal tells you when you have installed the software.

8. **Remove** and **store** the distribution disk in a safe place when you have finished the installation procedure.

2.2 RX02 Diskettes

Figure 2–2: RX02 Diskette

MLO-003315

This section tells you how to install RT–11 software distributed on RX02 diskettes. You should be able to complete the installation procedure within one-half hour.

Procedure:

1. **Check** for the required software.

   You need two sets of RX02 diskettes containing the RT–11 distribution software (one to install and one to save as a backup copy, in case your installation or operating system diskettes are ever damaged or lost).

2. **Remove** all diskettes from the RX02 diskette drives.

3. **Turn on** your terminal and processor.

4. **Remove** the RT–11 software distribution diskette labeled AUTO (the installation diskette) from its paper envelope and **insert** it in a diskette drive. You may use any RX02 diskette drive on your system.

CAUTION

Do not remove the diskette from its black plastic jacket. Do not touch exposed diskette surfaces.

5. **Restart** your processor.
6. **Boot** the installation procedure from the device containing the RT–11 installation diskette. Follow the boot instructions specific to your hardware.
7. **Run** the automatic installation procedure by following the instructions presented on your terminal.

   A message displayed on your terminal tells you when you have installed the software.
8. **Remove** the final distribution diskette from the diskette drive and **store** the distribution diskettes in a safe place.

2.3 RX50 Diskettes

Figure 2–3: RX50 Diskette

MLO-003316

This section tells you how to install RT–11 software distributed on RX50 diskettes. RX50 diskettes require either an RX50 or an RX33 diskette drive, and the installation procedure takes approximately one-half hour to an hour to complete, depending on your output device.

Note that automatic installation from an RX33 diskette drive requires more memory than automatic installation from an RX50 diskette drive. See the *RT–11 Software Product Description* for the automatic installation procedure's minimal memory requirements for your configuration.

Procedure:

1. **Check** for the required software.

   You need two sets of RX50 diskettes containing the RT–11 distribution software (one to install and one to save for a backup copy, in case your installation or operating system diskettes are ever damaged or lost).

   Look for the write-protect notch on the diskette labeled AUTO. If it is covered, peel off the adhesive tab.

2. **Turn on** your terminal and **remove** all diskettes from diskette drives.

3. **Remove** the RT–11 software distribution diskette labeled AUTO (the installation diskette) from its paper envelope and **insert** it into a diskette drive. You may use any RX50/RX33 diskette drive on your system.

   CAUTION

   Do not remove the diskette from its black plastic jacket. Do not touch any exposed diskette surfaces.

4. **Turn on** or restart your processor. If you have a MicroPDP–11, be sure the WRITE-PROTECT button is raised and not lit.

5. **Wait** while the processor runs some diagnostic tests.

   - If the processor automatically boots the installation procedure, the instructions for automatic installation immediately follow the diagnostic tests.
   - If previously installed software is booted rather than the procedure from your installation media, the processor is in auto-bootstrap mode. To boot from your installation media, the processor needs to be in *dialogue* mode. To enter dialogue mode:

     a. **Follow** the instructions in Appendix A to get the prompt allowing you to boot.

     b. **Boot** the installation procedure from the device containing the RT–11 installation diskette by typing the following command on your terminal:

        ```
        BOOT DUn RET
        ```

        where *n* is the DU diskette device unit number; for example, DU1.

6. **Run** the automatic installation procedure by following the instructions presented on your terminal.

   A message displayed on your terminal tells you when you have installed the software.

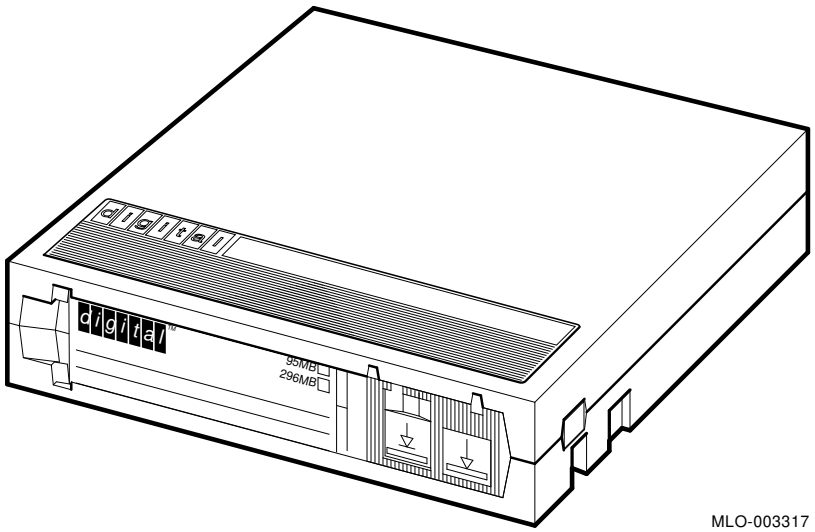
7. **Remove** the final distribution diskette from the diskette drive and **store** the distribution diskettes in a safe place.

