

RSTS/E Release Notes

Order Number: AA-LC11A-TC

August 1988

These Release Notes describe new features of the RSTS/E system and explain the differences between this version and previous versions of RSTS/E. System managers and system maintainers should read this document prior to system installation.

Operating System and Version: RSTS/E Version 9.6

Software Version: RSTS/E Version 9.6

August 1988

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Preface

The *RSTS/E V9.6 Release Notes* describe new features in RSTS/E for this release as well as differences between this and the previous release, RSTS/E V9.5.

The procedure to install a new RSTS/E V9.6 system or to upgrade an existing RSTS/E system to V9.6 follows the same general process developed for V9.0.

Because of the V9.0 changes to the installation process, users of earlier versions of RSTS/E should read the *RSTS/E System Installation and Update Guide* prior to attempting an installation of RSTS/E V9.6.

If you are installing a new RSTS/E V9.6 system, refer to PART I of the *RSTS/E System Installation and Update Guide*.

If you are upgrading a pre-V9.0 system to V9.6, refer to PART II of the *RSTS/E System Installation and Update Guide*.

If you are updating a RSTS/E V9.0 or later system to V9.6, refer to PART IV of the *RSTS/E System Installation and Update Guide*.

In addition, users and programmers familiar with RSTS/E V9.5 should read these notes to learn about changes and new features in RSTS/E V9.6. The V9.6 Release Notes are divided into four chapters:

1. New Features
2. Differences Between V9.6 and V9.5
3. Documentation Changes
4. Known Problems and Restrictions

NOTE

If you last used a version of RSTS/E older than V9.5, you should read the release notes for any intermediate versions.

Chapter 1

New Features

1.1 New Hardware Support

1.1.1 Terminal Servers

RSTS V9.6 now includes support that allows systems with DECnet/E V4.0 to connect terminals directly over the Ethernet from Terminal Servers. These types of terminal connections are known as Local Area Transport (LAT). LAT allows users at terminals connected to the following Terminal Servers to directly access your RSTS V9.6 system:

- DIGITAL Ethernet Terminal Server (DECSEA)
- DECserver 100
- DECserver 200
- DECserver 500
- VAXmate systems
- IBM-PC systems running DECnet-DOS

RSTS V9.6 only supports terminals on Terminal Servers for the purpose of logging into the system. Printers connected to Terminal Servers cannot be accessed by RSTS V9.6.

1.1.1.1 Terminal Server Software

Each of the previously listed terminal servers (with the exception of the VAXmate and IBM-PC systems) requires that software be loaded into it from a host system on the Ethernet. Since RSTS cannot load this software, it must be loaded from another system. The systems which are currently available to load this software are: VAX/VMS, ULTRIX-32, ULTRIX-32m, DECsystem-10, DECSYSTEM-20, RSX-11M-PLUS, or Micro/R SX.

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1.1.2 Enabling LAT

To enable the use of terminal servers, RSTS requires the presence of DECnet/E V4.0. When DECnet/E V4.0 is present on your system, and you have the required Ethernet hardware, RSTS will automatically make LAT available.

LAT support requires approximately 2K words of memory. If you will not be using LAT on your Ethernet, the following command can be used to prevent inclusion of LAT support in your system.

```
$ SET SYSTEM/NOLAT
```

The system must be shut down and restarted after issuing the SET SYSTEM command before the state of LAT will change.

Use the SHOW SYSTEM command to determine the current state of LAT and the state that will take effect at the next reboot (if different than the current state). For example:

```
$ SHOW SYSTEM
```

1.1.3 DCL LAT Commands

Several new DCL commands have been added for setting, modifying, and showing the characteristics of LAT services on your system. These commands are included in the online HELP files. They are as follows:

Table 1-1: New DCL LAT Commands

| Command | Meaning |
|------------------------------|-------------------------------------|
| \$ START/LAT | Start LAT on an Ethernet device |
| \$ STOP/LAT | Stop LAT on an Ethernet device |
| \$ SET NODE/LAT | Set LAT node characteristics |
| \$ SHOW NODE/LAT | Show LAT node characteristics |
| \$ CREATE/SERVICE/LAT | Create a LAT service |
| \$ SET SERVICE/LAT | Set LAT service characteristics |
| \$ SHOW SERVICES/LAT | Show LAT service characteristics |
| \$ DELETE/SERVICE/LAT | Delete a LAT service |
| \$ SHOW COUNTERS/LAT | Show LAT related counters |
| \$ SHOW TERMINAL_SERVERS/LAT | Show terminal servers known to LAT |
| \$ SHOW SESSIONS | Show information about LAT sessions |

1.1.3.1 START/LAT

```
$ START/LAT dev:
```

This command is used to start up LAT. LAT will be started on the specified Ethernet device. Note that Ethernet devices can only be XH0: or XE0: (UNA-0 or QNA-0). It is required that a SET NODE/LAT command be executed prior to issuing the first START/LAT command. The START/LAT command requires SWCTL privilege.

