

**RT-11**  
**System Release Notes**

AA-5286F-TC

digital  
software



# RT-11 System Release Notes

AA-5286F-TC

## December 1983

This manual summarizes the features that differentiate the RT-11 V5.0 and V5.1 operating systems from RT-11 V4.0.

This manual supersedes *RT-11 System Release Notes*, AA-5286E-TC.

**Operating System:** RT-11 Version 5.1

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## PREFACE

The system manager and system programmers should be thoroughly familiar with the contents of this manual before performing a system generation as described in the RT-11 System Generation Guide.

Part I (Chapters 1 through 4) describes new features and corrected problems, and presents a comparison between this release of RT-11 and the previous releases:

- Chapter 1 - NEW FEATURES

This chapter describes the new processors, devices, software components, and documentation.

- Chapter 2 - CHANGES AND ADDITIONS TO EXISTING COMPONENTS

This chapter describes software components that have been improved through changed or added capabilities.

- Chapter 3 - CORRECTED PROBLEMS AND CURRENT RESTRICTIONS

This chapter describes current software restrictions and documentation problems, and lists software problems that have been corrected.

- Chapter 4 - INSTALLATION, BOOTSTRAP, AND HARDWARE SETUP PROCEDURES

This chapter tells you how to access on-line information that describes customizations you can use to improve system performance. The chapter also describes installation, bootstrap, and hardware setup procedures you may need depending on your configuration.

References to Version 5.1 for Version 5.1 are highlighted in red. In software releases, a red number (5.1) represents a major release and all its updates, and a black number (5.1) represents a major release or a specific update of a major release. For example, references to Version 5 apply to Version 5.1 as well, but references to Version 5.1 apply only to Version 5.1.

Part II (Chapters 5 through 12) provides more detail about features added for Version 5.1. Chapters 5 and 6 describe how to manually install RT-11 on a Professional 325 and 350. Chapter 7 provides specific information you need for running RT-11 on a Professional 325 or 350, and describes restrictions that apply. Chapter 8 outlines changes to the RT-11 distribution kits, provides detailed descriptions of new IND directives, programmed requests, macros, and SYSLIB routines, and lists new device codes and bit definitions. Chapter 9 describes changes made to the system generation process, and includes a full reprint of the new dialog.

Chapters 10, 11, and 12 describe three new utilities added in Version 5.1: SETUP, (hardware characterization setup utility), SPOOL (transparent spooling package), and VTCM (virtual terminal communication package).

Appendix A lists new error messages, with causes and solutions for each. Appendix B provides the software kit maps for each type of RT-11 distribution kit.

#### NOTE

A machine-readable addendum to the RT-11 System Release Notes, V5NOTE.TXT, is provided on the distribution kit. V5NOTE.TXT describes changes that have occurred since this document was printed.

**PART I**

**CHANGES BETWEEN RELEASES**

Part I describes differences in hardware support and software features between RT-11 V4.0 and RT-11 V5. Differences between RT-11 V5.0 and V5.1 are highlighted in red.



## CHAPTER 1

### NEW FEATURES

The primary goals of RT-11 Version 5 are to support additional processors and devices, improve and extend the functionality of existing software components, correct existing software problems, and increase the ease of RT-11 installation and maintenance.

This chapter summarizes new hardware that RT-11 supports and its new software components. Refer to the rest of the manuals in the documentation set for detailed descriptions of how to use these new features.

#### 1.1 NEW PROCESSORS

RT-11 Version 5 runs on four new processors:

T-11 Malvern (SBC-11/21 and SBC-11/21 PLUS)

PDP-11/23 PLUS and MICRO/PDP-11

Professional 300 Series

J-11 Microprocessor (SBC-11/21 New board)

##### 1.1.1 T-11 Malvern (SBC-11/21 and SBC-11/21 PLUS)

The new T-11 processor chip is supported by the RT-11 single-job (SJ) and multi-job (MJ) monitors in the SBC-11/21 PLUS, simplifying system configuration. The original SBC-11/21 is also supported by the SJ and MJ monitors. In RT-11 V5.0, only the FB monitor supported the SBC-11/21, and there was no support for the SBC-11/21 PLUS.

##### 1.1.2 PDP-11/23 PLUS and MICRO/PDP-11

The PDP-11/23 PLUS is supported by RT-11 Version 5, including full 22-bit addressing (up to 4MB) under the XM monitor. The PDP-11/23 PLUS processor is available in both the standard PDP-11/23 PLUS system configuration and in the new MICRO/PDP-11 configuration.

## NEW FEATURES

### 1.1.3 Professional 300 Series

The Professional 325 and Professional 350 computers are supported by RT-11 Version 5.1. Although the foreground/background (FB) monitor runs on Professional computers with some restrictions (see Chapter 7 of this manual), the extended memory (XM) monitor is better suited for running RT-11 on Professional computers. The XM monitor supports full RT-11 functionality, including 22-bit addressing, on Professional computers. The SJ and BL monitors are not supported on Professional 300 series computers.

### 1.1.4 J-11 Microprocessor (LSI-11/73 CPU Board)

The J-11 microprocessor chip is supported by RT-11 Version 5.1, including full 22-bit addressing (up to 4MB) under the XM monitor.

## 1.2 NEW DEVICES

RT-11 Version 5 supports the following new mass storage devices:

RX50 diskette

RD50/RD51 disk

RA80 disk

RC25 disk

TSV05 magtape

### 1.2.1 RX50 Diskette (DU or DZ)

The RX50 is a diskette subsystem available on MICRO/PDP-11 and Professional 300 series computers. The subsystem consists of two drives, each of which holds one 5-1/4 inch diskette. Each diskette provides a storage capacity of 4096 (256 blocks).

RX50 diskettes on the MICRO/PDP-11 are MSCP (mass storage communication protocol) devices supported by the new disk class handler, DU. On the Professional 325 and 350, both diskette drives are supported by the DZ handler. MICRO/PDP-11 and Professional computers can read and write both classes of diskettes. However, since they are supported by different handlers, a diskette formatted to bootstrap on one cannot be hardware bootstrapped on the other.

RX50 diskettes can be used as system or data storage volumes. The RT-11 V5 distribution kit is available on RX50 diskettes.

RX50 diskettes are not interchangeable with RX01 and RX02 diskettes. You can insert an RX50 diskette only in an RX50 drive.

### 1.2.2 RD50/RD51 Disk (DU or DU)

The RD50/RD51 disk is a fixed Winchester disk available on the MICRO/PDP-11 and Professional 350.

## NEW FEATURES

The MICRO/PDP-11 includes a 124MB RA80 disk, which is an MSCP device supported by the MSCP disk class handler, DU. Professional 350 systems may include a 26MB RC25 or a 10MB RD51, both of which are supported by the DU handler.

RA80/RD51 disks can be used as system or data volumes.

### 1.2.3 RA80 Disk (DU)

The RA80 disk is a 124MB, fixed Winchester disk supported by the MSCP disk class handler, DU.

Because the RA80 disk contains more than 64K blocks, it is divided into multiple 64K-block partitions. When running under RT-11, each partition operates as a separate disk. Partition 0 may be used as a system volume or for data storage. All other partitions may be used for data storage only.

### 1.2.4 RC25 Disk (DU)

The RC25 disk is a 26MB disk supported by the MSCP handler, DU. RC25 disk drives are always paired; the even-numbered drive accepts a removable disk and the odd-numbered drive contains a fixed RC25 disk for total storage of 52MB per pair. These disks can be used as the system volume or for data storage.

### 1.2.5 TSV05 Magtape (MS)

The TSV05 is a TS11-compatible tape drive that operates with the PDP-11/23 PLUS. Data is recorded on nine-track 1/2-inch format magnetic tape. The TSV05 can store up to 28MB (in formatted 2K records) on a standard 10-1/2 inch, 2400 foot reel of tape. TSV05 tape drives can accept three tape reel sizes: 7 inch, 8-1/2 inch, and 10-1/2 inch.

The TSV05 is a streaming tape drive that operates in two modes, TS11 compatible mode and extended features mode. In TS11 mode, the TSV05 is a TS11 look-alike that automatically streams at 25 in/s. In extended features mode, which is turned on by setting the hardware extended features switch, the tape can stream at 100 in/s under program control.

## 1.3 NEW DISTRIBUTION KITS

The format of RT-11 distribution kits has changed because of the new automatic installation and verification procedure (see Section 1.4.1). Refer to Chapter 4 of this manual for procedures for RT-11 V5 distribution kits that will not be installed automatically.

## NEW FEATURES

### 1.4 NEW SOFTWARE COMPONENTS

Although RT-11 Version 5's primary goal is to extend the functionality of existing software, Version 5 also includes the following new operating features:

- Automatic installation (AI) and installation verification procedure (IVP)
- Backup utility program (BUP)
- Concise command language (CCL) and user command linkage (UCL)
- Indirect control file processor (IND)
- Logical disk subsetting (LD)
- ~~Hardware setup utility (SETUP)~~
- Single-line editor (SL)
- Transparent spooling utility (SPOOL)
- Virtual KED (KEX)
- Virtual RUN utility (V)
- ~~Virtual terminal communication package (VTCM)~~

In addition, RT-11 Version 5 includes new programmed requests, macros, SYSLIB routines, handlers and error messages, new system generation procedures and options, a new software update process, and new unsupported utilities. The following sections summarize those new components and refer you to more detailed descriptions provided in the documentation set.

#### 1.4.1 New Automatic Installation and Verification Procedure

The RT-11 Version 5 automatic installation and verification procedure installs RT-11 by conducting an interactive dialog at the console terminal. As you answer the dialog questions, the system creates and tests a working RT-11 system.

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

- PDP-11 processor with 24K words of memory or Professional 300 series computer
- A line or Professional clock
- VT100 series or LA100 series console terminal, or a Professional 300 series system



## NEW FEATURES

- One of the following mass storage configurations:

MICRO/PDP-11 (RX50/RD51) - distribution kit resides on RX50 diskettes

~~RT-11 (RX50/RD51) - distribution kit resides on~~

Dual RL02 disks - distribution kit resides on RL02 disk

Dual RX02 diskettes - distribution kit resides on RX02 diskettes

If you bought an RT-11 distribution kit on any of these media, you should have received an RT-11 Automatic Installation Booklet which tells you how to start the automatic installation process. If your configuration does not meet the requirements shown above, you must have DIGITAL install your system or install your system by following the procedures described in the RT-11 Installation Guide.

RX02 and RX50 distribution kits include two copies of the RT-11 distributed software, so you do not have to back up the distribution kit. Store one copy as your master distribution kit, and bootstrap the other copy to run the automatic installation procedure. Be careful to keep the volumes from these two distribution kits separate. Once the installation procedure has been run, volumes AUTO and 1 of the distribution kit you installed will no longer be identical to volumes AUTO and 1 of the master distribution kit you stored.

For RL02 distribution, the only difference between the original distribution volume you received and the installed volume is the bootstrap. The bootstrap on the original distribution kit bootstraps the automatic installation monitor, RT11AI.SYS. The bootstrap on your installed system bootstraps the RT-11 FB monitor, RT11FB.SYS. Therefore, you can return your installed system to its original state simply by copying the RT11AI.SYS bootstrap to the boot blocks of your disk.

See Chapter 4 of this manual for procedures for RT-11 V5 distribution kits that do not support automatic installation.

### 1.4.2 New System Utilities

This section describes the new system utilities provided with RT-11 Version 5.

**1.4.2.1 Backup Utility Program (BUP)** - The backup utility program provides a quick way to store a large volume or file on a set of smaller volumes. BUP lets you copy a large volume or file to several specially initialized backup volumes; the file or volume cannot be used, however, while stored on the backup volumes. BUP also lets you initialize backup volumes, obtain directory information about a set of backup volumes, and restore a volume or file to its original form from a set of backup volumes. In addition, BUP will utilize the 100 in/s streaming mode of TSV05 magnetic tape controller.

See Chapter 3 in the RT-11 System Utilities Manual for a complete description of BUP.

## NEW FEATURES

1.4.2.2 Concise Command Language (CCL) and User Command Linkage (UCL)  
- Concise command language lets you issue commands directly to utility programs or your own user-written program on a single command line. Prior to Version 5, you could issue commands on a single command line only by using DCL keyboard monitor commands or by running (R or RUN) the program and specifying a CSI command line. CCL lets you run the program and specify the input and output files and all accompanying options on a single line. In the following example, the second command shows the CCL equivalent of the first command.

### Running a Utility Program

```
.R PIP
*DL1:MYPROG.OLD=DL0:MYPROG.MAC
*
```

### CCL Equivalent

```
.PIP DL1:MYPROG.OLD=DL0:MYPROG.MAC
.
or
.PIP DL0:MYPROG.MAC DL1:MYPROG.OLD
.
```

See Section 4.6 in the RT-11 System User's Guide for more information on CCL.

User command linkage (UCL) lets you write your own command parser, so you can create your own commands. ~~UCL support is included in the RT-11 distributed monitors.~~ Refer to Section 2.2.4.2 in the RT-11 Software Support Manual for more information on UCL.

A usable example of a UCL ~~command parser~~ ~~is included in the RT-11 distributed kit as an example.~~ ~~Refer to Section 2.2.4.2 in the RT-11 Software Support Manual for instructions on how to use the RT-11 distributed UCL.~~

1.4.2.3 Indirect Control File Processor (IND) - The indirect control file processor executes indirect control files. IND control files contain IND directives, which control the execution of the indirect control file, and may contain keyboard commands (DCL, CCL, and UCL). You can use indirect control files to access other files, execute keyboard monitor commands, define symbols, pass parameters, and perform logical tests.

When running ~~in the RT-11~~ ~~distributed monitors,~~ ~~the default command file processor is KMON.~~

KMON is the default command file processor in the distributed monitors. If you want to change the default command file processor to IND, use the monitor command SET KMON IND or apply the customization given in Section 3.2.1 of this manual.

Chapter 5 in the RT-11 System User's Guide describes how to create and execute indirect control files. ~~for Version 5.1. See Chapter 5 in the RT-11 Software Support Manual for the new IND directives.~~

## NEW FEATURES

**1.4.2.4 Logical Disk Subsetting Handler (LD)** - The logical disk subsetting handler lets you define logical disks, which are subsets of physical disks. You define logical disks by assigning a logical disk unit number to a file on a physical disk. You can then use the logical disk as though it were a physical disk.

Logical disk subsetting is particularly useful when you work with large disks, which often run out of directory entry space before the volume is full. Since each logical disk contains its own directory, dividing a physical disk into several logical disks increases directory entry space. Logical disk subsetting also increases the speed of directory operations on large disks.

Chapter 9 in the RT-11 System Utilities Manual details logical disk subsetting.

**1.4.2.5 Setup Utility (SETUP)** - The SETUP utility lets you change the characteristics of video terminals, printers, and other devices. In addition to the standard control characters, you can control background and foreground colors and text color, scrolling, and other features. You can also change printer characteristics such as length of line, number of lines per page, and other characteristics such as the 12- or 24-hour clock.

SETUP's video characteristics are intended primarily for use with Tektronix and other monitors, since they have no hardware terminal emulation. However, many SETUP commands are also valid for VT100 and other terminal emulators. Some commands are valid for only VT100 series terminals.

See Chapter 11 of this manual for details on how to use SETUP and for

**1.4.2.6 Single-Line Editor (SL)** - The single-line editor lets you edit your current keyboard command line or CSI command string typed on a video terminal before you terminate the line. The single-line editor lets you position the cursor anywhere in the current line for editing by using a subset of KED (keypad editor) commands. You can also recall previous input lines for editing.

Note that the single-line editor for the XM monitor (SLX) is distributed with SYSGEN options different from the monitor itself. Therefore, SLX will not be installed when you first boot RT11XM. This is because SLX resides in high memory when installed, even when it's not being used. For compatibility with past releases, it is not desirable to have SLX use extended memory formerly available to user programs. To use SLX, issue the command SET SL SYSGEN.

See Section 4.3 in the RT-11 System User's Guide for instructions on using the single-line editor.

## NEW FEATURES

**1.4.2.7 Transparent Spooling Package (SPOOL)** - The transparent spooler (SPOOL) is a utility you can use for sending output to the line printer. SPOOL runs as a foreground or system job. Once SPOOL is running, its operations are transparent. Anytime you send output to the line printer, either explicitly by issuing commands (such as COPY and PRINT) or by using commands and options that send output to the line printer by default (such as CORREL/LOG), SPOOL accepts the output and sends it to the printer. While SPOOL runs in the foreground, you can continue to work on other jobs in the background. SPOOL differs from the Queue Package in that you need not send output to SPOOL as a complete file. Instead, SPOOL accepts output as it becomes available ("pipeline" operation).

Although the line printer is SPOOL's default output device, you can apply a software customization to change it.

See Chapter 11 of this manual for an explanation of how to use SPOOL.

**1.4.2.8 Virtual KED (KEX)** - The virtual KED program (KEX) is available for use under the XM monitor only. KEX editing commands are identical to KED commands. However, KEX maximizes the amount of high memory used, while minimizing the amount of low memory used. Therefore, KEX will continue to operate in many instances where there is insufficient low memory for KED to run. In addition, KEX may be run as a foreground or system job, allowing editing to continue while the background is performing some function. On systems that include multiterminal support, multiple copies of KEX may be run (by using the SRUN and FRUN commands), each with its own terminal.

**1.4.2.9 Virtual MMN Utility (V)** - V lets you run some programs under the XM monitor when there is not enough low memory to run the program by using the R or RUN command. V is especially useful for running programs on a Professional 300 series computer under the XM monitor.

Some restrictions apply when using V, and V is an unsupported utility. Read the file UNSUP.TXT on your distribution kit for details and restrictions.

**1.4.2.10 Virtual Terminal Communication Package (VTCOM)** - VTCOM lets you use your FDP-11, PDT-11/150, or Professional computer as a terminal when you connect it to a host computer. VTCOM.REL runs under all monitors. VTCOM.SAV, which runs under the XM monitor, maximizes the amount of high memory so more low memory is available for other programs.

When running VTCOM, you can access facilities on an RT-11, RSX-11, RTEM-11, or VAX/VMS host system and perform ASCII file transfer between the host computer and your stand-alone system. In addition, if the host computer is running RTEM-11 and the program TRANSF is installed on the host, you can transfer binary files as well. Since VTCOM can run as a foreground or system job, you can continue working under RT-11 in the background while you maintain a connection to the host computer.

Chapter 12 of this manual lists requirements for running VTCOM and explains how to use VTCOM and TRANSF.

## NEW FEATURES

### 1.4.3 New Programmed Requests

This section describes the new programmed requests available with RT-11 Version 5.

1.4.3.1 **.ABTIO** - The **.ABTIO** programmed request lets a running job stop all outstanding I/O operations on a specified channel without terminating the program under the FB and XM monitors. Under SJ, the request is simulated with a **.WAIT** directive.

See Section 2.1 in the RT-11 Programmer's Reference Manual for details and examples of the **.ABTIO** programmed request.

1.4.3.2 **.FPROT** - The **.FPROT** programmed request sets or resets the protection status of files.

See Section 2.32 in the RT-11 Programmer's Reference Manual for details and examples of the **.FPROT** programmed request.

1.4.3.3 **.PEEK** - The **.PEEK** programmed request returns in register R0 the contents of the specified low memory location (below 28KW) or the I/O page location you specify.

See Section 2.57 in the RT-11 Programmer's Reference Manual for details and examples of the **.PEEK** programmed request.

1.4.3.4 **.POKE** - The **.POKE** programmed request deposits the value you specify into a low memory (below 28KW) or I/O page location.

See Section 2.57 in the RT-11 Programmer's Reference Manual for details and examples of the **.POKE** programmed request.

1.4.3.5 **.PVAL** - The **.PVAL** programmed request modifies or replaces the monitor fixed offset location you specify.

See Section 2.37 in the RT-11 Programmer's Reference Manual for details and examples of the **.PVAL** programmed request.

1.4.3.6 **.SFDAT** - The **.SFDAT** programmed request lets a program set or change the creation date in a file's directory entry.

See Section 2.80 in the RT-11 Programmer's Reference Manual for details and examples of the **.SFDAT** programmed request.

### 1.4.4 New Macros

This section describes macros that have been added to SYSMAC.SML.

## NEW FEATURES

1.4.4.1 **.ADDR** - The **.ADDR** macro computes the address of the location you specify in a position-independent manner (independent of its link-time virtual address) and stores it in a register or on the stack.

See Section 8.6.1 of this manual for more information on the **.ADDR** macro.

1.4.4.2 **.ASSUME** - The **.ASSUME** macro tests, at assembly time, the validity of a condition you specify. If the test is false, **MACRO** generates an assembly error and prints a message from a comment you supply as an argument to the macro.

See Section 8.6.2 of this manual for more information on the **.ASSUME** macro.

1.4.4.3 **.BR** - The **.BR** macro warns you if code that belongs together is separated during assembly. When you call the **.BR** macro, you specify a location as an argument. **.BR** checks that the address of the next instruction matches the address of the location you specified as an argument to the macro. If the addresses do not match, **.BR** causes **MACRO** to print an error message.

See Section 8.6.3 of this manual for more information on the **.BR** macro.

1.4.4.4 **.DRINS** - The **.DRINS** macro sets up the installation code area in block 9 of a device handler. **.DRINS** defines the addresses that contain the display CSRs used by **DDDRIO**, the CSR checked by the **INSTALL** keyboard command code, and defines the system and data device installation entry points.

See Section 8.6.4 of this manual for more information on the **.DRINS** macro.

1.4.4.5 **SOB** - The **SOB** macro simulates the instruction "subtract one and branch if not equal" (**SOB**). This macro is useful for writing programs to run on any RT-11 supported processor, since the **SOB** instruction is invalid on some processors.

See Section 8.6.5 of this manual for more information on the **SOB** macro.

### 1.4.5 New System Subroutine Library (SYSLIB) Routines

This section describes the routines that have been added to **SYSLIB**.

## NEW FEATURES

1.4.5.1 **IABTIO** - The IABTIO routine stops all outstanding I/O operations on a specified channel without terminating the job under FB and XM. This routine is simulated under SJ with a .WAIT directive.

See Section 3.12 in the RT-11 Programmer's Reference Manual for details and examples of IABTIO.

1.4.5.2 **IFPROT** - The IFPROT routine changes a specified file's protection status.

See Section 3.27 in the RT-11 Programmer's Reference Manual for details and examples of IFPROT.

1.4.5.3 **IPUT** - The IPUT routine modifies or replaces the value of a monitor fixed offset location.

See Section 3.41 in the RT-11 Programmer's Reference Manual for details and examples of IPUT.

1.4.5.4 **ISDTTM** - The ISDTTM routine modifies the current date and time values stored in the monitor.

See Section 3.52 in the RT-11 Programmer's Reference Manual for details and examples of ISDTTM.

1.4.5.5 **ISFDAT** - The ISFDAT routine sets or changes the creation date in a file's directory entry.

See Section 3.53 in the RT-11 Programmer's Reference Manual for details and examples of ISFDAT.

### 1.4.6 New Handlers

RT-11 V5 includes the following new handlers.

1.4.6.1 **DU (MSCP Handler)** - The DU handler supports disk systems that implement the mass storage communication protocol (MSCP). Presently, RT-11 supports four MSCP storage systems: RC25 disk, RA80 disk, and RX50 diskette and RD51 disk on the MICRO/PDP-11.

The DU handler can be modified, by using SET commands, to address MSCP disks by unit number, partition number, and port number. (A port is the same as an individual controller.)

MSCP supports unit numbers 0-255. However, since RT-11 supports only unit numbers 0-7, you can map a given RT-11 unit number to any specific MSCP unit number using the SET DUN UNIT=x command. RT-11 unit n is translated to MSCP unit x.

## NEW FEATURES

MSCP supports disks larger than 64K blocks. Under RT-11, large disks are divided into 64K-block partitions. The DU handler supports up to 255 partitions on a single disk, with each partition referenced as though it were an RT-11 disk. The SET DUN PART=x command translates a DU unit number (n) to a particular partition (x) on a disk.

The DU handler also supports up to four separate controllers or ports, numbered 0-3. The command SET DUN PORT=x defines which port (x) is accessed when DU device unit n is referenced. An alternative method of supporting multiple ports, with some potential performance advantages, is to create a duplicate copy of the DU handler (DU.SYS) under another file name for each additional controller.

See Section 10.11 of the RT-11 Software Support Manual for more information on the DU handler.

1.4.6.2 DW (Professional 350 Winchester Disk Handler) - The DW handler supports 5MB RD50 and 10MB RD51 fixed Winchester disks for the Professional 350 computer. For the Professional 350, RT-11 supports only drive unit DW0.

1.4.6.3 DZ (Professional 325 and 350 Diskette Handler) - The DZ handler supports RX50 diskette drives for the Professional 300 series computers. RT-11 supports drive units DZ0 and DZ1. Drive unit 0 is the top drive if your Professional sits horizontally or the left drive if it is mounted vertically in a floor stand; drive unit 1 is the bottom or right drive respectively.

1.4.6.4 PI (Professional Interface Handler) - The PI handler supports the keyboard, video display, and system clock for Professional 300 series computers. Although you cannot alter PI handler characteristics or direct I/O operations to PI, PI.SYS (or PIK.SYS under the XM monitor) must reside on your system volume if you are running on a Professional 300 series computer.

1.4.6.5 SP (Transparent Spooler Handler) - The SP pseudohandler supports the transparent spooler (SPOOL). The SP handler intercepts output directed to the line printer and sends it to SPOOL for temporary storage and printing.

1.4.6.6 XC and XL (Communication Port Handler) - The XC handler supports the Professional 300 series computer communication port. The XL handler supports DE(V)-11 communication ports. DE or V (depending on your system) is required when you use the virtual terminal communication package, VTCON.



## NEW FEATURES

**1.4.6.7 VM (Memory Disk Handler)** - The VM handler allows memory above 28K words to be used as though it were a disk device. Under the SJ and FB monitors, the virtual device can be used as the system volume or as a data volume. Under the XM monitor, however, the virtual device can be used only as a data volume.

The command SET VM BASE=nnnnnn lets you select the memory location that corresponds to logical block 0 of the VM device. For the distributed SJ/FB version, the base is set to 1600 which corresponds to memory location 160000 (the 28KW boundary). For the distributed XM version, the base is set to 10000 (memory location 1000000), the 18-bit/22-bit addressing boundary. Consequently, when you first boot an XM monitor, only the low 256KB of memory will be available for use with the memory management programmed requests, the same amount of memory supported under RT-11 V4. To obtain more memory, remove the VM handler or set its base to a higher value.

RT-11 does not support the use of memory above 256KB on UNIBUS machines. Therefore, DIGITAL does not recommend the removal of the VM handler or changing the base on 22-bit UNIBUS systems (11/24, 11/44, or 11/70).

Refer to Section 10.12 of the RT-11 Software Support Manual for more information on the VM handler.

### 1.4.7 New System Generation Procedures and Options

The system generation process is controlled by the new indirect control file processor, IND, and includes support for new options. See the RT-11 System Generation Guide for a complete description of system generation. See Chapter 9 of this manual for a complete description of changes to system generation since Version 5.0 was released and for a reprint of the current system generation dialog.

**1.4.7.1 New System Generation Procedures** - The RT-11 Version 5 system generation procedures are no longer controlled by a FORTRAN IV program (SYSGEN.SAV). Instead, system generation is now run using the IND control file processor. The system generation procedures, however, remain basically the same: system generation produces new monitors and handlers depending on your answers to SYSGEN.COM dialog questions. (SYSGEN.COM is an IND control file that replaces SYSGEN.CND and the device section of SYSTBL.CND.) The following are the major changes to the system generation procedures:

- You can create an answer file to preserve your responses during a system generation session. You can use this answer file during later system generation sessions to recreate the same system without answering the dialog questions again.
- After answering the system generation dialog questions, you now have the opportunity to change some of your answers. If you are using an answer file, you can also change some responses. The new responses are recorded in the output answer file, if you request one.

## NEW FEATURES

- All work files associated with a particular system generation session use the same name as the answer file but have a different file type. For example, if the answer file is NEWSYS.ANS, the work files are named NEWSYS.BLD, NEWSYS.MON, NEWSYS.DEV, NEWSYS.CND, and so on. The default answer file is SYSGEN.ANS.
- The system generation dialog lets you define system conditionals for which there are no system generation questions. For example, you can define the conditional LIST? = 1 to enable support for the idle-loop light pattern. These definitions are then included in the answer file and the .CND (conditional) file created during system generation. This new feature lets you define system conditionals without having to edit the .CND file. The .ANS file will contain all system generation information.

See Chapter 9 of this manual for more information on defining system conditionals during system generation.

- You can create the .CND conditional files for the distributed monitors by performing a system generation and using the appropriate monitor answer file (BL.ANS, SJFB.ANS, or XM.ANS) as input.
- Instead of choosing the long or short form of the dialog, you can request explanatory text for individual questions by typing <ESC><RET>.
- SYSGEN.TBL, a new file produced during the system generation session, contains the device tables that were included in the file SYSTBL.MAC. SYSGEN.TBL is included during the assembly and link procedure for all monitors you generate. If you use an answer file during the system generation session, the resulting device tables file will have the same name as the answer file, but with the file type .TBL. The new file TRMTBL.MAC, which contains the multiterminal tables, is distributed on the RT-11 Version 5 distribution kit and is included in the assembly and link procedure only if you request multiterminal support during system generation.
- The system generation procedure for specifying device support has changed. Instead of asking if you want support for each device individually, the system generation dialog now asks you in one question to list all the devices you want to support. If you type a question mark (?) followed by a carriage return, the system lists the codes for all the devices you can support, and marks each device for which you have already included support with an asterisk (\*). The system asks appropriate questions about support for additional controllers, and CSR and vector addresses, as you select each device.

You can also specify your own device handlers during the system generation procedure. They will be included in the build command files generated.

## NEW FEATURES

- You can now specify logical device names for the devices to be used for building your system at the end of the system generation process. See Chapter 9 of this manual for a copy of the current system generation dialog.

1.4.7.2 **New System Generation Options** - The system generation dialog includes questions to generate support for the following new options.

- **High-speed ring buffer.** The high-speed ring buffer allows characters that are received at a very rapid rate to be processed and transmitted. This option is particularly useful for systems with intelligent terminals, such as VT100s, and for LSI systems. This option has no effect for Professional series computers.
- **Up to 9600 baud for DZ11 and DZV11 lines.** The system generation process lets you set the baud for DZ11 and DZV11 lines to 110, 150, 300, 1200, 2400, 4800, or 9600. Note that the bauds for all DZ11 and DZV11 lines are the same.
- **User command linkage.** UCL support lets you use your own command parsing program or the distributed UCL.SAV command parsing program to define your own commands.
- **Fetchable handlers under XM.** You no longer need to load device handlers when running under the XM monitor. Instead, RT-11 V5 lets you use the .FETCH programmed request in background jobs, as has been possible under the SJ and FB monitors in previous versions of RT-11. This feature is enabled in the distributed XM monitor but you can disable this feature through system generation.

If you use any device handlers that are not distributed by DIGITAL, you may need to make some modifications to use the .FETCH programmed request under XM. See Section 2.30 of the RT-11 Programmer's Reference Manual for more information on the .FETCH programmed request.

- **Global .SCCA.** Global .SCCA support lets you inhibit double character errors. When a global .SCCA request is issued, all CMT/C characters are disabled until another global .SCCA is issued. Global .SCCA support is available under the FB and XM monitors.

Only background jobs can issue global .SCCA requests, and these do not affect foreground or system job operation. Global .SCCA requests issued by foreground and system jobs act as local .SCCA requests.

See Chapter 8 of this manual for more details on global .SCCA support.

- **Exclude Professional printer port support from LS handler.** The LS handler has been modified to include support for the Professional series computer printer port. You can choose to exclude the overhead of support for the Professional printer port during system generation.

## NEW FEATURES

- **New devices.** You can generate support for the following new devices:

TSV05 magtape  
MSCP disks (DU) - RC25, RA80, RD51, RX50  
Professional 325 and 350 devices: IM and DE  
SP transparent spooler handling  
XL communication package (PDP-11 and PDP-11/150)  
XC communication package (Professional 300 series)

- Idle-loop light pattern has been removed from system generation. If you wish to include idle-loop light pattern support, you must set the conditional LIGHST to 1 by defining the system conditional during system generation.
- The BASIC keyboard command (conditional BASIC) has been removed. See Section 2.2.1 of this manual for more details.
- The clock for the Professional 325 and 350 works differently from a PDP-11 line clock. However, RT-11 supports the Professional clock in a mode similar to a 60 hertz line clock. Therefore, regardless of whether you choose 60 or 60 hertz during system generation, if you are running on a Professional computer, a 60 hertz clock rate will be used.
- Optimized PDT execution can be included by setting the conditional PDT\$OP to 1. However, monitors generated with PDT\$OP will not run on processors with programmable baud interfaces (DLARTS) or on the SBC-11/21.

### 1.4.8 New Error Messages

Error messages have been added for the following new software components:

BUP (backup utility program)  
IND (indirect control file processor)  
LD (logical disk subsetting facility)  
SETUP (hardware setup utility)  
SL (single-line editor)  
SPOOL (transparent spooling utility)  
SYSGEN (new system generation procedure)  
VTCOM (virtual terminal)  
TRANS (VTCOM file transfer)

In addition, KED error messages are included in a chapter of the RT-11 System Message Manual, as well as in the PDP-11 Keypad Editor User's Guide.

### 1.4.9 New Software Update Process

To maintain RT-11 and layered product software, you no longer need to install mandatory patches. Instead, RT-11 Version 5 provides a new update process that replaces the software modules that have been changed.

## NEW FEATURES

Update kits are distributed periodically after RT-11 is released. Each update kit includes an automatic procedure for replacing software modules and the replacement software modules. The update procedure guides you through an interactive dialog to determine which products you want to update and which devices you are using. Then the update software performs the module replacement operations.

Instead of providing binary patches, the RT-11 Software Dispatch now contains only articles describing problems corrected and functionality added by the update kits.

Source kits are still available.

### 1.4.10 New Unsupported Utilities

Several unsupported utilities have been added to the RT-11 distribution kit. Read the file UNSUP.TXT on your RT-11 distribution kit for a description of the unsupported utilities and instructions on how to use them.

## 1.5 NEW DOCUMENTATION

Two Version 4 manuals, the RT-11 System User's Guide and the RT-11 Installation and System Generation Guide, have each been split into two manuals to achieve a more modular documentation set. The RT-11 Version 5 documentation set also includes three new manuals, as well as additions to Version 4 manuals and changes in the documentation format. The following sections describe the new and changed Version 5 manuals.

### 1.5.1 RT-11 Automatic Installation Booklets

The RT-11 automatic installation booklets are new to the RT-11 documentation set. Each booklet provides instructions for starting the software that automatically installs RT-11. Your RT-11 documentation includes the booklet appropriate for your distribution medium: RX02, RL02, MICRO/PDP-11 RX50, ~~and Professional 1100 series~~.

### 1.5.2 RT-11 Mini-Reference Manual

This new RT-11 manual provides condensed reference information in a small, portable looseleaf binder. The RT-11 Mini-Reference Manual covers keyboard commands, utility programs, programmed requests, SYSLIB routines, and monitor fixed offsets. This manual replaces the Version 4 RT-11 Pocket Guide and contains information from the programmed request section of the RT-11 Programmer's Reference Manual as well as information from the RT-11 Pocket Guide.

## NEW FEATURES

### 1.5.3 RT-11 Update User's Guide

This manual, which you receive with your update kit, describes how to use the new RT-11 update process to maintain your software. ~~store your RT-11 Update User's Guide in the RT-11 documentation set.~~

### 1.5.4 Guide to RT-11 Documentation

This manual, which replaces the Version 4 RT-11 Documentation Directory, summarizes each manual in the RT-11 documentation set and suggests appropriate reading paths for different users.

### 1.5.5 RT-11 System User's Guide

The Version 5 RT-11 System User's Guide describes the RT-11 operating system, system conventions, keyboard monitor commands, and the text editor EDIT. This manual contains the information in Chapters 1 through 5 of the Version 4 RT-11 System User's Guide and provides a new chapter on the indirect control file processor (IND).

### 1.5.6 RT-11 System Utilities Manual

This new manual, which describes the RT-11 utility programs, presents the information from Chapters 6 through 24 of the Version 4 RT-11 System User's Guide. This manual also includes chapters on the new backup utility program (BUP) and logical disk subsetting program (LD).

### 1.5.7 RT-11 Installation Guide

The RT-11 Installation Guide describes manual procedures for installing RT-11; this document also tells you how to customize the distributed RT-11 software. This document contains the information in Chapters 1 through 7 of the Version 4 RT-11 Installation and System Generation Guide. Two chapters have been added to describe installing RT-11 on diskettes from a hard disk distribution kit, and installing RT-11 on a MICRO/PDP-11. Information has also been added to Chapter 5 to describe installing RT-11 using RC25 disks.

### 1.5.8 RT-11 System Generation Guide

This manual, taken from Chapters 8 through 10 of the Version 4 RT-11 Installation and System Generation Guide, tells you how to run the system generation software to produce monitors and handlers with specialized configurations and characteristics.

### 1.5.9 PDP-11 TECO User's Guide

Since TECO software has been included in the RT-11 documentation set, the PDP-11 TECO User's Guide has been removed from the set.

## CHAPTER 2

### CHANGES AND ADDITIONS TO EXISTING COMPONENTS

This chapter describes features that have been added to existing RT-11 software components and features that have been changed.

#### 2.1 MONITORS

The following features are additions or changes to the RT-11 monitors.

- **Minimum memory requirement** - The minimum memory requirement has been increased to 16KW for the SJ monitor and to 24KW for the FB monitor. The minimum memory requirement for the XM monitor (32KW) remains the same as in Version 4.
- **New default working monitor** - FB is the default monitor for a working system installed through RT-11 automatic installation procedures. If your system does not include the minimum hardware requirements for the FB monitor and a [REDACTED] perform [REDACTED] installation procedure. See Chapter 4 for information on how to install your system when your hardware configuration does not support automatic installation.
- **Distributed XM monitor** - Under RT-11 V4, use of the extended memory feature was available only through system generation. The RT-11 Version 5 distribution kit includes an XM monitor, RT11XM.SYS. The RT-11 Installation Guide provides a description of all the features included in the distributed XM monitor. The most notable features include device timeout support and system job support.

[REDACTED] support [REDACTED] systems.

- **BATCH excluded from distributed monitors** - BATCH support is excluded from the distributed monitors. BATCH support is available only through system generation.
- **FPU support included in distributed monitors** - FPU support is included in the distributed SJ, FB, and XM monitors.

## CHANGES AND ADDITIONS TO EXISTING COMPONENTS

- **New monitor fixed offsets** - The following monitor fixed offsets have been added to the resident monitor data base:

<b>SPSTAT</b>	<b>Word offset 414; SPOOL status word (formerly reserved for DECnet)</b>
<b>EXTIND</b>	Byte offset 416; the stored error byte for IND
<b>INDSTA</b>	Byte offset 417; the IND control status byte
<b>\$MEMSZ</b>	Word offset 420; contains the total amount of memory available (in 32-word blocks) to the monitor currently executing
<b>\$TCFIG</b>	Word offset 424; contains the address of the current console configuration word (SET option status); points to TTCNFG in single terminal systems and T.CNFG in the current console's terminal control block (TCB) in multiterminal systems
<b>\$INDDV</b>	Word offset 426; pointer to the ASCII device name and unit number from which IND will be run
<b>MEMPTR</b>	Word offset 430; contains the offset to memory control block pointers
<b>PLEXT</b>	Word offset 432; contains the address of kernel PAR1 externalization routine for fetchable handlers under the XM monitor; contains the value 0 when running under the SJ or FB monitor

See Section 3.6.1 in the RT-11 Software Support Manual for more information on monitor fixed offsets.

- **New bit definitions** - The following new bit masks are defined for fixed offset locations:

Offset	Bit Mask	Meaning
<b>CONFIG2</b>	<b>LDREL\$ = 20</b>	A handler has been unloaded or released
	<b>PROSS\$ = 20000</b>	<b>RT-11 is running on a Professional 300 series system</b>
<b>INDSTA</b>	<b>CC\$IND = 4</b>	<b>Status of .ENABLE/.DISABLE ABORT</b>
	<b>CC\$GBL = 10</b>	<b>Status of global .SCCA</b>
	<b>LN\$IND = 40</b>	Indicates current line from IND
	<b>IN\$RUN = 100</b>	KMON has issued a RUN IND command
	<b>IN\$IND = 200</b>	IND has returned control to KMON



## CHANGES AND ADDITIONS TO EXISTING COMPONENTS

SYSGEN	FPULL\$ = 400	Indicates that FPU support has been chosen as a system generation option
	TSXP\$ = 100000	Reserved for TSX PLUS*. This bit should never be set under RT-11.
SPSTAT	NEXT = 10	Move to start of next file
	OFF = 20	Set spooler unit off
	ON = 40	Set spooler unit on
	KILL = 100	Remove spooled output from work file
	ACTIVE = 200	Indicates spooler is active
	SHOW = 4000	Display spooler status
	PRTSCR = 10000	Print screen (Professional 300 series only)
	DATIME = 20000	Date and time request (for flag pages)
	INTEN = 40000	Fake interrupt enable
ERROR = 100000	Error bit (set by SPOOL)	

See Section 3.6 in the RT-11 Software Support Manual for more information on fixed offset bit masks.

- **Support for 22-bit addressing** (on Q-bus and CTI-bus processors only) - The XM monitor now supports 22-bit addressing to allow each job (up to eight with system job support) to have a 128KW program logical address space (PLAS) using virtual overlays and/or virtual .SETTOP. The job PLAS may be up to 4MB using explicit programmed requests.

All monitors also support up to 4MB of memory through the VM handler, which treats memory above 28KW as though it were a random access device.

When using the XM monitor on any 22-bit system, 22-bit addressing will be enabled. However, since RT-11 does not support the UNIBUS map hardware, memory above 256KB may not be used for direct memory access (DMA) I/O on UNIBUS processors. Any attempt to do so will return a hard error from the device handler. To avoid this situation, the VM handler may be installed such that its base is at the 18-bit/22-bit boundary (SET VM BASE=10000). No such restrictions apply to Q-bus systems.

See Chapter 4 of the RT-11 Software Support Manual for more information on 22-bit addressing.

- **KMON size** - The size of the keyboard monitor (KMON) for SJ has been increased to 20000(octal) bytes. In Version 4, KMON was 17000(octal) bytes.

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## CHANGES AND ADDITIONS TO EXISTING COMPONENTS

### 2.2 KEYBOARD MONITOR COMMANDS

This section summarizes the changes to existing keyboard monitor commands and describes the new keyboard monitor commands. For details on these changes and new features, see Chapter 4 in the RT-11 System User's Guide.

#### 2.2.1 Changed Keyboard Monitor Commands and Options

The following keyboard monitor commands and options have changed.

##### 2.2.1.1 Commands

###### BASIC



**COMPILE**      The /PASS:1 option has been eliminated.

**COPY**            When you use the /DELETE option with the COPY command, you are no longer prompted for confirmation of the deletion. If you want this prompt, you must now use the /QUERY option.

When you copy files, the protection status of the output file will be the same as the protection status of the input file, unless you use the /PROTECTION or /NOPROTECTION option. (See Section 2.2.3 for a description of these two new options.)

The /SETDATE option now accepts an optional date argument. When you specify /SETDATE[:date], the system puts the specified date on all files you copy.

You no longer need to use the /SYSTEM option to copy .SYS files unless you use wildcards in the input file type.

You can now use the /VERIFY option for files as well as for entire volumes. The /VERIFY option is invalid with the /ASCII and /BINARY options.

You can now use the /WAIT option with the /DOS and /INTERCHANGE options.

**DELETE**          The DELETE command no longer prompts you for confirmation unless you use wildcards in the file specification.

You no longer need to use the /SYSTEM option to delete .SYS files unless you use wildcards in the input file type.

You can now use the /WAIT option with the /DOS and /INTERCHANGE options.

## CHANGES AND ADDITIONS TO EXISTING COMPONENTS

- DIFFERENCES** The DIFFERENCES command now accepts wildcards; this allows you to compare several files with one command. See Chapter 4 of the RT-11 System User's Guide for more details on using wildcards with the DIFFERENCES command.
- The /SLP option now accepts a file specification argument. When you specify /SLP:filespec, you can later use the resulting file you specify as input to SLP. You can also use the /OUTPUT:filespec option in the same command line to produce a differences listing and an SLP command file simultaneously. If you use the /OUTPUT:filespec option without the /SLP:filespec option, a differences listing is generated and the SLP command file is printed on the console. In Version 4, it was necessary to use /OUTPUT:filepec with /SLP to specify a command file; you could not produce a differences listing and a command file simultaneously.
- DIRECTORY** You can now use the /WAIT option with the /DOS and /INTERCHANGE options.
- You can also now use the /VOLUMEID[:ONLY] option with /INTERCHANGE to print the volume ID of an interchange diskette.
- The DIRECTORY/BADBLOCKS/VERIFY command is no longer valid. This option combination caused data to be written to the suspected bad block. Therefore, when soft errors occurred, invalid data was written to the block, destroying it.
- EXECUTE** The /PASS:1 option has been eliminated.
- FORMAT** You can now format volumes while a foreground job is loaded or when the volume to be formatted contains protected files. If you try such an operation, the system gives you a warning message, then asks you whether you want to continue the operation.
- The table of verification patterns valid for the /PATTERN option has been increased to 16 patterns. (The last 4 of the 16 patterns are reserved for future use.)
- INITIALIZE** You can now use the /VOLUMEID[:ONLY] option with the /INTERCHANGE option to write a volume identification on an interchange diskette.
- The INITIALIZE/BADBLOCKS/VERIFY command is no longer valid. This option combination caused data to be written to the suspected bad block. Therefore, when soft errors occurred, invalid data was written to the block, destroying it.
- LINK** You can now link privileged foreground jobs with virtual overlays. Therefore, the /FOREGROUND and /XM options are no longer mutually exclusive.
- MACRO** The /PASS:1 option has been eliminated.