Remember:

- Never remove a diskette while an active drive light is on. This light indicates that the system is accessing information on the diskette.
- Never turn off the power while a drive light is on.
- If an installation diskette is unusable during the installation procedure, use the second copy of that diskette in its place.

2.4 TK50 Magtape

Figure 2–4: TK50 Magtape



This section tells you how to install RT–11 software distributed on a TK50 magtape cartridge. A TK50 magtape requires a TK50 magtape drive, and the installation procedure takes approximately one hour to complete.

Note that the automatic installation procedure from TK50 magtape checks for sufficient memory before attempting the procedure. If there is insufficient memory, the automatic installation procedure returns an error message and automatically begins manual installation. If that happens, see Chapter 8 of the *RT–11 Installation Guide* for complete information on manually installing your software.

Procedure:

1. **Check** for the required software.

   You need one TK50 distribution magtape cartridge.

The TK50 magtape distribution requires an installed MU boot ROM. See the *RT–11 Software Product Description* for the automatic installation procedure's minimal memory requirements when installing from a TK50 magtape.

CAUTION

Store magtape cartridges at room temperature for at least 24 hours before using them. See the *TK50 Tape Drive Subsystem User's Guide* for other cautions.

2. **Turn on** your terminal and processor.
3. **Load** the TK50 distribution magtape cartridge and **write protect** it.
4. **Restart** your processor.
5. **Boot** the installation procedure from the device containing the RT–11 distribution magtape by typing the following command on your terminal:

   ```
   BOOT MU0 RET
   ```

   Note:

   a. You can boot RT–11 only from magtape controller unit 0. This unit—TK50 magtape controller unit 0 (MU0)—must be installed at CSR address 774500 and at VECTOR 260 (the factory supplied default address).

   b. If you have a MicroPDP–11 or a PDP–11/84 processor and you do not get a prompt allowing you to boot from the distribution device after you have restarted the processor, see Appendix A.

   When you have done the preceding, the installation procedure is ready to run and displays the following message and prompt:

   ```
   MSBOOT V05.0x
   *
   ```

6. **Run** the automatic installation procedure as soon as you see the asterisk (*) prompt by typing the following command at your terminal:

   ```
   MDUP.AI RET
   ```

   If you wait too long to run the procedure, the device will not respond and you will have to reboot it (step 5).

7. **Wait** for instructions to appear on your terminal. This can take up to 10 minutes.
8. **Follow** the instructions presented on your terminal.

   A message displayed on your terminal tells you when you have installed the software.

9. **Unload** the TK50 magtape cartridge and **store** it in a safe place.

Appendix A
Starting/Restarting the MicroPDP–11 or the PDP–11/84

- Starting the processors
  - — To turn on the PDP–11/84 processor, turn the keylock power switch to ENABLE. The DC ON light turns on.
  - — To turn on the MicroPDP–11 processor, press the system power switch to the on position.
- Restarting the processors
  - — To restart a PDP–11/84 processor, lift the toggle switch to RESTART. The switch springs back to the center position, and the RUN indicator lights.
  - — To restart a MicroPDP–11 processor:
    1. Make sure the WRITE PROTECT button is raised and not lit.
    2. Press the RESTART button.
- Starting the MicroPDP–11 or PDP–11/84 processors in *dialogue* mode

  If the MicroPDP–11 or PDP–11/84 processor does not automatically boot from the distribution media when you restart it, or if you do not get a prompt allowing you to boot from the distribution device after you have restarted the processor, you have to put the processor in dialogue mode.

  To enter dialogue mode:

  1. Restart the processor.
  2. Press CTRL/C (while pressing the CTRL key, also press the C key) when you see a message like the following on your terminal:

     ```
     Testing in progress - Please wait

       1 2 3 4 5 6 7 8 9
     ```

     If you wait until after the testing to press CTRL/C, the processor will not enter dialogue mode.

     Note: A console switch setting may suppress dialogue mode. If this happens, see your hardware manual for the appropriate switch setting.

3. The processor is set up in dialogue mode when the opening messages on your terminal end with:

```
Commands are Help, Boot, List, Setup, Map and Test.

Type a command and press the RETURN key:
```

At this point, you can boot from your installation media. See the *MicroPDP–11 Systems Technical Manual* for information on how to set up your processor to automatically enter *automatic* or *dialogue* mode whenever the processor is restarted.

Appendix B
Distribution Device Mnemonics

The following list contains the device mnemonics for the distribution kit media. If you have to boot from the installation media (rather than the processor automatically booting from it), use the mnemonic name listed here to indicate the device from which you are booting. The letter *n* stands for the device unit number.

Device Mnemonic	Distribution Media
DLn:	RL02 disk
DUn:	RX50 diskette
DYn:	RX02 diskette
MU0:	TK50 magtape cartridge