`/[NO]LOG`

Specifies if a confirmation message is displayed indicating whether or not LAT has started up. The default is `/LOG`.

DECnet circuits must be started before LAT circuits. If you attempt to start LAT circuits before DECnet circuits are started, you will receive the following error messages:

```
$ NCP SET CIRCUIT QNA-0 STATE ON
      Listener response - Component in wrong state, Line
      ?Account or device in use
      Another circuit on; line protocol type allows only one
```

Issue the following commands to correct this:

```
$ STOP/LAT
$ NCP SET CIR
$ START/LAT
```

1.1.3.2 SET NODE/LAT

```
$ SET NODE/LAT[/qualifier1][/qualifier2]...
```

This command is used to initially set or change the LAT host node characteristics. SWCFG privilege is required to issue the SET NODE/LAT command.

`/DISABLE=group_list`

Removes the specified group codes from the list of group codes associated with the LAT host node. The group list can include multiple codes separated by commas. For example, `/DISABLE=(0,1,4,10)` disables group codes 0, 1, 4, and 10. You cannot specify a range of codes separated by a hyphen. For example, `/DISABLE=(1-4)` is not supported. The keyword ALL can be specified to indicate codes 0-255. The `/DISABLE` qualifier may be specified only once on a command line. No error is returned if a specified group code is not enabled.

`/ENABLE=group_list`

Adds the specified group codes to the list of group codes associated with the LAT host node. The group list can include multiple codes separated by commas. For example, `/ENABLE=(5,6,8,10)` enables group codes 5, 6, 8, and 10. You cannot specify a range of codes separated by a hyphen. For example, `/ENABLE=(5-10)` is not supported. The keyword ALL can be specified to indicate codes 0-255. The `/ENABLE` qualifier may be specified only once on a command line. No error is returned if a specified group code is already enabled.

`/IDENTIFICATION="node_id"`

Specifies a description for the LAT host node. This description can be used as an announcement string or to further identify the node. It may be up to 64 characters in length.

`/[NO]LOG`

Specifies if a confirmation message is displayed indicating the requested action was taken. The default is `/NOLOG`.

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`/MULTICAST_TIMER=seconds`

Specifies the interval, in seconds, between the multicast messages sent for service announcements. The minimum value is 10 seconds, the maximum value is 255 seconds. The default when the first SET NODE/LAT command is issued is 60 seconds. The following is an example of this command:

```
$ SET NODE RSTS /MULTICAST_TIMER=50
```

1.1.3.3 SHOW NODE/LAT

```
$ SHOW NODE/LAT
```

This command displays information about the current LAT host node characteristics. The information displayed includes the LAT version number, the node name and identification, the multicast timer, the groups to which the LAT host node is associated, and the Ethernet line(s) on which LAT is enabled.

`/OUTPUT=output_file`

Requests that the output of this display be put into a file rather than displayed at the terminal.

1.1.3.4 CREATE/SERVICE/LAT

```
$ CREATE/SERVICE/LAT service_name
```

This command creates a service which is then offered by the LAT host node. Only one service can be offered at a time in RSTS V9.6. SWCFG privilege is required to issue the CREATE/SERVICE/LAT command. The service_name may be up to 16 characters in length. These characters include the following:

- The letters A through Z both upper case and lower case
- The numbers 0 through 9
- The dollar sign (\$), the hyphen (-), the period (.), and the underscore (_)
- The 8-bit ASCII characters from 192 to 253.

`/IDENTIFICATION="service_id"`

Specifies a description for the service. This description is used to further identify the service being offered. It may be up to 64 characters in length. The characters include the 7-bit ASCII characters from 32 to 126 and the 8-bit ASCII characters from 170 to 253.

`/[NO]LOG`

Specifies if a confirmation message is displayed indicating the requested action was taken. The default is /NOLOG.