## CHANGES AND ADDITIONS TO EXISTING COMPONENTS

- PRINT**            The default number of banner pages printed when you use the /FLAGPAGE:n option is determined by the default number of banner pages you set with the QUEMAN /P option. If the default set with the /P option is 0, the default for /FLAGPAGE:n is 1.
- If QUEMAN.SAV resides on the system device and you are using the transparent spooler (SPOOL), you can use the /FLAGPAGE:n option to override the default number of banner pages set with the SET SP FLAG=n command.**
- RENAME**           The /SETDATE option now accepts an optional date argument. When you specify /SETDATE[:date], the system puts the specified date on all files you rename.
- You no longer need to use the /SYSTEM option to rename .SYS files unless you use wildcards in the input file type.
- RESET**            The RESET command now resets the console terminal ring buffers and command buffers.
- RUN**              You can now execute virtual jobs from devices other than the system device. Therefore, you can use the RUN command to execute virtual jobs. However, this facility is limited to virtual programs that do not cause the keyboard monitor to write to the swap blocks (SWAP.SYS). That is, the size of the root segment of the program must not overload the keyboard monitor. If that happens, you receive the following error message:
- ?MON-F-MMU fault
- In that case, copy the program's save file to the system disk and use the R command.
- SET**              You can now use SET TERM or SET TT to set console characteristics.
- SHOW**            The SHOW command now includes logical disk subsetting assignments.
- The SHOW ALL command now also displays the organization of physical memory, and logical disk subsetting assignments.
- The SHOW CONFIGURATION command now also displays the following system attributes:
- Total amount of memory
  - Active command file processor: KMON or IND
  - SL status: on or off
  - Default editor for EDIT command
  - **Status of .SCCA support and the .SCCA flag (enabled or disabled)**
- The SHOW DEVICES command lets you obtain information about a specific device by using the command SHOW DEVICES:xx. The variable xx represents the two-letter permanent device name. In addition, the CSR and vectors for each device displayed are given.

## CHANGES AND ADDITIONS TO EXISTING COMPONENTS

The SHOW MEMORY command shows the location of each low memory component and, under the XM monitor, each extended memory region as well.

The SHOW ERRORS command displays errors recorded by the error logger while running under the SJ monitor.

The SHOW QUEUE command shows the contents of the queue for SPOOL or QUEUE, or for both if both are running. The SPOOL status report shows whether the SPOOL output device is active or inactive, the number of blocks spooled for output, and the number of free blocks in SPOOL's work file.

The SHOW QUEUE command is now performed by the RESORC /Q option, rather than by the QUEMAN /L option. However, the QUEMAN /L option is still valid for compatibility.

SRUN           The default file type for the SRUN command is .REL. The SRUN command now defaults to the system device (SY:).

### 2.2.1.2 /WAIT Options

You can now abort a /WAIT operation. Refer to the following commands in the RT-11 System User's Guide for more information.

- BOOT
- COPY
- DELETE
- DIRECTORY
- FORMAT
- INITIALIZE
- PRINT
- PROTECT
- RENAME
- SQUEEZE
- TYPE
- UNPROTECT

### 2.2.2 New Keyboard Monitor Commands

The following keyboard monitor commands are new. Options for these commands are listed in Section 2.2.3.

ABORT           The ABORT command lets you abort, from the shared console, a foreground or system job assigned to a private console terminal with the FRUN or SRUN /TERMINAL:n option. The abort command cannot abort a job with SCCA in effect.

BACKUP           The BACKUP command provides a quick means of backing up a file or an entire volume for storage.

DISMOUNT        The DISMOUNT command is used for logical disk subsetting, to disassociate a logical disk unit from the file to which it was assigned.

## CHANGES AND ADDITIONS TO EXISTING COMPONENTS

**MOUNT**            The MOUNT command is used to associate a file with a logical disk unit, for logical disk subsetting.

**PROTECT**        The PROTECT command assigns a protection status that prevents deletion of a file until you remove the protection.

**UNPROTECT**      The UNPROTECT command removes protection from a file so you can delete it.

### 2.2.3 New Keyboard Monitor Command Options

This section describes new options for old and new keyboard monitor commands.

#### BACKUP

**/DEVICE**            Backs up or restores an entire volume.

**/RESTORE**         Copies a file or volume stored on several backup volumes to one volume or file.

#### COMPILE

**/BUFFERING**        With the /DIBOL option, directs the compiler to use single-buffered I/O.

**/LOG**                With the /DIBOL option, creates a log file of error messages generated by the compiler.

**/PAGE:n**            With the /DIBOL option, specifies the number of lines in a listing page. The default is 66.

**/TABLES**            With the /DIBOL option, includes symbol and label tables in the output listing.

#### COPY

**/BEFORE[:date]**    Copies files created before the specified date.

**/DATE[:date]**        Copies files created on the specified date.

**/INFORMATION**      Causes an informational rather than fatal message to print when a file in the command line is not found. If used in an indirect command file, the remainder of the command file is processed.

**/MULTIVOLUME**      Copies files from an input volume to one or more output volumes using one command.

**/PROTECTION**        Assigns a protection status to the output file, which prevents deletion of the output file until the protection status is changed.

**/NOPROTECTION**     Removes protection from the output file so you can delete it. If you use neither /PROTECTION nor /NOPROTECTION in a command line, the output file retains the protection status of the input file.

## CHANGES AND ADDITIONS TO EXISTING COMPONENTS

**/RETAIN** With COPY/DEVICE, preserves the output volume's bad block replacement table.

**/SINCE[:date]** Copies files created on or after the specified date.

### DELETE

**/BEFORE[:date]** Deletes files created before the specified date.

**/DATE[:date]** Deletes files created on the specified date.

**/INFORMATION** Causes an informational rather than fatal message to print when a file in the command line is not found. If used in an indirect command file, the remainder of the command file is processed.

**/SINCE[:date]** Deletes files created on or after the specified date.

### DIBOL

**/BUFFERING** Directs the compiler to use single-buffered I/O.

**/LOG** Creates a log file of error messages generated by the compiler.

**/PAGE:n** Specifies the number of lines in a listing page. The default is 66.

**/TABLES** Includes symbol and label tables in the output listing.

### DIFFERENCES

**/DEVICE** Compares two entire devices starting with block 0.

### DIRECTORY

**/BACKUP** Lists the directory of volumes created with the BACKUP command.

**/PROTECTION** Includes in the directory listing only those files on the specified volume that are protected against deletion.

**/NOPROTECTION** Includes in the directory listing only those files on the specified volume that are not protected against deletion.

### EDIT

**/KEX** Selects the virtual KED editor, KEX.

### EXECUTE

**/BUFFERING** With the /DIBOL option, directs the compiler to use single-buffered I/O.

## CHANGES AND ADDITIONS TO EXISTING COMPONENTS

**/DUPLICATE** Places duplicate copies of a library module in each overlay segment that references the module. This option reduces the size of your program's root segment.

**/GLOBAL** With the **/MAP** option, includes a global symbol cross-reference section in the load map.

**/LOG** With the **/DIBOL** option, creates a log file of error messages generated by the compiler.

**/PAGE:n** With the **/DIBOL** option, specifies the number of lines in a listing page. The default is 66.

**/TABLES** With the **/DIBOL** option, includes symbol and label tables in the output listing.

**INITIALIZE**

**/BACKUP** Initializes a volume to be used as an output volume with the **BACKUP** command.

**LINK**

**/DUPLICATE** Places duplicate copies of a library module in each overlay segment that references the module. This option reduces the size of your program's root segment.

**/GLOBAL** With the **/MAP** option, includes a global symbol cross-reference section in the load map.

**/LIMIT:n** Used with **/XM** to limit the amount of memory allocated by a **.SETTOP** programmed request to **nKW** (octal).

**MOUNT**

**/WRITE** Write-enables the logical disk you specify.

**/NOWRITE** Write-locks the logical disk you specify.

**PRINT**

**/BEFORE[:date]** Prints files created before the specified date.

**/DATE[:date]** Prints files created on the specified date.

**/INFORMATION** Causes an informational rather than fatal message to print when a file in the command line is not found. If used in an indirect command file, the remainder of the command file is processed.

**/SINCE[:date]** Prints files created on or after the specified date.



## CHANGES AND ADDITIONS TO EXISTING COMPONENTS

### PROTECT

**/BEFORE[:date]** Protects files created before the specified date.

**/DATE[:date]** Protects files created on the specified date.

**/EXCLUDE** Protects all files on a volume except the ones you specify.

**/INFORMATION** Causes an informational rather than fatal message to print when a file in the command line is not found. If used in an indirect command file, the remainder of the command file is processed.

**/LOG** Lists on the terminal the names of files protected by the current command.

**/NOLOG** Does not list on the terminal the names of files being protected.

**/NEWFILES** Protects files created on the current system date.

**/QUERY** Requests confirmation before protecting each file.

**/SINCE[:date]** Protects files created on or after the specified date.

**/SYSTEM** Lets you protect system (.SYS) files when you use wildcards in the file specification.

**/WAIT** Initiates the PROTECT operation, then pauses and waits while you change volumes. For example, you may need to temporarily replace the system volume with a data volume.

### RENAME

**/BEFORE[:date]** Renames files created before the specified date.

**/DATE[:date]** Renames files created on the specified date.

**/INFORMATION** Causes an informational rather than fatal message to print when a file in the command line is not found. If used in an indirect command file, the remainder of the command file is processed.

**/SINCE[:date]** Renames files created on or after the specified date.

### SET

**dd CSR=n** Modifies device handler dd to use n as the CSR address for the first controller. The following handlers are valid with this command: DD, DL, DM, DU, DX, DT, LP, LB, RK, and XL.

## CHANGES AND ADDITIONS TO EXISTING COMPONENTS

dd	RETRY=n	Defines the number of times (n) that a device handler tries to recover from an error while the error logger is running. This command is valid for any device the error logger supports.
dd	SUCCE	Causes the error logger to log both successful and unsuccessful I/O transfers. This command is valid for any device the error logger supports.
dd	NOSUCCE	Causes the error logger to log only unsuccessful I/O transfers. This command is valid for any device the error logger supports.
dd	VECTOR=n	Modifies the device handler dd to use n as the vector address for the first controller. The following handlers are valid with this command: DD, DL, DL, DL, DL, DL, DL, LP, LP, LP, and NL.
DU	CSR3=n	Modifies the DU handler to use n as the CSR address for the third controller.
DU	CSR4=n	Modifies the DU handler to use n as the CSR address for the fourth controller.
DU	VEC3=n	Modifies the DU handler to use n as the vector for the third controller.
DU	VEC4=n	Modifies the DU handler to use n as the vector for the fourth controller.
DUn	PART=x	Defines the disk partition on which device unit n resides.
DUn	PORT=x	Defines which port to access when device unit n is specified.
DUn	UNIT=x	Defines which unit plug number to access when device unit n is specified.
DW	WCHECK	Verifies output to RD50 or RD51 disks by reading data after writing it to the disk.
DW	NOWCHECK	Does not verify output to RD50 and RD51 disks.
DW	WRITE	Write-enables RD50/RD51 drive unit 0.
DW	NOWRITE	Write-locks RD50/RD51 drive unit 0.
DXn	WRITE	Write-enables RX01 drive unit n.
DXn	NOWRITE	Write-locks RX01 drive unit n.
DYN	WRITE	Write-enables RX02 drive unit n.
DYN	NOWRITE	Write-locks RX02 drive unit n.
EDIT	KEX	Selects the KEX editor (virtual KED) as the default under XM only.

## CHANGES AND ADDITIONS TO EXISTING COMPONENTS

- EL LOG** For error logging under the SJ monitor, turns on the error logger if the EL handler is loaded and begins logging errors in an EL handler internal buffer.
- EL NOLOG** For error logging under the SJ monitor, turns off the error logger.
- EL PURGE** For error logging under the SJ monitor, discards the contents of the EL handler internal buffer.
- EXIT SWAP** Causes any portion of a program that resides in SWAP.SYS to be written back into memory on program termination.
- EXIT NOSWAP** Prevents any portion of a program that resides in SWAP.SYS from being written back into memory on program termination.
- KMON IND** Causes IND to execute the file specified with the @filespec syntax as an indirect control file. This may be overridden by using the syntax \$@filespec which forces execution of the command file by KMON regardless of the current KMON/IND setting.
- KMON NOIND** Causes KMON to execute the file specified with the @filespec syntax as an indirect command file.
- LDn CLEAN** For logical disk subsetting, verifies and corrects logical disk assignments.
- LDn WRITE** For logical disk subsetting, write-enables logical disk unit n.
- LDn NOWRITE** For logical disk subsetting, write-locks logical disk unit n.
- LD SPDS=n** Sets the printer to run at baud n, where n can be any of the following bauds:
- |     |       |
|-----|-------|
| 50  | 1200  |
| 75  | 1800  |
| 120 | 2400  |
| 150 | 2400  |
| 150 | 3600  |
| 240 | 4800  |
| 300 | 9600  |
| 600 | 19200 |
- This command is valid only when running on a Professional 300 series system.
- You must specify a value for n in this command. If you do not use this command, the printer runs at 4800 baud.
- SL ASK** Determines terminal type; if supported, terminal sets SL appropriately.
- SL LEARN** Locks SL help text on a VT100 or VT102 screen.

## CHANGES AND ADDITIONS TO EXISTING COMPONENTS

SL NOLEARN	Clears SL help text from VT100 or VT102 screen.
SL LET	Enables string substitution using the unsupported program LET.SAV.
SL NOLET	Disables LET.SAV string substitution.
SL OFF	Turns off the single-line editor. This must be the last option in a multiple option SET command (for example, SET SL VT100,LEARN,OFF).
SL ON	Turns on the single-line editor. This must be the last option in a multiple option SET command (for example, SET SL VT100,LEARN,ON).
SL SYSGEN	Causes SL to adapt to the booted monitor's system generation options. You cannot rename SL.SYS to SLX.SYS and issue this command to run under XM.
SL TTYIN	Causes SL to edit all line mode .TTYIN (.CSIxxx and .GTLIN) input, which lets you edit responses to prompts printed by the system utilities.
SL NOTTYIN	Causes SL to edit only lines that follow the keyboard monitor prompt (.).
SL VT52	Causes SL to support the console as a VT52.
SL VT62	Causes SL to support the console as a VT52.
SL VT100	Causes SL to support the console as a VT100.
SL VT101	Causes SL to support the console as a VT101.
SL VT102	Causes SL to support the console as a VT102. VT102 support is appropriate for all DEC VT1XX family terminals that support INSERT/OVERSTRIKE mode selection (VT102, VT131, VT132, and VT100s with certain options).
SL WIDTH=n	Sets terminal (and editing) width.
SP FLAG=n	Sets the number of flag pages to generate whenever SPOOL begins printing a file. The default for n is 0. The largest value for n is 4.
SP FORM0	Issues a form feed on the output device each time SPOOL encounters block 0 of a file to be printed. Useful if the output device is part of a multiterminal system, or if the output device handler does not support its own FORM0 option. The default mode is WOFORM0.
SP NOFORM0	Turns off FORM0 mode. This is the default mode.
SP KILL	Removes all currently spooled output from SPOOL's work file.
SP NEXT	Stops sending output from the current file, discards the remaining spooled output for that file, and begins sending output from the next listing in SPOOL's work file.

CHANGES AND ADDITIONS TO EXISTING COMPONENTS

**SP WAIT** Suspends sending output from SPOOL's work file to the output device, but does not delete anything from the work file. SPOOL continues to accept input with SET SP WAIT in effect.

**SP NOWAIT** Resumes sending spooled output suspended by the command SET SP WAIT.

**SP WIDE** Causes SPOOL to generate 132-column flag pages.

**SP NOWIDE** Causes SPOOL to generate 80-column flag pages.

**VM BASE=nnnnnn** Lets you select the memory location where block 0 of the virtual device will begin.

**XC SPEED=n** Sets the communication port to run at baud n, where n can be any of the following bauds:

50	1200
75	1800
110	2000
134	2400
150	3600
200	4800
300	9600
600	19200

You must specify a value for n in this command. If you do not use this command, the communication port runs at 1200 baud.

SHOW

**MEMORY** Displays the organization of physical memory: physical addresses of loaded jobs, loaded device handlers, KMON, and USR.

**SUBSET** Lists logical disk assignments for physical disks that contain logical disks.

TYPE

**/BEFORE[:date]** Types, on the console, files created before the date you specify.

**/DATE[:date]** Types, on the console, files created on the specified date.

**/INFORMATION** Causes an informational rather than fatal message to print when a file in the command line is not found. If used in an indirect command file, the remainder of the command file is processed.

**/SINCE[:date]** Types, on the console, files created on or after the specified date.

## CHANGES AND ADDITIONS TO EXISTING COMPONENTS

### UNPROTECT

/BEFORE[:date] Removes protection from files created before the specified date.

/DATE[:date] Removes protection from files created on the specified date.

/EXCLUDE Removes protection from all files on a volume except the ones you specify.

/INFORMATION Causes an informational rather than fatal message to print when a file in the command line is not found. If used in an indirect command file, the remainder of the command file is processed.

/LOG Lists on the terminal the names of the files affected by the current UNPROTECT command.

/NOLOG Does not list on the console the names of the files affected by the current UNPROTECT command.

/NEWFILES Removes protection from files created on the current system date.

/QUERY Requests confirmation before removing protection from each file.

/SINCE[:date] Removes protection from files created on or after the specified date.

/SYSTEM Lets you remove protection from system (.SYS) files when you use wildcards in the file specification.

/WAIT Initiates the UNPROTECT operation, then pauses and waits for you to change volumes. For example, you may need to temporarily replace the system volume with a data volume.

### 2.3 HANDLERS

The following handlers, distributed on the RT-11 V5 distribution kit, are no longer supported by RT-11 and are therefore no longer documented in the RT-11 documentation set. You can still use these handlers as documented in previous versions of RT-11.

CR	DT
CT	PC
DP	PD
DS	RF

Also, support for V11 and V12 generation procedures to initialize the system are included by default in the RT-11 V5 distribution kit.

XM versions of all supported handlers are now included on the RT-11 distribution kit.

## CHANGES AND ADDITIONS TO EXISTING COMPONENTS

All RT-11 handlers are now linked using the /NOBITMAP option.

The following sections describe the changes made to RT-11 handlers.

### 2.3.1 DD

- The DD handler now operates on the SBC-11/21 and SBC-11/21 PLUS.
- The following SET commands are valid for the DD handler:

SET DD: RETRY=n

SET DD: SUCCES

SET DD: NOSUCCES

See Section 2.2.3 for a description of these commands.

### 2.3.2 DL

- The following SET commands are valid for the DL handler:

SET DL: CSR=n

SET DL: RETRY=n

SET DL: SUCCES

SET DL: NOSUCCES

SET DL: VECTOR=n

See Section 2.2.3 for a description of these commands.

- The DL handler now maintains device size information in a unit-specific table. This feature reduces the number of controller operations required in a system with multiple DL units.
- The DL handler now reports write-lock and write-gate errors to the error logger.
- The DL handler supports 22-bit DMA with the RLV12 controller.

### 2.3.3 DM

- The following SET commands are valid for the DM handler:

SET DM: RETRY=n

SET DM: SUCCES

SET DM: NOSUCCES

See Section 2.2.3 for a description of these commands.

## CHANGES AND ADDITIONS TO EXISTING COMPONENTS

- The DM handler now reports the following errors to the error logger:

Cylinder overflow

Data late

Transfer to or from nonexistent drive

Transfer to or from memory address higher than existing memory

Write-lock

### 2.3.4 DU

The following SET commands are valid for the DU handler:

SET DU: CSR=n

SET DU: VECTOR=n

SET DU: CSR2=n

SET DU: VEC2=n

SET DU: CSR3=n

SET DU: VEC3=n

SET DU: CSR4=n

SET DU: VEC4=n

SET DU: RETRY=n

SET DU: SUCCES

SET DU: NOSUCCES

SET DUn: WRITE

SET DUn: NOWRITE

SET DUn: PART=x

SET DUn: PORT=x

SET DUn: UNIT=x

See Section 2.2.3 for more information on these commands.



## CHANGES AND ADDITIONS TO EXISTING COMPONENTS

### 2.3.5 DW

The following SET commands are valid for the DW handler:

SET DW: RETRY=n  
SET DW: SUCCES  
SET DW: NOSUCCES  
SET DW: WCHECK  
SET DW: NOWCHECK  
SET DW: WRITE  
SET DW: NOWRITE

See Section 2.2.3 for more information on these commands.

### 2.3.6 DX

The following SET commands are valid for the DX handler:

SET DX: CSR=n  
SET DX: RETRY=n  
SET DX: SUCCES  
SET DX: NOSUCCES  
SET DX: VECTOR=n  
SET DXn: WRITE  
SET DXn: NOWRITE

See Section 2.2.3 for more information on these commands.

### 2.3.7 DY

- The following SET commands are valid for the DY handler:

SET DY: CSR=n  
SET DY: RETRY=n  
SET DY: SUCCES  
SET DY: NOSUCCES  
SET DY: VECTOR=n  
SET DYn: WRITE  
SET DYn: NOWRITE

See Section 2.2.3 for more information on these commands.

## CHANGES AND ADDITIONS TO EXISTING COMPONENTS

- The DY handler supports only ECO Revision Level F and later controllers.

### 2.3.8 DZ

The following SET commands are valid for the DZ handler:

SET DZ: RETRY=n

SET DZ: SUCCES

SET DZ: NOSUCCES

See Section 2.2.3 for more information on these commands.

### 2.3.9 LS

- The default setting for the LS handler has been changed from NOCTRL to CTRL.
- The following new SET command is valid for the LS handler:

SET LS SPEED=n

See Section 2.2.3 for more information on this command.

### 2.3.10 RK

The following SET commands are now valid for the RK handler:

SET RK: CSR=n

SET RK: RETRY=n

SET RK: SUCCES

SET RK: NOSUCCESS

SET RK: VECTOR=n

See Section 2.2.3 for more information on these commands.

### 2.3.11 XC

The following SET command is valid for the XC handler:

SET XC SPEED=n

See Section 2.2.3 for more information on that command.

## CHANGES AND ADDITIONS TO EXISTING COMPONENTS

### 2.3.12 XL

The following SET commands are valid for the XL handler:

SET XL CSR=n

SET XL VECTOR=n

See Section 2.2.3 for more information on these commands.

### 2.4 BINCOM

The following changes have been made to the binary file comparison program.

- You can now use wildcards with BINCOM to compare multiple binary files.
- The /D option, new for Version 5, compares two entire volumes starting with block 0.

See Chapter 2 of the RT-11 System Utilities Manual for more information on these changes to BINCOM.

### 2.5 DIR

RT-11 V5 includes the following new directory program options:

- /T Includes in the directory listing only those files that are protected against deletion.
- /U Includes in the directory listing only those files that are not protected against deletion.

See Chapter 4 of the RT-11 System Utilities Manual for more information on these DIR options.

### 2.6 DUP

The following changes have been made to the device utility program.

- The /H option is now invalid when combined with the /K or /B option. This option combination caused data to be written to the suspected bad block. Therefore, when soft errors occurred, invalid data was written to the block, destroying it.

To verify whether a bad block is caused by a hard or soft error, you must perform two bad block scans and compare the results to see if any blocks reported as bad were able to recover.

- When you use the /I option to copy a larger volume to a smaller one, DUP asks for confirmation before copying the volume.

## CHANGES AND ADDITIONS TO EXISTING COMPONENTS

- You can now abort a /W (WAIT) operation.
- You can now combine the /R and /I options to preserve the output volume's bad block replacement table. In Version 4, the input volume's bad block replacement table was always transferred to the output volume.

See Chapter 6 of the RT-11 System Utilities Manual for more information on these changes to DUP.

### 2.7 ERROR LOGGER

The following changes have been made to the error logger subsystem.

- The SJ monitor now supports the error logger. Refer to Chapter 16 of the RT-11 System Utilities Manual for information on how to use the error logger under the SJ monitor.
- The RT-11 Version 5 error logger reports the number of retries for a single error and the final status of the operation (success or failure). The error logger provides separate entries for retries only if the registers differ.
- You can choose to log successful I/O transfers and errors, or only errors. Use the SET dd SUCCE command to log successes as well as errors, and the SET dd NOSUCCE command to log only errors.
- The error logger supports the new ~~RM (RQ50/RQ51 disk) and DR (RX50 diskette) handlers for the Professional 125 and 150.~~
- The error logger supports the RC25 and RA80 disks.

See Chapter 16 of the RT-11 System Utilities Manual for more information on changes to the error logger.

### 2.8 FILEX

The following changes have been made to the file exchange program.

- The default device for all FILEX operations is DK:.
- There are two new FILEX options:
  - /V[:ONL] Use with /Z and /U[:n] simultaneously to write a volume identification during initialization of an interchange diskette. Use the [:ONL] argument to change an interchange diskette's volume ID without initializing the diskette. Use with /L or /F to list the volume ID of an interchange diskette when obtaining a directory listing.
  - /W Initiates the operation but pauses and waits for you to mount different volumes.

## CHANGES AND ADDITIONS TO EXISTING COMPONENTS

See Chapter 7 of the RT-11 System Utilities Manual for more information on these changes.

### 2.9 FORMAT

The following changes have been made to the volume formatting program.

- If you try to format a volume that contains protected files, or try to format a volume while a foreground job is loaded, FORMAT warns you and asks you to confirm the operation.
- You can now abort a /W (WAIT) operation.
- The table of verification bit patterns has been increased to 16 patterns. (The last 4 of the 16 patterns are reserved for future use.)
- Formatting of devices at nonstandard addresses is now supported. This will occur automatically, based on the CSR location specified in the device handler.

See Chapter 8 of the RT-11 System Utilities Manual for more information on these changes to FORMAT.

### 2.10 HELP

The files HELP.TXT and HELP.EXE, which together make up the program HELP.SAV, are no longer provided on the distribution kit. Therefore, if you want to change your HELP text, as described in Section 2.7.14 of the RT-11 Installation Guide, you must first recreate HELP.TXT and HELP.EXE from HELP.SAV using the unsupported utility SPLIT.

To recreate these files, type this command:

```
.SPLIT ddn:HELP.EXE,,ddn:HELP.TXT=ddn:HELP.SAV/B:..HLP1:..HLP2
```

In the command, ddn: represents the device on which to create the files HELP.TXT and HELP.EXE, or the device on which HELP.SAV exists. The variables ..HLP1 and ..HLP2 represent the boundaries along which to split HELP.SAV. Refer to the file CUSTOM.TXT on your distribution kit for the values to substitute in the command line for ..HLP1 and ..HLP2.

### 2.11 IND

The following changes have been made to the .ENABLE and .DISABLE directives. These changes also apply to the .IFENABLED and .IFDISABLED directives.

## CHANGES AND ADDITIONS TO EXISTING COMPONENTS

### 2.11.1 **.ENABLE/.DISABLE ABORT**

This new operating mode lets you enable or disable double CTRL/C aborts. When **.DISABLE ABORT** is in effect, CTRL/C characters are ignored until the currently executing control file exits. When **.ENABLE ABORT** is in effect, CTRL/C characters are recognized and processed. **.DISABLE ABORT** is valid only if you have included global **.SCCA** support in your system through system generation.

**.DISABLE ABORT** also disables CTRL/Z aborts.

See Chapter 8 of this manual for more information on using **.ENABLE** and **.DISABLE ABORT**.

### 2.11.2 **.ENABLE/.DISABLE CONTROL-Z**

This new operating mode lets you enable or disable CTRL/Z aborts. Typing CTRL/Z in response to an **.ASK**, **.ASKN**, or **.ASKS** prompt causes the control file to abort. When **.DISABLE CONTROL-Z** is in effect, CTRL/Z characters are ignored until the currently executing control file exits. When **.ENABLE CONTROL-Z** is in effect, CTRL/Z characters are recognized and processed.

See Chapter 8 of this manual for more information on using **.ENABLE** and **.DISABLE CONTROL-Z**.

### 2.11.3 **.ENABLE/.DISABLE TYPEAHEAD**

This new operating mode causes IND to accept or ignore type-ahead. When **.ENABLE TYPEAHEAD** is in effect, IND accepts and stores characters you type to answer an **.ASK**, **.ASKS**, or **.ASKN** prompt even before the prompt is displayed. When **.DISABLE TYPEAHEAD** is in effect, IND discards all characters that have been stored before processing **.ASK**, **.ASKN**, and **.ASKS** directives. If you have answered a prompt prematurely, your response is discarded.

See Chapter 8 of this manual for more information on using **.ENABLE** and **.DISABLE TYPEAHEAD**.

### 2.11.4 **.ENABLE/.DISABLE TIMEOUT**

In RT-11 V5.1, if the **.ENABLE TIMEOUT** directive is issued but the system does not include timer support, IND assigns special symbol **<EXSTAT>** the value 0, for warning, instead of printing an error message.

## CHANGES AND ADDITIONS TO EXISTING COMPONENTS

### 2.12 KED

The following changes have been made to the keypad editor (KED).

- <CTRL/R> or <CTRL/W> redisplay the screen.
- <GOLD><CTRL/U> performs the same function as <GOLD><PF4>. (GOLD is the PF1 key.)
- <GOLD><DEL> performs the same function as <GOLD><,>. (GOLD is the PF1 key.)
- On terminals with AVO (advanced video option) or its equivalent, select ranges are displayed with reverse background and boldface.
- If the command EDIT/KED filespec is issued and the file you specify is not found, KED prompts you for permission to create the file. If the file is protected, KED prompts you for permission to inspect the file.
- A new version of KED, called KEX, runs as a virtual job under XM. KEX can run as a background job, a foreground job, a system job, or as all of these simultaneously.
- The version of KED you are using appears as the prefix for messages displayed (?KED-, ?K52-, or ?KEX-). Formerly, all error messages were prefixed by ?KED-.

See Appendix A for a list of KED messages that are documented in neither the RT-11 System Message Manual nor the PDP-11 Keypad Editor User's Guide.

- KED now supports default file types. When editing a file, the default input file type is .MAC; the default output file type is the same as the input file type. When inspecting a file, the default input file type is .LST. There is no default input file type when creating a file.

To specify a file with no file type, type only the file name and the period separating the file name and type (FILNAM.).

You can modify the default file types with the following software customization:

```
.R SIPP
*aaa.SAV/A
Base? 0<RET>
Offset? bbbbbb<RET>

Base   Offset   Old           New?
000000 bbbbbb    ??????      ;R<RET>
000000 bbbbbb    <????>      ;Rccc<RET>
000000 bbbbbb+2 <????>      <CTRL/Y><RET>

*<CTRL/C>
```

## CHANGES AND ADDITIONS TO EXISTING COMPONENTS

In this customization, substitute KED, K52, or KEX for aaa. Substitute the value for the symbol ..EXT (for the editing-file default) or ..IEXT (for the inspecting-file default) for bbbbbb. These values can be found in CUSTOM.TXT on your distribution kit (be sure to use the proper KED variant). Substitute the three-character file type default you want for ccc.

### 2.13 LIBR

The following changes have been made to the RT-11 librarian program.

- With Version 5, LIBR continues instead of exiting when an error occurs.
- The default file type for macro libraries has been changed to .MLB.

See Chapter 10 of the RT-11 System Utilities Manual for more information on LIBR.

### 2.14 LINK

The following changes have been made to the RT-11 linker program.

- A problem with LINK's CSI processing has been corrected, so that with Version 5 you can link an increased number of modules at one time.
- The /R and /V options are no longer mutually exclusive; privileged foreground jobs can be linked with virtual overlays. The root and low memory overlays are now located just below the lowest window created for virtual overlays.
- The /K:n option is no longer restricted to use for RSTS compatibility. You can now use the /K:n option with RT-11 to limit the number of words allocated by a .SETTOP programmed request.
- RT-11 V5 includes two new LINK options:
  - /D Defines the global symbol you specify once in each segment that references that symbol. Such global symbols must be defined in a library module.
  - /N Produces in the load map a cross-reference listing of all global symbols defined during the linking process.

See Chapter 11 of the RT-11 System Utilities Manual for more information on these changes to LINK.

### 2.15 MACRO

Refer to Appendix J of the PDP-11 MACRO-11 Language Reference Manual for MACRO-11 release note information.



## CHANGES AND ADDITIONS TO EXISTING COMPONENTS

### 2.16 PAT

When PAT finishes executing a command, control returns to the CSI (indicated by the asterisk prompt, \*) rather than to the keyboard monitor.

### 2.17 PIP

The following changes have been made to the peripheral interchange program.

- If a PIP command line includes file transfers from magtape, PIP performs all file transfer operations requested on the command line in the order in which the files appear on the volume rather than the order in which they are specified in the command line.
- The /C option now accepts the [:date] argument. Use /C[:date] to include files of a certain date in the operation you specify.
- You can now abort a /E (WAIT) operation.
- In Version 5, you can use the /F (PROTECTION) and /Z (NOPROTECTION) options alone or for copy operations as well as for rename operations. It is no longer necessary to use /R (/RENAME) with /F or /Z.
- The /Q (QUERY) option is no longer the default when deleting files, except when you include wildcards in the file specification.
- The /T (SETDATE) option now accepts the [:date] argument, so you can assign files dates other than the current system date.
- The /Y (SYSTEM) option is now necessary only when you specify wildcards in the input file types.
- The following PIP options are new:

/H	(VERIFY) Verifies that the output file matches the input file after a copy operation. This option is invalid with /A (ASCII) and /B (BINARY).
/I[:date]	(SINCE) Includes only those files created on or after the specified date.
/J[:date]	(BEFORE) Includes only those files created before the specified date.
/V	(MULTIVOLUME) Copies files from one input volume to two or more smaller output volumes.
/X	Prints an informational (I) message rather than a fatal (F) message when PIP cannot find a file specified in the command line.

See Chapter 13 of the RT-11 System Utilities Manual for more information on these changes to PIP.

## CHANGES AND ADDITIONS TO EXISTING COMPONENTS

### 2.18 QUEUE PACKAGE

The following changes have been made to the Queue Package.

- When QUEUE sends a job consisting of more than one input file to an RT-11 file-structured device, QUEUE now copies each input file to a separate output file with the same file name and type. The job name is printed in the JOBNAME field of the banner page. In Version 4, all input files in the same job were concatenated into one output file with the file type .JOB.
- Input files are now protected from deletion while QUEUE is copying them to the output device.
- The default number of banner pages printed when you use the /H command is now determined by the number of banner pages you set as the default with the /P command.
- When the input device for QUEUE operations is MT, to save time MT no longer rewinds between files.
- QUEUE no longer performs a form feed after printing each file on the line printer.
- QUEUE's work file is now SY:QUFILE.WRK. In RT-11 Version 4, the work file was DK:QUFILE.TMP.
- The following are new QUEMAN options:

/C[:date]	(DATE) Prints only those files with the specified creation date.
/I[:date]	(SINCE) Prints only those files created on or after the specified date.
/J[:date]	(BEFORE) Prints only those files created before the specified date.
/Q	Requests confirmation for each file to be included in the operation. QUEMAN prints the name of each file and pauses; you must respond Y for each file you want to include.
/W	Prints on the console a log of the files included in the operation.
/X	Allows QUEMAN to continue processing instead of halting when it cannot find a file specified in the command line.

See Chapter 17 of the RT-11 System Utilities Manual for more information on these changes to the Queue Package.

- In Version 5.1, QUEMAN command overrides the SPOC as well as for the system device. The output is now in the file specified with the

## CHANGES AND ADDITIONS TO EXISTING COMPONENTS

### 2.19 RESORC

The following changes have been made to the resource program.

- The /A (ALL) option now provides information about the total amount of memory on the system, logical disk subsetting assignments, and organization of physical memory.
- The /C (CONFIGURATION) option now provides status information for SET KMON [NO]IND, SET EXIT [NO]SWAP, SET EDIT, SET SL ON/OFF, and ~~the following options:~~
- The /D (DEVICES) option now accepts the optional argument dd (dd:/D), where dd represents the two-letter permanent device name. You can use the argument dd to obtain information about a specific device.
- The /H option now includes the total amount of memory on the system.

~~The following options are supported:~~

- The RESORC utility now includes the following new options:

~~the queue for QUEUE or~~  
~~which is running. The SHOW~~  
~~is performed by this option.~~

/S Displays information about logical disk subsetting assignments.

/X Displays information about the organization of physical memory: where jobs and handlers are loaded and where KMON and the USR will reside.

See Chapter 14 of the RT-11 System Utilities Manual for more information on these changes to RESORC.

### 2.20 SIPP

The following changes have been made to the save image patch program.

- When SIPP is used to patch a file, the creation date of the patched file is changed to the current system date. If no modifications are made, the date remains unchanged.
- When using SIPP to create an indirect command file, the command file contains the command R SIPP rather than RUN SIPP. This lets you run the command file from a volume other than the system volume.

See Chapter 20 of the RT-11 System Utilities Manual for more information on these changes to SIPP.

## CHANGES AND ADDITIONS TO EXISTING COMPONENTS

### 2.21 SL

A new function has been added to SL. When you press the **RT1 (GOLD)** key, then the **↑ (UPARROW)** key, SL reproduces the line before the last line terminated with a carriage return. This extends the functionality of the **↑ (UPARROW)** key by letting you recall an older line for editing.

In the following example, pressing **GOLD<↑>** recalls the next-to-last command line for editing:

```
.RENAME FILE1.MAC FILE1.BAKRET>
.<RET>
.ASSIGN DLB: LOG:KRET>
.<GOLD><↑>.RENAME FILE1.MAC FILE1.BAK
```

### 2.22 SLP

The following changes have been made to the source language patch program.

- SLP ignores any characters that precede the start-of-update character (-) in SLP command files. If SLP is unable to find the start-of-update character, SLP prints an error message and returns control to the CSI (indicated by the asterisk prompt).
- You can now update more than one file in a single SLP command file. Type a double slash (//) on a line by itself after the update text for each file. On the next line, type the command line that specifies the next input file to be updated and the command file name (the same command file that contains the update text). Then type the update text on the lines that follow. Type a single slash (/) on a separate line to indicate the end of a series of update texts.
- The SLP utility includes the following new options:

/C[:n]            Determines or validates the contents of the SLP input file or the SLP command file. Use /C to determine the checksum of a file. Use /C:n to verify the contents of a file. SLP computes the checksum for the file and compares the checksum to the value you specify for n.

/N                Suppresses the creation of a backup file when SLP updates the input file.

See Chapter 21 of the RT-11 System Utilities Manual for more information on these changes to SLP.

## CHANGES AND ADDITIONS TO EXISTING COMPONENTS

### 2.23 SRCCOM

The following changes have been made to the source file comparison program.

- The syntax of the SRCCOM command has changed to:  
[[out-filespec][,SLP-filespec]=]old-filespec,new-filespec[/options]  
  
The new syntax element, [SLP-filespec], lets you create a differences file and a SLP command file in the same command line. With RT-11 Version 4, you could create only one or the other. Because you can specify both with the Version 5 syntax in your command line, the /P option has been eliminated.
- You can now use wildcards with SRCCOM to compare multiple source files.

See Chapter 15 of the RT-11 System Utilities Manual for more information on these changes to SRCCOM.

### 2.24 SYSGEN

Some of the system generation procedures have been changed. See Section 1.4.7 for a description of the new system generation procedures.

### 2.25 SYSTEM SUBROUTINE LIBRARY (SYSLIB)

The following routines have been changed in SYSLIB.

- ICSTAT - This routine can now be used under the SJ monitor.
- ISLEEP - This routine can now be used under the SJ monitor.
- IUNTIL - This routine can now be used under the SJ monitor.
- ILUN - This routine now calls a local copy of the \$FCHNL routine. That copy of \$FCHNL does not assign a logical unit number (LUN) to an available channel if the LUN is not already assigned and thus prevents the channel address table from filling up.

See Section 3.33 in the RT-11 Programmer's Reference Manual for more information on ILUN.

- ~~ISRW/ISRW/ISRW~~ - These routines have been modified to include support for the DW and DZ handlers, for the following special functions:

Function	DW	DZ
Read absolute sector	377	377
Write absolute sector	376	376
Return volume size	373	

See Chapter 8 of this manual for more information on using these special functions.

## CHANGES AND ADDITIONS TO EXISTING COMPONENTS

### 2.26 SYSTEM MACRO LIBRARY (SYSMAC)

The following programmed requests have been changed:

- .CSTAT - This programmed request can now be used under the SJ monitor.
- .ELRG - This programmed request will now concatenate contiguous areas of memory that are segmented in the allocation table when memory is restored after a region is eliminated.

See Section 2.27 in the RT-11 Programmer's Reference Manual for more information on .ELRG.

- .FETCH - This programmed request can now be used under the XM monitor.
- .GTLIN - Now includes a terminal option (.GTLIN ,,TERM=YES) which forces input to come from the terminal rather than from the active command or control file.

See Section 2.36 in the RT-11 Programmer's Reference Manual for details and examples of the .GTLIN programmed request.

- .MAP - This programmed request now checks to see if the specified window is already mapped. If it is, no unmapping and remapping operations are performed.
- .SCCA - This programmed request has been modified to include global .SCCA support. If this request is entered as a special feature during system initialization, it will allow you to prevent double CTRL/C events by causing the system to ignore all CTRL/C characters issued from the terminal.

See Chapter 8 of this manual for more information on global .SCCA support.

- .SEFUN - This programmed request has been modified to include support for the DS and DS2 functions, for the following special functions:

Function	DS	DS2
Read absolute sector	377	377
Write absolute sector	374	376
Return volume size	373	

See Chapter 8 of this manual for more information on these special functions.

- .WAIT - This programmed request can now be used under the SJ monitor.

## CHAPTER 3

### CORRECTED PROBLEMS AND CURRENT RESTRICTIONS

This chapter lists software problems that have been corrected, describes corrections and additions for the RT-11 documentation set, and lists the software restrictions that remain.

#### 3.1 CORRECTED PROBLEMS

The following problems in previous versions of RT-11 have been corrected in Version 5.

##### 3.1.1 Monitors

The following monitor problems have been corrected.

**KMON** When KMON parsed a file name longer than six characters, KMON printed the error message ?KMON-F-Command file not at end of line. In Version 5, KMON prints the more appropriate message ?KMON-F-Error in file spec.

With previous versions of RT-11, the device had to be loaded prior to chaining to another file. In Version 5, devices need not be loaded.

The command DELETE \* now expands to the command DELETE \*.\* rather than the command \*.NULL.

When you omitted an argument from an option that required one, a trap to 4 occurred. In Version 5, when you omit a required argument, the trap to 4 does not occur and KMON prints the error message ?KMON-F-Invalid value specified with option.

If you performed a chain exit when running under a monitor with system job support, vector areas 472-476 were destroyed. These vector areas are now preserved.

Typing digits in a command name caused KMON to print the error message ?KMON-F-Ambiguous command. This message is appropriate for commands that contain alphabetic characters only. In V5, using digits rather than characters in the command generates the error message ?KMON-F-Invalid command.

## CORRECTED PROBLEMS AND CURRENT RESTRICTIONS

In V5, KMON prints the error message ?KMON-F-Invalid set parameter, rather than ?KMON-F-Illegal command, if the handler specified in the command rejects parameters.

USR

Under the SJ monitor, the .GTLIN programmed request didn't echo user input when TTSCP\$ was set. The .GTLIN request now echoes user input when TTSCP\$ is set.

When an indirect command file contained blank lines for utility version numbers, the version numbers were not always displayed. Version numbers are now displayed.

Files created on a device were not always allocated the smallest empty space for the file length requested. The smallest empty space for the file length requested is now allocated.

### 3.1.2 Utilities

The following problems have been corrected for utility programs.

BINCOM

When a comparison was being performed and one or both of the files or volumes being compared resided on a diskette, BINCOM generated a hard error message if it reached the end of the diskette. In V5, BINCOM returns to the keyboard monitor when it reaches the end of the diskette.

DUMP

When a diskette was being dumped, DUMP generated a hard error message when it reached the end of the diskette. In V5, DUMP returns to the keyboard monitor when it reaches the end of the diskette.

DUP

When several DUP options were specified with the /WAIT (DUP /W) option, DUP prompted to mount the input volume once for each operation requested. In Version 5, the prompt to mount a volume is printed only once.

When using the command INIT/BAD/WAIT ddn: (DUP/B/W), where ddn is the device in which the system disk resides, DUP did not prompt to mount the input volume a second time for the initialization operation. Therefore, DUP initialized the system volume instead, destroying the boot blocks. DUP now correctly prompts you to mount the input volume.

When using the BOOT/WAIT command, DUP printed the prompt ?DUP-W- Foreground loaded. Are you sure? prompt twice. In Version 5.1, the prompt is printed only once.

Error Logger

The error logger did not report the correct time of error. Time of error is now reported correctly.

LIBR

The LIBR utility failed if a forms library directory exceeded one block. LIBR now allows forms library directories to exceed one block.



## CORRECTED PROBLEMS AND CURRENT RESTRICTIONS

- PIP                   When COPY/PREDELETE (PIP /O) was performed and the specified input and output volumes were the same, PIP deleted the file. In Version 5, COPY/PREDELETE performs a RENAME operation when the input and output volumes are the same.
- When wildcards were used in a RENAME/NOREPLACE (PIP /N) operation, the first file was found but not renamed, and an error message appeared. RENAME/NOREPLACE now works as documented in the RT-11 System User's Guide and RT-11 System Utilities Manual.
- When the /WAIT option (PIP /E) was specified, PIP attempted to read the output volume's directory before it prompted to mount the output volume. Therefore, an error occurred (if no volume was present in the output device) or the wrong volume could be read. PIP now prompts you to mount the output volume before attempting to read its directory.
- QUEUE                QUEUE did not recognize and correctly print asterisk (\*) and percent (%) characters used in job names on banner pages. QUEUE now correctly handles asterisk and percent characters for banner pages.
- SRCCOM               When the DIFFERENCES /CHANGE BAR (SRCCOM /D) option was specified with the console as the output device, the message ?SRCCOM-I-No differences found would overwrite the end of the console output. This message is now printed on a new line.

### 3.1.3 MACRO-11 Assembler

The following corrections have been made to the MACRO-11 assembler. See Appendix J of the PDP-11 MACRO-11 Language Reference Manual for other MACRO release note information.

**MACRO was processing some index deferred arguments as floating point numbers by default. MACRO now processes all index deferred arguments as octal by default.**

**Internal displaced relocatable statements were not being marked as relocatable with an apostrophe (') in the assembly listing. They are now correctly marked.**

**Bit 3, an unused bit, was being set in all .PSECT object records. Bit 3 is no longer set. This change causes object files created with the new version of the MACRO-11 assembler to differ from those created with previous versions, resulting in different PAT checksums. Note that differences between object files do not always cause differences in task or SAV image files, as is true in this case.**

### 3.2 DOCUMENTATION CORRECTIONS AND ADDITIONS

This section contains information that was incorrect in or inadvertently left out of the RT-11 documentation set.

## CORRECTED PROBLEMS AND CURRENT RESTRICTIONS

### 3.2.1 RT-11 Installation Guide

This section describes information in the RT-11 Installation Guide that is no longer correct, and provides customization and bootstrap information that does not appear in the RT-11 Installation Guide.

3.2.1.1 **Incorrect Diskette References** - RT-11 distribution diskettes are no longer labelled 1/x, 2/x, and so on. Instead, diskettes are numbered 1, 2, 3, and so on. Therefore, references to the old numbering scheme in Chapters 3, 4, 6, 7, and 9 are incorrect.

3.2.1.2 **Customizations** - The following customizations were left out of the RT-11 Installation Guide.

#### Changing QUEUE to Allow First Form Feed

QUEUE suppresses the first form feed in a file because QUEUE assumes that the LP or LS handler is set to FORM0, which generates a form feed. If the line printer handler is set to NOFORM0, no form feed is generated.

You can apply the following customization so that QUEUE will never suppress the initial form feed in a file. If you apply this customization and set your printer handler to FORM0, an extra blank page will be produced.

In the customization, ..DOFF is the value of that symbol from the file CUSTOM.TXT on your distribution kit.

```
.RUN SIPP<RET>
*QUEUE.REL<RET>
Base? 0<RET>
Offset? ..DOFF<RET>
```

Base	Offset	Old	New?
000000	..DOFF	??????	240<RET>
000000	..DOFF+2	??????	240<RET>
000000	..DOFF+4	??????	<CTRL/Y><RET>

```
*<CTRL/C>
```

#### Changing Listing Page Length in MACRO and CREP

The default listing page size for MACRO and CREP, 60 lines long, is suitable for line printers that use standard size line printer paper (10.5 inches long). If you use line printer paper that is not standard size, or if your configuration does not include a line printer, you may need to modify the listing page length in MACRO and CREP. In the customizations, nnn represents the desired listing page length (octal). Substitute for the symbol PGSIZE the value of that symbol given in the file CUSTOM.TXT on your distribution kit.

## CORRECTED PROBLEMS AND CURRENT RESTRICTIONS

To modify MACRO:

```
.RUN SIPP<RET>
*MACRO.SAV<RET>
Segment? 0<RET>
Base?     0<RET>
Offset?   PGSIZE<RET>
```

Segment	Base	Offset	Old	New?
000000	000000	PGSIZE	000074	nnn<RET>
000000	000000	PGSIZE+2	003467	<CTRL/Y><RET>

\*<CTRL/C>

To modify CREF:

```
.RUN SIPP<RET>
*CREF.SAV<RET>
Base?     0<RET>
Offset?   PGSIZE<RET>
```

Base	Offset	Old	New?
000000	PGSIZE	000074	nnn<RET>
000000	PGSIZE+2	003467	<CTRL/Y><RET>

\*<CTRL/C>

### Changing Default Command File Processor to IND

In the distributed monitors, the default command file processor is KMON. Apply the following customization to change the default command file processor to IND. After you have applied this customization, you may use an IND control file as your start-up command file, providing the file IND.SAV resides on your system volume.

In the customization, monitr.SYS is the monitor file you want to modify, and ..INDR is the value of that symbol from the appropriate monitor link map. If the monitor you customize is hardware bootable, write a new system bootstrap with the COPY/BOOT command.

```
.RUN SIPP<RET>
*monitr.sys<RET>
Base?     0<RET>
Offset?   ..INDR<RET>
```

Base	Offset	Old	New?
000000	..INDR	000000	1<RET>
000000	..INDR+2	001403	<CTRL/Y><RET>

\*<CTRL/C>

If you do not wish to apply this customization, you can set the default command file processor to IND by setting the conditional IND\$ON to 1 in the conditional file.

### Limiting Amount of Memory KEX Requests

KEX, by default, requests all available 16-bit memory up to 32KW. This customization allows you to limit the amount of memory KEX requests with a .SETTOP programmed request.

## CORRECTED PROBLEMS AND CURRENT RESTRICTIONS

In the customization, the symbol `..MAXM` represents the highest address KEX will request. (In the distributed monitors, this value is set to 177776, the highest address possible.) If you set this value too low, KEX will fail and print the error message `?KEX-F-Insufficient memory`. You can find the correct value for the symbol `..MAXM` in the file `CUSTOM.TXT` on your distribution kit. Replace the symbol `nnnnnn` with the new maximum address value you want KEX to request.

```
.R SIPP<RET>
*KEX.SAV<RET>
Segment?<RET>
Base? <RET>
Offset? ..MAXM<RET>
```

Base	Offset	Old	New?
000000	..MAXM	??????	;nnnnnn<RET>
000000	..MAXM+2	??????	<CTRL/Y><RET>

\*<CTRL/C>

### Setting VTCOM Default Dial String

Apply the following customization to `VTCOM.REL` or `VTCOM.SAV` to set a default dial string for the `DIAL` command.

In the customization, the symbol `..DIAL` represents the address of the first character in the dial string, which is dictated by your modem. For example, the first character required in a dial string sent to a DF03 modem is `^B`. The next 39(decimal) bytes are reserved for the remainder of the dial string, including other characters your modem may require. You can find the correct value for the symbol `..DIAL` in the file `CUSTOM.TXT` on your distribution kit. Replace the symbols `aaa`, `bbb`, and so on, with the characters that make up your dial string. Use a NULL character in the last byte to terminate the dial string.

To modify `VTCOM.REL`:

```
.R SIPP<RET>
*VTCOM.REL<RET>
Base? 0<RET>
Offset? ..DIAL<RET>
```

Base	Offset	Old	New?
000000	..DIAL	000002	\<RET>
000000	..DIAL	002	aaa<RET>
000000	..DIAL+1	xxx	bbb<RET>
000000	..DIAL+2	xxx	ccc<RET>
.	.	.	.
.	.	.	.
.	.	.	.
000000	..DIAL+51	xxx	<CTRL/Y><RET>

\*<CTRL/C>

CORRECTED PROBLEMS AND CURRENT RESTRICTIONS

To modify VTCOM.SAV:

```
.R SIMP<RET>
*VTCOM.SAV<RET>
Segment? 1<RET>
Base? 0<RET>
Offset? ..DIAL<RET>
```

```
Segment      Base      Offset      Old      New?
000001      000000      ..DIAL      000002      \<RET>
```

```
Segment      Base      Offset      Old      New?
000001      000000      ..DIAL      002      aaa
000001      000000      ..DIAL+2    xxx      bbb
000001      000000      ..DIAL+4    xxx      ccc
.
.
.
.
000001      000000      ..DIAL+51    .      xxx <CTRL/Y><RET>
```

\*<CTRL/C>

3.2.1.3 TSV05 Bootstrap - The TSV05 bootstrap, which was left out of the RT-11 Installation Guide, is documented in Section 4.3 of this manual.

### 3.2.2 RT-11 System User's Guide

In Section 4.5, add the following sentence to the descriptions of the /DEVICE and /POSITION options of the COPY command:

The /DEVICE and /POSITION options are mutually exclusive.

In Section 4.5, the following information should be noted for the description of the /BUFFER option of the FRUN command.

To specify a decimal number for n, include a decimal point (.) after the number you specify. The formula for determining n calculates n as a decimal number, so include the decimal point when you specify this number.

In Section 4.5, the description of the /FLAGPAGE option of the PRINT command should include the following information:

If you use the /FLAGPAGE option but specify no value for n, the default number of banner pages set with the QUEMAN /P option will be printed. If the default number of banner pages set with the /P option is 0, n defaults to 1.

## CORRECTED PROBLEMS AND CURRENT RESTRICTIONS

In Section 4.5, the description of the /NAME option of the PRINT command is incorrect after the third sentence. Replace the remainder of the paragraph (starting with "If you do not use ...") with the following information:

If you specify a device with the job name, you can send the files to that device, permitting you to send files to any valid RT-11 device. If you send the files to a mass storage volume, the system copies each input file to a separate output file with the same file name and type as the input file. The job name is used only in the JOBNAME field of the banner page. The handler for the output device must be loaded in memory (see the LOAD command description).

The following example sends the files FILE1.LST, FILE2.LST, and FILE3.LST to files of the same name on DX1:. The job name JOB5 appears in the JOBNAME field of the banner page.

```
PRINT/NAME:DX1:JOB5 FILE1,FILE2,FILE3
```

Add to Table 5-8 in Section 5.5.22, the error message ?IND-F-Invalid operator for operation.

### 3.2.3 RT-11 System Utilities Manual

In Section 17.2.4 of the RT-11 System Utilities Manual, add the following sentence to the end of the first paragraph, inside the parentheses:

If the default number of banner pages set with the /P option is 0, n defaults to 1.

### 3.2.4 RT-11 Programmer's Reference Manual

The following information is missing from Section 1.1.3.7 of the RT-11 Programmer's Reference Manual:

The programmed requests .MRKT/.CMKT and .TIMIO/.CTIMIO require request identification words as an argument. Certain ranges of values are reserved for different uses as shown in the following table.

Range	Use
1-176777	For user applications with .MRKT/.CMKT. Values in this range are cancelled if a .CMKT request is issued with a value of 0.
177000-177377	For use in device handler .TIMIO/.CTIMIO requests.. To ensure a unique value for each handler, DIGITAL suggests that the value be assigned as 177000+devcod, where devcod represents the device identifier value used in the .DRDEF macro at the beginning of the handler.

## CORRECTED PROBLEMS AND CURRENT RESTRICTIONS

177400-177477	Reserved for multiterminal support
177500-177677	Reserved
177700	Used by the .TWAIT request
177701-177766	Reserved
177767-177777	DECnet

Values in the range 177000-177677 must be cancelled individually by the routine that issued the .TIMIO request. This would occur, for example, in handler abort code.

Values in the range 177700-177777 are automatically cancelled whenever a program terminates or aborts.

In Section 2.44, the description of the argument for the .MTPS programmed request is incorrect. The argument addr should be changed to the argument value, which represents the value you want to load into the processor status word.

In Section 2.90, .TTYIN/.TTINR, the third paragraph (beginning with "If the carry bit ...") is incorrect. The second sentence should read:

Under the FB or XM monitor and under an SJ monitor with multiterminal support, .TTINR does not return the carry bit set unless bit 6 of the job status word (JSW) was on when the request was issued.

### 3.2.5 RT-11 Software Support Manual

In Table 10-11 of the RT-11 Software Support Manual, under the description of First Word Code 3, and in Table 10-12, under the description of First Word Code 4, the second paragraph should read as follows:

The second word in the status block contains the number of blocks requested to be spaced (wcnt), minus the number of blocks spaced if a tape mark or BOT is detected. (A tape mark is counted as a block.) Otherwise, its value is not defined. The tape will be positioned after the tape mark on forward spacing, and before the tape mark on backward spacing.

The last paragraph of Section 7.6.1 contains the sentence: "Start with 177000 and work up to the highest valid sequence number, 177377." Replace this sentence with the following sentence:

To ensure a unique number, use a value of 177000+devcod, where devcod is the device identifier code used in the .DRDEF macro at the beginning of the handler.

## CORRECTED PROBLEMS AND CURRENT RESTRICTIONS

### 3.2.6 RT-11 System Message Manual

See Appendix A for a list of error messages that are not documented in the RT-11 System Message Manual.

### 3.3 CURRENT RESTRICTIONS

When running RT-11 Version 5.1, observe the following restrictions.

- IND control files cannot include an indirect command file which, in turn, calls another IND control file. Such files also cannot call a KMON command file which, in turn, calls another IND control file.
- You cannot place CSI commands or DCL commands that require more than one line in IND control files. To execute CSI commands and multiline DCL commands from an IND control file, create an indirect command file that contains the command, and call the command file from the control file by using the \$@ syntax. Alternatively, you can use CCL.

For example, the following IND control file executes a CSI command by creating an indirect command file, then calling the indirect command file.

```
.IFF PIP .GOTO 1
.OPEN SECOND.COM
.DATA R PIP
.DATA A.MAC=B.MAC
.DATA ^C
.CLOSE
.$@SECOND
.l: .ASKS ...
```

Instead of creating the indirect command file, you can achieve the same result by using the following CCL command example.

```
.IFT PIP PIP A.MAC=B.MAC
```

- If you pass more than one command through a special chain exit, you can call an indirect command file only as the last command in a series of chain exits.
- If you use the RT-11 Version 5 command INIT/VOL to assign a volume ID, that volume ID will not be displayed when you issue the command DIR/VOL under RT-11 Version 4.
- TU58 DEctape II cannot be used as the system device on a 38.4K baud line. You must change your hardware to lower the baud to 19.2K.
- You cannot use BUP (or the BACKUP command) to back up a disk to magtape if the disk contains bad blocks covered with FILE.BAD files. Use PIP or the COPY command instead. This restriction does not apply during disk-to-disk backup operations, or to disks initialized using bad block replacement rather than bad block covering.



## CORRECTED PROBLEMS AND CURRENT RESTRICTIONS

- The VM handler may not be used on a PDP-11/23 processor with MSV11 memory, strapped for a 2KW I/O page. The VM handler installs, but any attempt to perform I/O to it immediately returns a hard error. This occurs because the VM handler must turn on the memory management unit to operate. However, when the MMU is enabled, the I/O page reverts to 4KW and corrupts the top 2KW of the monitor.
- The single-line editor does not support the use of control characters as input data. Before you run a program that must receive control characters as input data in line mode, you must turn off the single-line editor. Use the SET SL OFF command, or have your program set the EDIT\$ bit (bit 4) in the JSW.

This restriction does not apply to programs that use special mode input.

- When the single-line editor is enabled, the command COPY TT: filespec does not work.
- When running under the XM monitor, programs that fetch magtape handlers must place them above PAR1 space.
- Even when .ENABL MCL is in effect, you must manually .MCALL any macros whose names conflict with names in the MACRO-11 permanent symbol table (such as .PRINT).
- You cannot run the BATCH processor and IND simultaneously. You must have SET KMON NOIND in effect to run BATCH. Also, you cannot run BATCH from an IND control file.
- You can use the RUN command to run virtual programs only if the program does not require the keyboard monitor to write to the swap blocks (SWAP.SYS). That is, the size of the program's root segment must not overload the keyboard monitor. If this happens, the error message ?MON-F-MMU fault appears.

- The RT-11 manual recommends that you do not use the command SET LS when using the command SET LS PERM, printers with very large buffers, or any other command that causes the printer to print through printing. The SET LS PERM command will be removed in a later release of RT-11.



## CHAPTER 4

### INSTALLATION, BOOTSTRAP, AND HARDWARE SETUP PROCEDURES

This chapter describes procedures you may need to follow, depending on your distribution kit and your hardware configuration. Additional information for this chapter is contained in two files on the RT-11 distribution kit:

V5NOTE.TXT contains procedures and software customizations that are not listed in the RT-11 documentation.

CUSTOM.TXT contains a table that helps you determine the correct values and addresses to use when installing software customizations.

Chapter 2 of the RT-11 Installation Guide provides and describes software customizations. In the customizations, symbols are used in place of values and addresses. When you install software customizations, use the values and addresses provided in CUSTOM.TXT in place of each symbol shown in the software customization.

#### 4.1 PROCEDURES FOR DISTRIBUTION KITS

All RT-11 distribution kits contain system software, and automatic installation and verification software. However, automatic installation and verification is supported only with certain distribution kits: RL02, RX02, and RX50. If you attempt to bootstrap the automatic installation monitor (INITIAL.SYS for PDP-11 systems, ~~INITIAL.SYS for PDP-11 systems~~) on a distribution kit that does not support automatic installation, the installation procedure informs you that automatic installation is not supported, and you must install your system manually.

You may need to follow the procedures described below, if your distribution kit does not support automatic installation or if your hardware configuration does not meet automatic installation requirements.

- When you bootstrap an RL02, RX02, or RX50 distribution kit, the automatic installation monitor (INITIAL.SYS for PDP-11 systems, ~~INITIAL.SYS for PDP-11 systems~~) is bootstrapped. If your hardware configuration meets automatic installation requirements, the installation procedure tells you how to proceed. (See the appropriate RT-11 Automatic Installation Booklet for more details on automatic installation.) If, however, your hardware configuration does not meet automatic installation requirements, the automatic installation procedure informs you that automatic installation is not supported, and you must install your system by following the procedures in the RT-11 Installation Guide. If

## INSTALLATION, BOOTSTRAP, AND HARDWARE SETUP PROCEDURES

your configuration does not include a line clock or 24KW of memory (FB monitor requirements), you must first copy the bootstrap for the SJ monitor from RT11SJ.SYS to your system volume while still operating under the automatic installation monitor, ~~RT11AI.SYS or RT11PI.SYS.~~

- RX01 distribution kits contain two copies of the RT-11 distributed software, so you do not need to back up the distribution kit. Store one copy as your master distribution kit, and bootstrap Volume 1 of the second copy to complete system installation. Follow the instructions in the RT-11 Installation Guide. If you are following Chapter 3, you need not perform any of the operations described in Section 3.2 for preserving the distribution volumes, except for the instructions for removing protection from files beginning near the middle of page 3-6.
- Volume 10 of RX01 distribution kits includes the same software as the AUTO volume on kits that support automatic installation. This volume is also PDT-11/150 bootable. However, if you bootstrap this volume on a PDT-11/150, the installation procedure informs you that automatic installation is not supported, and you must follow the procedures in the RT-11 Installation Guide to install your system. To create a PDT-11/150-bootable RT-11 distribution kit, you should then respond to the keyboard monitor prompt (.) by using the COPY/BOOT command to copy the PD bootstrap to volume 1 of the RX01 distribution kit.

### 4.2 PROCEDURES FOR CREATING A BOOTABLE MS MAGTAPE

Follow these steps to create a bootable MS magtape.

1. Verify that your distribution kit contains the files DISMT1.COM and DISMT2.COM.
2. Edit the first command in the file DISMT1.COM to read:  
INITIALIZE/VOLUMEID/FILE:DIS:MBOT16.BOT
3. Using the ASSIGN keyboard command, assign the logical device name DIS: to your distribution disk and assign the logical device name TAP: to your magtape.
4. Type @DISMT1 to create volume 1 of the magtape. Volume 1 will contain the bootstrap.
5. When DISMT1 is finished, mount another magtape and again assign the logical device names DIS: and TAP: as described in step 3.
6. Type @DISMT2 to create volume 2 of the magtape.

### 4.3 PROCEDURES FOR LOADING THE TSV05 BOOTSTRAP

This section provides instructions for loading the TSV05 bootstrap, first using Micro-ODT, then using the console switch register.

## INSTALLATION, BOOTSTRAP, AND HARDWARE SETUP PROCEDURES

### 4.3.1 Loading the TSV05 Bootstrap Using Micro-ODT

Deposit the TSV05 bootstrap loader in memory as follows:

1. Turn on your processor; if it is already on, halt it.
2. At the console, type the first address (7776) followed by a slash (/):

```
7776/
```

The system responds by printing the contents of address 7776 (represented below by xxxxxx) on the console:

```
7776/ xxxxxx
```

3. On the same line, type the first contents value from the bootstrap table (46523) followed by a line feed.

```
7776/ xxxxxx 46523 <LF>
```

The system deposits the value you type and displays the next memory location.

```
10000/
```

4. Type the contents for the next memory location followed by a line feed.
5. Repeat step 4 until you have deposited all the instructions. Then, type a carriage return.
6. Finally, type:

```
10000G
```

The processor reads the software bootstrap from the magtape into memory. The system prints the following prompt when it is finished:

```
MSBOOT V05.xx  
*
```

7. Respond to the asterisk (\*) as described in Chapter 8 of the RT-11 Installation Guide. Wherever MM or MT appears in the instructions, substitute MS.

#### TSV05 Bootstrap Loader

##### Address Contents

007776	046523
010000	012701
010002	172522
010004	010102
010006	005000
010010	105711
010012	100376
010014	010704
010016	112737
010020	000200
010022	172523
010024	005242

## INSTALLATION, BOOTSTRAP, AND HARDWARE SETUP PROCEDURES

010026	105711
010030	100376
010032	005711
010034	100761
010036	005007

### 4.3.2 Loading the TSV05 Bootstrap Using the Switch Register

Deposit the TSV05 bootstrap loader in memory as follows:

1. Set the ENABLE/HALT switch to HALT.
2. Set the first address, 7776, in the switch register.
3. Press the LOAD ADDR switch.
4. Set the contents for the first address (46523 from the bootstrap table) in the switch register.
5. Lift the DEP switch.  
The computer automatically advances to the next address.
6. Set the contents for the next address (from the table) in the switch register.
7. Lift the DEP switch.
8. Repeat steps 6 and 7 until you have deposited all the instructions.

Now verify that you deposited the bootstrap loader properly.

1. Set the first address, 7776, in the switch register.
2. Press the LOAD ADDR switch.
3. Press the EXAM switch to display the contents of that address in the data register.
4. Compare the value in the data register with the contents value for that address in the table.
5. If the values are the same, press EXAM again to display the contents of the next address. If the values are not the same, repeat the entire procedure for depositing the bootstrap. Verify the contents of all addresses in this way. If any instruction is incorrect, repeat the entire deposit procedure.

Once you have correctly deposited the bootstrap in memory, start the computer as follows:

1. Set the starting address, 10000, in the switch register.
2. Press the LOAD ADDR switch.
3. Set the ENABLE/HALT switch to ENABLE.
4. Press the START switch.

## INSTALLATION, BOOTSTRAP, AND HARDWARE SETUP PROCEDURES

### 4.4 PROCEDURES FOR LINE PRINTERS AND TERMINALS

This section describes procedures you may need to follow to use your line printer or terminal.

#### 4.4.1 Line Printer Handlers

This section describes restrictions and workaround solutions for using line printers with RT-11.

- If output to some models of line printers is terminated prematurely, the print head may not be at the left margin. When output to the printer is resumed, printing may begin in the middle of the line. To prevent this, reset the printer manually.
- Some conditions cause data sent to a printer using the LS handler to be lost without warning. Those are:

For all terminals: The printer is powered down or placed off-line.

For all terminals except LA34, LA38, LA120, LS120, or serial LA180: The terminal encounters an error condition while in operation.

- The LS handler cannot be used to communicate with the console terminal. Instead, you must use the TT handler.
- The SET LS NOHANG option is valid only if device timeout support is included in a monitor created through system generation. ~~It is recommended that you do not use the command in cases where printers are not connected to the system before they are through the command. This command will be removed in a later release of RT-11.~~

- If the LP or LS handler NOFORM or SKIP option is used, load the handler by including a LOAD command in your STARTx.COM files. Then, manually set the printer paper to top of page each time the system is bootstrapped (top of page is normally set so printing begins on the fourth print line down from the page perforation). Afterward, you should not manually move the paper. Instead, the handler should perform all movement of the paper.

For example, to remove the last printed file from the printer, you must send two form feeds to the printer. Create the file FF.LST with an editor, and include in it only two form feed characters (CTRL/L). When you issue the command PRINT FF, the printer will perform two form feeds, so you can remove the last file printed. The top of page will still be set correctly for printing the next file.

- For the LS handler, the default CSR address is 176500 and the default vector address is 300. If your line printer is connected to a DL11/DLV11 interface with different addresses, use the SET LS CSR and SET LS VECTOR commands to modify the default values. For example, to modify the LS handler to use the MINC-11 printer port, SLU2, issue the following command:

```
SET LS CSR=176520,VECTOR=320
```

## INSTALLATION, BOOTSTRAP, AND HARDWARE SETUP PROCEDURES

### 4.4.2 Recommended Terminal/Line Printer SET Command Options

This section lists the nondefault SET options recommended for use with the terminals and line printers shown.

#### LA30, LA35, LA36, and LS120

```
SET TT WIDTH=n
SET LP/LS CR,CTRL,NOFORM,NOFORM0,LC,WIDTH=n
```

#### LA34 and LA38

```
SET TT TAB,WIDTH=n
SET LP/LS CR,CTRL,NOFORM,NOFORM0,LC,TAB,WIDTH=n
```

#### LA120

```
SET TT FORM,TAB,WIDTH=n
SET LP/LS CR,CTRL,NOFORM0,LC,TAB,WIDTH=n
```

#### LA180

```
SET LP/LS CR,CTRL,NOFORM0,LC,WIDTH=n
```

#### VT05

```
SET TT SCOPE,TAB,WIDTH=72
```

#### VT50, VT52, VT55, and VT100 Series

```
SET TT NOCRLF,SCOPE,TAB
```

SET TT commands are not permanent and must be issued every time the monitor is bootstrapped. Therefore, DIGITAL recommends that you include the command in the appropriate STARTx.COM file(s). However, SET LP and SET LS commands modify the permanent copy of the handler, so you need to issue them only once.

When running under a multiterminal monitor, you can set the characteristics of local terminals other than the boot-time console: Include the command SET TT CONSOLE=n in an appropriate STARTx.COM file followed by the SET TT commands you want for that terminal. After all the terminal characteristics have been set, include the SET TT CONSOLE=0 command in the STARTx.COM file to return control to the boot-time console.

Of the SET TT commands listed, only the SET TT SCOPE command is valid for a single-terminal SJ monitor.

### 4.4.3 Recommended VT100 Series, VT105, and LA120 Setup Mode Options

This section lists recommended setup modes for VT100, VT105, and LA120 series terminals. Terminal bauds should be set to correspond to the computer interface. Setup options other than those discussed below should be set for operator preference or form requirements. To permanently save the setup options you select, type <SHIFT/S> on a VT100 series or VT105 and <SHIFT/9> on an LA120.



## INSTALLATION, BOOTSTRAP, AND HARDWARE SETUP PROCEDURES

**4.4.3.1 VT100 Series and VT105 Terminals** - The following setup mode options are recommended for normal use on VT100 series and VT105 terminals:

On line

Autorepeat on

Margin bell off (when preparing FORTRAN programs, it may be useful to have the margin bell set on, to notify you when column 72 is reached)

Auto XON/XOFF on

Wrap around on

New line off

Interlace off

Parity off

Bits per character 8

Tabs set every 8 columns

**4.4.3.2 LA120 Series Terminals** - LA120 terminals should be initialized to factory settings. Then, buffer control should be changed to small. The following factory setup options should not normally be changed:

line/local status

local echo

auto newline

parity and data bits

auto repeat

auto linefeed

XON/XOFF

printer new line character

Use the LA120 local form feed key to make sure that the paper is positioned correctly at top of form before printing a listing.



## PART II

### NEW FEATURES IN VERSION 5.1

Part II describes in detail new features added to RT-11 for V5.1.

Chapters 5, 6, and 7 contain specific information for running RT-11 on Professional 300 series computers. Chapter 5 describes how to install RT-11 software on a Professional 325 without using the automatic installation program. Chapter 6 describes RT-11 software installation procedures on a Professional 350. Chapter 7 provides details for running RT-11 on Professional 300 series computers, including new device mnemonics, video terminal and keyboard operating procedures, and RT-11 restrictions peculiar to Professional 300 series computers.

The remainder of Part II is of interest to all RT-11 users, regardless of hardware configuration. Chapter 8 describes changes to the RT-11 distribution kit, new IND directives, programmed requests, SYSLIB routines, and macros, and new device codes and bit definitions. Chapter 9 describes new features added to the system generation procedures and includes a reprint of the entire current system generation dialog. Chapters 10, 11, and 12 describe how to use the new hardware setup utility (SETUP), transparent spooling package (SPOOL), and virtual terminal communication package (VTCOM).

Examples consist of actual computer output whenever possible. In these examples, user input appears in red where it must be differentiated from computer output.



## CHAPTER 5

### INSTALLING RT-11 ON A PROFESSIONAL 325

If you are installing RT-11 to run on a Professional 325 computer, perform the procedures described in this chapter.

Your distribution kit contains two copies of the RT-11 operating system on RX50 diskettes. Store one set of the RX50 diskettes in a safe place and do not modify their contents; they provide a master copy of the distributed RT-11 operating system.

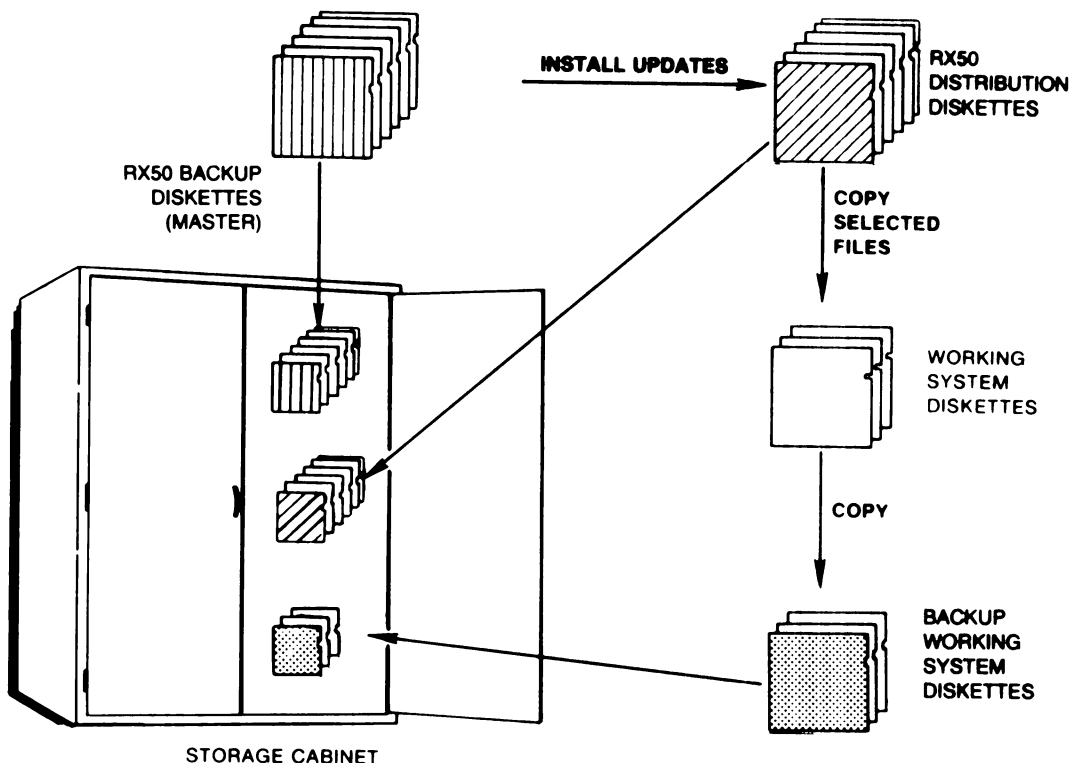
Store the second set of diskettes in a safe place, after installing software updates and creating your working system diskettes. The second set provides a backup copy of your updated RT-11 system. If those diskettes are ever damaged, use the master copy of the distributed RT-11 operating system to reproduce them.

To install your system, perform the procedures summarized below and described in Sections 5.1 through 5.8. Figure 5-1 shows the diskettes you create when you install RT-11.

1. Bootstrap the system diskette.
2. Install software updates.
3. Create the working system from chosen components.
4. Install the bootstrap on any diskettes that must be bootable.
5. Customize the system.
6. Preserve the working system.
7. Test the working system.
8. If appropriate, perform the system generation procedures.

## INSTALLING RT-11 ON A PROFESSIONAL 325

Figure 5-1: Sample Backup Diskettes



### 5.1 BOOTSTRAPPING THE SYSTEM DISKETTE

The first procedure you perform when installing RT-11 bootstraps the system diskette, distribution diskette 1.

First, turn off the processor (press the power switch to 0).

Insert the distribution diskette labeled 1 in Unit 0 (which has the physical device name DZ0:). Unit 0 is the top slot if your Professional 325 sits horizontally on a table top, or the left slot if it sits vertically in a floor stand.

Press the power switch to 1 (on). Wait while the system runs diagnostic tests. If there are no problems, the DIGITAL logo appears on the screen within about 30 seconds.

If a problem occurs, a diagram of the Professional computer appears on your screen. The part of the Professional that has a problem is highlighted in the picture. Write down the numbers you see on the screen. If the top number is 051124, refer to Chapter 7 of the RT-11 System Release Notes for help. Otherwise, refer to your Professional 300 Series Owner's Manual.

If nothing happens when you turn the power on, refer to the Owner's Manual for help.

## INSTALLING RT-11 ON A PROFESSIONAL 325

RT-11 should respond with the following message if you have successfully bootstrapped the diskette:

RT-11XM V05.xx

.TYPE V5USER.TXT

RT-11 V5.1

-----

Installation of RT-11 Version 5 is complete and you are now executing from the working volume (provided that you have used the automatic installation procedure). DIGITAL recommends that you verify the proper operation of your system's software by invoking the verification procedure. To do this, enter the command:

IND VERIFY

Note that VERIFY should be performed only after the distribution media have been backed up. This was done as part of automatic installation on RL02 and RX02 based systems, and on the Micro/PDP-11 and the PC325 or PC350. If you have not completed automatic installation, you should perform a manual backup before using VERIFY. Note also that VERIFY is NOT supported on RX01 diskettes or DEctape I or II.

Next, type these commands:

.SET TT SCOPE<RET>  
.SET TT NOCRLF<RET>

### 5.2 INSTALLING SOFTWARE UPDATES

You must install updated software modules at this point. Updated modules are critical to system or component operation. They correct software errors discovered since the last release, and may add new functions to the operating system.

Updated software modules are distributed in update kits. Each kit contains complete software module replacements. Software corrections will already have been installed in the new modules and fully tested. Your only requirement is to copy the new modules from the update kit to your system, using the procedures described in the RT-11 Update User's Guide. Updates are distributed on the same medium on which you received the RT-11 operating system and contain modules for the operating system and layered products.

#### NOTE

If you are installing your system for the first time, you need not update the RT-11 operating system. The RT-11 distribution kit you received contains the most recent modules.

## INSTALLING RT-11 ON A PROFESSIONAL 325

The RT-11 Software Dispatch Review reports serious problems submitted in SPRs and may provide temporary solutions to use until the module containing the errors is corrected by an update kit.

For a complete description of how to update your software, refer to the RT-11 Update User's Guide.

### 5.3 CREATING THE WORKING SYSTEM FROM CHOSEN COMPONENTS

Once you have chosen your system components and have planned the best arrangement of them on diskettes (See Sections 2.3 and 2.4 of the RT-11 Installation Guide), you can create the working system by copying selected components to initialized blank diskettes.

Start by initializing a number of blank diskettes. Insert each diskette in Unit 1 and use the INITIALIZE command. Use the /BADBLOCKS option with INITIALIZE to cover any bad blocks that may be on your diskettes (this prevents the system from trying to use them). If a diskette contains bad blocks, the ?DUP-W-Bad blocks detected nnnnnn message appears on the terminal.

#### NOTE

DIGITAL recommends that you use only diskettes that do not have bad blocks when you build a working system. To ascertain whether an initialized diskette has bad blocks, use the command DIRECTORY/BAD DZn:. You can use diskettes with bad blocks later for temporary storage or as work volumes.

```
.INITIALIZE/BADBLOCKS DZ1:<RET>  
DZ1:/Initialize; Are you sure? Y<RET>  
?DUP-I-No bad blocks detected DZ1:
```

The system scans the diskette for bad blocks and creates a new directory. The monitor dot appears when this process is complete.

.

Repeat this step to create as many initialized blank diskettes as you need for the system you have planned, leaving one initialized, blank diskette in Unit 1.

Then, use the COPY command to copy selected files from distribution diskette 1 to the diskette that will become your working system diskette. The /SYSTEM option is required for copying .SYS files only if wildcards are used in input file specifications.

```
.COPY DZ0:filnam.typ DZ1:filnam.typ<RET>
```

.



## INSTALLING RT-11 ON A PROFESSIONAL 325

You can use the following command to avoid typing numerous file specifications. RT-11 queries you about all the files on the diskette, and you choose the files it copies.

```
.COPY/SYSTEM/QUERY DZ0: DZ1:<RET>
```

Files copied:

```
DZ0:aaaaaa.ttt to DZ1:aaaaaa.ttt? Y<RET> (to include a specific file)
```

```
DZ0:bbbbbb.ttt to DZ1:bbbbbb.ttt? N<RET> (to exclude a specific file)
(and so on)
```

To copy files from nonbootable diskettes, you have to alternate diskettes.

Type the following command, where filnam.typ is the name of the file you want to copy.

```
.COPY/QUERY/WAIT DZ1:filnam.typ DZ0:filnam.typ<RET>
```

Mount input volume in DZ1;; Continue?

Place the diskette containing the file you want to copy in Unit 1.

Y<RET>

Files copied:

```
DZ1:aaaaaa.ttt to DZ0:aaaaaa.ttt?
```

Type Y to include or N to exclude the file.

Mount output volume in DZ0;; Continue?

Replace the system diskette in Unit 0 with the diskette to which you want to copy filnam.typ.

Y<RET>

Mount system volume in DZ0;; Continue?

Replace the diskette in Unit 0 with the system diskette.

Y<RET>

.

Repeat this procedure to copy all the files you planned for the working system diskette.

When you have copied all the files, label the diskette "RT-11 Working System V05.n 1" (where n is the release number of RT-11 V5).

Repeat those procedures to create the other diskettes in the working system.

### 5.4 INSTALLING THE BOOTSTRAP ON DISKETTES THAT MUST BE BOOTABLE

Once you have created your working system, you need to install the bootstrap on any diskettes that must be bootable (that you can use as system diskettes). Generally, any diskette that includes a monitor file and system device handler should be bootable. The diskette also needs SWAP.SYS, and PI(X).SYS to run on a Professional 325.

## INSTALLING RT-11 ON A PROFESSIONAL 325

Insert in Unit 1 the diskette on which you need to install the bootstrap. In the following command, aa is FB or XM.

```
.COPY/BOOT DZ1:RT11aa.SYS DZ1:<RET>
```

This command copies bootstrap information from the monitor file to blocks 0 and 2 through 5 of the same diskette. In the command, you identify the device on which the monitor that contains the bootstrap information resides, the name of the monitor file (RT11FB.SYS or RT11XM.SYS), and the device on which you need to install the bootstrap.

Then, insert working system diskette 1 in Unit 0, and use the hardware bootstrap (turn the system off, then on) to boot your working system.

```
RT-11aa V05.xx  
(Followed by any start-up file commands.)
```

Store the updated distribution diskettes for future updates.

### 5.5 CUSTOMIZING THE SYSTEM

You may want to make customizations (described in Section 2.7 of the RT-11 Installation Guide) to the distributed RT-11 components. At this point, perform the procedures to implement any software customizations. Table 1-3 in the RT-11 Installation Guide summarizes the available customizations and directs you to the section in Chapter 2 that describes a particular customization and the procedure for implementing it.

The files on the distribution diskettes have been protected to prevent you from accidentally deleting them. (Note the P that prints next to the file size in the directory. Refer to the RT-11 System User's Guide for a description of file protection.) You need to remove the protection from the files you want to customize. Type the following command to remove protection from the files on distribution diskette 1 (your system diskette):

```
.UNPROTECT/SYSTEM *.*<RET>  
Files unprotected:  
DK:aaaaaa.ttt  
DK:bbbbbb.ttt  
DK:cccccc.ttt  
DK:dddddd.ttt  
.  
.  
.  
DK:zzzzzz.ttt
```

## INSTALLING RT-11 ON A PROFESSIONAL 325

To remove protection from files on other diskettes, insert each diskette in Unit 1. Then type the following command:

```
.UNPROTECT/SYSTEM DZ1:*. *<RET>
Files unprotected:
DZ1:aaaaaa.ttt
DZ1:bbbbbb.ttt
DZ1:cccccc.ttt
DZ1:dddddd.ttt
.
.
.
DZ1:zzzzzz.ttt
.
```

### NOTE

Later, you can perform the system generation procedures to implement additional customizations.

## 5.6 PRESERVING THE WORKING SYSTEM

Once you build a satisfactory working system, DIGITAL recommends that you preserve the system on backup diskettes.

If you have unprotected files to make software customizations (Section 5.5), use the following command to protect all the files on the system diskette:

```
.PROTECT/SYSTEM *. *<RET>
Files protected:
DK:aaaaaa.ttt
DK:bbbbbb.ttt
DK:cccccc.ttt
DK:dddddd.ttt
.
.
.
DK:zzzzzz.ttt
.
```

To protect files on other diskettes in the working system, insert each diskette in Unit 1 and use the following command:

```
.PROTECT/SYSTEM DZ1:*. *<RET>
Files protected:
DZ1:aaaaaa.ttt
DZ1:bbbbbb.ttt
DZ1:cccccc.ttt
DZ1:dddddd.ttt
.
.
.
DZ1:zzzzzz.ttt
.
```

Next, copy the working system to backup diskettes. Insert blank diskettes in Unit 1 with RT-11 still booted from Unit 0, and initialize the appropriate number of diskettes.

## INSTALLING RT-11 ON A PROFESSIONAL 325

Then, copy all the files in your working system. To copy the system diskette, type:

```
.SQUEEZE/OUTPUT:DZ1: DZ0:
```

To copy other diskettes, type this command and follow the instructions to change diskettes:

```
.SQUEEZE/WAIT/OUTPUT:DZ1: DZ0:
```

Remember to copy the bootstrap to any diskettes that need to be bootable.

Store the backup diskettes. If you ever need to restore the working system, you can make copies of the backup working system diskettes.

### 5.7 TESTING THE WORKING SYSTEM

Once you have built and preserved the working system, you can execute the following demonstration to test that system. This demonstration does not serve as a comprehensive system exercise; however, because it uses several major system components, it does serve as a minimal integrity check. Moreover, DIGITAL considers your system officially installed if the demonstration runs without error.

To execute this demonstration, your working system must include at least the following components.

```
SWAP.SYS
RT11FB.SYS or RT11XM.SYS
DZ.SYS or DZX.SYS (system device handler)
PI.SYS or PIX.SYS
LS.SYS or LSX.SYS
KED.SAV
MACRO.SAV
SYSMAC.SML
LINK.SAV
PIP.SAV
DUP.SAV
DIR.SAV
DEMOBG.MAC
DEMOFG.MAC
```

Insert a blank diskette in Unit 1.

```
.INITIALIZE/BADBLOCKS DZ1:<RET>
DZ1:/Initialize; Are you sure? Y<RET>
?DUP-I-No bad blocks detected DZ1:
```

```
.ASSIGN DZ1: DK:<RET>
```

## INSTALLING RT-11 ON A PROFESSIONAL 325

Display the system volume's directory on the terminal. The directory varies according to your particular working system. As long as a directory prints, you need not worry if it does not match the one in the following example.

```
.DIRECTORY/BRIEF/COLUMNS:1 SY:<RET>
  dd-mmm-yy
SWAP  .SYS
RT11xx.SYS
PI    .SYS
LS    .SYS
DZ    .SYS
KED   .SAV
MACRO .SAV
SYSMAC.SML
LINK  .SAV
PIP   .SAV
      .
      .
      .
xxx Files, bbb Blocks
fff Free blocks
.
```

### NOTE

If the directory scrolls by too quickly, press the HOLD SCREEN key to stop the display. Press HOLD SCREEN again to continue scrolling.

Before you can execute the background and foreground demonstration programs, you must first edit, assemble, and link the background program, DEMOBG.MAC, and then you must assemble and link the foreground program, DEMOPG.MAC.

### 5.7.1 Preparing the Background Demonstration Program

To prepare the background demonstration program, DEMOBG.MAC, follow these instructions to edit, assemble, link, and run the program.

5.7.1.1 **Edit the Background Demonstration Program** - Use a text editor, for example KED, to modify the background demonstration program, DEMOBG.MAC. One of the lines in the program contains a message to be printed, but it is preceded by a semicolon (the symbol for a comment field). You must delete the semicolon so the message will print.

## INSTALLING RT-11 ON A PROFESSIONAL 325

If DEMOBG.MAC is a protected file, remove the protection before making the edits (UNPROTECT SY:DEMOBG.MAC).

To start KED, type:

```
.KED DEMOBG.MAC<RET>
```

Once the file is displayed, press the down-arrow key until the cursor rests on top of the semicolon (;) at the beginning of the line:

```
;      .ASCII      /WELL DONE./
```

Delete the semicolon by pressing the comma key (,) on the keypad.

Then, exit the file: Press the PFl key, then the 7 key on the keypad. When KED prompts Command:, type EXIT and press the ENTER key:

```
Command:  EXIT<ENTER>
```

**5.7.1.2 Assemble the Background Demonstration Program** - The background program, DEMOBG.MAC, is an assembly language source file; it must be assembled and linked before you can execute it.

To assemble DEMOBG.MAC and obtain a listing, make sure your configuration has a line printer that is on-line and ready.

```
.ASSIGN LS: LST:<RET>
```

.

### NOTE

If your configuration does not include a line printer, use the console terminal.

```
.ASSIGN TT: LST:<RET>
```

.

Assemble DEMOBG.MAC as follows:

```
.MACRO/LIST:LST: SY:DEMOBG<RET>  
(See Figure 5-2.)
```

If any errors occur when you assemble DEMOBG.MAC, you have incorrectly edited the file and should repeat the edits as described in Section 5.7.1.1. Use the backup demonstration program.

```
.RENAME SY:DEMOBG.BAK SY:DEMOBG.MAC<RET>
```

.