`/STATIC_RATING=rating`

Specifies the static rating associated with the service. This rating directs terminal server users away from or toward a particular node. The range of values is 0 to 255. A value of 255 is highly available to users while a value of 0 is not available to users. The default static rating is 255.

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Currently only one host service is supported at a time. If you attempt to create a second service, an error message will be displayed.

"Dynamic" service ratings, ratings which are based on various system resources, are not supported for V9.6. You may set the static service rating using the SET SERVICE/LAT/STATIC_RATING= command.

1.1.3.5 SET SERVICE/LAT

```
$ SET SERVICE/LAT service_name
```

This command modifies the information associated with a particular service being offered by the node. SWCFG privilege is required to issue the SET SERVICE/LAT command.

```
/IDENTIFICATION="service_id"
```

Modifies the description for the service. This description is used to further identify the service being offered. It may be up to 64 characters in length.

```
/[NO]LOG
```

Specifies if a confirmation message is displayed indicating the requested action was taken. The default is /NOLOG.

```
/STATIC_RATING=rating
```

Modifies the static rating associated with the service.

1.1.3.6 SHOW SERVICES/LAT

```
$ SHOW SERVICES/LAT [service_name]
```

This command displays information about the service(s) offered by the LAT host node. If a service name is specified, only that service will be displayed. Otherwise, all services offered by the LAT host will be displayed.

```
/OUTPUT=output_file
```

Requests that the output of this display be put into a file rather than displayed at the terminal.

1.1.3.7 DELETE/SERVICE/LAT

```
$ DELETE/SERVICE/LAT service_name
```

This command deletes a service currently offered by the LAT host node. SWCFG privilege is required to issue the DELETE/SERVICE/LAT command.

```
/[NO]LOG
```

Specifies if a confirmation message is displayed indicating the requested action was taken. The default is /NOLOG.

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1.1.3.8 SHOW COUNTERS/LAT

```
$ SHOW COUNTERS/LAT [server_name]
```

This command displays information about counters that are relevant to managing LAT on the host node. There are three types of counter information: LAT host node counters, Terminal Server counters, and Ethernet portal counters. These are displayed using the /NODE, /TERMINAL_SERVER, or /DEVICE qualifiers. Only one of these qualifiers may appear on the command line.

/DEVICE

Specifies that the Ethernet device counters are to be displayed. Counters will be displayed for all Ethernet portals open for LAT service.

/NODE

Requests that counters be displayed for the LAT host node. /NODE is the default if neither /DEVICE nor /TERMINAL_SERVERS is specified.

/TERMINAL_SERVERS

Specifies that the counters be displayed for the terminal server(s) known to the LAT host node. If a server name parameter is specified, only the counters for that server are displayed. If no parameter is specified, then counters for all servers known to the LAT host node are displayed.

/ZERO

Specifies that the counters be zeroed after they are displayed. This qualifier acts only on the counter(s) that is being displayed. SWCTL privilege is required to use the /ZERO qualifier.

/OUTPUT=output_file

Requests that the display of the requested counters is to go to the output file specified.

1.1.3.9 SHOW TERMINAL_SERVERS/LAT

```
$ SHOW TERMINAL_SERVERS/LAT [server_name]
```

This command displays information about the terminal server(s) known to the LAT host node. The server name is optional and, if omitted, information is displayed about all servers known to RSTS.

/OUTPUT=output_file

Requests that the output of this display be put into a file rather than displayed at the terminal.

1.1.3.10 SHOW SESSIONS

```
$ SHOW SESSIONS [server_name]
```

This command displays information about the sessions currently running LAT on the host node. The server name is optional and, if omitted, information is displayed about all servers known to RSTS. The information includes the RSTS keyboard number on which the user is logged in, the terminal server on which the user is physically connected, and the name of the service the user is currently running. An asterisk (*) appears after the keyboard number if the session was started from a dialup LAT line.

```
/LAT
```

Indicates that LAT sessions are to be displayed. /LAT is the default.

```
/OUTPUT=output_file
```

Requests that the output of this display be put into a file rather than displayed at the terminal.

1.1.3.11 STOP/LAT

```
$ STOP/LAT [Ethernet_device]
```

This command disables LAT service on a particular Ethernet device or on all Ethernet devices. If no Ethernet device parameter is specified, LAT will be disabled on all Ethernet devices. Jobs which are currently running on an Ethernet device which is to be disabled will detach.

```
/[NO]LOG
```

Specifies if a confirmation message is displayed indicating whether or not LAT has stopped. The default is /LOG.

1.1.4 Enabling LAT at System Startup

The commands listed in the previous section are used to set parameters for the LAT software on the system. A new sample startup file is installed as part of the V9.6 installation. If you already have a [0,1]START.COM file, then the sample is called [0,1]START.096. If you do not have a [0,1]START.COM on your system, then the sample file will be installed on your system with that name. Adding these commands to the system startup file ([0,1]START.COM) would look something like the following:

```
$ ! Turn on DECnet
$ !
$ ! Now, we can turn LAT on
$ !
$ __SET NODE/LAT/ENABLE=(1,3,4,5,10)
$ __SET NODE/LAT/IDENTIFICATION="RSTS V9.6 at its finest"
$ __CREATE/SERVICE/LAT mynode/IDENT="Unauthorized use prohibited"
$ __START/LAT XE0:
```

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1.1.5 Isolation of LAT Problems

Isolation of LAT problems requires the use of the DECnet/E Network Control Program (NCP) utility and the DCL SHOW COUNTERS/LAT command. These commands provide the necessary information for isolating network problems. The specific commands are:

```
NCP SHOW LINE dev COUNTERS
NCP LOOP CIRCUIT dev PHYSICAL ADDRESS e-addr
SHOW COUNTERS/LAT
SHOW COUNTERS/LAT/DEVICE
```

Note that "dev" is the name of the device being used (UNA-0 or QNA-0) and "e-addr" is the Ethernet address of the terminal server under question.

Additional information on these commands can be found in the *DECnet/E System Managers Guide* and Section 1.1.3, DCL LAT Commands of this manual.

1.1.6 TK50 Hardware Update

There have been many questions from our customers regarding the uses of the TK50 cartridge tape drive.

The TK50 tape cartridge is a low-cost TMSCP tape drive that was designed for applications that supply data at a fast enough rate to cause the drive to "stream," that is, to run continuously while writing or reading data. While the drive is capable of operating in non-streaming mode (called "start/stop" operation), its performance in this mode is very poor.

DIGITAL strongly recommends that the TK50 be used ONLY in applications where the drive can be made to stream. This means that any user program that writes directly to the TK50 should use asynchronous I/O directives (.READA, .WRITA) and the program should be written so that the data throughput to the TK50 is as high as possible. In addition, any program that uses the TK50 must have enough system resources available (buffer space, CPU time, disk availability) so that it can deliver data to the TK50 fast enough to make it stream consistently.

The only DIGITAL-supplied utility for RSTS that meets this requirement is BACKUP. We recommend that BACKUP be used for all TK50 operations, and we strongly discourage the use of the DCL COPY command, PIP, SAVRES, and the AUXLIB\$:COPY utility with the TK50.

DIGITAL has released a required FCO, TQK50-R002, for all TQK50 controllers. INIT.SYS for V9.6 has been enhanced to look at the revision of any TQK50 controllers present on your system and print an informational message if they need to be updated. In future versions of RSTS/E, we will disallow the use of any TQK50 controllers that do not have FCO TQK50-R002 installed.

It is normal to log a number of soft errors in the system error log when using a TK50. However, some system configurations may log more errors than others, especially when reading TK50 tapes containing data blocks of 512 bytes or less. These soft errors will use some space in your system error log, but they are otherwise inconsequential.

NOTE

Under certain circumstances, TK50 tape controllers do not correctly find tapemarks during SKIP_RECORD_REVERSE¹ operations. A POSITION_LOST² failure can occur if the controller is instructed to backspace a larger number of records than those on the tape and the TK50 performs a track-turnaround³ before finding a tapemark. The POSITION_LOST failure appears to be random because a track-turnaround is transparent to the user.

Some user-written programs and DIGITAL-supplied utilities use the SKIP_RECORD_REVERSE technique of backspacing a large number of records to find the nearest previous tapemark. Those programs and utilities may fail with a POSITION_LOST condition, when the above conditions are met.

Most DIGITAL-supplied utilities use a SKIP_TAPE_MARK_REVERSE⁴ operation to find tapemarks and normally do not experience a POSITION_LOST failure under those circumstances. User-written programs should also use the SKIP_TAPE_MARK_REVERSE operation to find tapemarks in a reverse direction.

This problem exists in all firmware releases through ECO revision 5. It will be corrected in a subsequent release of TK50 controller firmware.