## INSTALLING RT-11 ON A PROFESSIONAL 325

**Figure 5-2: DEMOBB Assembly Listing**

```

DEMOBG MACRO V05.01b Friday 09-Dec-83 10:16 Page 1

1          .TITLE DEMOBB
2          .IDENT /V05.00/
3          ; DEMONSTRATION PROGRAM TO PRINT DEMONSTRATION MESSAGE, THEN
4          ; RING BELL IF FG JOB SENDS A MESSAGE.
5
6          .MCALL .RCVDC,.PRINT
7
8 000000   START:: .RCVDC @AREA,@BUFFER,@400,@MSGIN ;POST REQUEST FOR MESSAGE
9 000034   .PRINT @MSG ;PRINT DEMONSTRATION MESSAGE
10 000042 000777 BR . ;AND LOOP
11
12          ; COMPLETION ROUTINE ENTERED WHEN FG SENDS MESSAGE
13
14 000044   MSGIN: .PRINT @BELL ;RING BELL IN RESPONSE TO MESSAGE
15 000052   .RCVDC @AREA,@BUFFER,@400,@MSGIN ;POST ANOTHER MESSAGE REQUEST
16 000106 000207 RETURN ;AND RETURN FROM COMPLETION ROUTINE
17
18          ; ASCII MESSAGES
19          .NLIST BEX
20 000110 007 20C BELL: .BYTE 7,200 ;MESSAGE THAT RINGS BELL
21
22 000112 127 124 055 MSG: .ASCII /RT-11 DEMONSTRATION PROGRAM/<15><12>
23 000147 111 106 040 .ASCII /IF INCORRECTLY EDITED,THIS IS THE LAST LINE./<15><12>
24          ; .ASCII /WELL DONE./
25 000225 000 .BYTE 0
26
27 000226   AREA: .BLKW 6 ;MENT ARGUMENT AREA
28 000242   BUFFER: ;RCVDC MESSAGE AREA
29          .END START
    
```

DEMOBG MACRO V05.01b Friday 09-Dec-83 10:16 Page 1-1

Symbol table

AREA	000226R	BUFFER	000242R	MSGIN	000044R	...	V1 = 000003	...	V2 = 000027
BELL	000110R	MSG	000112R	START	000000RG				

```

. ABS. 000000 000 (RW,I,GBL,ABS,OLR)
      000242 001 (RW,I,LCL,REL,CON)
Errors detected: 0
    
```

\*\*\* Assembler statistics

```

Work file reads: 0
Work file writes: 0
Size of work file: 9188 Words ( 36 Pages)
Size of core pool: 16128 Words ( 63 Pages)
Operating system: RT-11
    
```

```

Elapsed time: 00:00:05.4%
DK:DEMOBG,DK:DEMOBG=DK:DEMOBG
    
```

**5.7.1.3 Link the Background Demonstration Program** - Link the program DEMOBB.OBJ to produce an executable background program, DEMOBB.SAV.

```
.LINK DEMOBB<RET>
```

**5.7.1.4 Run the Background Demonstration Program** - Run the program DEMOBB to check the results of the first exercise.

```
.RUN DEMOBB<RET>
RT-11 DEMONSTRATION PROGRAM
IF INCORRECTLY EDITED, THIS IS THE LAST LINE.
WELL DONE.
```

If you did not delete the semicolon character, the last line will not print. Return to the monitor by typing two CTRL/Cs.

```
<CTRL/C><CTRL/C>
```

## INSTALLING RT-11 ON A PROFESSIONAL 325

If you incorrectly edited the file, you can repeat the exercise, although you can continue without correcting the file. If you want to repeat the exercise, begin by using the backup demonstration program.

```
.RENAME SY:DEMOBG.BAK SY:DEMOBG.MAC<RET>
```

Then, repeat the editing procedure (see Section 5.7.1.1).

### 5.7.2 Preparing the Foreground Demonstration Program

To execute the foreground program, you must assemble the program DEMOFG.MAC, link it for the foreground, and then execute it in conjunction with DEMOFG.SAV.

DEMOFG.MAC is a small foreground program that sends a message every 2 seconds to DEMOFG (running in the background), telling it to ring the terminal bell. DEMOFG recognizes those messages and rings the bell once for each message sent.

Although DEMOFG is always active, sending messages to the background every 2 seconds, this exercise can execute other programs in the background besides DEMOFG. The circuit is complete and messages are successfully received and honored only when DEMOFG is active. During those periods when DEMOFG is not running, DEMOFG enters the messages in the monitor message queue. Once you restart DEMOFG in the background, the system immediately releases all the messages queued since the last forced exit, resulting in many successive bell rings. When the queue is empty, the normal send/receive cycle resumes and the bell rings every 2 seconds as each current message is sent and honored.

**5.7.2.1 Assemble the Foreground Demonstration Program** - The foreground demonstration program, DEMOFG.MAC, is an assembly language source file which you must assemble and link before running. Assemble DEMOFG.MAC as follows:

```
.MACRO/LIST:LST: SY:DEMOFG<RET>
```

The output resulting from this MACRO command is an object file called DEMOFG.OBJ, which resides on your data volume (DK).

**5.7.2.2 Link the Foreground Demonstration Program** - You must link the DEMOFG.OBJ file to produce an executable program. Use the /FOREGROUND option to produce the load module DEMOFG.REL. The .REL file type tells the system that the file is a foreground program and should be run as a priority job.

```
.LINK/FOREGROUND DEMOFG<RET>
```



## INSTALLING RT-11 ON A PROFESSIONAL 325

### 5.7.3 Run the Foreground and Background Demonstration Programs

Type the following command to load and start DEMOFG.REL as the foreground job.

```
.FRUN DEMOFG<RET>
F>
FOREGROUND DEMONSTRATION PROGRAM
SENDS A MESSAGE TO THE BACKGROUND PROGRAM DEMOBG
EVERY 2 SECONDS, TELLING IT TO RING THE BELL.
<CTRL/B>
B>
```

DEMOFG.REL is now running and queuing the message for DEMOBG every 2 seconds. Now execute DEMOBG.SAV in the background and receive the messages.

```
.RUN DEMOBG<RET>
```

(The bell rings quickly several times, then once every 2 seconds.)

```
RT-11 DEMONSTRATION PROGRAM
IF INCORRECTLY EDITED, THIS IS THE LAST LINE.
WELL DONE.
```

Execute a DIRECTORY command in the background to obtain a directory listing.

```
<CTRL/C><CTRL/C>
(The bell stops ringing.)
```

```
.DIRECTORY<RET>
dd-mmm-yy
(The directory of the device DK prints on the terminal.)
.
```

Rerun DEMOBG to collect all the foreground messages queued while the directory was printing.

```
.RUN DEMOBG<RET>
```

(The bell rings several times in rapid succession, then rings once every 2 seconds.)

```
RT-11 DEMONSTRATION PROGRAM
IF INCORRECTLY EDITED, THIS IS THE LAST LINE.
WELL DONE.
<CTRL/C><CTRL/C>
```

(The bell stops ringing.)

Now, stop the foreground program and remove it from memory.

```
<CTRL/F>
F>
<CTRL/C><CTRL/C>
B>
UNLOAD F<RET>
.
```

If you completed these exercises without error, your system has passed the minimal test and you can consider it successfully installed.

## INSTALLING RT-11 ON A PROFESSIONAL 325

### 5.8 PERFORMING THE SYSTEM GENERATION PROCEDURES

If you have decided that you need RT-11 features that are available only if you generate your own monitor(s) and handlers, perform the system generation procedures at this point. You should have thoroughly studied Chapter 1 of the RT-11 Installation Guide to make this decision and to establish that you can perform the system generation procedures on your particular hardware configuration.

DIGITAL does not recommend that you perform a system generation on a Professional 325. The process is lengthy and is not automated. However, should you decide to perform a system generation, read the RT-11 System Generation Guide for guidance.

## CHAPTER 6

### INSTALLING RT-11 ON A PROFESSIONAL 350 COMPUTER

If you are installing RT-11 to run on a Professional 350 computer, perform the procedures described in this chapter.

You will have received the RT-11 operating system on RX50 diskettes, and will be installing it to run on a nonremovable RD50 or RD51 disk.

#### NOTE

The procedures described in this chapter assume that your Professional 350 system includes an RD50 or RD51 Winchester disk. If your system does not include a Winchester disk, install RT-11 software by following the procedures described in Chapter 5.

Your distribution kit contains two copies of the RT-11 operating system on RX50 diskettes. Store one set of the RX50 diskettes in a safe place, and do not modify their contents; they provide a master copy of the distributed RT-11 operating system.

Store the second set of diskettes in a safe place, after installing software updates and copying their contents onto the nonremovable disk. The second set provides a backup copy of your updated RT-11 system. Use those diskettes if it is ever necessary to copy their contents onto the permanent disk, for example, to create another working system. If those diskettes are ever damaged, use the master copy of the distributed RT-11 operating system to reproduce them.

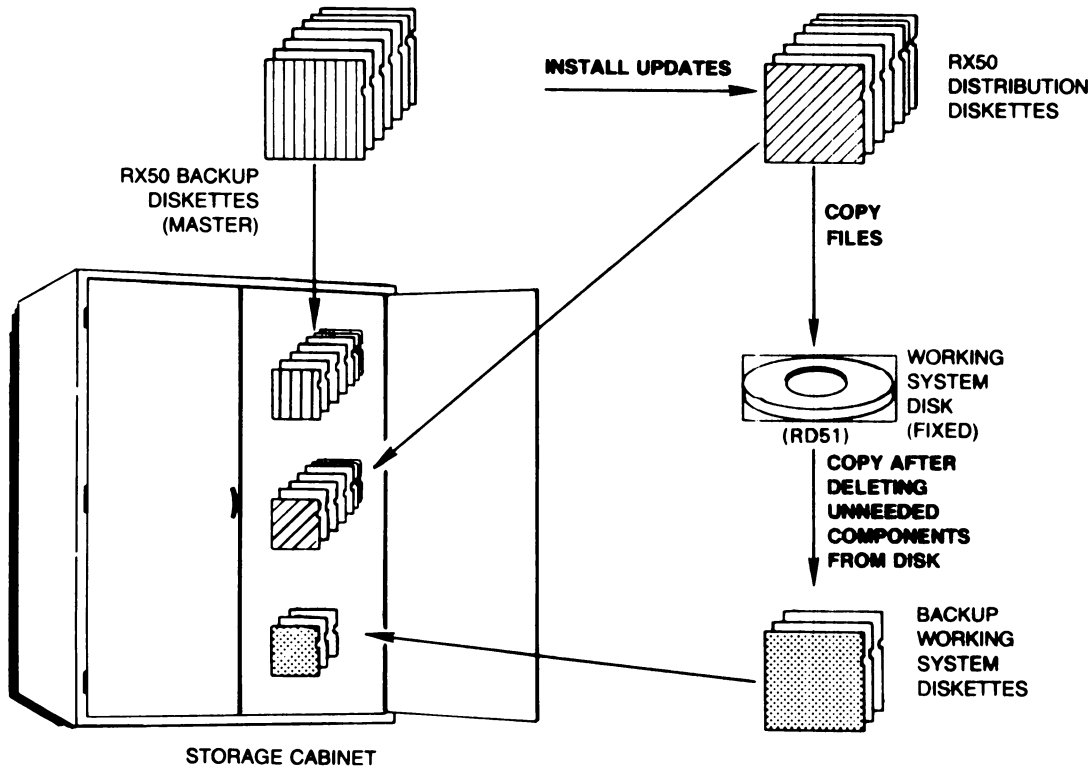
To install your system, perform the procedures summarized below and described in Sections 6.1 through 6.11. Figure 6-1 shows the diskettes you create when you install RT-11.

1. Bootstrap the system diskette.
2. Install software updates.
3. Copy the system diskette onto the system disk.
4. Install the bootstrap on the system disk.
5. Copy the distribution diskettes onto the system disk.
6. Create the working system from chosen components.
7. Customize the system.
8. Compress the system disk.
9. Preserve the working system.

## INSTALLING RT-11 ON A PROFESSIONAL 350 COMPUTER

10. Test the working system.
11. If appropriate, perform the system generation procedures.

Figure 6-1: Sample Backup Diskettes



### 6.1 BOOTSTRAPPING THE SYSTEM DISKETTE

The first procedure you perform when installing RT-11 bootstraps the system diskette.

First, turn off the processor (press the power switch to 0).

Make sure the system diskette, labeled 1, is write-protected (with a write-protect tape over the notch), and insert it in diskette Unit 0 (which has the physical device name DZ0:). Unit 0 is the top slot if your Professional 350 sits horizontally on a table top, or the left slot if it sits vertically in a floor stand.

Press the power switch to 1 (on). Wait while the system runs diagnostic tests. If there are no problems, the DIGITAL logo appears on the screen within about 30 seconds.

If a problem occurs, a diagram of the Professional computer appears on your screen. The part of the Professional that has a problem is highlighted in the picture. Write down the numbers you see on the screen. If the top number is 051124 refer to Chapter 7 of the RT-11 System Release Notes for help. Otherwise, refer to your Professional 300 Series Owner's Manual.

## INSTALLING RT-11 ON A PROFESSIONAL 350 COMPUTER

If nothing happens when you turn the power on, refer to the Owner's Manual for help.

RT-11 should respond with the following message if you have successfully bootstrapped the system diskette.

RT-11XM V05.xx

.TYPE V5USER.TXT

RT-11 V5.1

-----

Installation of RT-11 Version 5 is complete and you are now executing from the working volume (provided that you have used the automatic installation procedure). DIGITAL recommends that you verify the proper operation of your system's software by invoking the verification procedure. To do this, enter the command:

IND VERIFY

Note that VERIFY should be performed only after the distribution media have been backed up. This was done as part of automatic installation on RL02 and RX02 based systems, and on the Micro/PDP-11 and the PC325 or PC350. If you have not completed automatic installation, you should perform a manual backup before using VERIFY. Note also that VERIFY is NOT supported on RX01 diskettes or DECTape I or II.

Next, type these commands:

```
.SET TT SCOPE<RET>
.SET TT NOCRLF<RET>
```

### 6.2 INSTALLING SOFTWARE UPDATES

To make sure that RT-11 operates correctly, you must install updated software modules at this point. Update modules are critical to system or component operation. They correct software errors discovered since the last release, and may add new functions to the operating system.

Updated software modules are distributed in update kits. Each kit contains complete software module replacements. Software corrections will already have been installed in the new modules and fully tested. Your only requirement is to copy the new modules from the update kit to your system, using the procedures described in the RT-11 Update User's Guide. Updates are distributed on the same medium on which you received the RT-11 operating system and contain modules for the operating system and layered products.

#### NOTE

If you are installing your system for the first time, you need not update the RT-11 operating system. The RT-11 distribution kit you received contains the most recent modules.

## INSTALLING RT-11 ON A PROFESSIONAL 350 COMPUTER

The RT-11 Software Dispatch Review reports serious problems submitted in SPRs and may provide temporary solutions to use until the module containing the errors is corrected by an update kit.

For a complete description of how to update your software, refer to the RT-11 Update User's Guide.

### 6.3 COPYING THE SYSTEM DISKETTE ONTO THE SYSTEM DISK

Once you have installed software updates, copy the system diskette onto the nonremovable system disk (RD50 or RD51).

You must first use the INITIALIZE command to initialize the nonremovable system disk. Use the /BADBLOCKS option with INITIALIZE to cover any bad blocks that may be on your disk (this prevents the system from trying to use them). If the disk contains bad blocks, the ?DUP-W-Bad blocks detected nnnnnn message appears on the terminal.

```
.INITIALIZE/BADBLOCKS DW0:<RET>
DW0:/Initialize; Are you sure? Y<RET>
?DUP-I-No bad blocks detected DW0:
```

The system scans the disk for bad blocks and creates a new directory. The monitor dot appears when this process is complete.

.

Then, copy the contents of the system diskette onto the disk.

```
.COPY/SYSTEM/NOPROTECT DZ0: DW0:<RET>
```

.

### 6.4 INSTALLING THE BOOTSTRAP ON THE SYSTEM DISK

Once you have copied the contents of the system diskette onto the system disk, you need to install the bootstrap on the system disk.

```
.COPY/BOOT DW0:RT11XM.SYS DW0:<RET>
```

.

This command copies bootstrap information from the monitor file to blocks 0 and 2 through 5 of the same volume. In the command, you identify the device (DW0:) on which resides the monitor that contains the bootstrap information, the name of the monitor file (RT11XM), and the device on which you need to install the bootstrap (DW0:).

Remove the system diskette from Unit 0, and use the hardware bootstrap to boot the system disk. RT-11 should respond with the following message if you have successfully bootstrapped the system disk:

```
RT-11XM V05.xx
(Followed by any start-up file commands.)
```

.

## INSTALLING RT-11 ON A PROFESSIONAL 350 COMPUTER

### 6.5 COPYING THE DISTRIBUTION DISKETTES ONTO THE SYSTEM DISK

The next operation you perform with the running RT-11 system copies the remaining distribution diskettes onto the system disk that will serve as your working system disk.

Insert distribution diskette 2 in Unit 0, and copy all its files to the system disk by typing the command:

```
.COPY/SYSTEM/NO PROTECT DZ0: DW0:<RET>
```

.

Remove the distribution diskette from Unit 0 and store it. Then Repeat this procedure to copy the remaining distribution diskettes onto the system disk. When you have completed copying all distribution diskettes, store them in a safe place.

### 6.6 CREATING THE WORKING SYSTEM FROM CHOSEN COMPONENTS

Once you have chosen your system components (see Section 2.3 of the RT-11 Installation Guide), you can create the working system by deleting selected components from your system disk.

You can use the following command to avoid typing numerous file specifications. RT-11 queries you about all the files on the disk, and you choose the files it deletes.

```
.DELETE/SYSTEM/ ) JEBY DW0:<RET>
```

Files deleted:

```
DW0:aaaaaa.ttt Y<RET> (to delete a specific file)
```

```
DW0:bbbbbb.ttt N<RET> (to retain a specific file)
```

(and so on)

Repeat this procedure to retain only the files you planned for the working system disk.

### 6.7 CUSTOMIZING THE SYSTEM

You may want to make customizations (described in Section 2.7 of the RT-11 Installation Guide) to the distributed RT-11 components. At this point, perform the procedures to implement any software customizations. Table 1-3 of the RT-11 Installation Guide summarizes the available customizations and directs you to the section in Chapter 2 that describes a particular customization and the procedure for implementing it.

#### NOTE

Later, you can perform the system generation procedures to implement additional customizations.

### 6.8 COMPRESSING THE SYSTEM DISK

DIGITAL recommends that you compress the working system disk to make its free space contiguous. Consolidating free space lets you use space on the disk that would otherwise be too fragmented to be usable.

## INSTALLING RT-11 ON A PROFESSIONAL 350 COMPUTER

Use the SQUEEZE command to compress free space. (The volume must be write-enabled.)

```
.SQUEEZE DW0:<RET>
DW0:/Squeeze; Are you sure? Y<RET>
```

```
RT-11xx V05.xx
```

The system automatically reboots when you compress a system disk.

### 6.9 PRESERVING THE WORKING SYSTEM

Once you build a satisfactory working system, DIGITAL recommends that you protect all the files and preserve the system on backup diskettes.

Use the following command to protect all the files on the system disk:

```
.PROTECT/SYSTEM DW0:*. *<RET>
```

Files protected:

```
DW0:aaaaaa.ttt
```

```
DW0:bbbbbb.ttt
```

```
DW0:cccccc.ttt
```

```
.
```

```
.
```

```
.
```

```
DW0:zzzzzz.ttt
```

```
.
```

Insert a blank RX50 diskette in diskette Unit 0 or 1 so you can initialize it. You can use the INITIALIZE command with the /BADBLOCKS option to initialize the diskette and to detect any bad blocks that may be on it. If the diskette contains bad blocks, the ?DUP-W-Bad blocks detected nnnnnn message appears on the terminal. In the command, n is the device unit number.

#### NOTE

DIGITAL recommends that you use only diskettes that have no bad blocks. To ascertain whether an already initialized diskette has bad blocks, use the command DIRECTORY/BAD DZn: where n is the drive number. If bad blocks exist on a diskette, copy the contents of the diskette to an error-free diskette. You can use diskettes with bad blocks later for temporary storage or as work volumes.

```
.INITIALIZE/BADBLOCKS DZn:<RET>
```

```
DZn:/Initialize; Are you sure? Y<RET>
```

```
?DUP-I-No bad blocks detected DZn:
```

There will be a delay while the system scans the diskette for bad blocks and creates a new directory. The monitor dot appears when this process is complete.

```
.
```

Now, remove the newly initialized diskette and initialize an adequate number of blank diskettes, leaving one initialized, blank, write-enabled (write-protect notch uncovered) diskette inserted in Unit 0 or 1.



## INSTALLING RT-11 ON A PROFESSIONAL 350 COMPUTER

Copy all the files in your working system, using the COPY/MULTIVOLUME command below. In the command, n is the device unit number. The system copies all the files from the disk (the input volume) that will fit on the diskette (the output volume). When no more files will fit on the diskette, the system prompts you to mount another output volume and prints the Continue? message.

Mount another blank, initialized diskette, and type Y to continue. Continue to mount diskettes in this fashion until all the files are copied.

```
.COPY/MULTIVOLUME/SYSTEM DW0: DZn:<RET>
```

Files copied:

```
DW0:aaaaaa.ttt to DZn:aaaaaa.ttt
```

```
DW0:bbbbbb.ttt to DZn:bbbbbb.ttt
```

(and so on)

```
Mount next output volume in DZn;; Continue? Y
```

(Log of files copied)

```
Mount next output volume in DZn;; Continue? Y
```

(Log of files copied)

(and so on)

Then, install the bootstrap on any backup working system diskettes that need to be bootable. In the following command, aa is FB or XM.

```
.COPY/BOOT DZn:RT1:aa DZn:<RET>
```

.

Remove each diskette from Unit 0 or 1, and label it "Backup RT-11 V05 x" (where x is the diskette number). Use a soft-tipped pen when you label diskettes. Then, store them in a safe place.

If you ever need to restore the working system, you can copy the backup working system diskettes to DW:

As long as the diskette you intend to copy is bootable and contains certain system utility programs, you can boot RT-11 from that diskette and copy the diskette. Distribution diskette 1 is bootable, but the rest of the diskettes in your kit are not bootable because they lack the necessary components. A bootable diskette needs an appropriate monitor file, a bootstrap, a system device handler, the SWAP.SYS file, and the Professional interface PI(X).SYS.

### 6.10 TESTING THE WORKING SYSTEM

Once you have built and preserved the working system, you can execute the following demonstration to test that system. This demonstration does not serve as a comprehensive system exercise; however, because it uses several major system components, it does serve as a minimal integrity check. Moreover, DIGITAL considers your system officially installed if the demonstration runs without error.

## INSTALLING RT-11 ON A PROFESSIONAL 350 COMPUTER

To execute this demonstration, your working system must include at least the following components.

```
SWAP.SYS
RT11FB.SYS or RT11XM.SYS
DW.SYS or DWX.SYS (system device handler)
PI.SYS or PIX.SYS
LS.SYS or LSX.SYS
KED.SAV
MACRO.SAV
SYSMAC.SML
LINK.SAV
PIP.SAV
DUP.SAV
DIR.SAV
DEMOBG.MAC
DEMOFG.MAC
```

Display the directory of the system volume on the terminal. The directory varies according to your particular working system. As long as a directory prints, you need not worry if it does not match the one in the following example.

```
.DIRECTORY/BRIEF/COLUMNS:1 SY:<RET>
  dd-mmm-yy
SWAP .SYS
RT11FB.SYS
LS .SYS
DW .SYS
PI .SYS
KED .SAV
MACRO .SAV
SYSMAC.SML
LINK .SAV
PIP .SAV
.
.
.
xxx Files, bbb Blocks
fff Free blocks
.
```

### NOTE

If the directory scrolls by too quickly, press the HOLD SCREEN key to stop the display. Press HOLD SCREEN again to continue scrolling.

Before you can execute the background and foreground demonstration programs, you must first edit, assemble, and link the background program, DEMOBG.MAC, and then you must assemble and link the foreground program, DEMOFG.MAC.

#### 6.10.1 Preparing the Background Demonstration Program

To prepare the background demonstration program, DEMOBG.MAC, follow these instructions to edit, assemble, link, and run the program.

## INSTALLING RT-11 ON A PROFESSIONAL 350 COMPUTER

6.10.1.1 **Edit the Background Demonstration Program** - Use a text editor, for example KED.SAV, to modify the background demonstration program, DEMOBSG.MAC. One of the lines in the program contains a message to be printed, but it is preceded by a semicolon (the symbol for a comment field). You must delete the semicolon so the message will print.

If DEMOBSG.MAC is a protected file, remove the protection before making the edits (UNPROTECT SY:DEMOBSG.MAC).

To start KED, type:

```
.KED DEMOBSG.MAC<RET>
```

Once the file is displayed, press the down-arrow key until the cursor rests on top of the semicolon (;) at the beginning of the line:

```
;      .ASCII      /WELL DONE./
```

Delete the semicolon by pressing the comma key (,) on the keypad.

Then, exit the file: press the PFl key, then the 7 key on the keypad. When KED prompts Command:, type EXIT and press the ENTER key:

```
Command:  EXIT<ENTER>
```

6.10.1.2 **Assemble the Background Demonstration Program** - The background program, DEMOBSG.MAC, is an assembly language source file; it must be assembled and linked before you can execute it.

To assemble DEMOBSG.MAC and obtain a listing, make sure that your configuration has a line printer that is on-line and ready.

```
.ASSIGN LS: LST:<RET>
```

.

### NOTE

If your configuration does not include a line printer, use the console terminal.

```
.ASSIGN TT: LST:<RET>
```

.

**Assemble DEMOBSG.MAC as follows:**

```
.MACRO/LIST:LST: DEMOBSG<RET>  
(See Figure 6-2.)
```

If any errors occur when you assemble DEMOBSG.MAC, you have incorrectly edited the file and should repeat the edits as described in Section 6.10.1.1. Use the backup demonstration program.

```
.RENAME SY:DEMOBSG.BAK SY:DEMOBSG.MAC<RET>
```

.

# INSTALLING RT-11 ON A PROFESSIONAL 350 COMPUTER

**Figure 6-2: DEMOBG Assembly Listing**

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```

1          .TITLE DEMOBG
2          .IDENT /V05.00/
3          ; DEMONSTRATION PROGRAM TO PRINT DEMONSTRATION MESSAGE, THEN
4          ; RING BELL IF FG JOB SENDS A MESSAGE.
5
6          .MCALL .RCVDC,.PRINT
7
8 000000   START:: .RCVDC #AREA,#BUFFER,#400,#MSGIN ;POST REQUEST FOR MESSAGE
9 000034   .PRINT #MSG ;PRINT DEMONSTRATION MESSAGE
10 000042 000777 BR      . ;AND LOOP
11
12          ;
13          ; COMPLETION ROUTINE ENTERED WHEN FG SENDS MESSAGE
14 000044   MSGIN: .PRINT #BELL ;RING BELL IN RESPONSE TO MESSAGE
15 000052   .RCVDC #AREA,#BUFFER,#400,#MSGIN ;POST ANOTHER MESSAGE REQUEST
16 000106 000207 RETURN ;AND RETURN FROM COMPLETION ROUTINE
17
18          ;
19          ; ASCII MESSAGES
20 000110 007 200 .NLIST BEX
21          BELL: .BYTE 7,200 ;MESSAGE THAT RINGS BELL
22 000112 122 124 055 MSG: .ASCII /RT-11 DEMONSTRATION PROGRAM/ 15 12
23 000147 111 106 040 .ASCII /IF INCORRECTLY EDITED,THIS IS THE LAST LINE./ 15<12>
24          ; .ASCII /WELL DONE./
25 000225 000 .BYTE 0
26
27 000226   AREA: .BLKW 6 ;EMT ARGUMENT AREA
28 000242   BUFFER: ;RCVDC MESSAGE AREA
29          .END START

```

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Symbol table

```

AREA 000226R      BUFFER 000242R      MSGIN 000044R      ..V1 = 000003      ...V2 = 000027
BELL 000110R      MSG 000112R      START 000000RG

```

```

. ABS. 000000 000 (RW,I,BBL,ABS,OVR)
      000242 001 (RW,I,LCL,REL,CON)
Errors detected: 0

```

\*\*\* Assembler statistics

```

Work file reads: 0
Work file writes: 0
Size of work file: 9188 Words ( 36 Pages)
Size of core pool: 16128 Words ( 63 Pages)
Operating system: RT-11

```

```

Elapsed time: 00:00:05.45
DK:DEMOBG,DK:DEMOBG=DK:DEMOBG

```

6.10.1.3 **Link the Background Demonstration Program** - Link the program DEMOBG.OBJ to produce an executable background program, DEMOBG.SAV.

```
.LINK DEMOBG<RET>
```

6.10.1.4 **Run the Background Demonstration Program** - Run the program DEMOBG to check the results of the first exercise.

```
.RUN DEMOBG<RET>
RT-11 DEMONSTRATION PROGRAM
IF INCORRECTLY EDITED, THIS IS THE LAST LINE.
WELL DONE.
```

If you did not delete the semicolon character, the last line will not print. Return to the monitor by typing two CTRL/Cs.

```
<CTRL/C><CTRL/C>
```

## INSTALLING RT-11 ON A PROFESSIONAL 350 COMPUTER

If you incorrectly edited the file, you can repeat the exercise, although you can continue without correcting the file. If you want to repeat the exercise, begin by using the backup demonstration program.

```
.RENAME SY:DEMOB3.BAK SY:DEMOBG.MAC<RET>  
.
```

Then, repeat the editing procedure (see Section 6.10.1.1).

### 6.10.2 Preparing the Foreground Demonstration Program

To execute the foreground program, you must assemble the program DEMOFG.MAC, link it for the foreground, and then execute it in conjunction with DEMOFG.SAV.

DEMOFG.MAC is a small foreground program that sends a message every 2 seconds to DEMOFG (running in the background), telling it to ring the terminal bell. DEMOFG recognizes those messages and rings the bell once for each message sent.

Although DEMOFG is always active, sending messages to the background every 2 seconds, this exercise can execute other programs in the background besides DEMOFG. The circuit is complete and messages are successfully received and honored only when DEMOFG is active. During those periods when DEMOFG is not running, DEMOFG enters the messages in the monitor message queue. Once you restart DEMOFG in the background, the system immediately releases all the messages queued since the last forced exit, resulting in many successive bell rings. When the queue is empty, the normal send/receive cycle resumes and the bell rings every 2 seconds as each current message is sent and honored.

**6.10.2.1 Assemble the Foreground Demonstration Program** - The foreground demonstration program, DEMOFG.MAC, is an assembly language source file which you must assemble and link before running. Assemble DEMOFG.MAC as follows:

```
.MACRO/LIST:LST: DEMOFG<RET>  
.
```

The output resulting from this MACRO command is an object file called DEMOFG.OBJ which resides on your system volume.

**6.10.2.2 Link the Foreground Demonstration Program** - You must link the DEMOFG.OBJ file to produce an executable program. Use the /FOREGROUND option to produce the load module DEMOFG.REL. The .REL file type tells the system that the file is a foreground program and should be run as a priority job.

```
.LINK/FOREGROUND DEMOFG<RET>  
.
```

## INSTALLING RT-11 ON A PROFESSIONAL 350 COMPUTER

### 6.10.3 Run the Foreground and Background Demonstration Programs

Type the following command to load and start DEMOFG.REL as the foreground job.

```
.FRUN DEMOFG<RET>
```

```
F>
```

```
FOREGROUND DEMONSTRATION PROGRAM  
SENDS A MESSAGE TO THE BACKGROUND PROGRAM DEMOBG  
EVERY 2 SECONDS, TELLING IT TO RING THE BELL.  
<CTRL/B>
```

```
B>
```

DEMOFG.REL is now running and queuing the message for DEMOBG every 2 seconds. Now execute DEMOBG.SAV in the background and receive the messages.

```
.RUN DEMOBG<RET>
```

(The bell rings quickly several times, then once every 2 seconds.)

```
RT-11 DEMONSTRATION PROGRAM  
IF INCORRECTLY EDITED, THIS IS THE LAST LINE.  
WELL DONE.
```

Execute a DIRECTORY command in the background to obtain a directory listing.

```
<CTRL/C><CTRL/C>
```

(The bell stops ringing.)

```
.DIRECTORY<RET>
```

```
dd-mmm-yy
```

(The directory of the device DK prints on the terminal.)

```
.
```

Rerun DEMOBG to collect all the foreground messages queued while the directory was printing.

```
.RUN DEMOBG<RET>
```

(The bell rings several times in rapid succession, then rings once every 2 seconds.)

```
RT-11 DEMONSTRATION PROGRAM  
IF INCORRECTLY EDITED, THIS IS THE LAST LINE.  
WELL DONE.
```

```
<CTRL/C><CTRL/C>
```

```
.
```

(The bell stops ringing.)

Now, stop the foreground program and remove it from memory.

```
<CTRL/F>
```

```
F>
```

```
<CTRL/C><CTRL/C>
```

```
B>
```

```
UNLOAD F<RET>
```

```
.
```

If you completed these exercises without error, your system has passed the minimal test and you can consider it successfully installed.

## INSTALLING RT-11 ON A PROFESSIONAL 350 COMPUTER

### 6.11 PERFORMING THE SYSTEM GENERATION PROCEDURES

If you have decided that you need RT-11 features that are available only if you generate your own monitor(s) and handlers, perform the system generation procedures at this point. You should have thoroughly studied Chapter 1 of the RT-11 Installation Guide to make this decision and to establish that you can perform the system generation procedures on your particular hardware configuration. Read the RT-11 System Generation Guide for guidance in planning and performing system generation.





## CHAPTER 7

### USING RT-11 ON PROFESSIONAL 300 SERIES COMPUTERS

This chapter contains specifics for running RT-11 on a Professional 325 or 350. Included are new media specifications, bootstrap error messages, video terminal operations, and both system monitor and general restrictions. This chapter assumes you are familiar with RT-11 operation.

RT-11 V5.1 lets your terminal emulate the VT100 terminal. Unless otherwise specified, all video programming characteristics and control sequences used with Professional 325 and 350 processors are the same as for the VT100 terminal.

The VT100 User Guide is an excellent source of information for programming transmitted and received video control characters.

#### 7.1 NEW MEDIA SPECIFICATIONS

Media for Professional 300 series computers include RX50 diskettes for the Professional 325, and Winchester hard disk and RX50 diskettes for the Professional 350. The Winchester disk can be an RD50 (5 megabytes) or an RD51 (10 megabytes). RT-11 assigns the following physical device mnemonics, drive unit numbers, and directory segment sizes for each:

Medium	Device Mnemonic	Drive Unit Number(s)	Number (decimal) of Segments in Directory
RX50	DZ	0,1	4
RD50	DW	0	16
RD51	DW	0	32

#### 7.2 BOOTSTRAP SOFTWARE ERROR MESSAGES

If a software bootstrap error occurs when you power-up your system, the octal number 051124 will appear on your screen. Below this will be a second octal number that is the error code. The following table gives the error message assigned to each error code. A complete explanation of each error message is located in the RT-11 System Message Manual. Reference the error message, not the error code number.

## USING RT-11 ON PROFESSIONAL 300 SERIES COMPUTERS

Table 7-1: Bootstrap Error Codes and Messages

Code Number	Error Message
000001	?BOOT-F-No boot on volume
000002	?BOOT-F-Conflicting SYSGEN options
000003	?BOOT-U-Handler file not found
000004	?BOOT-U-Insufficient memory
000005	?BOOT-U-I/O error
000006	?BOOT-U-Monitor file not found
000007	?BOOT-U-No KT-11
000010	?BOOT-U-Swap file too small
000011	?BOOT-U-SWAP.SYS not found
000012	?BOOT-W-Error reading handler

If a problem occurs when you boot your system but the octal number 051124 does not appear on your screen, you have a hardware problem and should consult the Professional 300 Series Owner Manual.

### 7.3 FORMATTING AND INITIALIZING MEDIA

You should not format Professional 325 and 350 diskettes and Winchester hard disks. However diskettes and Winchester hard disks must be initialized and examined for bad blocks before using them for the first time. Type in response to the keyboard monitor prompt (.):

```
.INITIALIZE/BADBLOCKS ddn:
```

where ddn: represents DZ0: or DZ1: for diskette drives, or DW: for the Winchester disk.

Do not use the /REPLACE option when initializing Professional 325 and 350 volumes.

For complete information on the INITIALIZE command, see the RT-11 System User's Guide.

### 7.4 PROFESSIONAL 300 SERIES KEYBOARD AND VIDEO TERMINAL

The RT-11 operating system controls operation of the Professional keyboard and video screen. The following sections describe those operations.

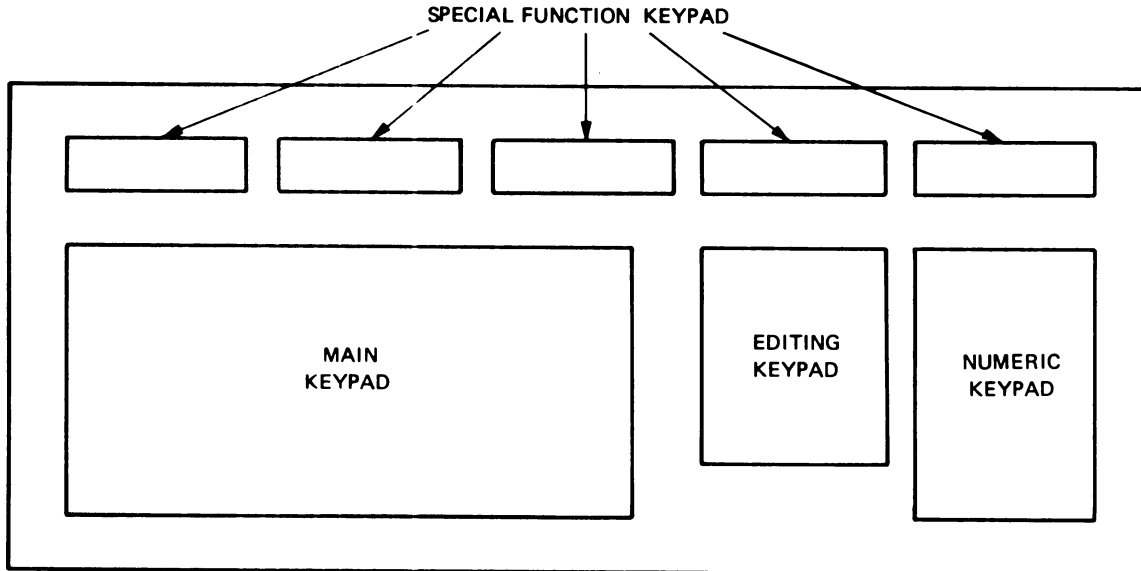
Refer to Chapter 10 for information on setting up Professional series keyboard and video terminal characteristics.

## USING RT-11 ON PROFESSIONAL 300 SERIES COMPUTERS

### 7.4.1 Professional Keyboard

The Professional keyboard has four separate groups of keys. They are the main keypad, editing keypad, numeric keypad, and the special function keypad. Figure 7-1 shows where those keypads are located.

Figure 7-1: Professional Keyboard Simplified Block Diagram



The Professional keyboard operates in normal mode or function key mode.

**7.4.1.1 Normal Mode** - In normal mode, the following keys on the Professional keyboard can be used. All keys used in normal mode except HOLD SCREEN and PRINT SCREEN are also found on the VT100 terminal.

- All main keypad keys except COMPOSE CHARACTER.
- All keys on the numeric keypad.
- Cursor control (arrow) keys on the editing keypad.
- The following special function keypad keys: HOLD SCREEN (F1), PRINT SCREEN (F2), ESCAPE (F11), BACK SPACE (F12), and LINE FEED (F13).

HOLD SCREEN (F1) has the same function as NO SCROLL on the VT100 terminal. Pressing HOLD SCREEN stops screen scrolling as you type or view lines of characters. To resume scrolling, press HOLD SCREEN again.

## USING RT-11 ON PROFESSIONAL 300 SERIES COMPUTERS

PRINT SCREEN (F2) prints a copy of the text from your terminal screen directly on your printer. PRINT SCREEN can not be used to print graphics. The contents of the screen can not be changed while the screen is printing. You must be running the transparent spooling package (SPOOL) under the XM monitor to use PRINT SCREEN.

The following keys do not function in normal mode:

- Special function keys F-3 through F-10, F-14, HELP (F15), DO (F16), and F-17 through F-20.
- Editing keypad keys FIND, INSERT HERE, REMOVE, SELECT, PREV SCREEN, and NEXT SCREEN. Editing functions under RT-11 use the numeric keypad (see the PDP-11 Keypad Editor's User Guide).
- Main keypad key COMPOSE CHARACTER.

**7.4.1.2 Function Key Mode (DECFKM)** - Programs written for the Professional 325 or 350 can place the terminal in function key mode. In function key mode, each special function key sends an assigned control sequence to the processor. The control sequence is not assigned a specific function, but software can be programmed to recognize the control sequence.

A program places the terminal in function key mode by sending the 7-bit escape sequence:

<ESC>[?39h (transmitted as 033 133 077 063 071 150 octal)

A program returns the terminal to normal key mode by sending the 7-bit escape sequence:

<ESC>[?39l (transmitted as 033 133 077 063 071 154 octal)

The following table lists control sequences for the special function keys.

Key	Control Sequence	Key	Control Sequence
F1	<ESC>[11~	DO (F16)	<ESC>[29~
F2	<ESC>[12~	F17	<ESC>[31~
F3	<ESC>[13~	F18	<ESC>[32~
F4	<ESC>[14~	F19	<ESC>[33~
F5	<ESC>[15~	F20	<ESC>[34~

(Continued on next page)

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Key	Control Sequence	Key	Control Sequence
F6	<ESC>[17~	COMPOSE CHARACTER	<ESC>[10~
F7	<ESC>[18~	FIND	<ESC>[1~
F8	<ESC>[19~	INSERT HERE	<ESC>[2~
F9	<ESC>[20~	REMOVE	<ESC>[3~
F10	<ESC>[21~	SELECT	<ESC>[4~
F11	<ESC>[23~	PREV SCREEN	<ESC>[5~
F12	<ESC>[24~	NEXT SCREEN	<ESC>[6~
F13	<ESC>[25~		
F14	<ESC>[26~		
HELP (F15)	<ESC>[28~		

### 7.4.2 Professional Video Terminal

To decrease the possibility of screen burn-out, the video screen goes blank if the terminal is not used for a period of approximately 30 minutes. Restore the screen image by pressing any keyboard key. You lose nothing that was previously displayed on the screen.

The following sections describe operations and escape sequences for implementing operations that are different from, or not found on the VT100 terminal.

**7.4.2.1 Advanced Video Option Emulation** - The Professional 325 and 350 provide a limited emulation of the VT100 implementation of the advanced video option, and use the same escape sequences as the VT100 terminal. Advanced video emulation enhances the screen display of the Professional 325 and 350 with bolding, underlining, and reverse video.

To use the features, type the appropriate escape sequence found in the following table immediately before the text you want enhanced. The features may be combined by separating the escape sequence numeric parameters with a semicolon (;). For example, to indicate that you want the phrase "Every good boy does fine" enhanced with BOLD, UNDERLINE and REVERSE, type:

```
<ESC>[1;4;7mEvery good boy does fine<ESC>[0m
```

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The features are implemented independently, and a feature can be added to another feature or group of features. However, to remove any feature you must remove all features by issuing NORMAL (<ESC>[0m). Any desired character enhancement must then again be specified.

Feature	Escape Sequence	Description
BOLD	<ESC>[1m	Displayed characters are printed on the screen in boldface. BOLD is invalid in 132 column mode.
UNDERLINE	<ESC>[4m	Displayed characters are underlined on the screen.
REVERSE	<ESC>[7m	Reverses the selected character and background representation. For example, light characters on a dark background become dark characters on a light background.
NORMAL	<ESC>[0m	Removes all character enhancement features. Necessary if any feature is to be removed.

The advanced video option BLINK is not supported; BLINK displays as bold.

**7.4.2.2 Text Cursor Mode (DECTCEM)** - Text cursor mode lets a program control whether the cursor is displayed on the video screen. Enabling text cursor mode displays the cursor and is the default. Text cursor mode is necessary when working with text because the cursor shows where the next character will be displayed.

A program places the terminal in text cursor mode by sending the 7-bit escape sequence:

```
<ESC>[?25h (transmitted as 033 133 077 062 065 150 octal)
```

A program takes the terminal out of text cursor mode by sending the 7-bit escape sequence:

```
<ESC>[?25l (transmitted as 033 133 077 062 065 154 octal)
```

You can control the cursor directly using the SETUP CURSOR and SETUP NOCURSOR commands explained in Chapter 10.

**7.4.2.3 Device Attributes (DA)** - A program uses the device attributes request/reply exchange to ask the terminal, "what are you". The response sent by the terminal to the program can identify the terminal as a specific VT100 terminal (the default) or as a nonspecific member of the VT100 series of terminals. The SETUP modes VT100 and GENERIC100 (explained in Chapter 10) determine which of the two responses the terminal sends the program.

## USING RT-11 ON PROFESSIONAL 300 SERIES COMPUTERS

A program can request information on two levels. The primary level DA requests basic compatibility information. The secondary level DA requests the specific version and edit level of the Professional interface (PI).

The terminal reply to primary and secondary DA requests gives this information, and also tells the program which monitor the system is running. The following is a complete DA interchange:

A program requests primary DA by sending the 7-bit escape sequence:

```
<ESC>[c (transmitted as 033 133 143 octal)
```

If the terminal is SETUP VT100, it responds by sending the 7-bit escape sequence:

```
<ESC>[?1;2c (transmitted as 033 133 077 061 073 062 143 octal)
```

If the terminal is SETUP GENERIC100 without 132 column capability (for the Professional series this means running under the FB monitor), it responds by sending the 7-bit escape sequence:

```
<ESC>[?6lc (transmitted as 033 133 077 066 061 143 octal)
```

If the terminal is SETUP GENERIC100 with 132 column capability (for the Professional series this means running under the XM monitor), it responds by sending the 7-bit escape sequence:

```
<ESC>[?61;lc (transmitted as 033 133 077 066 061 073 061 143 octal)
```

A program requests the secondary DA by sending the 7-bit escape sequence:

```
<ESC>[>c (transmitted as 033 133 076 143 octal)
```

If the terminal is operating under the FB monitor, it responds by sending the 7-bit escape sequence:

```
<ESC>[7;Vnnc (transmitted as 033 133 067 073 V nn 143 octal) where  
V is the version number, and nn is the edit number of the  
Professional interface*
```

If the terminal is operating under the XM monitor, it responds by sending the 7-bit escape sequence:

```
<ESC>[8;Vnnc (transmitted as 033 133 070 073 V nn 143 octal) where  
V is the version number, and nn is the edit number of the  
Professional interface*
```

\*For this release of RT-11, V is 5 (065 octal) and nn is 01 (060 061 octal). The values can change with future releases.

### 7.5 RESTRICTIONS

RT-11 V5.1 contains monitor restrictions and general restrictions.

## USING RT-11 ON PROFESSIONAL 300 SERIES COMPUTERS

### 7.5.1 Monitor Restrictions

- Due to memory limitations, the 132 column video mode is not available under the FB monitor.
- PRINT SCREEN can only be used under the XM monitor.
- Due to low memory limitations, you may not be able to use the R or RUN command to run large programs under the XM monitor. If you have difficulty running a program under the XM monitor, you may be able to run the program using V, the virtual run utility.

Some restrictions apply when using V, and V is an unsupported utility. See the description of V in the file UNSUP.TXT on your distribution kit for details and restrictions.

### 7.5.2 General Restrictions

- The SJ monitor is not supported.
- 8-bit ASCII code is not supported.
- Professional 300 series and MICRO/PDP-11 processors can read and write the same RX50 diskettes. However, bootable system volumes are not interchangeable. A bootable system diskette written for the Professional does not boot a MICRO/PDP-11.
- You cannot use ODT (on-line debugging technique) on a Professional 325 or 350. Use VDT (virtual debugging technique) instead.
- Only one RX50 controller module can be used. No additional RX50 diskette drives can be added.
- FILEX does not support P/OS media.
- No input/output (write/read) operation can be addressed to the PI (Professional interface) handler; attempts to do so cause a hard error. PI must be present on the system disk and loaded at all times.
- The Professional 300 series processors do not support split-screen smooth scrolling.
- RT-11 V5.1 does not support the following VT100 control character codes, modes, character sets, or tests, adjustments and reports:

Control Character Codes:

ETX (end of text)

EOT (end of transmission)



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### Modes:

- DECPEX (printer extent mode)
- DECPFF (printer form feed mode)
- SRM (send-receive mode)
- MC (auto print mode)
- Interlace mode
- All VT52 modes

### Character Sets:

- Alternate ROM character set
- Alternate ROM special characters set

### Tests, Adjustments and Reports:

- All DECTST (device diagnostic tests)
- ECLL (load LED)
- DSR (printer)



## CHAPTER 8

### CHANGES TO RT-11 KIT, UTILITIES AND LIBRARIES FOR V5.1

Part I of this manual lists changes to the RT-11 distribution kit, utilities, and libraries. This chapter provides details you need to use the new UCL.SAV program, IND directives, programmed requests, SYSLIB routines, and macros. This chapter also lists new bit definitions and device codes.

#### 8.1 CHANGES TO DISTRIBUTION KIT

This section describes the files added to and removed from the RT-11 distribution kit. Sources for all components (supported and unsupported) are provided on the RT-11 source distribution kit except the following: MACRO, CREF, KED, KEX, K52, VTCOM, SPLIT, SETUP, TRANSF, UCL, SPOOL, PI, and V.

##### 8.1.1 Files Added

The following new files are part of the RT-11 distribution kit:

CONFIG.COM	Automatic system software configuration command file (unsupported)
CNFSVC.SAV	Automatic system software configuration services program (unsupported)
DW.MAC	Winchester disk handler source file for system generation
DW.SYS	Winchester disk handler for FB monitor
DWX.SYS	Winchester disk handler for XM monitor
DZ.MAC	Diskette handler source file for system generation
DZ.SYS	Diskette handler for FB monitor
DZX.SYS	Diskette handler for XM monitor
PI.SYS	Professional interface handler for video, clock and keyboard for FB monitor
PIX.SYS	Professional interface handler for video, clock and keyboard for XM monitor
RT11PI.SYS	Automatic installation monitor for Professional 300 series

## CHANGES TO RT-11 KIT, UTILITIES AND LIBRARIES FOR V5.1

SETUP.SAV	VT100 and Professional terminal setup utility
SPLIT.SAV	File split utility (unsupported)
SP.MAC	Transparent print spooler handler source file for system generation
SP.SYS	Transparent print spooler handler for FB monitor
SPX.SYS	Transparent print spooler handler for XM monitor
SPOOL.REL	Transparent print spooler utility
TRANSF.SAV	File transfer program for VTCOM, to be installed on RT-11 or RTEM-11 host system
UCL.SAV	User command linkage executable image
VBGEXE.SAV	Virtual RUN Utility (unsupported)
VTCOM.REL	Virtual terminal communication and file transfer utility
VTCOM.SAV	Virtual version of VTCOM communication utility, for running under XM monitor
XC.MAC	Professional communication port modem handler source file for system generation
XC.SYS	Professional communication port modem handler for FB monitor
XCX.SYS	Professional communication port modem handler for XM monitor
XL.MAC	DL-11 communication port modem handler source file for system generation
XL.SYS	DL-11 communication port modem handler for FB monitor
XLX.SYS	DL-11 communication port modem handler for XM monitor

### 8.1.2 Files Removed

The following components have been removed from the RT-11 V5.1 binary distribution kit:

HELP.EXE	HELP program executable image, can be created from HELP.SAV using SPLIT utility (see Section 8.1.2.1)
HELP.TXT	HELP text file, can be created from HELP.SAV using SPLIT utility (see Section 8.1.2.1)
LET.MAC	LET program source file (unsupported)
MTYSET.MAC	Autobaud terminal and set characteristics source file
MTYSET.SAV	Autobaud terminal and set characteristics executable program
SEARCH.TEC	Search TECO macro

## CHANGES TO RT-11 KIT, UTILITIES AND LIBRARIES FOR V5.1

SYSMAC.MAC      System macro library source file, can be created from  
                  SYSMAC.SML using SPLIT utility (see Section 8.1.2.2)

TECO.SAV        TECO text editor

TTYSET.MAC     Set terminal characteristics source file

TTYSET.SAV     Set terminal characteristics executable program

**8.1.2.1 Creating HELP.TXT and HELP.EXE from HELP.SAV** - The files HELP.TXT and HELP.EXE are no longer provided on the RT-11 distribution kit. However, you will need these files if you want to change your HELP text as described in Section 2.7.14 of the RT-11 Installation Guide.

You can create HELP.TXT and HELP.EXE from the distributed file HELP.SAV by running the SPLIT utility. Type this CCL command:

```
.SPLIT HELP.EXE,,HELP.TXT=HELP.SAV/B:..HLP1:..HLP2
```

This command creates the files HELP.TXT and HELP.EXE on your default device. The variables ..HLP1 and ..HLP2 represent the boundaries along which to split HELP.SAV. Refer to the file CUSTOM.TXT on your distribution kit for the values to substitute for ..HLP1 and ..HLP2 in the command line. Refer to the file UNSUP.TXT for more information on using the SPLIT utility.

**8.1.2.2 Creating SYSMAC.MAC from SYSMAC.SML** - The file SYSMAC.MAC is no longer provided on the RT-11 distribution kit. However, you will need this file if you want to modify the system macro library.

You can create SYSMAC.MAC from the distributed file SYSMAC.SML by running the SPLIT utility. Type this CCL command:

```
.SPLIT ,SYSMAC.MAC=SYSMAC.SML/B:..SYSM
```

This command creates the file SYSMAC.MAC on your default device. The variable ..SYSM represents the boundary along which to split SYSMAC.SML. Refer to the file CUSTOM.TXT on your distribution kit for the value to substitute for ..SYSM in the command line. Refer to the file UNSUP.TXT for more information on using the SPLIT utility.

## 8.2 DEFINING COMMANDS WITH DISTRIBUTED UCL.SAV

The user command linkage (UCL) feature lets you define your own commands. You can write your own UCL.SAV command parser or you can use the distributed file UCL.SAV.

## CHANGES TO RT-11 KIT, UTILITIES AND LIBRARIES FOR V5.1

### 8.2.1 Command Definition Syntax

To define a command using the distributed UCL.SAV, type a command line with the following syntax:

```
newcommand := oldcommand[/options][\oldcommand\oldcommand...\]
```

where:

**newcommand** represents the name of the new command you want to define. The command name can include up to 16 letters and numbers.

**:=** are the command definition symbols that separate the new command from old commands.

**oldcommand** represents an RT-11 keyboard command or a command you have previously defined with UCL.SAV. To include several old commands in a command definition, separate the old commands with a backslash character (\), and terminate the string of old commands with a double backslash (\). You can include up to four old commands in a command definition. You cannot call indirect files (@filename) in a command definition.

**/options** represents any valid options for that command.

You can type command definitions in response to the keyboard monitor prompt (.), or you can include them in indirect files. Command definitions are stored in the file UCL.DAT on the system disk SY:. As UCL processes and stores command definitions, it prints:

```
?UCL-I-Processing...  
?UCL-I-Successfully entered new command
```

After defining a command, you can use it like any keyboard command in response to the keyboard monitor prompt (.) or in indirect files.

The following defines the new command FILES as the RT-11 keyboard command DIRECTORY including the /VOLUMEID and /COLUMNS:1 options.

```
.FILES := DIRECTORY/VOLUME/COLUMNS:1  
?UCL-I-Processing...  
?UCL-I-Successfully entered new command
```

The FILES command processes the RT-11 keyboard command DIRECTORY/VOLUMEID/COLUMNS:1 to produce a single-column directory listing including volume identification and owner name.

The next example defines the command WHEN using two RT-11 keyboard commands, DATE and TIME.

```
.WHEN := DATE\TIME\
```

### 8.2.2 Defining Command Abbreviations

When you define a command using UCL.SAV, you can choose a command abbreviation by inserting an asterisk (\*) in the command name. Characters in the command name that appear before the asterisk constitute the shortest valid abbreviation for the command.

## CHANGES TO RT-11 KIT, UTILITIES AND LIBRARIES FOR V5.1

For example, the following example defines the new command STATUS, whose shortest valid abbreviation is STAT.

```
.STAT*US ::= SHOW ALL\SHOW QUEUE\
```

### 8.2.3 Displaying Command Definitions

To display a list of UCL commands, run UCL.SAV. The following shows a sample list of UCL commands.

```
.UCL<RET>
                User Command Language (UCL)
FILES           ::= DIRECTORY/VOLUMEID/COLUMNS:1
WHEN            ::= DATE\TIME\
STAT*US        ::= SHOW ALL\SHOW QUEUE\
```

### 8.2.4 Adding Information from a Command Line

Some information that you include in a command, such as a file specification, can change with each command. You plan for this kind of information change by including the append symbol (^) in command definitions. The append symbol (^) lets you tell UCL where to add information given at command time.

For example, the following command definition includes two append symbols where additional information is required.

```
.KILL ::= UNPROTECT ^\DELETE/NOQUERY ^\WHEN\
```

When the KILL command is issued, any text following the word KILL is inserted in place of the append symbols when the command is processed. Suppose you typed this command:

```
.KILL DZ1:*.*
```

The command would perform the following operations:

UNPROTECT DZ1:*.*	Unprotect all files on DZ1:.
DELETE/NOQUERY DZ1:	Delete, without confirmation, all files on DZ1:.
WHEN	Show date and time. Since no append symbol follows the WHEN command, no additional information is included.

## CHANGES TO RT-11 KIT, UTILITIES AND LIBRARIES FOR V5.1

### 8.2.5 Redefining Commands

To redefine a UCL command, type a new command definition. UCL prompts:

```
?UCL-I-Processing...
```

```
Command already exists. Replace, Are you sure?
```

Type Y to replace the old definition with the new one. Type N to keep the old definition and ignore the new one.

### 8.2.6 Deleting Commands

To delete a UCL command, type the command and the definition symbols ::=, and press the RETURN key. For example, the following deletes the command WHEN.

```
.WHEN ::= <RET>
```

UCL prompts:

```
?UCL-I-Processing...
```

```
Delete command; Are you sure?
```

Type Y to delete the command or N to save the command.

## 8.3 IND DIRECTIVES

This section describes three new operating modes (ABORT, CONTROL-Z, and TYPEAHEAD) for the .ENABLE and .DISABLE directives. A change to a fourth operating mode (TIMEOUT) is also described. Although described specifically for the .ENABLE and .DISABLE directives, you can use these operating modes with the .IFENABLED and .IFDISABLED directives as well.

For a full description of the indirect control file processor (IND) and the .ENABLE and .DISABLE directives, see Chapter 5 of the RT-11 System User's Guide.

### 8.3.1 .ENABLE/.DISABLE ABORT

The IND directives .ENABLE ABORT and .DISABLE ABORT enable and disable abort mode. In abort mode, you can abort a control file by typing a double CTRL/C. If you disable abort mode (.DISABLE ABORT), IND ignores CTRL/C characters typed at the terminal. Abort mode remains disabled until the currently executing control file (including control files nested within it) exits or until you issue the .ENABLE ABORT directive. The default setting is .ENABLE ABORT.

Abort mode is global in scope; it remains enabled or disabled throughout all levels of control files until you explicitly change the setting. .DISABLE ABORT is available only if you have included global .SCCA support in your monitor through the system generation process. If you issue the .DISABLE ABORT directive and your monitor does not include global .SCCA support, IND returns the value 0 (for warning) in the special symbol <EXSTAT> when the directive is processed.



## CHANGES TO RT-11 KIT, UTILITIES AND LIBRARIES FOR V5.1

In the following example, double CTRL/C aborts are disabled during an INITIALIZE operation.

```
.ASKS DEV What disk do you want to initialize?
.IF DEV EQ "" .GOTO 10
.;Disable abort so user cannot abort INITIALIZE
.;with double CTRL/C
.DISABLE ABORT
INITIALIZE/BADBLOCKS/NOQUERY 'DEV':
.ENABLE ABORT
.10:
```

Abort mode also enables or disables the ability to abort a control file by typing CTRL/Z in response to an .ASK, .ASKN, or .ASKS directive.

### 8.3.2 .ENABLE/.DISABLE CONTROL-Z

The IND directives .ENABLE CONTROL-Z and .DISABLE CONTROL-Z enable and disable CONTROL-Z mode. When CTRL/Z is enabled, a <CTRL/Z> typed in response to an .ASK, .ASKN, or .ASKS prompt aborts the control file. If you disable CTRL/Z (.DISABLE CONTROL-Z), IND ignores <CTRL/Z> characters typed at the terminal. CTRL/Z remains disabled until the currently executing control file (including control files nested within it) exits or until you issue the .ENABLE CONTROL-Z directive. The default setting is .ENABLE CONTROL-Z.

CONTROL-Z mode is global in scope; it remains enabled or disabled throughout all levels of control files until you explicitly change the setting.

### 8.3.3 .ENABLE/.DISABLE TYPEAHEAD

The IND directives .ENABLE TYPEAHEAD and .DISABLE TYPEAHEAD enable and disable type-ahead mode. When type-ahead is enabled, IND uses characters you type before an .ASK, .ASKN, or .ASKS prompt is printed in the response. If you disable type-ahead (.DISABLE TYPEAHEAD), IND discards characters that have been typed before processing .ASK, .ASKN, and .ASKS directives. Consequently, if you respond to a prompt before IND prints the prompt, your response is discarded. The default setting is .ENABLE TYPEAHEAD.

TYPEAHEAD mode is global in scope; it remains enabled or disabled throughout all levels of control files until you explicitly change the setting.

In the following example, type-ahead is disabled until the directory operation is complete. Therefore, any characters typed before the .ASKS prompt is printed are discarded.

```
.DISABLE TYPEAHEAD
DIR DL:
.;Since typeahead is disabled, an answer to the following
.;question will not be accepted until the directory
.;listing has finished.
.ENABLE TYPEAHEAD .ASKS FILE What file on DL do you want printed?
PRINT 'FILE'
```

## CHANGES TO RT-11 KIT, UTILITIES AND LIBRARIES FOR V5.1

### 8.3.4 .ENABLE/.DISABLE TIMEOUT

If you issue the .ENABLE TIMEOUT directive but your monitor does not include timeout support, IND no longer prints the error message ?IND-W-Timeout support not available. Instead, IND returns the value 0, for warning, in the special symbol <EXSTAT> when the directive is processed.

### 8.4 PROGRAMMED REQUESTS

This section describes changes to the .SCCA and .SPFUN programmed requests.

#### 8.4.1 .SCCA

The .SCCA programmed request:

Inhibits a CTRL/C abort

Indicates when a double CTRL/C is initiated at the keyboard

Distinguishes between single and double CTRL/C commands

CTRL/C characters are placed in the input ring buffer and treated as normal control characters without specific system functions. The request requires a terminal status word address (addr) that is used to report consecutive CTRL/C input sequences. Bit 15 of the status word is set when consecutive CTRL/C characters are detected. The program must clear that bit. An .SCCA request with a status word address of 0 disables the intercept and reenables CTRL/C system action.

Normally, the .SCCA request affects only the job currently running. When the program exits, CTRL/C aborts are automatically reenabled. However, if your FB or XM monitor includes global SCCA support enabled through system generation, you can choose to disable CTRL/C aborts throughout the system for as long as you need. Set the argument type to global (type=global) and set addr to any valid SCCA control word. Thereafter, all CTRL/C aborts will be inhibited until another global .SCCA request is issued to set addr to 0. Only background jobs can issue global .SCCA requests, and these do not affect foreground or system job operation. Global .SCCA requests issued by foreground and system jobs act as local .SCCA requests.

There are two cautions to observe when using global .SCCA:

- The request makes it impossible to terminate program loops from the console; therefore, it should be used only in thoroughly tested, reliable programs.

When .SCCA is in effect and the program enters an infinite loop, the system must be halted and rebootsrapped. The keyboard monitor command ABORT is not inhibited by .SCCA, however, so foreground and system jobs can still be terminated in this manner.

## CHANGES TO RT-11 KIT, UTILITIES AND LIBRARIES FOR V5.1

- CTRL/Cs from indirect command files or indirect control files are not intercepted by the .SCCA.

Macro call: .SCCA area,addr,type=global

where:

area is the address of a two-word parameter block.

addr is the address of a terminal status word (an address of 0 reenables double CTRL/C aborts).

type is the global mode of the SCCA operation.

Request format:

```
R0 ---> area: +-----+
                | 35 | 1 |
                +-----+
                | addr |
                +-----+
```

Errors:

None.

Example:

```
.MCALL .SCCA,.EXIT,.PRINT,.GTLINE
                                           ;Program to prompt for a
                                           ;name. User cannot CTRL/C
                                           ;out until entering name.

START: .SCCA AREA, ADDR,TYPE=GLOBAL      ;Disable Control/C
       .GTLINE NAME, PROMPT              ;Prompt for name
       .SCCA AREA, 0,TYPE=GLOBAL         ;Enable Control/C
       .EXIT

AREA:   .BLKW 4
ADDR:   .WORD
NAME:   .BLKW 12
PROMPT: .ASCII /Enter your name /<200>
       .END START
```

### 8.4.2 .SPFUN

The .SPFUN request is used with certain device handlers for device dependent special functions. It can now be used with RX50 diskette drives (DZ) and RD50/RD51 disk drives (DW) on Professional 300 series computers to allow reading and writing of absolute sectors, and with RD50/RD51 disk drives to determine the disk's size.

Macro call: .SPFUN area,chan,func,buf,wcnt,blk[,crtn]

## CHANGES TO RT-11 KIT, UTILITIES AND LIBRARIES FOR V5.1

where:

- area is the address of a six-word EMT argument block.
- chan is a channel number in the range 0 to 376(octal).
- func is the numerical code of the function to be performed; the code must be negative.
- buf is the buffer address; this parameter must be set to 0 if no buffer is required.
- wcnt is defined in terms of the device handler associated with the specified channel and in terms of the specified special function code.
- blk is also defined in terms of the device handler associated with the specified channel and in terms of the specified special function code.
- crtn is the entry point of a completion routine. If left blank, 0 is automatically inserted. This value is the same for .READ, .READC, and .READW.

0 = wait I/O (.READW)

1 = real time (READ)

Value > 500 = completion routine

Request format:

```

R0 ----> area:  +-----+
                  | 32 | chan |
                  +-----+
                  |  blk  |
                  +-----+
                  |  buf  |
                  +-----+
                  |  wcnt  |
                  +-----+
                  |func| 377 |
                  +-----+
                  |  crtn  |
                  +-----+
    
```

The following table lists functions and function codes for Professional series RX50 diskettes and RD50/RD51 disks.

Function	Function Codes	
	DW	DZ
Read	377	377
Write	376	376
Return device size	373	

To use the .SPFUN request, the handler must be in memory and a channel must be associated with the handler file via a non-file-structured .LOOKUP request. For more general information on the .SPFUN request, see Section 2.83 in the RT-11 Programmer's Reference Manual. The following sections describe details for using the special functions.

## CHANGES TO RT-11 KIT, UTILITIES AND LIBRARIES FOR V5.1

### 8.4.2.1 DW and DZ - Read and Write Absolute Sector Arguments - When using .SPFUN 376 and 377 with DW or DZ:

wcnt is the track to be read or written.  
blk is the sector.  
buf is the address of a 256-word buffer.

### 8.4.2.2 DW - Return Device Size Argument - When using .SPFUN 373 with DW:

chan is the channel on which DW was opened with .LOOKUP.  
buf is the address of a one-word buffer in which the size of the volume is returned: 9727(decimal) blocks for an RD50, 19519(decimal) blocks for an RD51.  
wcnt should be set to 1.  
blk is not used and should be set to 0.

## 8.5 SYSLIB ROUTINES ISPFN, ISPFNC, ISPFNF, AND ISPFNW

The subroutines ISPFN, ISPFNC, ISPFNF, and ISPFNW are used with certain device handlers for device dependent special functions. They can now be used with RX50 diskette drives (DZ) and RD50/RD51 disk drives (DW) for reading and writing absolute sectors, and with RD50/RD51 drives to determine the volume size.

Forms: i = ISPFN (code,chan[,wcnt,buffer,blk])  
i = ISPFNC (code,chan,wcnt,buffer,blk,crtm)  
i = ISPFNF (code,chan,wcnt,buffer,blk,area,crtm)  
i = ISPFNW (code,chan[,wcnt,buffer,blk])

where:

code is the numeric code of the function to be performed (see following table).  
chan is an RT-11 channel to be used for the operation. You must obtain this channel through an IGETC call, or you can use channel 16(decimal) or higher if you have issued an ICDFN call.  
wcnt is the integer number of data words in the operation. The default value is 0.  
buffer is the array to be used as the data buffer. The default value is 0.  
blk is the integer block number of the file to be operated on. The default value is 0.  
crtm is the name of a completion routine. For ISPFNC, it is an assembly language completion routine. For ISPFNF, it is the name of a FORTRAN routine. The name must be specified in an EXTERNAL statement in the FORTRAN routine that issues the call to the subroutine.

## CHANGES TO RT-11 KIT, UTILITIES AND LIBRARIES FOR V5.1

area is a four-word area to be set aside for linkage information; the area must not be modified by the FORTRAN program, and the USR must not swap over it. The area can be reclaimed by other FORTRAN completion functions when crtn is activated.

The following table lists functions and function codes for Professional series RX50 diskettes and RD50/RD51 disks.

Function	Function Codes	
	DW	DZ
Read	377	377
Write	376	376
Return device size	373	

To use the subroutines, the handler must be in memory and a channel must be associated with the handler file via a non-file-structured LOOKUP call. For more general information on the the subroutines, see Section 3.55 in the RT-11 Programmer's Reference Manual. The following sections describe details for using the special functions.

### 8.5.1 DW and DZ - Read and Write Absolute Sector Arguments

When using special function 376 and 377 with DW or DZ:

wcnt is the track to be read or written.  
blk is the sector.  
buf is the address of a 256-word buffer.

### 8.5.2 DW - Return Device Size Argument

When using special function 373 with DW:

chan is the channel on which DW was opened with .LOOKUP.  
buf is the address of a one-word buffer in which the size of the volume will be returned: 9727(decimal) blocks for an RD50, 19519(decimal) blocks for an RD51.  
wcnt should be set to 1.  
blk is not used and should be set to 0.

### 8.6 MACROS ADDED TO SYSMAC.SML

This section describes the macros that have been added to SYSMAC.SML: .ADDR, .ASSUME, .BR, .DRINS, and SOB.

## CHANGES TO RT-11 KIT, UTILITIES AND LIBRARIES FOR V5.1

### 8.6.1 .ADDR

The `.ADDR` macro computes the address you specify in a position-independent manner.

The `.ADDR` macro has the following syntax:

```
.ADDR adr,reg,push
```

where:

`adr` is the label of the address to compute, expressed as an immediate value with a number sign (#) before the label.

`reg` is the register in which to store the computed address, expressed as a register reference `Rn` or `@Rn`. To store the address on the stack, use `@SP` or `-(SP)`. The following register references are valid:

R1	@R1	@SP
R2	@R2	-(SP)
R3	@R3	
R4	@R4	
R5	@R5	
	@R6	

`push` determines what to do with the original contents of the register. If you omit `push`, the computed address overwrites the register contents. If you use `ADD` for the `push` argument, the computed address is added to the original contents of the register. If you use `PUSH` for the `push` argument, the register contents are pushed onto the stack before the computed address is stored in the register.

If you use `-(SP)` for the argument `reg` and you omit the `push` argument, `PUSH` is automatically used.

The following sample lines from a program show all three uses of the `.ADDR` macro.

```
.ADDR    #ABC,R0           ;LOAD ADDRESS OF ABC IN R0
.ADDR    #ABC,R0,ADD       ;ADD ADDRESS OF LABEL TO CONTENTS
                          ;OF R0
.ADDR    #ABC,R0,PUSH     ;PUSH CONTENTS OF R0 ONTO STACK,
                          ;THEN LOAD ADDRESS OF ABC IN R0
```

### 8.6.2 .ASSUME

The `.ASSUME` macro tests for a condition you specify. If the test is false, `MACRO` generates an assembly error and prints a descriptive message.

## CHANGES TO RT-11 KIT, UTILITIES AND LIBRARIES FOR V5.1

The .ASSUME macro has the following syntax:

```
.ASSUME a rel c [message=text]
```

where:

a is an expression.  
c is an expression.  
rel is the relationship between a and c you want to test.  
text is the message you want MACRO to print if the condition you specified in the relationship between a and c is false. To specify your own error message, start the message with a semicolon (;), or start with a valid assembly expression followed by a semicolon (;) and the message. If you omit the message argument, the error message "a REL c IS NOT TRUE" prints; the expressions you used appear in the message in place of a and c.

In the following example, if the location counter (.) is less than 1000, MACRO generates an assembly error and prints the message 1000 - .; LOCATION TOO HIGH.

```
.ASSUME . LT 1000 MESSAGE=<1000-.;LOCATION TOO HIGH>
```

### 8.6.3 .BR

The .BR macro warns you if code that belongs together is separated during assembly. When you call the .BR macro, you specify an address as an argument. .BR checks that the next address matches the address you specified in the .BR macro. If it does not, MACRO prints the error message Error; not at location "adr". The location you specified in the .BR macro appears in place of adr in the message.

The .BR macro has the following syntax:

```
.BR adr
```

where adr is the address you want to test.

In the following example, MACRO tests the location that follows the .BR macro. Since the address does not match the address ABC, MACRO prints an error message.

```
.BR      ABC                ;TEST THE NEXT ADDRESS FOR ABC  
FOO:  
      .  
      .  
      .  
      .  
ABC:
```



## CHANGES TO RT-11 KIT, UTILITIES AND LIBRARIES FOR V5.1

In the next example, no error occurs:

```
.BR DEF
DEF:
    .
    .
    .
    .
```

### 8.6.4 .DRINS

The .DRINS macro sets up the installation code area in block 0 of a device handler. The .DRINS macro defines addresses that contain the CSR addresses listed by RESORC (display CSRs) and the CSR checked by the INSTALL keyboard command. The .DRINS macro also defines the system and data device installation entry points.

The .DRINS macro has the following syntax:

```
.DRINS name,<csr,csr,...>
```

where:

name	represents the two-letter device mnemonic for the device whose handler installation code you are setting up.
csr	represents a symbolic CSR address for that device. If more than one display CSR exists, separate them with commas and enclose the list in angle brackets (<>). With multiple display CSRs, you do not have to list the first CSR.

When the .DRINS macro is processed, the following addresses are defined based on the CSR addresses you supply.

INSCSR	Installation check CSR
DISCSR	First display CSR
DISCSn	Subsequent display CSRs if any exist (n begins at 2 and is incremented by 1 for each subsequent display CSR)

In addition, the .DRINS macro sets the location counter to 200 (INSDAT =: 200) for the data device installation entry point, and to 202 (INSSYS =: 202) for the system device installation entry point.

## CHANGES TO RT-11 KIT, UTILITIES AND LIBRARIES FOR V5.1

The following example shows the installation code generated by a .DRINS macro used for a DX handler with two controllers.

```
.DRINS    DX,<DX$CS2>           ;GENERATE INSTALLATION CODE
                                     ;FOR TWO-CONTROLLER RX01

.=172
        .WORD    0                ;END OF LIST
DISCS2:  .WORD    DX$CS2           ;SECONDARY DISPLAY CSR
DISCSR:  .WORD    DX$CSR          ;PRIMARY DISPLAY CSR
INSCSR:  .WORD    DX$CSR          ;INSTALL CSR
INSDAT:
.=202
INSSYS:
.=200
```

The next example shows the installation code generated by a .DRINS macro used for a DU handler with three controllers.

```
.DRINS    DU,<DU$CS2,DU$CS3>    ;GENERATE INSTALLATION CODE
                                     ;FOR THREE-CONTROLLER
                                     ;MSCP DEVICE

.=170
        .WORD    0                ;END OF LIST
DISCS3:  .WORD    DU$CS3          ;THIRD DISPLAY CSR
DISCS2:  .WORD    DU$CS2          ;SECOND DISPLAY CSR
DISCSR:  .WORD    DU$CSR          ;FIRST DISPLAY CSR
INSCSR:  .WORD    DU$CSR          ;INSTALL CSR
INSDAT:
.=202
INSSYS:
.=200
```

### 8.6.5 SOB

The SOB macro simulates the SOB instruction (subtract one and branch if not equal) by generating the code:

```
DEC register
BNE location
```

You can use the SOB macro on all processors, but it is especially useful for processors that do not have the hardware SOB instruction. If you are running on a processor that supports the SOB instruction, simply eliminate the MACRO call to SOB (.MCALL SOB), and the SOB instruction executes.

The SOB macro has the following syntax:

```
SOB reg,adr
```

where:

reg is the register whose contents will be decremented by 1.  
adr is the location to branch to if the register contents do not equal 0 after the decrement.

## CHANGES TO RT-11 KIT, UTILITIES AND LIBRARIES FOR V5.1

In the following example, register R0 is decremented by 1 and then tested. If the contents do not equal 0, the program branches to the label HERE.

```
SOB      R0,HERE
      .
      .
      .
```

### 8.7 RT-11 REFERENCES

This section lists new device codes and bit definitions.

#### 8.7.1 Device Codes

The following device codes have been assigned to the DW, DZ, PI, SP, XC, and XL handlers.

Name	Code	Device
DZ.	52	RX50 diskette (Professional 325/350)
DW	53	RD50/RD51 disk (Professional 350)
PI	54	Professional interface
SP	55	Transparent spooler
XC/XL	57	Communication port (Professional 325/350 or DL(V)-11)

#### 8.7.2 Bit Definitions

This section lists new bit definitions in RMON fixed offset 300 (CONFIG), 370 (CONFIG2), 372 (SYSGEN), 414 (SPSTAT), and 417 (INDSTA).

##### Configuration Word (RMON Fixed Offset 300)

Word Name	RMON Fixed Offset	Bit Name	Bit Mask	Meaning
CONFIG	300	GSCCA\$	010000	Global SCCA support in monitor
CONFIG2	370	PROSS\$	200000	RT-11 running on Professional series computer
SYSGEN	372	FPULL\$	000400	FPU support selected during system generation

CHANGES TO RT-11 KIT, UTILITIES AND LIBRARIES FOR V5.1

SPSTAT	414	NEXT	000010	Move to start of next file
		OFF	000020	Set spooler unit off
		ON	000040	Set spooler unit on
		KILL	000100	Remove spooled output from work file
		ACTIVE	000200	Spooler active
		SHOW	004000	Display spooler status
		PRTSCR	010000	Print screen (Professional 300 series only)
		DATIME	020000	Date and time request for flag pages
		INTEN	040000	Fake interrupt enable
		ERROR	100000	Error bit (set by SPOOL)
INDSTA	417		000001	Reserved
			000002	Reserved
		CC\$IND	000004	Set if double CTRL/C abort is enabled
		CC\$GBL	000010	Set if global SCCA support is enabled

## CHAPTER 9

### RT-11 SYSTEM GENERATION

Several changes have been made to the RT-11 system generation procedures for Version 5.1. Section 9.1 describes the changes. Section 9.2 contains a reprint of the new system generation dialog including help text. Section 9.3 lists new system conditionals. Section 9.4 describes restrictions for performing a system generation on a Professional 325 computer.

#### 9.1 CHANGES TO SYSTEM GENERATION

Changes to the RT-11 system generation procedures for Version 5.1 include:

- Global SCCA support
- Removal of the BASIC keyboard command
- Device support for the Professional 300 series clock, device handlers, and printer port
- Device support for the new transparent spooling utility (SPOOL) and virtual terminal communication utility (VTCOM)
- A new method for defining system conditionals during system generation
- The ability to use logical device names for the system build procedure

These changes are described in the following sections.

##### 9.1.1 Global SCCA Support

The .SCCA programmed request causes the system to ignore all CTRL/C characters until the program currently running exits. This protects a program from being aborted with double CTRL/Cs. The new global SCCA feature lets you tell the system to ignore all CTRL/C characters until you specifically reenable them, even after the program exits.

A question in the system generation dialog asks if you want to include global SCCA support in the monitor you are generating. Respond YES to include global SCCA support or NO if you do not want it included. This option adds approximately 64(decimal) words to the monitor.

You must choose global SCCA support to use the IND directives .ENABLE ABORT and .DISABLE ABORT.

## RT-11 SYSTEM GENERATION

Section 8.4.1 of this manual describes how to use the global SCCA feature.

### 9.1.2 BASIC Command Removed

The BASIC command has been removed from the list of keyboard monitor commands, and BASI\$\$ has been removed from the list of keyboard command conditionals. The BASIC command belonged to the LANGUAGE subset of keyboard monitor commands you could choose during system generation. To call BASIC, type:

```
.BASIC<RET>
```

### 9.1.3 Professional Series Computer Clock Support

Professional series computers include no 50 or 60 hertz line clock, as do PDP-11 and PDT-11/150 computers. However, RT-11 supports the Professional power-of-two clock as though it were a 60 hertz line clock. If you are running on a Professional 325 or 350, 60 hertz clock support will be selected when you bootstrap the system no matter which clock speed (50 or 60 hertz) you choose during system generation. The clock will function correctly even in a 50 hertz environment (such as Europe).

### 9.1.4 New Device Support

The system generation dialog lets you choose support for the following new devices:

- DW RD50/RD51 Winchester disk drive for the Professional 350
- DZ RX50 diskette drive for the Professional 325 and 350
- SP Transparent spool package pseudohandler
- XC Virtual terminal communication package pseudohandler for the Professional 300 series communication port
- XL Virtual terminal communication package pseudohandler for DL(V)-11 ports

### 9.1.5 Virtual Terminal Communication Package Support

If you choose to support the XL handler, the system generation dialog asks you for the CSR and vector addresses of your DL-11 or DLV-11 interface:

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

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

Respond with the appropriate CSR and vector addresses. The default (octal) addresses appear in parentheses. The field service representative who installed your hardware system is responsible for supplying you with a written record of addresses at which he or she installed each device.

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If the target system is a Professional 300 series computer, choose XC rather than XL. If you choose XC, the default CSR and vector addresses (173300 and 210 respectively) are used.

### 9.1.6 Professional Printer Port Support

The distributed LS handler includes support for the Professional computer printer port. The system generation dialog lets you choose support for the Professional printer port:

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

Respond YES if you plan to use the LS handler with the Professional computer printer port. Otherwise, respond NO. Excluding Professional printer port support saves approximately 60(octal) words in the LS handler.

The dialog next asks for the CSR and vector addresses of the serial line printer. If you answered YES to question 133, the default CSR is 173400, and the default vector is 220. If you answered no, the defaults are 176500 and 300.

### 9.1.7 Defining Other System Conditionals

Some system conditionals are not set as a result of the system generation dialog. For example, there is no system generation question that asks if you want idle-loop light support; therefore, the LIGH\$T conditional is not set by a response to a system generation question. However, the system generation dialog lets you define these system conditionals during the system generation session. This feature prevents you from ever having to edit a system generation .ANS or .CND file, since the definitions will be included in both files.

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

If you have no system conditionals to define, respond NO.

Respond YES if you want to define other system conditionals. The dialog then prompts you to define the conditionals:

69. Enter the system conditional and value:

Type the conditional and value in this format:

```
CONDITIONAL = VALUE
```

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

```
LIGH$T = 1<RET>
```

Type a question mark (?) to list all the conditionals you have defined in this manner. Type a period (.) followed by a carriage return when you are through defining conditionals.

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### 9.1.8 Logical Device Names for System Module Builds

When you have chosen all the features you want to include by answering the system generation questions, your system monitors and handlers are built. Other system generation questions require that you specify an input device for source files, and output devices for the resulting binary files and monitor link maps.

When the dialog asks you to specify your input and output devices, you can respond with a physical device name or a logical device name. Prior to Version 5.1, only physical device names could be specified.

## 9.2 SYSTEM GENERATION DIALOG

This section contains the new system generation dialog including help text. Some questions may appear to be out of sequence. This occurs because the system generation program asks some questions only if you give certain answers to other questions. Therefore, SYSGEN may not ask you all the questions shown in this dialog. Not all numbers are used in the system generation dialog; these numbers are reserved for future use.

### RT-11 SYSTEM GENERATION PROGRAM V5

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

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

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

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

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

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



## RT-11 SYSTEM GENERATION

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

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

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

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

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

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

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

ddn:filnam.typ

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

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

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

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

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

ddn:filnam.typ

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

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

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

## RT-11 SYSTEM GENERATION

\*\*\*\*\*  
MONITOR TYPE  
\*\*\*\*\*

1. Do you want the single-job (SJ) monitor (Y)?

### SINGLE-JOB MONITOR:

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

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

### FOREGROUND/BACKGROUND MONITOR:

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

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

### EXTENDED MEMORY MONITOR:

The extended memory (XM) monitor, which supports up to 124K words of memory, is a version of the FB monitor. It requires KT11 hardware (the memory management unit) and the extended instruction set (EIS). The XM monitor supports additional programmed requests that allow you to extend a program's logical addressing space. However, the XM monitor is larger than the FB monitor and requires that the user service routine (USR) be resident.

\*\*\*\*\*  
MONITOR OPTIONS  
\*\*\*\*\*

4. Do you want timer support in the SJ monitor (N)?

### SJ TIMER SUPPORT OPTION:

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

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

### DEVICE TIME-OUT SUPPORT OPTION:

The device time-out option permits device handlers to issue .MRKT (mark time) programmed requests. DECNET support requires this option.

## RT-11 SYSTEM GENERATION

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

### ERROR MESSAGE ON SYSTEM I/O ERRORS OPTION:

The SJ monitor normally halts if a fatal system I/O error occurs. You can replace this halt with a system error message. DIGITAL highly recommends this option if the system will be used by anyone but the most experienced individuals.

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

### SYSTEM JOB OPTION:

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

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

### SAVE/SET MAIN-LINE PC AND PS OPTION:

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

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

### GLOBAL SCCA SUPPORT OPTION

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

10. Do you want multiterminal support (N)?

### MULTITERMINAL SUPPORT OPTION:

The multiterminal option lets you use special programmed requests to do I/O to more than one terminal. RT-11 normally supports only one terminal interfaced through the console (DL11) which is shared by both background and foreground jobs. You can select multiterminal support for up to 16 terminals interfaced through a choice of DL11 and DZ11 interfaces. Subsequent questions will establish the number and type of interfaces. Note that if you choose multiterminal support your system cannot support VT11 or VS60 graphics.

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

### ASYNCHRONOUS TERMINAL STATUS OPTION:

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

## RT-11 SYSTEM GENERATION

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

**MULTITERMINAL TIME-OUT OPTION:**

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

13. Enter the size of the output buffers (40):

**OUTPUT RING BUFFER SIZE OPTION:**

The RT-11 terminal service requires a set of output ring buffers for each supported terminal. The output ring is a buffer in the monitor that holds characters until the terminal can print them. (A program can send characters faster than a terminal can print them.)

14. Enter the size of the input buffers (134):

**INPUT RING BUFFER SIZE OPTION:**

The RT-11 terminal service requires a set of input ring buffers for each terminal supported. The input ring is a buffer in the monitor that holds the characters that you type at a terminal until a program requests them. You may want to change the input ring size, in particular, since the size you need depends on the terminal's width and the amount of type-ahead you expect.

15. Do you want to use the .FETCH request under XM (Y)?

**.FETCH REQUEST OPTION:**

If you choose .FETCH support under XM, then device handlers can be fetched by user background programs. Also, pre-Version 5 programs which do not use the form of the .PROTECT directive which includes automatic vector setup must be modified to do so. If you do not select this option, all in-line service routines would, as in Version 4, have to remain clear of the memory mapped by kernel APR 1 and handlers must be loaded before use.

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

**MONTH ROLLOVER OPTION:**

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

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

**USER COMMAND LINKAGE OPTION:**

The user command linkage allows you to define your own commands which can be issued in a format similar to the standard DCL commands.

## RT-11 SYSTEM GENERATION

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

### HIGH SPEED RING BUFFER OPTION:

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

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

### KEYBOARD MONITOR COMMANDS OPTION:

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

23. Do you want the UTILITY subset (Y)?

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

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

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

24. Do you want the LANGUAGE subset (Y)?

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

COMPILE	DIBOL	EXECUTE	
FORTTRAN	LIBRARY	LINK	MACRO

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

## RT-11 SYSTEM GENERATION

25. Do you want the MINIMAL subset (Y)?

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

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

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

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

### 50 HZ CLOCK OPTION:

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

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

### PROGRAMMABLE CLOCK AS SYSTEM CLOCK OPTION:

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

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

### STARTUP INDIRECT COMMAND FILE OPTION:

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

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

### FLOATING POINT OPTION:

If your configuration includes floating point hardware and your application requires this feature, you should enable this option. Floating point hardware is available for many PDP-11 and Professional 300 series processors. This is especially useful for FORTRAN and BASIC users whose applications perform data manipulations.

## RT-11 SYSTEM GENERATION

32. Do you want memory parity support (N)?

**MEMORY PARITY SUPPORT OPTION:**

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

33. Do you want power failure messages (N)?

**POWER FAILURE MESSAGE OPTION:**

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

34. Do you want BATCH support (N)?

**BATCH SUPPORT OPTION:**

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

35. Do you want error logging (N)?

**ERROR LOGGING OPTION:**

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

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

**NUMBER OF UNITS SUPPORTED BY ERROR LOGGING OPTION:**

The error logger can handle up to 34 individual device units. You can conserve space by reducing the number of units the logger can handle to the specific number of supported units in the target configuration.

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

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

RT-11 SYSTEM GENERATION

Enter system conditional definition in the form

symbol = value

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

69. Enter the system conditional and value:

Enter the system conditional definition as you want it to appear in the system conditional (.CND) file. For example:

PDT\$OP = 1 ; Generate PDT optimal code

\*\*\*\*\*  
 DEVICE OPTIONS  
 \*\*\*\*\*

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

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

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

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

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

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

The <RX01/02 diskette or TU58 cartridge> subsystem supports only two drives for each controller. If your system contains four diskette drives, a second controller governs the third and fourth units, and you must select RT-11 support for it.

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

The RX02 diskette supports both single and double densities by default. If you select double-density only support, you can slightly improve the performance and reduce the size of the device handler.

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

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



## RT-11 SYSTEM GENERATION

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

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

104. How many disk platters are installed on the RF11 (1)?

Respond with the number (decimal) of RF11 platters included in your RF11 subsystem. The range of valid responses is from 1 to 8.

105. Do you want RJS03 rather than RJS04 support (Y)?

Type Y if your target system includes an RJS03 disk subsystem rather than an RJS04.

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

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

107. Do you want RPR02 rather than RPR02/RP03 support (N)?

Type Y if your target system includes an RPR02 disk subsystem rather than RPR02/RP03.

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

Enter the number of ports you want the MSCP disk class handler to support.

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

Type Y if you want banner page support to be included in the SPOOL handler.

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

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

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

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

122. What is the address of the <nth> unit (nnnnn)?

Each TS11 unit requires two contiguous unibus addresses for status registers. Enter the address (octal) of the <nth> unit. The range of valid responses is from 160000 to 177570.

## RT-11 SYSTEM GENERATION

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

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

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

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

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

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

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

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

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

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

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

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

### NOTE

If you answered YES to question 133, the default CSR is 173400. If you answered no, the default CSR is 176500.

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

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

### NOTE

If you answered YES to question 133, the default vector is 220. If you answered no, the default vector is 300.

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

Enter the CSR address (octal) of XL.

**RT-11 SYSTEM GENERATION**

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

Enter the vector address (octal) of XL.

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

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

Type <ESCAPE> <RETURN> for help.

Type ?<RETURN> to list all devices.

Type .<RETURN> when device specification is complete.

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

Enter the 2 character device name for the device for which you are supplying a device handler.

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

EXTRA DEVICE SLOT OPTION:

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

\*\*\*\*\*  
GRAPHICS OPTIONS  
\*\*\*\*\*

170. Do you want VT11 or VS60 graphics support (N)?

Type Y if your target configuration includes a VT11 or VS60 graphics subsystem. RT-11 support for VS60 is minimal. The display handler, VTHDLR, supports VT11 but does not support any special features of VS60.

171. Do you want VS60 support (N)?

Type Y if the graphics subsystem is VS60.

172. What is the CSR address for the VT11/VS60 (172000)?

The CSR addresses can be floating. The presence or absence of such floating address devices affects the addresses at which the other floating address devices in the system are installed. Floating address devices must be installed in a standard sequence.

The standard VT11/VS60 CSR address is 172000. However, VT11/VS60s can use floating addresses. If your VT11/VS60 is installed at nonstandard CSR addresses, supply the correct value. The valid range for responses is from 160000 to 177570.

## RT-11 SYSTEM GENERATION

173. What is the vector address for the VT11/VS60 (320)?

Many devices have floating vector addresses. The presence or absence of such floating address devices affects the addresses at which the other floating address devices in the system are installed. Floating address devices must be installed in a standard sequence.

The standard VT11/VS60 vector address is 320. However, VT11/VS60s can use floating addresses. If your VT11/VS60 is installed at nonstandard vector addresses, supply the correct value. The range for valid responses is from 100 to 474.

\*\*\*\*\*  
                  TERMINAL INTERFACE OPTIONS  
\*\*\*\*\*

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

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

The terminal interface options allow you to select RT-11 support for the terminal interfaces installed in your system. RT-11 supports a combination of serial asynchronous interfaces, which include the DLV11, DLV11-E, DLV11-F, DLV11-J, and the DL11 series. It also supports DL11-E and DLV11-E interfaces, with modem capabilities.

The dialog asks first for the number of local DL11 lines, then the number of remote DL11 lines. The total number of lines is the sum of local and remote lines and must not exceed 8 lines. SYSGEN assigns physical unit numbers of the DL11 lines first to local lines and then to remote lines. This assignment is permanent and you cannot change its order.

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

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

180. How many local DL11 lines, including the console, are to be supported (1)?

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

## RT-11 SYSTEM GENERATION

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

Enter the total number of REMOTE DL11 terminals included in the target configuration. Do not include LOCAL DL11 lines in this number. This response must not be greater than 7.

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

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

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

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

184. Do you want DZ11 or DZV11 multiplexer support (N)?

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

185. Do you want DZ11 multiplexer support (Y)?

Type Y if your configuration includes a DZ11 multiplexer.

186. How many DZ multiplexers are to be supported (1)?

Enter the number of DZ multiplexers in the target configuration.

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

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

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

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

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

189. What is the CSR for the <nth> DZ multiplexer (nnnnnn)?

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

190. What is the vector for the <nth> DZ multiplexer (nnn)?

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

## RT-11 SYSTEM GENERATION

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

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

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

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

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

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

What question number do you want re-asked?

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

The monitor option questions which you may change are:

- |                                     |                                   |
|-------------------------------------|-----------------------------------|
| 4. SJ timer support                 | 20. User command linkage          |
| 5. Device timeout support           | 21. High speed ring buffer        |
| 6. System I/O error messages        | 22. Keyboard monitor commands     |
| 7. System job support               | 26. 50 Hz clock                   |
| 8. .SPCPS request                   | 27. KW11-P as system clock        |
| 9. Global SCCA support              | 30. Startup command file          |
| 11. Asynchronous terminal status    | 31. Floating point support        |
| 12. Multiterminal timeout support   | 32. Memory parity support         |
| 13. Output buffer size              | 33. Power failure message         |
| 14. Input buffer size               | 34. Batch support                 |
| 15. .FETCH request under XM         | 35. Error logging                 |
| 16. Month and year rollover support | 160. Number of empty device slots |
|                                     | 170. VT11/VS60 graphics           |

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

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

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

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

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

What device do you NOT want supported?

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

**RT-11 SYSTEM GENERATION**

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

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

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

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

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

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

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

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

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

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

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

SYSTEM BUILD:  
The SYSGEN assembling and linking process requires a source input device and a binary output device, as well as an output device for monitor link maps. The name you specify can be either a physical or logical name (for example, RK1, DP4, BLD, etc.). For more explanation, see the RT-11 SYSTEM GENERATION GUIDE.

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

SYSTEM BUILD:  
The SYSGEN assembling and linking process requires a source input device and a binary output device, as well as an output device for monitor link maps. The name you specify can be either a physical or logical name (for example, RK1, DP4, BLD, etc.). For more explanation, see the RT-11 SYSTEM GENERATION GUIDE.

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

SYSTEM BUILD:  
The SYSGEN assembling and linking process requires a source input device and a binary output device, as well as an output device for monitor link maps. The name you specify can be either a physical or logical name (for example, RK1, DP4, BLD, etc.). For more explanation, see the RT-11 SYSTEM GENERATION GUIDE.

## RT-11 SYSTEM GENERATION

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

### RETAIN SYSTEM OBJS:

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

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

### RETAIN SYSGEN WORK FILES:

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

To build an entire system, mount the source and binary volumes, copy the files <file.CND>, <file.TBL>, and the sources for any user supplied device handlers to the source volume, and type \$@file.BLD. To build just the monitors, type \$@file.MON. To build just the device handlers, type \$@file.DEV. For more information, read the RT-11 SYSTEM GENERATION GUIDE.

END OF SYSGEN PROGRAM --

Figure 9-1: System Generation Worksheet

### MONITOR TYPE

1. SJ monitor (Y)
2. FB monitor (Y)
3. XM monitor (N)

### MONITOR OPTIONS

4. SJ timer support (N)
5. Device timeout support (N)
6. Message on system I/O errors (Y)
7. System job support (N)
8. .SPCPS programmed request (N)
9. Global SCCA support (N)
10. Multiterminal support (N)
11. Asynchronous terminal status (Y)
12. Multiterminal timeout (Y)
13. Output ring buffer size: \_\_\_\_\_ (40)
14. Input ring buffer size: \_\_\_\_\_ (134)
15. .FETCH request under XM (Y)
16. Month and year date rollover (N)
20. User command linkage (Y)
21. High-speed ring buffer (N)
22. All keyboard monitor commands (Y)
23. Utility subset (Y)
24. Language subset (Y)



## RT-11 SYSTEM GENERATION

- 25. Minimal subset (Y)
- 26. 50 Hz clock (N)
- 27. Programmable clock as system clock (N)
- 30. Start-up indirect command file (Y)
- 31. Floating point (N)
- 32. Memory parity support (N)
- 33. Power failure messages (N)
- 34. BATCH support (N)
- 35. Error logging (N)
- 36. Number of units supported by error logging (10)
- 68. Define other system conditionals (N)
- 69. Enter system conditional and value:

symbol = value

```
_____ = _____  
_____ = _____  
_____ = _____  
_____ = _____  
_____ = _____
```

### DEVICE OPTIONS

DW RD50/RD51 Winchester Disk  
DX RX01 Single-Density Diskette  
DY RX02 Double-Density Diskette  
DZ RX50 Diskette (Professional 300)  
DD TU58 DECTape II  
PD PDT-11 Intelligent Terminal  
RF RF11 Disk  
RK RK05 Cartridge Disk  
DL RL01/RL02 Cartridge Disk  
DP RP11 Disk Pack  
DM RK06/RK07 Cartridge Disk  
MT TM11 (UNIBUS) Magtape  
MM TJU16 (MASSBUS) Magtape  
MS TS11 (UNIBUS) Magtape  
CR Card Reader  
NL Null Handler  
LP Line Printer  
LS Serial Line Printer  
DU MSCP Disk-Class Handler  
LD Logical Disk Handler  
SL Single-Line Editor Handler  
SP Transparent Spooler Package Handler  
XC Professional Communication Port  
XL DL(V)-11 Communication Ports  
DT DECTape  
DS RJS03/RJS04 Fixed-Head Disk  
CT TA11 Cassette  
PC PC11 Paper Tape Reader/Punch  
PR PR11 Paper Tape Reader  
VM Virtual Memory Handler

100. Second device controllers:

RX11 (N)  
RX02 (N)  
TU58 (N)

**RT-11 SYSTEM GENERATION**

101. Double-Density only RX02 support (N)

**Addresses for Peripheral Device Controllers**  
(Questions 102 and 103)

Controller	CSR	Vector
1st RX11	_____ (177170)	_____ (264)
2nd RX11	_____ (177174)	_____ (270)
1st RX211	_____ (177170)	_____ (264)
2nd RX211	_____ (177150)	_____ (270)
1st TU58	_____ (176500)	_____ (300)
2nd TU58	_____ (176510)	_____ (310)

104. No. of disk platters on RF11 controller: \_\_\_\_\_ (1)

105. RJS03 (not RJS04) support (Y)

106. No. of RL01/RL02 units: \_\_\_\_\_ (2)

107. RPR02 (not RPR02/RP03) support (N)

108. No. of MSCP ports supported: \_\_\_\_\_ (1)

110. SPOOL flag page support (Y)

120. File-structured magtape handlers (Y)

TM11 (Y)

TJU16 (Y)

TS11 (Y)

121. No. of magtape units supported:

TM11 \_\_\_\_\_ (2)

TJU16 \_\_\_\_\_ (2)

TS11 \_\_\_\_\_ (2)

**Addresses for TS11 Units**  
(Questions 122 and 123)

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

130. Printer has nonstandard CSR/vector addresses (N)

131. Nonstandard CSR address for printer: \_\_\_\_\_ (177514)

132. Nonstandard vector address for printer: \_\_\_\_\_ (200)

133. Professional 300 printer port support (N)

134. CSR address for serial line printer: \_\_\_\_\_ (176500)

135. Vector address for serial line printer: \_\_\_\_\_ (300)

151. CSR address for XL: \_\_\_\_\_ (176500)

152. Vector address for XL: \_\_\_\_\_ (300)

160. No. of extra device slots: \_\_\_\_\_ (0)

**RT-11 SYSTEM GENERATION**

Support for your own devices (N)

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

**GRAPHICS OPTIONS**

- 170. VT11/VS60 graphics support (N)
- 171. VS60 support (N)
- 172. CSR address for VT11/VS60: \_\_\_\_\_ (172000)
- 173. Vector address for VT11/VS60: \_\_\_\_\_ (320)

**TERMINAL INTERFACE OPTIONS**

- 180. No. of local DL11 lines: \_\_\_\_\_ (1)
- 181. No. of remote DL11 lines: \_\_\_\_\_ (0)

**CSR and Vector Addresses for Local and Remote DL11**  
 (Questions 182 and 183)

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

- 184. DZ11 or DZV11 multiplexer support (N)
- 185. DZ11 multiplexer support (Y)
- 186. No. of DZ multiplexers: \_\_\_\_\_ (1)
- 187. No. of local DZ lines: \_\_\_\_\_ (1)
- 188. No. of remote DZ lines: \_\_\_\_\_ (0)

**Addresses for DZ Multiplexers**  
 (Questions 189 and 190)

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

- 191. Baud rate of lines: \_\_\_\_\_ (300)

## RT-11 SYSTEM GENERATION

### DEVICE ASSIGNMENTS AND SYSGEN CLEANUP

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

### SOURCE FILES REQUIRED

---

---

---

---

---

---

---

---

---

---

### 9.3 SYSTEM CONDITIONALS

This section lists the new conditionals added to RT-11, with a brief explanation of each conditional.

#### 9.3.1 Feature Conditionals

The following conditionals control support for RT-11 features.

LS\$PC	= 1	;LS SUPPORT FOR BOTH PRO 300 PRINTER PORT ;AND DL INTERFACES
SCCA\$G	= 1	;GLOBAL SCCA SUPPORT
SP\$FLG	= 1	;SPOOL HANDLER FLAG PAGE SUPPORT
XL\$PC	= 1	;SUPPORT FOR PRO 300 COMMUNICATIONS PORT
XL\$CSR	= nnnnnn	;CSR OF DL(V)-11 FOR XL
XL\$VEC	= nnn	;VECTOR OF DL(V)-11 FOR XL

## RT-11 SYSTEM GENERATION

### 9.3.2 Naming Convention Conditionals

The following conditionals control monitor, handler, and startup command file naming conventions.

```
NAME$1 = 'R      ;FIRST CHARACTER OF MONITOR NAME
NAME$2 = 'T      ;SECOND CHARACTER OF MONITOR NAME
NAME$3 = 'l      ;THIRD CHARACTER OF MONITOR NAME
NAME$4 = 'l      ;FOURTH CHARACTER OF MONITOR NAME
NAME$5 = 'm      ;FIFTH CHARACTER OF MONITOR NAME
NAME$6 = 'n      ;SIXTH CHARACTER OF MONITOR NAME
```

All characters must be both valid ASCII and Radix-50 characters. Default values are assigned for standard monitor names according to the settings of the following conditionals:

Conditionals	Monitor Names
BF=0	RT11SJ
BF=1 RTE\$M=0 MMG\$T=0	RT11FB
BF=1 MMG\$T=1	RT11XM
BF=1 RTE\$M=1 MMG\$T=0	RTE1FB

```
SUFX$H = 'n      ;SUFFIX CHARACTER FOR HANDLER FILE
                ;NAME TO INDICATE MONITOR TYPE
```

All characters must be both valid ASCII and Radix-50 characters. Default values are assigned for standard handler names according to the settings of the following conditionals:

Conditionals	Standard Suffix
BF=0	space
BF=1 RTE\$M=0 MMG\$T=0	space
BF=1 MMG\$T=1	X
BF=1 RTE\$M=1 MMG\$T=0	M

```
SUFX$X = 'N      ;SUFFIX CHARACTER FOR STARTUP FILE
                ;NAME TO INDICATE MONITOR TYPE
```

All characters must be both valid ASCII and Radix-50 characters. Default values are assigned for standard monitor names according to the settings of the following conditionals:

Conditionals	Standard Suffix
BF=1 RTE\$M=1 MMG\$T=0	M

Otherwise, the NAME\$5 value is used.

## RT-11 SYSTEM GENERATION

### 9.4 SYSTEM GENERATION RESTRICTIONS FOR PROFESSIONAL 325 COMPUTERS

You can perform the system generation procedures on a Professional 325 computer, but it is not recommended. The procedures will take a long time, and the process is not automated as it is on systems with more disk storage.

To perform the system generation procedures, follow the instructions given in Chapter 3 of the RT-11 System Generation Guide. The only differences are:

In Section 3.1, create a system diskette with the FB monitor rather than the SJ monitor. Include the file RT11FB.SYS on the system diskette.

Include the file DZ.SYS on your system volume. Substitute DZ for DX or DY wherever the chapter refers to these devices.

## CHAPTER 10

### HARDWARE CHARACTERISTICS PROGRAM (SETUP)

The SETUP program sets terminal (video and hard-copy), line printer, and system clock modes using English-language commands. SETUP commands are especially useful when you include them in start-up indirect command files or IND control files.

You cannot set a mode for a device that does not recognize (support) the mode; the device will ignore the mode. Refer to your device's user guide for guidance in selecting proper SETUP modes.

SETUP commands are explained in Section 10.1. SETUP modes are listed and described in Section 10.2. Terminal modes are located in Section 10.2.1, terminal and printer modes in Section 10.2.2, and system clock modes in Section 10.2.3.

Section 10.3 lists SETUP controls that provide HELP, and let you save, reset and show the modes selected from Section 10.2.

Section 10.4 contains a table which lists all SETUP modes and commands with applicable devices.

#### 10.1 SETUP COMMANDS

This section describes the SETUP mode and SETUP control commands.

##### 10.1.1 Mode Commands

To issue a SETUP mode command, type in response to the keyboard monitor prompt (.):

```
.SETUP destination mode[,mode,...]
```

The variable destination can be TERMINAL (or TT), PRINTER (or LP or LS), or CLOCK:

- Destination TERMINAL (device TT) sends modes to your terminal. In the command, TT can be substituted for TERMINAL. TERMINAL is the default, and need not be specified.
- Destination PRINTER (device LP or LS) sends modes to your line printer. If you specify destination PRINTER, SETUP looks first for device LP, and if not found then looks for device LS to send the mode to your printer.

## HARDWARE CHARACTERISTICS PROGRAM (SETUP)

In the command, LP or LS can be substituted for PRINTER. However, if LP or LS is explicitly specified, SETUP only looks for that particular device and returns an error message if not found. Destination PRINTER or LP or LS must be specified to send modes to your printer.

- Destination CLOCK sends modes to your system clock. You need not specify destination CLOCK to send clock modes to your system clock.

The variable mode represents a mode from Section 10.2 that you want to set. You can set several modes in one SETUP command by separating modes with a comma (,). For example, the following command sets three modes for the console terminal:

```
.SETUP SMOOTH,NOCLICK,WRAP
```

### 10.1.2 Control Commands

To issue a SETUP control command, type in response to the keyboard monitor prompt (.):

```
.SETUP destination control[,control,...]
```

The variable destination represents the device to which you send the control. Refer to the description of the destination variable in Section 10.1.1.

The variable control represents a control from Section 10.3 that lets you save, reset, or show SETUP modes. You can set several controls in one SETUP control command by separating each control with a comma (,).

## 10.2 SETUP MODES

The following sections list SETUP modes for terminals, serial line printers, and system clocks.

Default settings for Professional integrated terminals are indicated with an asterisk (\*) except where the default is a numeric argument following the mode. Numeric argument defaults are listed in the description. For VT200 and VT100 series defaults, refer to your terminal user guide.

### 10.2.1 Terminal Modes

The SETUP program lets you set terminal modes for:

- Professional integrated terminals used with Professional 325 and 350 processors
- VT200 series terminals used with other PDP-11 processors
- VT100 series terminals used with other PDP-11 processors
- Hard-copy terminals that accept standard ASCII escape sequences, such as DIGITAL's Correspondent



## HARDWARE CHARACTERISTICS PROGRAM (SETUP)

SETUP is the only means of setting certain modes for the Professional 325 and 350. The VT200 series terminals can be set up using their local menu or SETUP commands. You can set video modes on VT100 series terminals using the local set-up mode as described in the appropriate VT100 series user's guide, or with SETUP commands. Hard-copy terminals can be set up using the particular terminal's set-up procedure or with SETUP commands.

Some SETUP modes are valid for only Professional integrated terminals, as indicated.

The following SETUP modes are suitable for only your terminal. SETUP modes that you can send to your terminal or printer are listed in Section 10.2.3.

The shortest valid abbreviation is underlined.

Mode	Description
<u>ANSWERBACK</u> :/message/	<p>Applies to Professional terminals only. ANSWERBACK mode lets you store up to 20 characters in a message that is automatically transmitted from the terminal to the computer at power-up. The message must be enclosed by delimiters such as slashes (/) that are not part of the message.</p> <p>A different form of the SETUP ANSWERBACK command must be used if you want the message in lowercase letters, or if you want to embed carriage returns in the message. Let SETUP prompt for input by typing:</p> <pre>.SETUP &lt;RET&gt; Characteristics?:ANSWERBACK:/message/</pre> <p>You can now use lowercase letters and embed carriage returns in your message. The message will continue to be read until the final delimiter (/) is reached, regardless of carriage returns.</p>
<u>BLOCK</u> * <u>UNDERSCORE</u>	<p>Applies to Professional terminals only. When you set BLOCK, the cursor appears as a blinking block (█) on your screen.</p> <p>When you set UNDERSCORE, the cursor appears as a blinking underline (⎵) on your screen.</p>
<u>CAPS</u> * <u>SHIFT</u>	<p>Applies to Professional terminals only. When you set CAPS, pressing the LOCK key causes all letters to be entered as uppercase. In this mode the LOCK key serves the same function as the CAPS LOCK key on the VT100 series keyboard.</p> <p>When you set SHIFT, pressing the LOCK key causes all keys to enter their alternate (shifted) function. In this mode the LOCK key serves the same function as the shift lock key on a typewriter.</p>

## HARDWARE CHARACTERISTICS PROGRAM (SETUP)

CLICK\*  
NOCLICK

Applies to Professional terminals only. Setting CLICK causes the keys to click when you press them.

Setting NOCLICK causes the keys to make no sound when you press them.

[COLOR1] [ON COLOR2]

Applies to Professional color terminals only. When you set COLOR1 ON COLOR2 you specify the color of the text (COLOR1), and the color of the video screen background (COLOR2). You can specify any of the following colors for COLOR1 and COLOR2: red, yellow, blue, green, black, white, magenta and cyan.

For example, the following command displays green text on a blue background:

```
.SETUP GREEN ON BLUE
```

Colors can also be specified for just the text or video screen background. For example, the following command assigns blue for the text but does not change the background color:

```
.SETUP BLUE
```

The following command assigns blue for the video screen background but does not change the text color:

```
.SETUP ON BLUE
```

Color assignment for text and background can be reversed by issuing SETUP LIGHT or SETUP DARK.

CURSOR\*  
NOCURSOR

Applies to Professional terminals only. When you set CURSOR, the terminal screen displays a blinking cursor. The cursor's form is set using SETUP BLOCK or SETUP UNDERSCORE.

When you set NOCURSOR, the terminal screen does not display a cursor.

DARK\*  
LIGHT

When you set DARK, the screen displays light characters on a dark background, or reverses text and background colors on a Professional color video monitor.

When you set LIGHT, the screen displays dark characters on a light background, or reverses text and background colors on a Professional color video monitor.

GENERIC100

Does not apply to VT100 series terminals. When you set GENERIC100, your Professional or VT200 series terminal replies to a device attributes request with a code sequence identifying the terminal as a nonspecific VT100 series terminal.

## HARDWARE CHARACTERISTICS PROGRAM (SETUP)

The device attributes exchange is the same for the Professional and the VT200 series terminals when SETUP GENERIC100 is set. For a complete explanation of the device attributes exchange for the Professional terminal, and therefore the VT200 series terminals, see Chapter 7.

INTERLACE  
NOINTERLACE\*

Applies to VT100 series terminals only. When you set INTERLACE, the screen can display high-resolution graphics.

Set NOINTERLACE when you are not using high resolution graphics.

MARGINBELL  
NOMARGINBELL\*

Applies to Professional terminals only. MARGINBELL causes the terminal to beep when the cursor is eight characters from the right margin.

NOMARGINBELL disables the terminal's beep when the cursor is eight characters from the right margin.

NEWLINE  
NONEWLINE\*

When you set NEWLINE, pressing the RETURN key generates a <CR><LF> (carriage return, line feed) combination. RT-11 automatically generates a line feed, so setting NEWLINE sends two line feeds.

When you set NONEWLINE, pressing the RETURN key generates only a carriage return. However, RT-11 generates a line feed so setting NONEWLINE generates one <CR><LF> (carriage return, line feed) combination.

REPEAT\*  
NOREPEAT

When you set REPEAT, a key automatically repeats at the rate of about 30 characters per second when you press the key for more than 1/2 second.

When you set NOREPEAT, a character is displayed only once no matter how long you press the key.

SMOOTH\*  
JUMP

When you set SMOOTH, new lines are scrolled on the screen at a maximum of 6 lines per second. SMOOTH lets you read lines on the screen more easily. For processors other than the Professional 300 series, AUTOX must be set using the local set-up mode or the local set-up menu when you use SMOOTH.

## HARDWARE CHARACTERISTICS PROGRAM (SETUP)

When you set JUMP, new lines are scrolled on the screen as fast as the computer sends them to the terminal. Reading lines in JUMP mode is difficult at higher baud rates. For processors other than the Professional 300 series, NOAUTOX must be set using the local set-up mode or the local set-up menu when you use JUMP.

VT100\*  
VT52

When you set VT100 mode, the terminal transmits and decodes ANSI codes.

SETUP VT100 is also used by the Professional terminal to reply to a device attributes request as though it were a VT100 (with advanced video option). See Chapter 7 for a complete explanation of the device attributes exchange.

When you set VT52 mode, the terminal transmits and decodes according to the requirements of the earlier VT52 terminal. VT52 mode is not supported for the Professional terminal under RT-11 V5.1.

132COLUMNS  
80COLUMNS\*

When you set 132COLUMNS, your video terminal displays 132 characters per line. 132COLUMNS cannot be used with the Professional series computers when running under the FB monitor.

When you set 80COLUMNS, your video terminal displays 80 characters per line.

### 10.2.2 Terminal and Printer Modes

The following SETUP modes can be sent to your terminal (video or hard copy) or printer, depending on the description. If no qualification is given, a mode can be sent to either. You do not need to specify destination TERMINAL (or TT) to send a command to your terminal, but you must specify PRINTER (or LP or LS) to send a command to your line printer.

Some modes or printer features are incompatible with some arguments. Check your hard-copy terminal or printer user guide.

The shortest valid abbreviation is underlined.

#### Mode

#### Description

BOLD  
NOBOLD\*

When you set BOLD, characters printed on your terminal screen or printer are enhanced with bolding. May not be coupled with SETUP MEMO.

When you set NOBOLD and the destination is TERMINAL, bolding and underlining (if turned on) are turned off. If you want to keep underlining, you must reissue the SETUP UNDERLINE command.

When you set NOBOLD, and the destination is PRINTER, only bolding is turned off.

## HARDWARE CHARACTERISTICS PROGRAM (SETUP)

### CLEAR

The SETUP CLEAR command clears the screen, executes a shift in (SI) function and the DEC standard SOFT RESET.

The SI function moves the G0 (7-bit ASCII) graphic character set into the ASCII code table. That procedure makes sure the video or hard-copy terminal or printer is placed in ASCII standard text mode after receiving a SETUP CLEAR command.

The DEC standard SOFT RESET:

- Sets the current rendition to NORMAL;
- Resets scrolling margins to 1 and 24;
- Sets origin mode to absolute;
- Sets WRAP to off;
- Sets cursor key mode to cursor on;
- Sets keypad mode to numeric;
- Sets insert/replace mode to replace.

### DENSE

When you set DENSE, your dot matrix printer or hard-copy terminal operates at 30 characters/second. It overlaps two sets of dots for a close approximation of letter-quality printing. DENSE prints a more legible character than MEMO.

### DOWN

When you set DOWN, the print line in your printer or hard copy terminal is lowered 1/12 inch relative to the top-of-form. The paper is moved forward (upward) 1/12 inch. DOWN can be used for remote adjustment of the top-of-form position. DOWN requires the partial line adjustment feature; consult your user guide.

### DRAFT

When you set DRAFT, the printer or hard-copy terminal is set to an 8 X 9 dot matrix. DRAFT mode is the same as DATA mode used with some printers.

### GRAPHIC TEXT\*

Does not apply to VT100 series terminals. Setting GRAPHIC places your terminal or printer in graphic mode. Graphic mode selectively prints individual dot patterns using bit-mapping, rather than printing predefined characters. Check your terminal or printer user guide for support of this type of graphics (bit-mapping) capability.

When you set TEXT, your terminal or printer exits from graphic mode. Text mode prints predefined characters from a selected character set.

### HORIZONTAL:n

When you set HORIZONTAL, argument n sets the number of characters printed per horizontal inch. Valid arguments for n are 5, 6, 8.25, 10, 12, or 16.5. HORIZONTAL can be used with some hard-copy terminals.

## HARDWARE CHARACTERISTICS PROGRAM (SETUP)

### LANG:code

Does not apply to Professional series terminals. When you set LANG: you can determine the character set of your console terminal and line printer. The command sets the keyboard's character set to the specified code.

code will be one of the following:

Country	Code
Australia	AUS
Austria	A
Belgium	B
Canada (English)	CDNE
Canada (French)	CDNF
Denmark	DK
Finland	SF
France	F
Germany	D
Ireland	IRL
Italy	I
Netherlands	NL
New Zealand	NZ
Norway	N
Spain	SP
Sweden	S
Switzerland (French)	CHF
Switzerland (German)	CHD
United Kingdom	GB
United States	USA*

### LETTER

When you set LETTER, the dot matrix serial line printer or hard-copy terminal is automatically set to DENSE and HORIZONTAL:16.5.

### LISTING

When you set LISTING, the dot matrix printer or hard-copy terminal is automatically set to DRAFT and HORIZONTAL:8.25.

### MEMO

When you set MEMO, the printer or hard-copy terminal dot matrix changes from 8 X 9 to 16 X 9 dots. MEMO causes more fully formed characters to be printed; they are more legible than DRAFT. MEMO can be used with some hard-copy terminals.

### PAGELNGTH:n

When you set PAGELNGTH, argument n sets the number of lines printed per page. Valid argument parameters are 0 to 252. If the argument is 0, the printer or hard-copy terminal ignores form feed.

## HARDWARE CHARACTERISTICS PROGRAM (SETUP)

TABS[:n:n:n...]  
NOTABS

When you set TABS:n, argument n represents the column number for each successive tab stop. You must include the SET TT TAB command in your start-up command file, or issue the command each time you boot your system.

By default, tab stops are set every eight columns. To restore default tab settings, issue SETUP TABS with no argument.

Set NOTABS to clear all tab stops. To implement only the new tab stops specified by SETUP TABS:n, issue NOTABS before TABS:n. Otherwise, the previous tab stops remain in effect along with the new tab stops.

UNDERLINE  
NOUNDERLINE\*

When you set UNDERLINE, text displayed or printed is underlined. If destination is TERMINAL and SETUP BOLD is in effect, issuing SETUP NOBOLD automatically issues SETUP NOUNDERLINE. See SETUP BOLD.

When you set NOUNDERLINE, text displayed or printed is not underlined.

UP

When you set UP, the print line in your printer or hard-copy terminal is raised 1/12 inch relative to the top-of-form. The paper is moved backward (downward) 1/12 inch. UP can be used for remote adjustment of the top-of-form position. Requires support of partial line adjustment feature; check your user guide.

VERTICAL:n

When you set VERTICAL, argument n sets the number of lines printed per vertical inch. Valid arguments for n are 2, 3, 4, 6, 8, or 12. VERTICAL can be used with some hard-copy terminals.

WRAP  
NOWRAP\*

When you set WRAP, characters you type or print that exceed the right margin are automatically moved to the beginning of the following screen line.

When you set NOWRAP, characters you type or print that exceed the right margin overwrite the last character of the current screen line and are lost.

### 10.2.3 Clock Modes

The SETUP program lets you set modes for system clocks in Professional 300 series and other PDP-11 computers. There are differences in support between Professional 300 series and other PDP-11 computers, as explained.

## HARDWARE CHARACTERISTICS PROGRAM (SETUP)

The following SETUP modes can only be sent to CLOCK, the system clock. System clock modes do not have default settings. The shortest valid abbreviation for each mode is underlined.

Mode	Description
<u>12HOUR</u> <u>24HOUR</u>	<p>Applies to Professional 300 series computers only. When you set 12HOUR, you convert the contents of the time-of-year clock to 12 hour mode, and put the clock in 12 hour mode.</p> <p>When you set 24HOUR, you convert the contents of the time-of-year clock to 24 hour mode, and put the clock in 24 hour mode. For example, 1:00 PM is represented as 13:00.</p>
<u>BCD</u> <u>NOBCD</u>	<p>Applies to Professional 300 series computers only. When you set BCD (binary coded decimal), you convert the contents of the time-of-year clock to BCD, and put the clock in BCD mode.</p> <p>When you set NOBCD, you convert the contents of the time-of-year clock to binary, and put the clock in binary mode.</p>
<u>CLOCK SHOW</u>	<p>Applies to Professional 300 series computers only. When you set CLOCK SHOW, you print current settings of:</p> <ul style="list-style-type: none"><li>Date mode (BCD or BINARY)</li><li>12/24HOUR mode (12 or 24 hour)</li><li>Daylight saving time (DST) enable (on or off)</li></ul>
<u>DATE[:dd:mm:yy]</u>	<p>When you set DATE with a Professional 300 series computer, you set the specified date into the monitor date and the time-of-year clock. If any or all fields of the date are missing, the date is taken from the current monitor date. The date is stored in the time-of-year clock in whatever format (BCD or BINARY) is currently in the clock. A battery in the Professional computer maintains the clock, so that you need set it only once.</p> <p>When you set DATE with a PDP-11 computer other than the Professional 300 series, only the monitor date is set.</p>
<u>DST</u> <u>NODST</u>	<p>Applies to Professional 300 series computers only. When you set DST, the time-of-year clock is put in daylight saving time mode.</p> <p>When you set NODST, the time-of-year clock is taken out of daylight saving time mode.</p>



## HARDWARE CHARACTERISTICS PROGRAM (SETUP)

TIME[:hh:mm:ss]

When you set TIME on a Professional 300 series computer, you set the specified time into the monitor time and time-of-year clock. If any or all fields of TIME are missing, they are taken from the current monitor time. The time is stored in the time-of-year clock in whatever format (BCD or BINARY) is currently in the clock. A battery in the Professional computer maintains TIME, so that you need set it only once.

When you set TIME in a PDP-11 computer other than the Professional 300 series, only the monitor time is set.

### 10.3 SETUP CONTROLS

SETUP controls provide help, and save, reset, and show the current mode settings. Control modes do not have default settings. The shortest valid abbreviation is underlined.

Control	Description
<u>DEFAULT</u>	Applies to Professional terminals only. DEFAULT sets the terminal modes to the factory settings.
<u>HELP</u>	HELP provides a complete list of the SETUP modes with a one-line explanation of each mode.
<u>RESET</u>	RESET sets the modes to the settings that were set using the most recent SETUP SAVE command, or by a hardware SAVE (see your device's user guide).
<u>SAVE</u>	Applies to Professional terminals only. When you issue the SETUP SAVE command, current SETUP modes are saved and become the default modes. If the SETUP modes are changed, they may be restored by issuing SETUP RESET.

## HARDWARE CHARACTERISTICS PROGRAM (SETUP)

### SHOW

Applies to Professional terminals only. When you issue the SETUP SHOW command, current SETUP mode settings are printed on the screen. For example, if the terminal is set for the original (factory-set) default modes, issuing the SETUP SHOW command prints the following report:

```

BLOCK          is ENABLED
CAPS           is ENABLED
CLICK          is ENABLED
CURSOR         is ENABLED
DARK           is ENABLED
JUMP           is DISABLED
LIGHT          is DISABLED
MARGINBELL    is DISABLED
NEWLINE        is DISABLED
REPEAT         is ENABLED
SHIFT          is DISABLED
SMOOTH         is ENABLED
UNDERSCORE     is DISABLED
WRAP           is DISABLED
132COLUMNS   is DISABLED
80COLUMNS    is ENABLED
No Answerback Message
    
```

### 10.4 SUMMARY OF SETUP MODES AND CONTROLS

The following table lists all SETUP modes and controls, with devices for which they apply. Column three (other PDP-11 terminals) also refers to some hard-copy terminals. The shortest valid abbreviation for each mode is located before the asterisk (\*).

Modes and Controls	PC300 Series Terminals	Other PDP-11 Terminals	Printer	PC300 Series Clocks	Other PDP-11 Clocks
A*NSWERBACK	YES	---	---	---	---
[NO]BC*D	---	---	---	YES	---
BLO*CK	YES	---	---	---	---
[NO]BO*LD	YES	YES	YES	---	---
CA*PS	YES	---	---	---	---
CLE*AR	YES	YES	YES	---	---
[NO]CLI*CK	YES	---	---	---	---
COLOR	YES	---	---	---	---
[NO]CU*RSOR	YES	---	---	---	---
DAR*K	YES	YES	---	---	---
DAT*E	---	---	---	YES	YES
DEF*ALT	YES	---	---	---	---
DEN*SE	---	YES	YES	---	---
DO*WN	---	YES	YES	---	---
DR*AFT	---	YES	YES	---	---
[NO]DS*T	---	---	---	YES	---
GE*NERIC100	YES	YES	---	---	---
GRA*PHIC	YES	YES	YES	---	---
HE*LP	YES	YES	YES	YES	YES

HARDWARE CHARACTERISTICS PROGRAM (SETUP)

Modes and Controls	PC300 Series Terminals	Other PDP-11 Terminals	Printer	PC300 Series Clocks	Other PDP-11 Clocks
HO*RIZONTAL	---	YES	YES	---	---
[NO]I*NTERLACE	---	YES	---	---	---
J*UMP	YES	YES	---	---	---
LA*NG	---	YES	YES	---	---
LE*TTER	---	YES	YES	---	---
LIG*HT	YES	YES	---	---	---
LIS*TING	---	YES	YES	---	---
[NO]MAR*GINBELL	YES	---	---	---	---
ME*MO	---	YES	YES	---	---
[NO]NE*WLINE	YES	YES	---	---	---
P*AGELENGTH	---	YES	YES	---	---
[NO]REP*EAT	YES	YES	---	---	---
RES*ET	YES	YES	YES	---	---
SA*VE	YES	---	---	---	---
SHI*FT	YES	---	---	---	---
SHO*W	YES	---	---	YES	---
SM*OOTH	YES	YES	---	---	---
[NO]TA*BS:n	YES	YES	YES	---	---
TE*XT	YES	YES	YES	---	---
TI*ME	---	---	---	YES	YES
[NO]UNDERL*INE	YES	YES	YES	---	---
UNDERS*CORE	YES	---	---	---	---
UP*	---	YES	YES	---	---
VE*RTICAL	---	YES	YES	---	---
VT100*	YES	YES	---	---	---
VT52*	---	YES	---	---	---
[NO]WR*AP	YES	YES	YES	---	---
132*COLUMNS	YES	YES	---	---	---
80*COLUMNS	YES	YES	---	---	---
12*HOUR	---	---	---	YES	---
24*HOUR	---	---	---	YES	---



## CHAPTER 11

### TRANSPARENT SPOOLING PACKAGE (SPOOL)

The transparent spooling package (SPOOL) is a utility you can use for sending files to any RT-11 device. Although SPOOL is especially useful for spooling files for printing, the output device is not restricted to the line printer, but must be a serial device. SPOOL is distributed with two default output devices, LP and LS, but you can change the default output device by applying the customization in Section 11.4.

SPOOL is functionally similar to the Queue Package. However, use of the transparent spooling package is, as its name implies, transparent. Once running, SPOOL automatically intercepts all data directed to the line printer or other designated output device, stores it, then forwards it to the line printer or output device. You can send output to the line printer explicitly, by typing a command such as COPY MYFIL.MAC LP:, or implicitly by typing a command whose default is to send output to the line printer, such as MACRO/LIST MYFIL. In either case, you need not type a specific command to spool output, as is necessary when you use the Queue Package.

Another major advantage to using SPOOL is that SPOOL begins sending output as it is received. The Queue Package must wait until a complete file is available before it can begin sending output. Therefore, using SPOOL can be considerably faster than using QUEUE.

#### 11.1 SPOOL COMPONENTS

The transparent spooling package consists of a program, a pseudo-device handler, and a work file:

SPOOL.REL	Gathers output directed to the line printer or other output device, stores (spools) it in a work file, and sends the output to the line printer or other designated output device. SPOOL runs as a foreground or system job.
SP	A pseudo-device handler for SPOOL. The handler file is SP.SYS for the FB monitor and SPX.SYS for the XM monitor.
SPOOL.SYS	The work file where SPOOL stores output before sending it to the line printer or other output device.

## TRANSPARENT SPOOLING PACKAGE (SPOOL)

When output is directed to the line printer, the SP pseudohandler causes SPOOL to receive the data and spool it in the work file SPOOL.SYS. As soon as one block of information is available in SPOOL.SYS, SPOOL begins sending the output to the line printer. Since SPOOL runs as a foreground or system job, you can continue working in the background while files are spooled and printed.

### 11.2 RUNNING SPOOL

To use SPOOL, you must make sure the output device's handler is loaded, run the SPOOL program as a foreground or system job, and assign the SP pseudohandler the name of the output device as a logical name. System job support is a special feature available through the system generation process.

The following sections describe the commands you must issue to run SPOOL. You can include the commands in your start-up indirect command files so SPOOL is automatically available whenever you run under the FB or XM monitor.

#### 11.2.1 Loading the Line Printer Handler

Use the SHOW command to see if the LP handler is loaded. If it is not, load the LP handler by typing this command:

```
.LOAD LP<RET>
```

If you are running on a Professional 300 series computer, or you have a serial-line printer, load the LS handler instead:

```
.LOAD LS<RET>
```

If you customize your system to use an output device other than the line printer, substitute your output device's mnemonic for LP or LS.

You need not load the SP handler itself.

#### 11.2.2 Running the SPOOL Program

You can run SPOOL as a foreground or system job. If you are running under the FB monitor, you must set the USR to NOSWAP (SET USR NOSWAP) before running SPOOL. After you issue the command to run SPOOL, you can allow the USR to swap (SET USR SWAP). Under the XM monitor, you need not set the USR to NOSWAP to run SPOOL.

To run SPOOL as a foreground job, type this command:

```
.FRUN SPOOL/BUF:256.<RET>
```

To run SPOOL as a system job, type this command:

```
.SRUN SPOOL/BUF:256.<RET>
```

The FRUN command assumes SPOOL.REL is on the default volume (DK:). The SRUN command assumes SPOOL.REL is on the system volume (SY:). If SPOOL.REL is on another volume, include the device mnemonic in the command (ddn:SPOOL).

## TRANSPARENT SPOOLING PACKAGE (SPOOL)

### NOTE

The option /BUF:256. should not be included in the command to run SPOOL when running under the XM monitor. SPOOL will allocate working space in extended memory.

### 11.2.3 Assigning a Logical Name to SP

In order for SPOOL to work transparently, you must assign the device mnemonic of the line printer as a logical name for SP, the SPOOL pseudohandler. This causes SP to intercept output directed to the line printer.

To assign LP as the logical device name, type this command:

```
.ASSIGN SP0: LP:
```

To ensure that logical LP: and LP0: are the same, also type this command:

```
.ASSIGN SP0: LP0:
```

If you want SPOOL to intercept output directed to another physical device, assign that device's mnemonic as SP0's logical device name. For example, if you want SPOOL to intercept all output directed to LS, make the following logical assignment:

```
.ASSIGN SP0: LS:
```

### 11.3 SPOOL WORK FILE

SPOOL attempts to create its work file, SPOOL.SYS, on the device whose logical name is SFD (spool file device). If you have not assigned the logical name SFD to any device, SPOOL creates SPOOL.SYS on the system volume.

SPOOL allocates by default 1024(decimal) blocks on SFD: or SY: for its work file SPOOL.SYS. You can change the default size of SPOOL.SYS by applying the following software customization. In the customization, ..SPSZ is the offset for the current number of blocks SPOOL allocates for its work file. Substitute for ..SPSZ the value

## TRANSPARENT SPOOLING PACKAGE (SPOOL)

provided in the file CUSTOM.TXT. nnnnnn is the number (octal) of blocks you want SPOOL to allocate for its work file. xxxxxx is a number that varies; it is not important for you to know this number.

```
.RUN SIPP
*SPOOL.REL
Base?      0
Offset?    ..SPSZ
```

Base	Offset	Old	New?
000000	..SPSZ	xxxxxx	nnnnnn<RET>
000000	..SPSZ+2	xxxxxx	<CTRL/Y><RET>

\*<CTRL/C>

If there is not enough room on the volume for a work file of the default size, SPOOL.SYS occupies the largest empty area on the volume.

Do not squeeze the volume on which SPOOL.SYS resides while spooling is in progress. SPOOL.SYS may be moved, causing unpredictable results.

### 11.4 SPOOL OUTPUT DEVICE

SPOOL attempts to send output to the device whose logical name is S00. If you have not assigned the logical name S00 to any device, SPOOL sends output to the line printer LP. If LP is not installed on your system, SPOOL sends output to the line printer LS.

You can change SPOOL's default output device to any other RT-11 device by installing the following software customization. In the customization, substitute for ..SPSD the value provided in the file CUSTOM.TXT. nnn is the new output device's mnemonic. If you want to specify a terminal device as the new default output device, use the form Tnn, where nn is the terminal number. For example, to select terminal port 14(octal), specify T14. xxxxxx represents a number that varies but is not important for you to know.

#### NOTE

You cannot cause SPOOL to send output to another device by assigning the logical name LP to the device. SPOOL bypasses the logical translation and finds physical LP instead.

```
.RUN SIPP
*SPOOL.REL
Base?      0
Offset?    ..SPSD
```

Base	Offset	Old	New?
000000	..SPSD	xxxxxx	;R<RET>
000000	..SPSD	<LP>	;Rnnn<RET>
000000	..SPSD+2	xxxxxx	<CTRL/Y><RET>

\*<CTRL/C>



## TRANSPARENT SPOOLING PACKAGE (SPOOL)

### 11.5 STARTING SPOOL FROM AN INDIRECT COMMAND FILE

If you want SPOOL to run automatically whenever you run RT-11, include a sequence of commands like the following in your startup indirect command file. These commands run SPOOL as a foreground job under the FB monitor.

```
FRUN SY:SPOOL/BUF:256./PAUSE
LOAD LP:=F
SET USR NOSWAP
RESUME F
ASSIGN SP0 LP
ASSIGN SP0 LP0
SET USR SWAP
```

### 11.6 SPOOL SET COMMANDS

Although SPOOL operates transparently, you can use SET commands to control spooling operations. The following table lists and explains the SET command options for SPOOL. Most of these options require you to specify the unit number 0 (SET SP0), because SPOOL as distributed supports only one output device at a time.

Type the SET command in response to the keyboard monitor prompt (.). You can set several conditions on a single command line by separating the conditions with commas. For example:

```
.SET SP0 WIDE,FLAG=3
```

This command sets SPOOL to generate 132-column banner pages, and sets the default number of banner pages to 3.

You must unload SP and load a fresh copy for a SET command to take effect.

Option	Function
SP0 FLAG=n	Sets the number of banner pages to generate whenever SPOOL begins printing a file. The value n can be any integer in the range 0 to 4. The default value for n is 0.
SP0 FORM0	Issues a form feed each time SPOOL encounters block 0 of a file to be printed. Useful if the output device is part of a multiterminal system, or if the output device handler does not support its own FORM0 option. The default mode is NOFORM0.

#### NOTE

Setting SP0 and either LS or LP to FORM0 simultaneously generates multiple form feeds.

SP0 NOFORM0	Turns off FORM0 mode. This is the default mode.
SP0 KILL	Removes all spooled output from SPOOL's work file.

## TRANSPARENT SPOOLING PACKAGE (SPOOL)

SP0 NEXT	Stops printing the current file, discards the remaining spooled output for that file, and begins printing the next listing in SPOOL's work file.
SP0 WAIT	Suspends sending output from SPOOL's work file to the output device, but does not delete anything from the work file. SPOOL continues to accept input when SET SP0 WAIT is in effect.
SP0 NOWAIT	Resumes sending spooled output suspended by the command SET SP0 WAIT.
SP0 WIDE	Causes SPOOL to generate 132-column flag pages. This is the default setting.
SP0 NOWIDE	Causes SPOOL to generate 80-column flag pages.

### 11.7 SPOOL STATUS

You can check the spooler's status by using the SHOW QUEUE command. The SHOW QUEUE command tells whether or not the spooler is active, and gives the number of blocks spooled for output and the number of blocks in the SPOOL work file free for spooling.

The following is an example of the SHOW QUEUE display.

```
.SHOW QUEUE
```

```
Unit 0 status  
Device is active  
00045 blocks are spooled for output  
00954 blocks are free to be spooled
```

If QUEUE is running, the SHOW QUEUE command prints a QUEUE status report as well.

### 11.8 SPOOL FLAG PAGES

SPOOL flag page support is included in the distributed monitors. However, SPOOL generates flag pages only after you issue the command SET SP0 FLAG=n. This command causes SPOOL to print that number (n) of flag pages for all files subsequently spooled for printing, unless the files are spooled without an associated file name. For example, the command .PIP LP:=MYFIL.MAC sends output to the line printer without an associated file name, so no flag pages would be generated.

You can override the default number of flag pages by using the PRINT command with the /FLAGPAGE:n option. However, since this operation is executed by the queue manager, the file QUEMAN.SAV must reside on the system volume. For example, suppose you set the default number of banner pages to 3:

```
.SET SP0 FLAG=3
```

Then, you spool a file for printing with the following command:

```
.PRINT/FLAGPAGE:5 MYFIL.LST
```

## TRANSPARENT SPOOLING PACKAGE (SPOOL)

When MYFIL.LST prints, five banner pages (rather than three) are included. QUEMAN.SAV is not needed for SPOOL unless you use this command.

You can exclude SPOOL flag page support through system generation. Excluding SPOOL flag page support saves 927(decimal) words in the monitor.



## CHAPTER 12

### VIRTUAL TERMINAL COMMUNICATION PACKAGE (VTCOM)

The virtual terminal communication package (VTCOM) utility lets you communicate with a host system while you run under RT-11, making your stand-alone system a local terminal. With VTCOM, you can use resources available on host systems, such as electronic mail and programming languages, and still use RT-11 resources. You can also transfer ASCII and binary files between the host and your RT-11 stand-alone system.

The virtual terminal communication package is the software that lets you take advantage of these features. However, VTCOM requires certain hardware components.

#### 12.1 COMMUNICATION HARDWARE

Your stand-alone system can be connected to a host by a hard-wired connection or by a modem and telephone line. If the host is nearby, you can use a hard-wired connection.

To communicate with a more distant host, you must use a modem and telephone line. When you communicate over a telephone line, the electrical impulses generated by the computers must be converted to audio tones. This is done by the modem, which is connected to your computer system and to your telephone.

Whichever connection is used, the stand-alone end of the connection must be one of these serial interfaces:

- DL-11 or DLV-11 interface

- PDT-11/150 modem port

- Professional computer communication port

If your modem requires DTR (data terminal ready) signals, you must use a serial interface that asserts DTR when used with a modem. DL-11E, DLV-11E, and DLV-11F interfaces, the PDT communication port, and the Professional 300 communication port all assert DTR.

Your system must also include a line time clock, and DIGITAL recommends 28KW of memory if you want to run VTCOM as a foreground job.

## VIRTUAL TERMINAL COMMUNICATION PACKAGE (VTCOM)

### 12.2 COMMUNICATION SOFTWARE

The virtual terminal communication package consists of four components:

- VTCOM.REL      Once you are connected to a host, this program transfers information and ASCII files between the host system and your RT-11 stand-alone computer. VTCOM can run as a foreground or system job under the FB monitor, so you can perform other RT-11 operations in the background while you are linked to the host system. You can also run VTCOM under the SJ monitor or as a background job under the FB monitor.
- VTCOM.SAV      A virtual version of VTCOM.REL. You can run VTCOM.SAV as a background, foreground, or system job under the XM monitor.
- XC or XL        The device handler for your RT-11 stand-alone system's communication port. The handler file is XC.SYS for Professional 300 series systems, and XL.SYS for PDP-11 and PDT-11/150 computers (XCX.SYS and XLX.SYS if you are running under the XM monitor).
- TRANSF.SAV     A file transfer program. TRANSF.SAV transfers data between an RT-11 or RTEM-11 host system and your stand-alone computer while you are running VTCOM. Although TRANSF.SAV is provided on the RT-11 distribution kit, this program must be installed on the host system.

### 12.3 RUNNING VTCOM

VTCOM requires that your monitor include timer support. If you want to run VTCOM under the SJ monitor, you must generate a special monitor to include timer support.

To run VTCOM, you must first make sure the XC or XL handler is correctly installed. If you want to run VTCOM as a foreground or system job, you must also load the handler before running VTCOM. System job support is a special feature available through the system generation process.

#### 12.3.1 Installing the Handler

The XC or XL handler should install automatically when you bootstrap your system. Use the command SHOW DEVICE to make sure the handler has installed correctly.

If XC or XL is not listed as installed, make sure that the handler special features (included during system generation) match the monitor special features. If XL still does not install, correct the CSR and vector addresses by typing the following commands:

```
.SET XL CSR=n  
.SET XL VECTOR=n
```

Substitute for n the correct CSR and vector addresses for your system's serial port. The default CSR and vector settings are 176500 and 300 respectively.

## VIRTUAL TERMINAL COMMUNICATION PACKAGE (VTCOM)

XC should always install correctly if the monitor and handler special features match, because the CSR and VECTOR addresses are fixed at 173300 and 210 respectively. Therefore, these commands are invalid for Professional 325 and 350 computers. However, you can set the baud for data transmission on the Professional computers with the following command:

```
.SET XC SPEED=r
```

The default value for n is 1200 baud. Valid bauds are:

50	1200
75	1800
110	2000
134	2400
150	3600
200	4800
300	9600
600	19200

When you specify a value of 134 for n, the baud is actually 134.5 bits/s.

### 12.3.2 Loading the Handler

Before starting VTCOM, you must load the XC or XL handler. To prevent another job from using the handler while VTCOM is running, assign exclusive ownership of XC or XL to VTCOM.

If you plan to run VTCOM as a foreground job, type:

```
.LOAD XL:=F
```

or

```
.LOAD XC:=F
```

If you plan to run VTCOM as a system job, type:

```
.LOAD XL:=VTCOM
```

or

```
.LOAD XC:=VTCOM
```

### 12.3.3 Starting VTCOM

To run VTCOM as a foreground or system job under the FB monitor, type:

```
.FRUN VTCOM (foreground job)
```

or

```
.SRUN VTCOM (system job)
```

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To run VTCOM under the SJ monitor or as a background job under the FB monitor, type either of these commands:

```
.R VTCOM.REL
```

or

```
.RUN VTCOM.REL
```

Under the XM monitor, you can run VTCOM as a background, foreground, or system job by typing any of the commands shown above, but specify the file VTCOM.SAV in the command line rather than VTCOM.REL. These commands assume that VTCOM.REL or VTCOM.SAV is on your system volume. Otherwise, include the volume's device mnemonic in the VTCOM file specification.

### 12.4 COMMUNICATING WITH THE HOST

Now that VTCOM is running, you must establish a link with your host system. If your stand-alone system is connected to the host by a hard-wired connection, the link will be established just by starting VTCOM. However, if you plan to communicate with the host over a telephone line, you must dial a call to establish a connection. If you are using a modem other than DIGITAL's DF03, follow the instructions provided for that particular modem. If you are using a DF03 modem, follow these steps:

1. Set the ANL, ST, RDL, and DTL pushbuttons to the out position.
2. Make sure the CAR light is off and the DTR light is on. If the DTR light is off, make sure you are using a serial interface capable of asserting DTR.
3. Set the HS pushbutton for the speed you want:

In -- high speed (1200 baud)  
Out -- low speed (300 baud or less)

Make sure the communication port speed matches the speed you pick. If you are running on a Professional 300 series computer, use the command SET XC SPEED=n.

4. Set the DATA/TALK pushbutton to the in position.
5. Lift the telephone handset and listen for a dial tone.
6. Dial the number of the host computer. You can dial the number directly from the telephone or by using the VTCOM command DIAL (see Section 12.4.2). If you use the DIAL command, the DATA/TALK pushbutton must be in the out position.
7. When you hear the answer tone, set the DATA/TALK pushbutton to the out position.
8. Hang up the telephone handset.
9. Make sure the DSR and CAR lights are on.
10. Make sure the HS light is on if the modem is in high-speed mode.



## VIRTUAL TERMINAL COMMUNICATION PACKAGE (VTCOM)

If you log on to a host computer, be sure to log off the system before breaking the telephone connection. To break the telephone connection, set the DATA/TALK pushbutton to the in position. The DSR and CAR lights should go out; the DTR light should remain lit.

### 12.4.1 Control Commands

Once the connection is established, you can communicate with the host by placing your system in terminal mode.

If VTCOM is running as a foreground job, type <CTRL/F>. The prompt F> prints.

If VTCOM is running as a system job, type <CTRL/X>. The prompt X> prints and waits for you to type the job name (VTCOM).

You can then issue the VTCOM commands described in the next section, or log on to the host system.

While VTCOM maintains a link with the host, RT-11 continues to run in the background. To leave terminal mode and communicate with your RT-11 operating system, type <CTRL/B>. The prompt B> appears. Press RETURN, and the keyboard monitor prompt (.) appears.

### 12.4.2 VTCOM Commands

You use VTCOM commands to control the transfer of files and data between your RT-11 stand-alone system and a host system.

To issue a VTCOM command, first enter terminal mode by typing <CTRL/F> or <CTRL/X> and the system job name. Then, type <CTRL/P> to enter VTCOM command mode. VTCOM prompts:

TT::VTCOM>

Now type any of the commands listed in Table 12-1 and press RETURN. The shortest valid abbreviation for each command is underlined. You can display a list of VTCOM commands on your terminal by typing the VTCOM command HELP or by pressing RETURN in response to the VTCOM prompt.

Table 12-1: VTCOM Commands

Command	Function
<u>^x</u>	Lets VTCOM transmit CTRL characters that would normally be intercepted: <CTRL/B>, <CTRL/F>, <CTRL/O>, <CTRL/P>, <CTRL/Q>, <CTRL/S>.
<u>BREAK</u>	Transmits a break signal to the host, as if you had pressed the BREAK key.

(Continued on next page)

## VIRTUAL TERMINAL COMMUNICATION PACKAGE (VTCOM)

Table 12-1: VTCOM Commands (Cont.)

Command	Function
<u>CLEAR</u>	Clears any <CTRL/S> characters that have been sent, and starts sending characters to the terminal again.
<u>CLOSELOG</u>	Stops recording input in a log file and closes the log file. Use this command to make a log file permanent when you have finished transferring a file from the host to your stand-alone system.
<u>CONTINUE</u>	Returns your system to terminal mode. Use this command to exit VTCOM command mode and continue communication with the host system.
<u>CTRL/P</u>	Sends a <CTRL/P> character to the host. VTCOM normally intercepts <CTRL/P> characters and interprets them as a request to enter a VTCOM command.
<u>DIAL</u>	Causes the modem to dial the telephone dial string you specify. When you type the DIAL command and press RETURN, VTCOM prompts you for a string of numbers, letters, or symbols:  TT::VTCOM>Dial string?  Type the string you want the modem to dial and press RETURN. VTCOM remembers this number for future DIAL commands until you dial a new number, exit VTCOM, or reboot the system.  Apply the software customization provided in Chapter 3 of this manual to set a default telephone dial string.
<u>EXIT</u>	Terminates the VTCOM program and the XC or XL handler. To restart VTCOM, you must use the FRUN or SRUN command.
<u>FAST</u>	Lets VTCOM transmit ASCII characters to the host at high speed during a SEND operation. This command is valid only if the host system supports XON/XOFF for its input service.
<u>HELP</u>	Prints a list of VTCOM commands on your console.
<u>LOG</u>	Resumes recording data in a log file after a NOLOG command.
<u>NOLOG</u>	Suspends the recording of data in a log file. If you are transferring a file from a host to your stand-alone system, the transfer continues and information will be lost.

(Continued on next page)

## VIRTUAL TERMINAL COMMUNICATION PACKAGE (VTCOM)

Table 12-1: VTCOM Commands (Cont.)

Command	Function
<u>OPENLOG</u>	Opens a log file to receive ASCII input from the host system, and starts recording input in the log file. Use this command to transfer files from the host to your stand-alone system. You can have only one log file open at a time. If you try to open a second log file, VTCOM closes the first log file before opening the new one.
<u>PAUSE</u>	Ends VTCOM program control, but leaves the XL or XC handler running to receive input from the host.
<u>RESET</u>	Stops the transfer of an ASCII file to a host when using TRANSF or the VTCOM command OPENLOG.
<u>SEND</u>	Transfers an ASCII file from your stand-alone system to a host as if the file were being typed.
<u>SHOW</u>	Displays status of the following VTCOM characteristics:  Data transfers in progress Logging status - on or off SEND status - slow or fast Current dial string  For example:  Packets sent = 4 Packets received = 3 Packet size = 256 Next active block = 3 Logging is OFF SEND is SLOW Dial string is not set
<u>SLOW</u>	Causes VTCOM to transmit ASCII characters to the host at slow speed during a SEND operation.

### 12.5 TRANSFERRING ASCII FILES WITH VTCOM

The easiest, most reliable method of transferring files between your RT-11 stand-alone system and a host system is to use a storage device common to both systems and physically carry volumes between the two systems. For example, if your stand-alone system and the host system both include an RL02 device, copy files onto an RL02 volume and carry the volume between the systems.

If the two systems have no common storage devices, or if it is inconvenient to carry volumes between the systems, you can use the following methods to copy ASCII files from your stand-alone system to the host and from the host to your stand-alone system.

## VIRTUAL TERMINAL COMMUNICATION PACKAGE (VTCOM)

It is recommended that you use the ASCII file transfer methods described in the following two sections only if the TRANSF utility, described in Section 12.6, is not available on the host. TRANSF transfers are more reliable. Furthermore, TRANSF will not automatically convert lowercase characters to uppercase when copying files to the host, as sometimes happens when using other methods of file transfer.

### 12.5.1 Copying ASCII Files to Host System

Begin by starting VTCOM and establishing a link to your host system (see Sections 12.3 and 12.4). When you have logged on to the host system, follow these steps:

1. Type the command appropriate for your host's operating system to send terminal input to a file. For example, if your host system is RT-11, type:

```
.COPY TT: filnam.typ<RET>
```

filnam.typ represents the name and type of the output file to which you are copying.

2. Type <CTRL/P> to enter command mode, and type the SEND command:

```
TT::VTCOM>SEND<RET>
```

3. VTCOM prompts you for the name and type of the file you want to send to the host system. Type the file specification for the file you want to send to the host, and press RETURN.

```
TT::VTCOM>Send File named? filnam.typ<RET>
```

This completes the SEND command, and VTCOM leaves command mode. VTCOM begins to transfer the file. As the file is transferred, it is displayed on your screen.

4. When VTCOM finishes sending the file (the file finishes scrolling on the screen), type <CTRL/Z>. This closes the newly created file on the host.

### 12.5.2 Copying ASCII Files from Host System

Begin by starting VTCOM and establishing a link to your host system (see Sections 12.3 and 12.4). When you have logged on to the host system, follow these steps:

1. Type:

```
TYPE filnam.typ
```

filnam.typ represents the name and type of the file you want copied to your stand-alone system. Do not press RETURN.

2. Type <CTRL/P> to enter command mode, and type the OPENLOG command:

```
TT::VTCOM>OPENLOG<RET>
```

## VIRTUAL TERMINAL COMMUNICATION PACKAGE (VTCOM)

3. VTCOM prompts you for the name and type of the file on your stand-alone system to which you want to send the host file. Type the file specification.

```
TT::VTCOM>Log File name?  filnam.typ<RET>
```

This completes the OPENLOG command, and VTCOM leaves command mode.

4. Press RETURN once again. VTCOM begins to transfer the file. As the file transfers, it is displayed on the screen.
5. When VTCOM finishes sending the file (the file finishes scrolling on the screen and the host system prompt appears), enter VTCOM command mode once again by typing <CTRL/P>.
6. Type the CLOSELOG command and press RETURN. This closes the newly created file on your stand-alone system.

```
TT::VTCOM>CLOSELOG<RET>
```

The file on your stand-alone system will contain extra characters transmitted from the host: a carriage return, line feed combination at the beginning of the file, and the host system's prompt character at the end of the file. Delete these extra characters by editing the file with a text editor such as KED.

### 12.6 TRANSF FILE TRANSFER PROGRAM

While VTCOM can transfer only ASCII files, the TRANSF program can transfer ASCII and binary files between your stand-alone system and the host. TRANSF must be installed on a host running RT-11 or RTEM-11.

Since TRANSF is distributed only in binary format, you cannot copy TRANSF to the host by using the ASCII file transfer techniques described in Section 12.5. To install TRANSF on the host, you must copy TRANSF.SAV from your RT-11 volume to a common volume, carry the volume to the host, and copy TRANSF.SAV from the volume to the host.

The following section describes how to transfer files using TRANSF, from a host to your stand-alone system and from your stand-alone system to a host.

#### NOTE

If the host system supports the XON/XOFF feature, TRANSF can transfer files at any baud you choose. However, if the host does not support XON/XOFF, TRANSF can transfer files from your stand-alone system to the host only at speeds of 1200 baud or less using the distributed monitors. When transferring a file from a Professional 325 or 350 to a host system that does not support XON/XOFF, set your speed to 1200 baud or less with the SET XC SPEED=n command. Make sure the speed you set matches the host system's terminal speed.

You can transfer files at higher bauds if you increase the size of the input buffer through system generation.

### 12.6.1 TRANSF Command Syntax

To run TRANSF on your host system, type a command with the following syntax in response to your host system's prompt:

```
TRANSF output-filespec[/options]=input-filespec[/options]
```

where:

output-filespec is the device, file name, and file type to which you want a file copied.

input-filespec is the device, file name, and file type of the file you want to copy.

options represents the options listed in Tables 12-2.

RT-11 and RTEM-11 file specifications can include only a device, a file name of up to six characters, and a three-character file type. You cannot use wildcards in any file specifications for TRANSF.

**Table 12-2: TRANSF Options for RT-11 and RTEM-11 Hosts**

Option	Function
/S	Rings terminal bell when log messages are printed during file transfers. Automatically enables log messages.
/T	Indicates which file is the RT-11 stand-alone system file. To copy a file from the host to your stand-alone system, use /T with the output-filespec. To copy to the host, use /T with the input-filespec. If you do not specify /T in the command line, TRANSF assumes you are copying from the host to your stand-alone system. You cannot use /T on both sides of the command string.
/W	Causes TRANSF to print log messages during file transfers, but does not ring the terminal bell.

In the following example, the file RELSYS.SAV is transferred from an RTEM-11 host system to the file RELSYS.SAV on an RT-11 stand-alone system.

```
.TRANSF RELSYS.SAV/T=RELSYS.SAV/W
```

The following command string produces the same result.

```
.TRANSF RELSYS.SAV=RELSYS.SAV/W
```

The next example transfers the file SYSBLD.COM from a stand-alone system to a file named SYSBLD.COM on a host running RTEM-11.

```
.TRANSF SYSBLD.COM=DW:SYSBLD.COM/T
```

## VIRTUAL TERMINAL COMMUNICATION PACKAGE (VTCOM)

### 12.6.2 TRANSF Confirmation Messages

TRANSF confirms the start of the transfer by printing this message:

Creating [TT::]<output-filespec> from [TT::]<input-filespec>.

In the message:

TT:: represents the stand-alone system, and will appear with the input or output file specification.

output-filespec is the device, file name, and file type of the file being created.

input-filespec represents the device, file name, and file type of the file being copied.

If you have chosen either the /W or /S option, TRANSF prints the following information when the file transfer is complete:

Number of blocks transferred and number of retries

Number of characters saved through compression coding. Compression coding enables TRANSF to transfer data using fewer characters than normal, which saves transfer time.

Confirmation of file transfer

The following example shows a typical file transfer, from a stand-alone system to a host.

```
.TRANSF REL12.MAC=REL12.MAC/T/W
Creating REL12.MAC from TT::REL12.MAC
10 blocks transferred with 0 retries
1198 characters saved through compression coding
REL12.MAC created from TT::REL12.MAC
```





## APPENDIX A

### NEW ERROR MESSAGES

This appendix lists new error messages you may receive while running RT-11 V5.1. Under each message is a description of the problem that caused the message to appear and a solution to the problem.

#### **?BUP-F-Too many bad blocks DEV:**

More than 25 bad blocks were detected during a disk-to-disk backup or restore operation.

Verify that your disks are loaded correctly. If that is not the problem, use another disk.

#### **?BUP-W-Bad block read at nnnnnn**

A bad block was detected at location nnnnnn during a disk-to-disk backup or restore operation. The bad block was not copied.

This is an informational message.

#### **?BUP-W-Incompatible output volume size**

The output volumes used during the backup operation are a different size than the first backup volume used. For example, this message will appear if single-density and double-density diskettes are used for output volumes during the operation.

Try the operation again, using volumes that are the same size.

#### **?IND-F-Invalid operator for operation**

You attempted to use an arithmetic operator (+, -, \*, or /) in a logical expression with the .SETL directive.

Do not use arithmetic operators in .SETL logical expressions. Use only the logical operators & (AND), ! (OR), and ^ (NOT).

## NEW ERROR MESSAGES

### ?KED-F-Invalid device

The main input or output device is not a random-access device. This restriction does not apply to auxiliary files, which may reside on sequential-access devices.

Use a random-access device for your main input and output files.

### ?KED-F-Too big to edit

The input file is too large for KED to handle. KED cannot edit or inspect a file that is larger than 32767(decimal) blocks. This restriction does not apply to auxiliary files or devices.

Split the file into smaller segments using auxiliary output files (described in Chapter 4 of the PDP-11 Keypad Editor User's Guide), and edit each segment separately.

### ?KED-W-Cannot set terminal options -- Continue (Y,N)?

With KED running on an RT-11 multiterminal system, the terminal KED is running on has been attached (.MTATCH) by another job. KED requires that the multiterminal equivalent of SET TERM NOCRLF be performed, but cannot do so itself.

To continue processing, type Y and press the RETURN key. To stop KED, type N and press RETURN. When KED returns to the system prompt (.), type the command SET TERM NOCRLF. Then restart KED.

### ?KED-W-File not found -- Create it (Y,N)?

KED could not find the input file on the volume you specified.

Make sure you typed the input volume name and file name correctly. To continue, type Y and press the RETURN key. KED will create the file you specified on the volume you specified. To stop KED, type N and press return.

### ?KED-W-Output file or device protected -- Inspect (Y,N)?

The output file you specified for creating or editing already exists as a protected file, the input file you specified for editing is protected, or the output device you specified is write-protected.

To continue by inspecting the file you specified, on the device you specified, type Y and press the RETURN key. To stop KED, type N and press RETURN.

## NEW ERROR MESSAGES

### ?KEX-F-Insufficient memory

You attempted to run KEX, but there is not enough available memory. Or, you applied the customization in Section 3.2.1 of this manual to limit the amount of memory KEX requests with a .SETTOP, but the amount of memory you requested was too small.

Reapply the KEX customization, specifying a larger value for the highest address KEX requests with a .SETTOP.

### ?KMON-F-Invalid control file nesting

You are running an IND control file that calls an indirect command file, which in turn calls another IND control file.

You cannot include, in IND control files, an indirect command file that calls another IND control file.

### ?KMON-F-No such job or device - JOBNAME/DEVICENAME

An attempt was made to unload a job (JOBNAME) or device (DEVICENAME) that does not exist. This message appears only on systems with system job support.

Verify that you typed the job name or device name correctly. Use the SHOW JOBS or SHOW DEVICES command to obtain a list of current jobs or devices for your system.

### ?KMON-F-SY: write-locked DEV:FILNAM.TYP

A SET command failed because the system volume is write-protected.

Make sure the system device and volume are write-enabled and reissue the SET command.

### ?LD-F-SY: write-locked SY:LD.SYS

The LD handler could not be updated when RT-11 was bootstrapped because the system device was write-locked or the system volume was write-protected.

Make sure the system device and system volume are write-enabled. Bootstrap the system again.

### ?LD-F-Unable to update LD handler

An internal error occurred.

Retry the operation that produced the error. If the error persists, submit an SPR to DIGITAL; include with the SPR a program listing and a machine-readable source program, if possible.

### ?RESORC-I-No queues active

Neither QUEUE nor SPOOL were running when you issued a SHOW QUEUE or RESORC /Q command.

This message is informational.

## NEW ERROR MESSAGES

### ?SETUP-F-Ambiguous command <COMMAND>

The command abbreviation entered is not unique.

Retype the command, using enough characters to distinguish it from other commands.

### ?SETUP-F-Ambiguous value <VALUE>

The value you specified contains too few numbers to be unique.

Retype the command, using enough numbers to distinguish the value from others.

### ?SETUP-F-ANSWERBACK message too long

The message you specified for the answer-back feature has too many characters.

Retype the command, specifying an answer-back message with 20 (decimal) or fewer characters.

### ?SETUP-F-Channel in use

An internal SETUP error occurred.

Reboot the system and try the operation again. If the error occurs again, get a new copy of SETUP.SAV and retry the operation. If the error persists, submit an SPR to DIGITAL.

### ?SETUP-F-Channel not open DEV:FILNAM.TYP

An internal SETUP error occurred.

Reboot the system and try the operation again. If the error occurs again, get a new copy of SETUP.SAV and retry the operation. If the error persists, submit an SPR to DIGITAL.

### ?SETUP-F-Fetch error DEV:

An internal SETUP or a system error occurred. The copy of SETUP.SAV, the monitor file, or the specified device handler may be corrupted on disk.

Reboot the system and try the operation again. If the error occurs again, get a new copy of SETUP.SAV and retry the operation. If the error persists, submit an SPR to DIGITAL.

The in-core copy of SETUP or the monitor may be corrupted.

## NEW ERROR MESSAGES

### ?SETUP-F-File not found DEV:FILNAM.TYP

The device handler file for the device you specified was not found on the system volume.

Copy the handler file for the device to the system volume and try the operation again.

### ?SETUP-F-Input error DEV:FILNAM.TYP

SETUP detected a hardware error while reading the handler file.

Check the procedures for recovery from hard error conditions listed in Section 2.0 of the RT-11 System Message Manual. Try the operation again.

### ?SETUP-F-Insufficient memory

Not enough memory is available to complete the requested operation.

Refer to Section 3.0 of the RT-11 System Message Manual for information on how to increase memory space.

### ?SETUP-F-Invalid command <COMMAND>

The command line is invalid.

Check for a typing error. Make sure the format and syntax of the command line are correct, and retype the command line.

### ?SETUP-F-Invalid command for destination

The command you typed is invalid for the hardware you specified.

Retype the command, making sure the command option you choose is valid for the hardware (terminal, printer, or clock) you specify in the command line.

### ?SETUP-F-Invalid device DEV:

The specified device is not installed in the monitor device tables.

Check for a typing error in the command line. Use the `INSTALL` command to add the device to the monitor device tables.

### ?SETUP-F-Invalid processor for command <COMMAND>

The command you typed is invalid for your processor. Some SETUP commands are valid for Professional 300 series hardware only; some commands are valid for PDP-11 hardware only.

Make sure the command you type is valid for your processor.

## NEW ERROR MESSAGES

### ?SETUP-F-Invalid value <VALUE>

A value specified in the command line is invalid.

Check for a typing error in the command line. Make sure values you specify as arguments to SETUP commands are positive integers.

### ?SETUP-F-Unexpected EOF DEV:FILNAM.TYP

An internal SETUP error occurred.

Reboot the system and try the operation again. If the error occurs again, get a new copy of SETUP.SAV and retry the operation. If the error persists, submit an SPR to DIGITAL.

### ?SETUP-F-Wrong version of PI

You tried to run SETUP, but the version of PI(X).SYS on your system does not match the version of SETUP.

Use the version of PI(X).SYS distributed with the same version of RT-11 as the version of SETUP you are using.

### ?SETUP-U-System error

An internal SETUP error occurred.

Reboot the system and try the operation again. If the error occurs again, get a new copy of SETUP.SAV and retry the operation. If the error persists, submit an SPR to DIGITAL.

### ?SPOOL-F-Cannot attach output terminal

SPOOL could not use the logical unit number specified for output. This message appears only if you are running under a multiterminal system.

Make sure the terminal intended as the output device is not in use by a job other than SPOOL.

### ?SPOOL-F-Cannot get memory (use /BUFF:256.)

While running under the FB monitor, you attempted to run SPOOL as a foreground job, but neglected to use the /BUFFER option.

Run SPOOL again and include the option /BUFF:256. in the command line.

## NEW ERROR MESSAGES

### ?SPOOL-F-Cannot get required extended memory

Not enough extended memory is available for SPOOL to allocate for its output buffers.

Make sure you use the /BUF:256 option when running SPOOL. Make sure your system is configured so that 256 words of extended memory are available, possibly by changing the base address of VM.

### ?SPOOL-F-Cannot map window to extended memory

An internal SPOOL error has occurred.

Try the operation again. If the error persists, submit an SPR to DIGITAL; include with the SPR a program listing and machine-readable source program, if possible.

### ?SPOOL-F-Device for work file non-existent

The device specified for the work file SPOOL.SYS does not exist.

Check for a typing error. Reassign the logical device name SFD to a valid device.

### ?SPOOL-F-I/O error on work file

An error occurred while SPOOL was using the work file.

Check the work file volume for bad blocks by using the DIR/BADBLOCKS command. Initialize the volume or use another volume if necessary.

### ?SPOOL-F-SET USR NOSWAP

While running under the FB monitor, you attempted to run SPOOL but neglected to set the USR to NOSWAP first.

Issue the command SET USR NOSWAP and retype the command to run SPOOL. Then, issue the command SET USR SWAP.

### ?SPOOL-F-Spoiled device DEV: non-existent or not loaded

The SPOOL output device does not exist, or the handler for that device is not loaded.

Load the handler for the output device, and restart SPOOL. Make sure the logical device name S00: is assigned to a valid device.

### ?SPOOL-F-Work file device handler not loaded

The handler for the device specified for the work file SPOOL.SYS is not loaded.

Load the handler and restart SPOOL.

## NEW ERROR MESSAGES

### ?SPOOL-I-Invalid SP unit number specified

An attempt was made to issue a SET command for a SPOOL device other than SP0:.

Retype the SET command, using SP0:.

### ?SPOOL-W-Insufficient room for work file of nnn blocks

There is not enough room on the specified device for a work file of the size specified.

SPOOL allocates the largest free area on the specified device for SPOOL.SYS. If you require a larger work file, create SPOOL.SYS on a volume with more free space by assigning the logical name SF: to another volume.

### ?SYSGEN-E-Invalid baud rate

The baud rate specified is invalid.

Check for a typing error. Be sure to specify one of the following bauds: 110, 150, 300, 1200, 2400, 4800, 9600.

### ?SYSGEN-W-Output error DEV.FILNAM.TYP

A hardware error occurred while SYSGEN was accessing the specified file.

Check the procedures for recovery from hard error conditions listed in Section 2.0 of the RT-11 System Message Manual.

### ?TRANSF-F-Channel in use

An internal TRANSF error occurred.

Reboot the host system and try the operation again. If the error occurs again, install a new copy of TRANSF.SAV on the host and retry the operation. If the error persists, submit an SPR to DIGITAL. If possible, include a hard-copy listing or a summary of the console session from boot-time until the error occurred.



## NEW ERROR MESSAGES

### ?TRANSF-F-Channel not open

An internal TRANSF error occurred.

Reboot the host system and try the operation again. If the error occurs again, install a new copy of TRANSF.SAV on the host and retry the operation. If the error persists, submit an SPR to DIGITAL. If possible, include a hard-copy listing or a summary of the console session from boot-time until the error occurred.

### ?TRANSF-F-Conflicting option information

The /T option was specified with both the input and output file.

Use the /T option with only the input or output file specification, whichever is associated with your stand-alone system.

### ?TRANSF-F-Device full DEV:

The directory of the specified output device on the host system does not have enough room for the file name of the file being transferred.

Choose another output device for the operation, or delete some files from the output device and retry the operation.

### ?TRANSF-F-File created; protected file already exists DEV:FILNAM.TYP

A protect file exists on the host output device, along with a newly created unprotected file of the same name.

List an unsorted directory. If the unprotected file appears before the protected file in the directory listing, either delete or rename it. If the protected file appears first, either rename it or change the protection code.

### ?TRANSF-F-File not found DEV:FILNAM.TYP

The input file specified was not found on the host device specified.

Check for a typing error in the command line. Verify that the file name exists as entered in the command line, and try the operation again.

### ?TRANSF-F-Input error DEV:

A hardware error occurred while TRANSF was reading from the host device.

Check the procedures in Section 2.0 of the RT-11 System Message Manual for recovery from hard error conditions.

## NEW ERROR MESSAGES

### ?TRANSF-F-Invalid command

The command string entered is not a valid CSI or CCL command string.

Check the command line for typing errors. Reenter the command, using CSI or CCL command string syntax.

### ?TRANSF-F-Invalid device DEV:

The host device specified in a TRANSF command line is invalid.

Check for a typing error in the command line. Verify that the device specified is valid.

### ?TRANSF-F-Invalid option: /x

An invalid option was used in the TRANSF command line.

Check for a typing error in the command line. Use only the options listed as valid for TRANSF in Chapter 12 of the RT-11 System Release Notes.

### ?TRANSF-F-Output error DEV:

A hardware error occurred while TRANSF was writing to the host device.

Check the procedures in Section 2.0 of the RT-11 System Message Manual for recovery from hard error conditions.

### ?TRANSF-F-Protected file already exists DEV:FILNAM.TYP

A protected file already exists on the host output device with the same name as the file specified in the command. The file transfer is not processed.

Remove the protection from the existing file, or use a different output file name.

### ?TRANSF-F-Read past end of file

An internal TRANSF error occurred.

Reboot the host system and try the operation again. If the error occurs again, install a new copy of TRANSF.SAV on the host and retry the operation. If the error persists, submit an SPR to DIGITAL. If possible, include a hard-copy listing or a summary of the console session from boot-time until the error occurred.

## NEW ERROR MESSAGES

### ?TRANSF-F-Transfer aborted

A file transfer was aborted. Either a <CTRL/C> was typed, or an I/O error occurred on the host system.

If an I/O error occurred, try the operation again after hard error recovery procedures have been performed on the host.

### ?TRANSF-F-Transfer aborted by remote

A file transfer was aborted due to an I/O error on the stand-alone system.

Check the procedures listed in Section 2.0 of the RT-11 System Message Manual for recovery from hard error conditions.

### ?TRANSF-F-Unable to attach terminal

In a multiterminal environment, TRANSF was unable to attach the shared console because it was already attached by another job.

Remove the job that has attached the shared console and run TRANSF again.

### ?TRANSF-F-VTCOM not running on remote

VTCOM is not running on your stand-alone system, or the host system's response time is slow due heavy usage and TRANSF timed out before receiving a response from VTCOM.

Run VTCOM and try the operation again.

### ?TRANSF-F-Write past end of file

An internal TRANSF error occurred.

Reboot the host system and try the operation again. If the error occurs again, install a new copy of TRANSF.SAV on the host and retry the operation. If the error persists, submit an SPR to DIGITAL. If possible, include a hard-copy listing or a summary of the console session from boot-time until the error occurred.

### ?TRANSF-W-Transfer completed with n retries

The transfer completed, but n retries were performed.

Check the transfer output to make sure no errors were transmitted.

## NEW ERROR MESSAGES

### ?VTCOM-E-No dial string

You issued the DIAL command without specifying a dial string, and no default dial string has been set.

Retype the DIAL command. When the prompt appears, type a dial string.

### ?VTCOM-F-Device full

In an OPENLOG operation or in a TRANSF file transfer from the host, the directory of the output device does not have enough room for the file name of the file being transferred.

Choose another output device for the operation, or delete some files from the output device and retry the operation.

### ?VTCOM-F-Directory I/O error

A hardware error occurred while a directory was being read when a SEND, OPENLOG, or TRANSF operation was started.

Check the procedures listed in Section 2.0 of the RT-11 System Message Manual for recovery from hard error conditions.

### ?VTCOM-F-Petch error dd:

A serious VTCOM or internal system error occurred. The copy of VTCOM, the monitor file, or the specified device handler (XL or XC) may be corrupted on disk.

The in-core copy of VTCOM or the monitor may have been corrupted.

Reboot the system and try the operation again. If the error occurs again, get a new copy of VTCOM and the specified device handler. Retry the operation. If the error persists, submit an SPR to DIGITAL. If possible, include a hard-copy listing or a summary of the console session from boot-time until the error occurred.

### ?VTCOM-F-File not found

The input file specified during a SEND operation or a TRANSF file transfer from your stand-alone system was not found on the volume you specified.

Check for a typing error in the command line, verify that the file name exists as typed in the command line, and try the operation again.

### ?VTCOM-F-Handler not loaded

The handler needed for a SEND, OPENLOG, or TRANSF operation is not loaded.

Load the handler by using the LOAD command and retry the operation.

## NEW ERROR MESSAGES

### ?VTCOM-F-Handler not loaded dd:

The VTCOM handler (XL or XC) is not loaded.

Load the proper handler (XL for PDP-11 and PDT-11 systems, XC for Professional 300 series systems) and retry the operation.

### ?VTCOM-F-Insufficient memory

Not enough memory is available for VTCOM to fetch the XC or XL handler.

If you are running under the XM monitor, run VTCOM.SAV rather than VTCOM.REL. Otherwise, see Section 3.0 of the RT-11 System Message Manual for information on how to increase memory resources.

### ?VTCOM-F-Internal error

An internal error has occurred.

Run VTCOM again and retry the operation. If the error persists, submit an SPR to DIGITAL. If possible, include a hard-copy listing or a summary of the console session from boot-time until the error occurred.

### ?VTCOM-F-Internal task stack overflow

An internal error has occurred.

Run VTCOM again and retry the operation. If the error persists, submit an SPR to DIGITAL. If possible, include a hard-copy listing or a summary of the console session from boot-time until the error occurred.

### ?VTCOM-F-Invalid command

The command you typed is not a valid VTCOM command.

Check for a typing error in the command line. Check the list of valid VTCOM commands and command abbreviations by typing RETURN in response to the TT::VTCOM> prompt. Try the operation again.

### ?VTCOM-F-Invalid device

The device specified in an OPENLOG or SEND operation, or the device on the stand-alone system in a TRANSF file transfer, is invalid.

Check for a typing error in the command line. Verify that the device specified is valid.

## NEW ERROR MESSAGES

### ?VTCOM-F-Invalid device dd:

The device (XC or XL) was not found in the system device tables.

Make sure XC or XL has been installed. Try the operation again.

### ?VTCOM-F-Invalid file name

The file name specified for a SEND or OPENLOG operation, or the stand-alone system's file name during a TRANSF file transfer, is invalid.

Check for a typing error in the command line. Make sure the file name you specify includes only six characters in the file name and three in the file type.

### ?VTCOM-F-I/O error

A hardware error occurred during a SEND, OPENLOG, or TRANSF operation.

Check the procedures in Section 2.0 of the RT-11 System Message Manual for recovery from hard error conditions.

### ?VTCOM-F-Line too long

The line you typed in response to the VTCOM prompt TT::VTCOM> during a SEND or OPENLOG operation is too long.

Check for a typing error in the command line. Make sure the command you typed is a valid VTCOM command, and make sure your response to the VTCOM prompt includes no more than 40 characters. Try the operation again.

### ?VTCOM-F-.LOOKUP error dd:

An error occurred when VTCOM attempted to open a channel to the XC or XL handler.

Run VTCOM again and retry the operation. If the error persists, submit an SPR to DIGITAL. If possible, include a hard-copy listing or a summary of the console session from boot-time until the error occurred.

### ?VTCOM-F-Protected file already exists

The file you specified for an OPENLOG or TRANSF operation already exists as a protected file on the stand-alone system volume you specified.

Use another file name, or unprotect the file on the stand-alone system. Try the operation again.

## NEW ERROR MESSAGES

### ?VTCOM-F-Protocol version mismatch

The versions of the VTCOM and TRANSF protocol you are using do not match.

Make sure the version of TRANSF installed on the host system was distributed with the same version of RT-11 as the version of VTCOM. VTCOM and TRANSF are distributed on the RT-11 distribution kit as matched versions.

### ?VTCOM-F-Unexpected EOF

The log file became full before you closed it with the CLOSE command. VTCOM closes the log file when this error occurs.

Squeeze the device on which the log file resides, or use another device for the log file.

### ?VTCOM-F-Wrong version of dd:

The version of XL or XC you are using is not the version required by VTCOM.

Make sure the version of XC or XL you are using was distributed with the same version of RT-11 as the version of VTCOM. VTCOM and its handlers are distributed on the RT-11 distribution kit as matched versions.

### ?VTCOM-I-Connection established

VTCOM has established a connection to a remote modem.

You can now log onto your host system. This message is informational.

### ?VTCOM-I-Connection lost

The connection to a remote modem has been lost.

Reestablish the connection, or leave VTCOM terminal mode. This message is informational.

### ?VTCOM-W-File not sent, transfer in progress

A SEND command was issued while a SEND operation was already in progress.

The second SEND command is ignored. Wait until the operation in progress completes before issuing another SEND command.

### ?VTCOM-W-Log file closed due to I/O error

A hardware error has occurred during an OPENLOG operation. The log file has been closed.

Check the procedures listed in Section 2.0 of the RT-11 System Message Manual for recovery from hard error conditions.

## NEW ERROR MESSAGES

### ?VTCOM-W-Log file not open

A log file was not open when a LOG or NOLOG command was issued.

Open a log file by using the OPENLOG command and reissue the command.

### XXX-F-Wrong version of RT-11

An attempt was made to run an RT-11 Version 5 utility (XXX) on a previous version of RT-11.

Do not run RT-11 Version 5 utilities under earlier RT-11 versions.



APPENDIX B

RT-11 V5.1 SOFTWARE KIT MAPS

The following sections contain kit maps for the RT-11 distribution media:

Section	Media
B.1	RX50 diskettes
B.2	RX01 diskettes
B.3	RX02 diskettes
B.4	RL01, RL02, RK05 disks
B.5	9-track, 800 bits/in magtape

B.1 RX50 DISKETTES

AUTO

SWAP .SYS	26P	07-Dec-83	RT11AI.SYS	75P	07-Dec-83
RT11PI.SYS	89P	07-Dec-83	TT .SYS	2P	07-Dec-83
DL .SYS	4P	07-Dec-83	DU .SYS	4P	07-Dec-83
DZ .SYS	4P	07-Dec-83	DW .SYS	4P	07-Dec-83
PI .SYS	56P	07-Dec-83	DY .SYS	4P	07-Dec-83
TERMID.SAV	3P	07-Dec-83	PIP .SAV	29P	07-Dec-83
DIR .SAV	19P	07-Dec-83	IND .SAV	51P	07-Dec-83
DUP .SAV	45P	07-Dec-83	CONFIG.SAV	2P	07-Dec-83
CONFIG.COM	22P	07-Dec-83	QUEUE .REL	14P	07-Dec-83
QUEMAN.SAV	15P	07-Dec-83	STARTA.COM	50P	07-Dec-83
IVP .MAC	25P	07-Dec-83	IVP .COM	13P	07-Dec-83
RTBL .MAP	20P	07-Dec-83	RTFB .MAP	28P	07-Dec-83
RTSJ .MAP	20P	07-Dec-83	RTXM .MAP	31P	07-Dec-83
CUSTOM.TXT	6P	07-Dec-83	V5NOTE.TXT	2P	07-Dec-83
28 Files, 663 Blocks					
123 Free blocks					

Volume 1

SWAP .SYS	26P	07-Dec-83	RT11XM.SYS	99P	07-Dec-83
DUX .SYS	4P	07-Dec-83	DZX .SYS	4P	07-Dec-83
DWX .SYS	5P	07-Dec-83	NLX .SYS	2P	07-Dec-83
PIX .SYS	64P	07-Dec-83	DDX .SYS	5P	07-Dec-83
DLX .SYS	5P	07-Dec-83	DMX .SYS	5P	07-Dec-83
DXX .SYS	4P	07-Dec-83	DYX .SYS	4P	07-Dec-83
LDX .SYS	8P	07-Dec-83	LPX .SYS	2P	07-Dec-83
LSX .SYS	3P	07-Dec-83	MMX .SYS	10P	07-Dec-83
MSX .SYS	11P	07-Dec-83	MTX .SYS	9P	07-Dec-83
RKX .SYS	3P	07-Dec-83	SLX .SYS	16P	07-Dec-83
VMX .SYS	2P	07-Dec-83	XLX .SYS	4P	07-Dec-83

RT-11 V5.1 SOFTWARE KIT MAPS

SPX	.SYS	5P	07-Dec-83	XCX	.SYS	4P	07-Dec-83
KEX	.SAV	54P	07-Dec-83	IND	.SAV	51P	07-Dec-83
PIP	.SAV	29P	07-Dec-83	DUP	.SAV	45P	07-Dec-83
DIR	.SAV	19P	07-Dec-83	RESORC	.SAV	22P	07-Dec-83
HELP	.SAV	136P	07-Dec-83	SETUP	.SAV	28P	07-Dec-83
LET	.SAV	5P	07-Dec-83	UCL	.SAV	12P	07-Dec-83
V	.SAV	16P	07-Dec-83	VTCOM	.SAV	23P	07-Dec-83
VERIFY.COM		3P	07-Dec-83	V5USER.TXT		2P	07-Dec-83
STARTX.COM		1P	07-Dec-83				
39 Files, 750 Blocks							
36 Free blocks							

Volume 2

FORMAT.SAV		21P	07-Dec-83	KED	.SAV	59P	07-Dec-83
EDIT	.SAV	19P	07-Dec-83	ERROUT	.SAV	18P	07-Dec-83
V	.SAV	16P	07-Dec-83	MACRO	.SAV	60P	07-Dec-83
CREF	.SAV	6P	07-Dec-83	LINK	.SAV	49P	07-Dec-83
SYSMAC	.SML	49P	07-Dec-83	SYSLIB	.OBJ	46P	07-Dec-83
SRCCOM	.SAV	26P	07-Dec-83	SPOOL	.REL	11P	07-Dec-83
DATIME	.SAV	4P	07-Dec-83	DATIME	.COM	3P	07-Dec-83
SPLIT	.SAV	3P	07-Dec-83	TRANSF	.SAV	16P	07-Dec-83
VTCOM	.REL	25P	07-Dec-83	ODT	.OBJ	8P	07-Dec-83
VDT	.OBJ	8P	07-Dec-83	QUEUE	.REL	14P	07-Dec-83
RTMON	.REL	8P	07-Dec-83	BATCH	.SAV	26P	07-Dec-83
BINCOM	.SAV	24P	07-Dec-83	BUP	.SAV	37P	07-Dec-83
DUMP	.SAV	8P	07-Dec-83	FILEX	.SAV	22P	07-Dec-83
K52	.SAV	55P	07-Dec-83	LIBR	.SAV	24P	07-Dec-83
MDUP	.SAV	19P	07-Dec-83	PAT	.SAV	10P	07-Dec-83
QUEMAN	.SAV	15P	07-Dec-83	SIPP	.SAV	21P	07-Dec-83
SLP	.SAV	13P	07-Dec-83	SPEED	.SAV	4P	07-Dec-83
34 Files, 747 Blocks							
39 Free blocks							

Volume 3

RT11SJ	.SYS	73P	07-Dec-83	RT11BL	.SYS	73P	07-Dec-83
RT11FB	.SYS	87P	07-Dec-83	LD	.SYS	8P	07-Dec-83
LP	.SYS	2P	07-Dec-83	STARTF	.COM	1P	07-Dec-83
DY	.SYS	4P	07-Dec-83	VM	.SYS	3P	07-Dec-83
CR	.SYS	3P	07-Dec-83	CT	.SYS	6P	07-Dec-83
DD	.SYS	5P	07-Dec-83	DL	.SYS	4P	07-Dec-83
DM	.SYS	5P	07-Dec-83	DP	.SYS	3P	07-Dec-83
DS	.SYS	3P	07-Dec-83	DT	.SYS	3P	07-Dec-83
DU	.SYS	4P	07-Dec-83	DZ	.SYS	4P	07-Dec-83
DW	.SYS	4P	07-Dec-83	DX	.SYS	4P	07-Dec-83
PI	.SYS	56P	07-Dec-83	XL	.SYS	4P	07-Dec-83
XC	.SYS	4P	07-Dec-83	SP	.SYS	5P	07-Dec-83
SLMIN	.SYS	11P	07-Dec-83	LS	.SYS	3P	07-Dec-83
MM	.SYS	9P	07-Dec-83	MS	.SYS	10P	07-Dec-83
MT	.SYS	9P	07-Dec-83	NL	.SYS	2P	07-Dec-83
TT	.SYS	2P	07-Dec-83	PC	.SYS	2P	07-Dec-83
PD	.SYS	3P	07-Dec-83	RF	.SYS	3P	07-Dec-83
RK	.SYS	3P	07-Dec-83	SL	.SYS	13P	07-Dec-83
RTBL	.MAP	20P	07-Dec-83	RTFB	.MAP	28P	07-Dec-83
RTSJ	.MAP	20P	07-Dec-83	RTXM	.MAP	31P	07-Dec-83
STARTS.COM		1P	07-Dec-83				
41 Files, 538 Blocks							
248 Free blocks							

RT-11 V5.1 SOFTWARE KIT MAPS

Volume 4

SYSGEN.COM	203P	07-Dec-83	BL	.ANS	8P	07-Dec-83	
SJFB	.ANS	9P	07-Dec-83	XM	.ANS	8P	07-Dec-83
MBOOT	.BOT	1P	07-Dec-83	MBOT16	.BOT	1P	07-Dec-83
MSBOOT	.BOT	3P	07-Dec-83	DISMT1	.COM	12P	07-Dec-83
DISMT2	.COM	9P	07-Dec-83	ERROUT	.OBJ	15P	07-Dec-83
SAMPLE	.KED	4P	07-Dec-83	DEMOED	.TXT	1P	07-Dec-83
DEMOBG	.MAC	2P	07-Dec-83	DEMOFG	.MAC	3P	07-Dec-83
DEMOX1	.MAC	3P	07-Dec-83	DEMOF1	.FOR	2P	07-Dec-83
MDUP	.MM	56P	12-May-83	MDUP	.MS	56P	12-May-83
MDUP	.MT	56P	12-May-83	VTHDLR	.OBJ	8P	07-Dec-83
PUTSTR	.FOR	2P	07-Dec-83	GETSTR	.FOR	2P	07-Dec-83
CONSOL	.MAC	5P	07-Dec-83	DATIME	.MAC	20P	07-Dec-83
24 Files, 489 Blocks							
297 Free blocks							

Volume 5

TRMTBL	.MAC	19P	07-Dec-83	USR	.MAC	66P	07-Dec-83
BSTRAP	.MAC	64P	07-Dec-83	EDTGBL	.MAC	32P	07-Dec-83
KMON	.MAC	120P	07-Dec-83	KMOVLY	.MAC	205P	07-Dec-83
RMONFB	.MAC	146P	07-Dec-83	RMONSJ	.MAC	70P	07-Dec-83
XMSUBS	.MAC	34P	07-Dec-83				
9 Files, 756 Blocks							
30 Free blocks							

Volume 6

SJ	.MAC	1P	07-Dec-83	XM	.MAC	1P	07-Dec-83
FB	.MAC	1P	07-Dec-83	TM	.MAC	26P	07-Dec-83
TJ	.MAC	31P	07-Dec-83	XC	.MAC	1P	07-Dec-83
TS	.MAC	33P	07-Dec-83	FSM	.MAC	32P	07-Dec-83
BA	.MAC	20P	07-Dec-83	CR	.MAC	15P	07-Dec-83
CT	.MAC	34P	07-Dec-83	DD	.MAC	26P	07-Dec-83
DL	.MAC	26P	07-Dec-83	DM	.MAC	26P	07-Dec-83
DP	.MAC	11P	07-Dec-83	DS	.MAC	10P	07-Dec-83
DT	.MAC	9P	07-Dec-83	DZ	.MAC	17P	07-Dec-83
DW	.MAC	25P	07-Dec-83	XL	.MAC	26P	07-Dec-83
SP	.MAC	36P	07-Dec-83	DU	.MAC	28P	07-Dec-83
DX	.MAC	21P	07-Dec-83	DY	.MAC	23P	07-Dec-83
LD	.MAC	45P	07-Dec-83	LP	.MAC	9P	07-Dec-83
LS	.MAC	19P	07-Dec-83	NL	.MAC	3P	07-Dec-83
PC	.MAC	5P	07-Dec-83	PD	.MAC	12P	07-Dec-83
RF	.MAC	7P	07-Dec-83	EL	.MAC	16P	07-Dec-83
RK	.MAC	11P	07-Dec-83	TT	.MAC	7P	07-Dec-83
VM	.MAC	18P	07-Dec-83	VTMAC	.MAC	7P	07-Dec-83
ELCOPY	.MAC	15P	07-Dec-83	ELINIT	.MAC	16P	07-Dec-83
ELTASK	.MAC	9P	07-Dec-83	ERRTXT	.MAC	6P	07-Dec-83
MTTENT	.MAC	18P	07-Dec-83	MTTINT	.MAC	46P	07-Dec-83
42 Files, 748 Blocks							
38 Free blocks							

RT-11 V5.1 SOFTWARE KIT MAPS

B.2 RX01 DISKETTES

Volume 1

SWAP	.SYS	26P	07-Dec-83	RT11FB.SYS	87P	07-Dec-83	
DY	.SYS	4P	07-Dec-83	DL	.SYS	4P	07-Dec-83
DZ	.SYS	4P	07-Dec-83	DW	.SYS	4P	07-Dec-83
DU	.SYS	4P	07-Dec-83	LD	.SYS	8P	07-Dec-83
SL	.SYS	13P	07-Dec-83	VM	.SYS	3P	07-Dec-83
RK	.SYS	3P	07-Dec-83	DM	.SYS	5P	07-Dec-83
DD	.SYS	5P	07-Dec-83	TT	.SYS	2P	07-Dec-83
LP	.SYS	2P	07-Dec-83	LS	.SYS	3P	07-Dec-83
NL	.SYS	2P	07-Dec-83	MT	.SYS	9P	07-Dec-83
MM	.SYS	9P	07-Dec-83	MS	.SYS	10P	07-Dec-83
DS	.SYS	3P	07-Dec-83	DT	.SYS	3P	07-Dec-83
DP	.SYS	3P	07-Dec-83	DX	.SYS	4P	07-Dec-83
RF	.SYS	3P	07-Dec-83	PC	.SYS	2P	07-Dec-83
PD	.SYS	3P	07-Dec-83	CT	.SYS	6P	07-Dec-83
CR	.SYS	3P	07-Dec-83	SP	.SYS	5P	07-Dec-83
XL	.SYS	4P	07-Dec-83	XC	.SYS	4P	07-Dec-83
IND	.SAV	51P	07-Dec-83	PIP	.SAV	29P	07-Dec-83
DUP	.SAV	45P	07-Dec-83	DIR	.SAV	19P	07-Dec-83
KED	.SAV	59P	07-Dec-83	RESORC.SAV	22P	07-Dec-83	
STARTF.COM		1P	07-Dec-83	V5USER.TXT	2P	07-Dec-83	
40 Files, 478 Blocks							
8 Free blocks							

Volume 2

RT11BL.SYS		73P	07-Dec-83	RT11SJ.SYS	73P	07-Dec-83	
RT11XM.SYS		99P	07-Dec-83	SLMIN	.SYS	11P	07-Dec-83
DYX	.SYS	4P	07-Dec-83	DLX	.SYS	5P	07-Dec-83
DZX	.SYS	4P	07-Dec-83	DWX	.SYS	5P	07-Dec-83
XLX	.SYS	4P	07-Dec-83	SPX	.SYS	5P	07-Dec-83
XCX	.SYS	4P	07-Dec-83	PIX	.SYS	64P	07-Dec-83
DUX	.SYS	4P	07-Dec-83	LDX	.SYS	8P	07-Dec-83
VMX	.SYS	2P	07-Dec-83	DMX	.SYS	5P	07-Dec-83
DDX	.SYS	5P	07-Dec-83	LPX	.SYS	2P	07-Dec-83
LSX	.SYS	3P	07-Dec-83	DXX	.SYS	4P	07-Dec-83
RKX	.SYS	3P	07-Dec-83	SLX	.SYS	16P	07-Dec-83
NLX	.SYS	2P	07-Dec-83	MSX	.SYS	11P	07-Dec-83
MTX	.SYS	9P	07-Dec-83	MMX	.SYS	10P	07-Dec-83
STARTS.COM		1P	07-Dec-83	STARTX.COM		1P	07-Dec-83
28 Files, 437 Blocks							
49 Free blocks							

Volume 3

PI	.SYS	56P	07-Dec-83	EDIT	.SAV	19P	07-Dec-83
K52	.SAV	55P	07-Dec-83	MACRO	.SAV	60P	07-Dec-83
CREF	.SAV	6P	07-Dec-83	LINK	.SAV	49P	07-Dec-83
LIBR	.SAV	24P	07-Dec-83	SYSMAC.SML		49P	07-Dec-83
SYSLIB.OBJ		46P	07-Dec-83	ODT	.OBJ	8P	07-Dec-83
VDT	.OBJ	8P	07-Dec-83	PAT	.SAV	10P	07-Dec-83
BINCOM.SAV		24P	07-Dec-83	SRCCOM.SAV		26P	07-Dec-83
DUMP	.SAV	8P	07-Dec-83				
15 Files, 448 Blocks							
38 Free blocks							

RT-11 V5.1 SOFTWARE KIT MAPS

Volume 4

FORMAT.SAV	21P	07-Dec-83	BUP	.SAV	37P	07-Dec-83
FILEX .SAV	22P	07-Dec-83	SIPP	.SAV	21P	07-Dec-83
SLP .SAV	13P	07-Dec-83	HELP	.SAV	136P	07-Dec-83
SYSGEN.COM	203P	07-Dec-83	BL	.ANS	8P	07-Dec-83
SJFB .ANS	9P	07-Dec-83	XM	.ANS	8P	07-Dec-83

10 Files, 478 Blocks  
8 Free blocks

Volume 5

SJ .MAC	1P	07-Dec-83	FB	.MAC	1P	07-Dec-83
XM .MAC	1P	07-Dec-83	XL	.MAC	26P	07-Dec-83
EDTGBL.MAC	32P	07-Dec-83	BSTRAP.MAC		64P	07-Dec-83
KMON .MAC	120P	07-Dec-83	KMOVLY.MAC		205P	07-Dec-83

8 Files, 450 Blocks  
36 Free blocks

Volume 6

SP .MAC	36P	07-Dec-83	USR	.MAC	66P	07-Dec-83
RMONSJ.MAC	70P	07-Dec-83	RMONFB.MAC		146P	07-Dec-83
XMSUBS.MAC	34P	07-Dec-83	MTTEMT.MAC		18P	07-Dec-83
MTTINT.MAC	46P	07-Dec-83	CR	.MAC	15P	07-Dec-83
DT .MAC	9P	07-Dec-83	RF	.MAC	7P	07-Dec-83

10 Files, 447 Blocks  
39 Free blocks

Volume 7

TRMTBL.MAC	19P	07-Dec-83	BA	.MAC	20P	07-Dec-83
DD .MAC	26P	07-Dec-83	DL	.MAC	26P	07-Dec-83
DM .MAC	26P	07-Dec-83	DP	.MAC	11P	07-Dec-83
DS .MAC	10P	07-Dec-83	DU	.MAC	28P	07-Dec-83
DX .MAC	21P	07-Dec-83	DY	.MAC	23P	07-Dec-83
EL .MAC	16P	07-Dec-83	ELCOPY.MAC		15P	07-Dec-83
ELINIT.MAC	16P	07-Dec-83	ELTASK.MAC		9P	07-Dec-83
FSM .MAC	32P	07-Dec-83	LD	.MAC	45P	07-Dec-83
LP .MAC	9P	07-Dec-83	LS	.MAC	19P	07-Dec-83
NL .MAC	3P	07-Dec-83	PD	.MAC	12P	07-Dec-83
RK .MAC	11P	07-Dec-83	TJ	.MAC	31P	07-Dec-83
XC .MAC	1P	07-Dec-83				

23 Files, 429 Blocks  
57 Free blocks

Volume 8

DZ .MAC	17P	07-Dec-83	ERROUT.SAV		18P	07-Dec-83
TT .MAC	7P	07-Dec-83	DW	.MAC	25P	07-Dec-83
CONFIG.SAV	2P	07-Dec-83	CONFIG.COM		22P	07-Dec-83
TM .MAC	26P	07-Dec-83	CT	.MAC	34P	07-Dec-83
PC .MAC	5P	07-Dec-83	VM	.MAC	18P	07-Dec-83
TS .MAC	33P	07-Dec-83	ERROUT.OBJ		15P	07-Dec-83
ERRTXT.MAC	6P	07-Dec-83	MDUP .SAV		19P	07-Dec-83
MDUP .MT	56P	10-Mar-83	MDUP .MS		56P	10-Mar-83
MDUP .MM	56P	10-Mar-83	MBOOT .BOT		1P	07-Dec-83
MBOT16.BOT	1P	07-Dec-83	MSBOOT.BOT		3P	07-Dec-83
DISMT1.COM	12P	07-Dec-83	DISMT2.COM		9P	07-Dec-83

22 Files, 441 Blocks  
45 Free blocks

## RT-11 V5.1 SOFTWARE KIT MAPS

### Volume 9

BATCH .SAV	26P	07-Dec-83	QUEMAN.SAV	15P	07-Dec-83
SPEED .SAV	4P	07-Dec-83	SETUP .SAV	28P	07-Dec-83
SPLIT .SAV	3P	07-Dec-83	UCL .SAV	12P	07-Dec-83
V .SAV	16P	07-Dec-83	KEX .SAV	54P	07-Dec-83
LET .SAV	5P	07-Dec-83	UNSUP .TXT	14P	07-Dec-83
QUEUE .REL	14P	07-Dec-83	RTMON .REL	8P	07-Dec-83
CONSOL.MAC	5P	07-Dec-83	SAMPLE.KED	4P	07-Dec-83
DATIME.SAV	4P	07-Dec-83	DATIME.COM	3P	07-Dec-83
DATIME.MAC	20P	07-Dec-83	RT11PI.SYS	89P	07-Dec-83
VTCOM .SAV	23P	07-Dec-83	VTCOM .REL	25P	07-Dec-83
TRANSF.SAV	16P	07-Dec-83	SPOOL .REL	11P	07-Dec-83
VTMAC .MAC	7P	07-Dec-83	VTHDLR.OBJ	8P	07-Dec-83
DEMOBG.MAC	2P	07-Dec-83	DEMOFG.MAC	3P	07-Dec-83
DEMOX1.MAC	3P	07-Dec-83	DEMOF1.FOR	2P	07-Dec-83
DEMOED.TXT	1P	07-Dec-83	PUTSTR.FOR	2P	07-Dec-83
GETSTR.FOR	2P	07-Dec-83			
31 Files, 429 Blocks					
57 Free blocks					

### Volume 10

SWAP .SYS	26P	07-Dec-83	RT11AI.SYS	75P	07-Dec-83
TT .SYS	2P	07-Dec-83	PD .SYS	3P	07-Dec-83
TERMID.SAV	3P	07-Dec-83	PIP .SAV	29P	07-Dec-83
DIR .SAV	19P	07-Dec-83	IND .SAV	51P	07-Dec-83
DUP .SAV	45P	07-Dec-83	STARTA.COM	50P	07-Dec-83
VERIFY.COM	3P	07-Dec-83	IVP .MAC	25P	07-Dec-83
IVP .COM	13P	07-Dec-83	RTBL .MAP	20P	07-Dec-83
RTFB .MAP	28P	07-Dec-83	RTSJ .MAP	20P	07-Dec-83
RTXM .MAP	31P	07-Dec-83	CUSTOM.TXT	6P	07-Dec-83
V5NOTE.TXT	2P	07-Dec-83			
19 Files, 451 Blocks					
35 Free blocks					

## B.3 RX02 DISKETTES

### AUTO

SWAP .SYS	26P	07-Dec-83	RT11AI.SYS	75P	07-Dec-83
RT11PI.SYS	89P	07-Dec-83	TT .SYS	2P	07-Dec-83
DL .SYS	4P	07-Dec-83	DU .SYS	4P	07-Dec-83
DZ .SYS	4P	07-Dec-83	DW .SYS	4P	07-Dec-83
PI .SYS	56P	07-Dec-83	DY .SYS	4P	07-Dec-83
TERMID.SAV	3P	07-Dec-83	PIP .SAV	29P	07-Dec-83
DIR .SAV	19P	07-Dec-83	IND .SAV	51P	07-Dec-83
DUP .SAV	45P	07-Dec-83	QUEUE .REL	14P	07-Dec-83
QUEMAN.SAV	15P	07-Dec-83	STARTA.COM	50P	07-Dec-83
IVP .MAC	25P	07-Dec-83	CONFIG.SAV	2P	07-Dec-83
CONFIG.COM	22P	07-Dec-83	IVP .COM	13P	07-Dec-83
RTBL .MAP	20P	07-Dec-83	RTFB .MAP	28P	07-Dec-83
RTSJ .MAP	20P	07-Dec-83	RTXM .MAP	31P	07-Dec-83
CUSTOM.TXT	6P	07-Dec-83	V5NOTE.TXT	2P	07-Dec-83
28 Files, 663 Blocks					
311 Free blocks					

RT-11 V5.1 SOFTWARE KIT MAPS

Volume 1

SWAP	.SYS	26P	07-Dec-83	RT11FB.SYS	87P	07-Dec-83	
DY	.SYS	4P	07-Dec-83	VM	.SYS	3P	07-Dec-83
CR	.SYS	3P	07-Dec-83	CT	.SYS	6P	07-Dec-83
DD	.SYS	5P	07-Dec-83	DL	.SYS	4P	07-Dec-83
DM	.SYS	5P	07-Dec-83	DP	.SYS	3P	07-Dec-83
DS	.SYS	3P	07-Dec-83	DU	.SYS	4P	07-Dec-83
DZ	.SYS	4P	07-Dec-83	DW	.SYS	4P	07-Dec-83
DX	.SYS	4P	07-Dec-83	PI	.SYS	56P	07-Dec-83
XL	.SYS	4P	07-Dec-83	XC	.SYS	4P	07-Dec-83
SP	.SYS	5P	07-Dec-83	LD	.SYS	8P	07-Dec-83
LP	.SYS	2P	07-Dec-83	LS	.SYS	3P	07-Dec-83
MM	.SYS	9P	07-Dec-83	MS	.SYS	10P	07-Dec-83
MT	.SYS	9P	07-Dec-83	NL	.SYS	2P	07-Dec-83
RK	.SYS	3P	07-Dec-83	SL	.SYS	13P	07-Dec-83
HELP	.SAV	136P	07-Dec-83	FORMAT.SAV	21P	07-Dec-83	
IND	.SAV	51P	07-Dec-83	PIP	.SAV	29P	07-Dec-83
DUP	.SAV	45P	07-Dec-83	DIR	.SAV	19P	07-Dec-83
RESORC.SAV	22P	07-Dec-83	KED	.SAV	59P	07-Dec-83	
EDIT	.SAV	19P	07-Dec-83	MACRO	.SAV	60P	07-Dec-83
CREP	.SAV	6P	07-Dec-83	LINK	.SAV	49P	07-Dec-83
SYSMAC.SML	49P	07-Dec-83	SYSLIB.OBJ	46P	07-Dec-83		
SPOOL	.REL	11P	07-Dec-83	SRCCOM.SAV	26P	07-Dec-83	
DATIME.SAV	4P	07-Dec-83	DATIME.COM	3P	07-Dec-83		
SAMPLE.KED	4P	07-Dec-83	DEMOED.TXT	1P	07-Dec-83		
DEMOBG.MAC	2P	07-Dec-83	DEMOFG.MAC	3P	07-Dec-83		
DEMOX1.MAC	3P	07-Dec-83	DEMOF1.FOR	2P	07-Dec-83		
VERIFY.COM	3P	07-Dec-83	V5USER.TXT	2P	07-Dec-83		
STARTF.COM	1P	07-Dec-83					
55 Files, 969 Blocks							
5 Free blocks							

Volume 2

RT11XM.SYS	99P	07-Dec-83	RT11BL.SYS	73P	07-Dec-83		
RT11SJ.SYS	73P	07-Dec-83	RF	.SYS	3P	07-Dec-83	
DT	.SYS	3P	07-Dec-83	SLMIN	.SYS	11P	07-Dec-83
TT	.SYS	2P	07-Dec-83	PC	.SYS	2P	07-Dec-83
PD	.SYS	3P	07-Dec-83	DDX	.SYS	5P	07-Dec-83
DLX	.SYS	5P	07-Dec-83	DMX	.SYS	5P	07-Dec-83
DUX	.SYS	4P	07-Dec-83	DZX	.SYS	4P	07-Dec-83
DWX	.SYS	5P	07-Dec-83	DXX	.SYS	4P	07-Dec-83
DYX	.SYS	4P	07-Dec-83	LDX	.SYS	8P	07-Dec-83
LPX	.SYS	2P	07-Dec-83	LSX	.SYS	3P	07-Dec-83
MMX	.SYS	10P	07-Dec-83	MSX	.SYS	11P	07-Dec-83
MTX	.SYS	9P	07-Dec-83	NLX	.SYS	2P	07-Dec-83
RKX	.SYS	3P	07-Dec-83	SLX	.SYS	16P	07-Dec-83
VMX	.SYS	2P	07-Dec-83	XLX	.SYS	4P	07-Dec-83
SPX	.SYS	5P	07-Dec-83	XCX	.SYS	4P	07-Dec-83
PIX	.SYS	64P	07-Dec-83	KEX	.SAV	54P	07-Dec-83
STARTX.COM	1P	07-Dec-83	STARTS.COM	1P	07-Dec-83		
ODT	.OBJ	8P	07-Dec-83	VDT	.OBJ	8P	07-Dec-83
QUEUE	.REL	14P	07-Dec-83	RTMON	.REL	8P	07-Dec-83
BATCH	.SAV	26P	07-Dec-83	BINCOM.SAV	24P	07-Dec-83	
BUP	.SAV	37P	07-Dec-83	DUMP	.SAV	8P	07-Dec-83
FILEX	.SAV	22P	07-Dec-83	K52	.SAV	55P	07-Dec-83
LIBR	.SAV	24P	07-Dec-83	MDUP	.SAV	19P	07-Dec-83
UCL	.SAV	12P	07-Dec-83	V	.SAV	16P	07-Dec-83
LET	.SAV	5P	07-Dec-83	PAT	.SAV	10P	07-Dec-83
QUEMAN.SAV	15P	07-Dec-83	SIPP	.SAV	21P	07-Dec-83	

**RT-11 V5.1 SOFTWARE KIT MAPS**

SLP .SAV	13P	07-Dec-83	SPEED .SAV	4P	07-Dec-83
SETUP .SAV	28P	07-Dec-83	SPLIT .SAV	3P	07-Dec-83
TRANSF.SAV	16P	07-Dec-83	VTCOM .SAV	23P	07-Dec-83
VTCOM .REL	25P	07-Dec-83			
59 Files, 948 Blocks					
26 Free blocks					

Volume 3

MTTEMT.MAC	18P	07-Dec-83	MTTINT.MAC	46P	07-Dec-83
TRMTBL.MAC	19P	07-Dec-83	SYSGEN.COM	203P	07-Dec-83
BL .ANS	8P	07-Dec-83	SJFB .ANS	9P	07-Dec-83
XM .ANS	8P	07-Dec-83	MBOOT .BOT	1P	07-Dec-83
MBOT16.BOT	1P	07-Dec-83	MSBOOT.BOT	3P	07-Dec-83
DISMT1.COM	12P	07-Dec-83	DISMT2.COM	9P	07-Dec-83
MDUP .MM	56P	10-Mar-83	MDUP .MS	56P	10-Mar-83
MDUP .MT	56P	10-Mar-83	EL .MAC	16P	07-Dec-83
ELCOPY.MAC	15P	07-Dec-83	ELINIT.MAC	16P	07-Dec-83
ELTASK.MAC	9P	07-Dec-83	ERRTXT.MAC	6P	07-Dec-83
ERRROUT.SAV	18P	07-Dec-83	ERRROUT.OBJ	15P	07-Dec-83
22 Files, 600 Blocks					
374 Free blocks					

Volume 4

SJ .MAC	1P	07-Dec-83	XM .MAC	1P	07-Dec-83
FB .MAC	1P	07-Dec-83	BSTRAP.MAC	64P	07-Dec-83
EDTGBL.MAC	32P	07-Dec-83	KMON .MAC	120P	07-Dec-83
KNOVLY.MAC	205P	07-Dec-83	RMONFB.MAC	146P	07-Dec-83
RMONSJ.MAC	70P	07-Dec-83	XMSUBS.MAC	34P	07-Dec-83
10 Files, 674 Blocks					
300 Free blocks					

Volume 5

USR .MAC	66P	07-Dec-83	FSM .MAC	32P	07-Dec-83
TM .MAC	26P	07-Dec-83	TJ .MAC	31P	07-Dec-83
XC .MAC	1P	07-Dec-83	TS .MAC	33P	07-Dec-83
BA .MAC	20P	07-Dec-83	CR .MAC	15P	07-Dec-83
CT .MAC	34P	07-Dec-83	DD .MAC	26P	07-Dec-83
DL .MAC	26P	07-Dec-83	DM .MAC	26P	07-Dec-83
DP .MAC	11P	07-Dec-83	DS .MAC	10P	07-Dec-83
DT .MAC	9P	07-Dec-83	DZ .MAC	17P	07-Dec-83
DW .MAC	25P	07-Dec-83	XL .MAC	26P	07-Dec-83
SP .MAC	36P	07-Dec-83	DU .MAC	28P	07-Dec-83
DX .MAC	21P	07-Dec-83	DY .MAC	23P	07-Dec-83
LD .MAC	45P	07-Dec-83	LP .MAC	9P	07-Dec-83
LS .MAC	19P	07-Dec-83	NL .MAC	3P	07-Dec-83
PC .MAC	5P	07-Dec-83	PD .MAC	12P	07-Dec-83
RF .MAC	7P	07-Dec-83	RK .MAC	11P	07-Dec-83
TT .MAC	7P	07-Dec-83	VM .MAC	18P	07-Dec-83
VTMAC .MAC	7P	07-Dec-83	VTHDLR.OBJ	8P	07-Dec-83
PUTSTR.FOR	2P	07-Dec-83	GETSTR.FOR	2P	07-Dec-83
CONSOL.MAC	5P	07-Dec-83	DATIME.MAC	20P	07-Dec-83
UNSUP .TXT	14P	07-Dec-83			
39 Files, 736 Blocks					
238 Free blocks					



## RT-11 V5.1 SOFTWARE KIT MAPS

### B.4 RL01, RL02, RK05 DISKS

SWAP .SYS	26P	07-Dec-83	RT11AI.SYS	75P	07-Dec-83
RT11PI.SYS	89P	07-Dec-83	RT11SJ.SYS	73P	07-Dec-83
RT11FB.SYS	87P	07-Dec-83	RT11XM.SYS	99P	07-Dec-83
RT11BL.SYS	73P	07-Dec-83	TT .SYS	2P	07-Dec-83
LD .SYS	8P	07-Dec-83	DX .SYS	4P	07-Dec-83
DY .SYS	4P	07-Dec-83	DD .SYS	5P	07-Dec-83
PD .SYS	3P	07-Dec-83	VM .SYS	3P	07-Dec-83
DZ .SYS	4P	07-Dec-83	DW .SYS	4P	07-Dec-83
SP .SYS	5P	07-Dec-83	XL .SYS	4P	07-Dec-83
DT .SYS	3P	07-Dec-83	XC .SYS	4P	07-Dec-83
RF .SYS	3P	07-Dec-83	DS .SYS	3P	07-Dec-83
RK .SYS	3P	07-Dec-83	DL .SYS	4P	07-Dec-83
DU .SYS	4P	07-Dec-83	DP .SYS	3P	07-Dec-83
DM .SYS	5P	07-Dec-83	MT .SYS	9P	07-Dec-83
MM .SYS	9P	07-Dec-83	MS .SYS	10P	07-Dec-83
CT .SYS	6P	07-Dec-83	LP .SYS	2P	07-Dec-83
LS .SYS	3P	07-Dec-83	PC .SYS	2P	07-Dec-83
CR .SYS	3P	07-Dec-83	NL .SYS	2P	07-Dec-83
SL .SYS	13P	07-Dec-83	PI .SYS	56P	07-Dec-83
LDX .SYS	8P	07-Dec-83	DXX .SYS	4P	07-Dec-83
DYX .SYS	4P	07-Dec-83	DDX .SYS	5P	07-Dec-83
VMX .SYS	2P	07-Dec-83	DZX .SYS	4P	07-Dec-83
DWX .SYS	5P	07-Dec-83	SPX .SYS	5P	07-Dec-83
XLX .SYS	4P	07-Dec-83	XCX .SYS	4P	07-Dec-83
RKX .SYS	3P	07-Dec-83	DLX .SYS	5P	07-Dec-83
DUX .SYS	4P	07-Dec-83	DMX .SYS	5P	07-Dec-83
MTX .SYS	9P	07-Dec-83	MMX .SYS	10P	07-Dec-83
MSX .SYS	11P	07-Dec-83	LPX .SYS	2P	07-Dec-83
LSX .SYS	3P	07-Dec-83	NLX .SYS	2P	07-Dec-83
SLX .SYS	16P	07-Dec-83	PIX .SYS	64P	07-Dec-83
MTHD .SYS	4P	07-Dec-83	MMHD .SYS	4P	07-Dec-83
MSHD .SYS	5P	07-Dec-83	SLMIN .SYS	11P	07-Dec-83
IND .SAV	51P	07-Dec-83	BUP .SAV	37P	07-Dec-83
PAT .SAV	10P	07-Dec-83	PIP .SAV	29P	07-Dec-83
DUP .SAV	45P	07-Dec-83	DIR .SAV	19P	07-Dec-83
SLP .SAV	13P	07-Dec-83	LET .SAV	5P	07-Dec-83
UCL .SAV	12P	07-Dec-83	KED .SAV	59P	07-Dec-83
K52 .SAV	55P	07-Dec-83	KEX .SAV	54P	07-Dec-83
LINK .SAV	49P	07-Dec-83	LIBR .SAV	24P	07-Dec-83
CREF .SAV	6P	07-Dec-83	HELP .SAV	136P	07-Dec-83
MDUP .SAV	19P	07-Dec-83	SIPP .SAV	21P	07-Dec-83
DUMP .SAV	8P	07-Dec-83	EDIT .SAV	19P	07-Dec-83
MACRO .SAV	60P	07-Dec-83	BATCH .SAV	26P	07-Dec-83
FILEX .SAV	22P	07-Dec-83	SPEED .SAV	4P	07-Dec-83
SETUP .SAV	28P	07-Dec-83	SPLIT .SAV	3P	07-Dec-83
VTCOM .SAV	23P	07-Dec-83	FORMAT.SAV	21P	07-Dec-83
RESORC.SAV	22P	07-Dec-83	QUEMAN.SAV	15P	07-Dec-83
SRCCOM.SAV	26P	07-Dec-83	BINCOM.SAV	24P	07-Dec-83
DATIME.SAV	4P	07-Dec-83	TERMID.SAV	3P	07-Dec-83
ERRROUT.SAV	18P	07-Dec-83	TRANSF.SAV	16P	07-Dec-83
CONFIG.SAV	2P	07-Dec-83	QUEUE .REL	14P	07-Dec-83
RTMON .REL	8P	07-Dec-83	SPOOL .REL	11P	07-Dec-83
VTCOM .REL	25P	07-Dec-83	STARTS.COM	1P	07-Dec-83
STARTF.COM	1P	07-Dec-83	STARTX.COM	1P	07-Dec-83
STARTA.COM	50P	07-Dec-83	DATIME.COM	3P	07-Dec-83
DISMT1.COM	12P	07-Dec-83	DISMT2.COM	9P	07-Dec-83
SYSGEN.COM	203P	07-Dec-83	IVP .COM	13P	07-Dec-83
VERIFY.COM	3P	07-Dec-83	CONFIG.COM	22P	07-Dec-83
SYSLIB.OBJ	46P	07-Dec-83	ODT .OBJ	8P	07-Dec-83
VDT .OBJ	8P	07-Dec-83	VTHDLR.OBJ	8P	07-Dec-83

**RT-11 V5.1 SOFTWARE KIT MAPS**

ERROUT.OBJ	15P	07-Dec-83	SYSMAC.SML	49P	07-Dec-83
RTBL .MAP	20P	07-Dec-83	RTSJ .MAP	20P	07-Dec-83
RTFB .MAP	28P	07-Dec-83	RTXM .MAP	31P	07-Dec-83
MBOOT .BOT	1P	07-Dec-83	MBOT16.BOT	1P	07-Dec-83
MSBOOT.BOT	3P	07-Dec-83	V .SAV	16P	07-Dec-83
VTMAC .MAC	7P	07-Dec-83	GETSTR.FOR	2P	07-Dec-83
PUTSTR.FOR	2P	07-Dec-83	DEMOBG.MAC	2P	07-Dec-83
DEMOFG.MAC	3P	07-Dec-83	DEMOX1.MAC	3P	07-Dec-83
DEMOF1.FOR	2P	07-Dec-83	DEMOED.TXT	1P	07-Dec-83
V5USER.TXT	2P	07-Dec-83	SJ .MAC	1P	07-Dec-83
FB .MAC	1P	07-Dec-83	XM .MAC	1P	07-Dec-83
DATIME.MAC	20P	07-Dec-83	CONSOL.MAC	5P	07-Dec-83
SAMPLE.KED	4P	07-Dec-83	SJFB .ANS	9P	07-Dec-83
BL .ANS	8P	07-Dec-83	XM .ANS	8P	07-Dec-83
TRMTBL.MAC	19P	07-Dec-83	V5NOTE.TXT	2P	07-Dec-83
UNSUP .TXT	14P	07-Dec-83	CUSTOM.TXT	6P	07-Dec-83
IVP .MAC	25P	07-Dec-83	EDTGBL.MAC	32P	07-Dec-83
BSTRAP.MAC	64P	07-Dec-83	KMON .MAC	120P	07-Dec-83
KMOVLY.MAC	205P	07-Dec-83	USR .MAC	66P	07-Dec-83
RMONSJ.MAC	70P	07-Dec-83	RMONFB.MAC	146P	07-Dec-83
XMSUBS.MAC	34P	07-Dec-83	MTTEMT.MAC	18P	07-Dec-83
MTTINT.MAC	46P	07-Dec-83	VM .MAC	18P	07-Dec-83
CR .MAC	15P	07-Dec-83	CT .MAC	34P	07-Dec-83
DD .MAC	26P	07-Dec-83	DL .MAC	26P	07-Dec-83
DU .MAC	28P	07-Dec-83	DM .MAC	26P	07-Dec-83
DP .MAC	11P	07-Dec-83	DS .MAC	10P	07-Dec-83
DT .MAC	9P	07-Dec-83	DX .MAC	21P	07-Dec-83
DY .MAC	23P	07-Dec-83	BA .MAC	20P	07-Dec-83
LP .MAC	9P	07-Dec-83	LS .MAC	19P	07-Dec-83
TJ .MAC	31P	07-Dec-83	TM .MAC	26P	07-Dec-83
TS .MAC	33P	07-Dec-83	NL .MAC	3P	07-Dec-83
PC .MAC	5P	07-Dec-83	PD .MAC	12P	07-Dec-83
RF .MAC	7P	07-Dec-83	RK .MAC	11P	07-Dec-83
TT .MAC	7P	07-Dec-83	DZ .MAC	17P	07-Dec-83
DW .MAC	25P	07-Dec-83	LD .MAC	45P	07-Dec-83
XL .MAC	26P	07-Dec-83	XC .MAC	1P	07-Dec-83
SP .MAC	36P	07-Dec-83	FSM .MAC	32P	07-Dec-83
EL .MAC	16P	07-Dec-83	ELCOPY.MAC	15P	07-Dec-83
ELINIT.MAC	16P	07-Dec-83	ELTASK.MAC	9P	07-Dec-83
ERRTXT.MAC	6P	07-Dec-83	MDUP .MT	56P	10-Mar-83
MDUP .MS	56P	10-Mar-83	MDUP .MM	56P	10-Mar-83
202 Files, 4326 Blocks					
16056 Free blocks					

**B.5 9-TRACK, 800 BITS/IN MAGTAPE**

Volume 1

MSBOOT.BOT	3	11-Dec-83	MDUP .MM	56	11-Dec-83
MDUP .MT	56	11-Dec-83	MDUP .MS	56	11-Dec-83
SWAP .SYS	26	11-Dec-83	RT11BL.SYS	73	11-Dec-83
RT11SJ.SYS	73	11-Dec-83	RT11FB.SYS	87	11-Dec-83
RT11XM.SYS	99	11-Dec-83	RT11AI.SYS	75	11-Dec-83
RT11PI.SYS	89	11-Dec-83	TT .SYS	2	11-Dec-83
RK .SYS	3	11-Dec-83	DL .SYS	4	11-Dec-83
DM .SYS	5	11-Dec-83	DP .SYS	3	11-Dec-83
DS .SYS	3	11-Dec-83	DX .SYS	4	11-Dec-83
DY .SYS	4	11-Dec-83	DD .SYS	5	11-Dec-83
DT .SYS	3	11-Dec-83	RF .SYS	3	11-Dec-83
PD .SYS	3	11-Dec-83	DU .SYS	4	11-Dec-83
DZ .SYS	4	11-Dec-83	DW .SYS	4	11-Dec-83

RT-11 V5.1 SOFTWARE KIT MAPS

PI	.SYS	56	11-Dec-83	SP	.SYS	5	11-Dec-83
XC	.SYS	4	11-Dec-83	XL	.SYS	4	11-Dec-83
SLMIN	.SYS	11	11-Dec-83	PIX	.SYS	64	11-Dec-83
SPX	.SYS	5	11-Dec-83	XCX	.SYS	4	11-Dec-83
XLX	.SYS	4	11-Dec-83	RKX	.SYS	3	11-Dec-83
DLX	.SYS	5	11-Dec-83	DMX	.SYS	5	11-Dec-83
DXX	.SYS	4	11-Dec-83	DYX	.SYS	4	11-Dec-83
DDX	.SYS	5	11-Dec-83	DUX	.SYS	4	11-Dec-83
DZX	.SYS	4	11-Dec-83	DWX	.SYS	5	11-Dec-83
MM	.SYS	9	11-Dec-83	MMX	.SYS	10	11-Dec-83
MT	.SYS	9	11-Dec-83	MTX	.SYS	9	11-Dec-83
MS	.SYS	10	11-Dec-83	MSX	.SYS	11	11-Dec-83
MMHD	.SYS	4	11-Dec-83	MSHD	.SYS	5	11-Dec-83
MTHD	.SYS	4	11-Dec-83	LD	.SYS	8	11-Dec-83
SL	.SYS	13	11-Dec-83	VM	.SYS	3	11-Dec-83
LP	.SYS	2	11-Dec-83	LS	.SYS	3	11-Dec-83
NL	.SYS	2	11-Dec-83	CR	.SYS	3	11-Dec-83
PC	.SYS	2	11-Dec-83	CT	.SYS	6	11-Dec-83
LSX	.SYS	3	11-Dec-83	LPX	.SYS	2	11-Dec-83
NLX	.SYS	2	11-Dec-83	LDX	.SYS	8	11-Dec-83
VMX	.SYS	2	11-Dec-83	SLX	.SYS	16	11-Dec-83
PIP	.SAV	29	11-Dec-83	DUP	.SAV	45	11-Dec-83
DIR	.SAV	19	11-Dec-83	IND	.SAV	51	11-Dec-83
BUP	.SAV	37	11-Dec-83	STARTS.COM		1	11-Dec-83
STARTF.COM		1	11-Dec-83	STARTX.COM		1	11-Dec-83
STARTA.COM		50	11-Dec-83	V5USER.TXT		2	11-Dec-83
RESORC.SAV		22	11-Dec-83	FORMAT.SAV		21	11-Dec-83
KED	.SAV	59	11-Dec-83	K52	.SAV	55	11-Dec-83
KEX	.SAV	54	11-Dec-83	SAMPLE.KED		4	11-Dec-83
EDIT	.SAV	19	11-Dec-83	SYSMAC.SML		49	11-Dec-83
MACRO	.SAV	60	11-Dec-83	CREF	.SAV	6	11-Dec-83
LINK	.SAV	49	11-Dec-83	LIBR	.SAV	24	11-Dec-83
FILEX	.SAV	22	11-Dec-83	SRCCOM.SAV		26	11-Dec-83
BINCOM.SAV		24	11-Dec-83	SLP	.SAV	13	11-Dec-83
DUMP	.SAV	8	11-Dec-83	SIPP	.SAV	21	11-Dec-83
PAT	.SAV	10	11-Dec-83	SYSGEN.COM		203	11-Dec-83
HELP	.SAV	136	11-Dec-83	BATCH	.SAV	26	11-Dec-83
QUEMAN.SAV		15	11-Dec-83	QUEUE	.REL	14	11-Dec-83
SPOOL	.REL	11	11-Dec-83	VTCOM	.REL	25	11-Dec-83
VTCOM	.SAV	23	11-Dec-83	TRANSF.SAV		16	11-Dec-83
SPLIT	.SAV	3	11-Dec-83	V	.SAV	16	11-Dec-83
ERROUT.SAV		18	11-Dec-83	DATIME.SAV		4	11-Dec-83
DATIME.COM		3	11-Dec-83	LET	.SAV	5	11-Dec-83
RTMON	.REL	8	11-Dec-83	ODT	.OBJ	8	11-Dec-83
VDT	.OBJ	8	11-Dec-83	SYSLIB.OBJ		46	11-Dec-83
MDUP	.SAV	19	11-Dec-83	MBOOT	.BOT	1	11-Dec-83
MBOT16.BOT		1	11-Dec-83	DISMT1.COM		13	11-Dec-83
DISMT2.COM		8	11-Dec-83				
121 Files, 2501 Blocks							

Volume 2

VTMAC	.MAC	7	11-Dec-83	VTHDLR.OBJ		8	11-Dec-83
GETSTR.FOR		2	11-Dec-83	PUTSTR.FOR		2	11-Dec-83
SJ	.MAC	1	11-Dec-83	FB	.MAC	1	11-Dec-83
XM	.MAC	1	11-Dec-83	USR	.MAC	66	11-Dec-83
KMON	.MAC	120	11-Dec-83	KMOVLY.MAC		205	11-Dec-83
RMONSJ.MAC		70	11-Dec-83	RMONFB.MAC		146	11-Dec-83
XMSUBS.MAC		34	11-Dec-83	EDTGBL.MAC		32	11-Dec-83
BSTRAP.MAC		64	11-Dec-83	TT	.MAC	7	11-Dec-83
BA	.MAC	20	11-Dec-83	MTTEMT.MAC		18	11-Dec-83
MTTINT.MAC		46	11-Dec-83	TRMTBL.MAC		19	11-Dec-83
CONSOL.MAC		5	11-Dec-83	UNSUP	.TXT	14	11-Dec-83

RT-11 V5.1 SOFTWARE KIT MAPS

LP	.MAC	9	11-Dec-83	LS	.MAC	19	11-Dec-83
DD	.MAC	26	11-Dec-83	DL	.MAC	26	11-Dec-83
DU	.MAC	28	11-Dec-83	DZ	.MAC	17	11-Dec-83
DW	.MAC	25	11-Dec-83	VM	.MAC	18	11-Dec-83
EL	.MAC	16	11-Dec-83	LD	.MAC	45	11-Dec-83
SP	.MAC	36	11-Dec-83	XL	.MAC	26	11-Dec-83
XC	.MAC	1	11-Dec-83	RK	.MAC	11	11-Dec-83
DT	.MAC	9	11-Dec-83	DS	.MAC	10	11-Dec-83
PC	.MAC	5	11-Dec-83	PD	.MAC	12	11-Dec-83
RF	.MAC	7	11-Dec-83	DM	.MAC	26	11-Dec-83
DX	.MAC	21	11-Dec-83	DY	.MAC	23	11-Dec-83
CR	.MAC	15	11-Dec-83	DP	.MAC	11	11-Dec-83
NL	.MAC	3	11-Dec-83	CT	.MAC	34	11-Dec-83
TM	.MAC	26	11-Dec-83	TJ	.MAC	31	11-Dec-83
TS	.MAC	33	11-Dec-83	FSM	.MAC	32	11-Dec-83
SETUP	.SAV	28	11-Dec-83	SPEED	.SAV	4	11-Dec-83
ELCOPY	.MAC	15	11-Dec-83	ELINIT	.MAC	16	11-Dec-83
ELTASK	.MAC	9	11-Dec-83	ERROUT	.OBJ	15	11-Dec-83
ERRTXT	.MAC	6	11-Dec-83	DEMOBG	.MAC	2	11-Dec-83
DEMOFG	.MAC	3	11-Dec-83	DEMOX1	.MAC	3	11-Dec-83
DEMOF1	.FOR	2	11-Dec-83	DEMOED	.TXT	1	11-Dec-83
BL	.ANS	8	11-Dec-83	XM	.ANS	8	11-Dec-83
SJFB	.ANS	9	11-Dec-83	RTBL	.MAP	20	11-Dec-83
RTSJ	.MAP	20	11-Dec-83	RTFB	.MAP	28	11-Dec-83
RTXM	.MAP	31	11-Dec-83	IVP	.MAC	25	11-Dec-83
IVP	.COM	13	11-Dec-83	VERIFY	.COM	3	11-Dec-83
CUSTOM	.TXT	6	11-Dec-83	CONFIG	.COM	22	11-Dec-83
CONFIG	.SAV	2	11-Dec-83	V5NOTE	.TXT	2	11-Dec-83
TERMID	.SAV	3	11-Dec-83	UCL	.SAV	12	11-Dec-83

80 Files, 1805 Blocks

# HOW TO ORDER ADDITIONAL DOCUMENTATION

From	Call	Write
Chicago	312-640-5612 8:15 AM to 5:00 PM CT	Digital Equipment Corporation Accessories & Supplies Center 1050 East Remington Road Schaumburg, IL 60195
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British Columbia	1-800-267-6146 8:00 AM to 5:00 PM ET	Digital Equipment of Canada Ltd 940 Belfast Road Ottawa, Ontario K1G 4C2 Attn: A&SG Business Manager
Ottawa-Hull	613-234-7726 8:00 AM to 5:00 PM ET	
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Did you find this manual understandable, usable, and well organized? Please make suggestions for improvement.

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Did you find errors in this manual? If so, specify the error and the page number.

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Please indicate the type of user/reader that you most nearly represent.

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- Higher-level language programmer
- Occasional programmer (experienced)
- User with little programming experience
- Student programmer
- Other (please specify) \_\_\_\_\_

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Organization \_\_\_\_\_ Telephone \_\_\_\_\_

Street \_\_\_\_\_

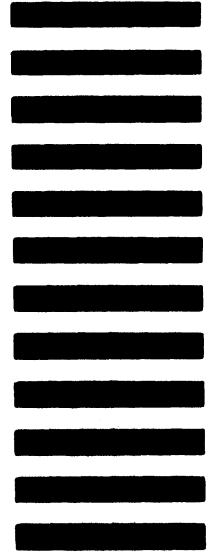
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