For RSTS applications, this means that the conventional method of backspacing to a tape mark (which is to issue a backspace command for a large number of records, and then let the backspace abort when a tape mark is encountered) will not always work on the TK50. We have therefore provided a new method to back up one tape mark on TMSCP drives which does work correctly. Please see Section 1.2.4, Device Drivers for details.

¹ The SKIP_RECORD_REVERSE command is implemented in RSTS/E by the Skip Record function (in BASIC-PLUS and BP2) or Skip record .SPEC call (in Macro).

² A POSITION_LOST failure will appear as a "?Device hung or write locked" error to the application program. In addition, the error will be listed as a Position Lost error in the system error log.

³ In the TK50, data is recorded on the tape in a number of parallel tracks. During read or skip operations, the tape reverses direction and the tape head is repositioned when the end of a track is reached so that the next track can be read. This process is called track turnaround. It is normally transparent to the user. It will occur more frequently as more data is put onto the tape.

⁴ The SKIP_TAPE_MARK_REVERSE command is implemented in RSTS/E by a special variation of the "Backspace" function (in BASIC-PLUS or BP2) or "Backspace over record" .SPEC call (in Macro). See Section 1.2.4, Device Drivers for details.

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1.2 New Software Support

1.2.1 Terminal Configuration Information

Significant changes have been made to the RSTS Terminal Service device driver. The first of these changes is visible during system installation. There are no longer any installation questions relating to terminal hardware interfaces or software features. All terminal hardware devices are now automatically configured at startup. The following software features are no longer optional and are included in all systems:

- Multi-Terminal Service
- Echo control
- Control/T support
- Multiple private delimiters

NOTE

For sites that previously did not include any of these features, the size of the monitor will be increased by 1K word. For sites that selected some, but not all of these features, the increase will be less than 1K word, and may not have any impact at all.

1.2.1.1 Automatic Terminal Hardware Determination

The hardware selections for terminal interfaces are now made at system boot time, rather than at system installation time. INIT automatically determines which terminal hardware interfaces exist on your system, and allows full use of them. This automatic determination has eliminated the need to specify which terminal interfaces exist on your system.

1.2.1.2 Enabling Pseudo-Keyboards

The installation question defining the number of pseudo-keyboards on your system has been replaced by two independent features. First, pseudo-keyboards are now fully dynamic. By the use of a special mode, you will always have access to a pseudo-keyboard. See Section 1.2.3.2, Dynamic Pseudo-Keyboard Access for additional information on this special mode. The monitor will dynamically create a pseudo-keyboard to fill your need. Due to this dynamic creation, you cannot preset any of the terminal characteristics for these pseudo-keyboards. When you have completed access to the pseudo-keyboard, and close it, the dynamic pseudo-keyboard will be eliminated. The only time dynamic pseudo-keyboards are not available is when all 128 keyboards are in use on your system or when the system is very low on small buffer space.

Second, for those applications that cannot be changed to make use of dynamic pseudo-keyboards, there is a SET SYSTEM command that will allow for the creation of static pseudo-keyboards. This set of pseudo-keyboards will act just as they have in the past. Terminal characteristics for these pseudo-keyboards can be preset using the SET TERMINAL/PERM command. The number of static pseudo-keyboards is limited to the number you specify in the command. If additional ones are needed, you can reenter the command with a higher number, shutdown the system, and restart the system.

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OPSER BATCH requires the use of static pseudo-keyboards. PBS BATCH requires the use of static pseudo-keyboards for nonshareable servers. Use the following command for specifying the number of static pseudo-keyboards:

```
$ SET SYSTEM/PSEUDO_KEYBOARDS=n
```

The system must be shutdown and restarted after issuing this command before any changes occur.

Use the SHOW SYSTEM command to determine the number of pseudo-keyboards that will be available the next time the system is rebooted. For example:

```
$ SHOW SYSTEM
```

When installing RSTS V9.6 or updating to V9.6, the installation procedure will set the system to have 4 static pseudo-keyboards if none were previously defined.

1.2.1.3 Enabling FMS-11 Support

Support for FMS is now enabled by a DCL command, rather than at system installation time. In this way, a new system installation is not required if you wish to add the layered product FMS at a later time. The command is as follows:

```
$ SET SYSTEM/[NO]FMS
```

After issuing the SET SYSTEM command, the system must be shutdown and restarted before FMS is available for use.

Use the SHOW SYSTEM command to determine the current state of FMS and the state that will occur at the next reboot (if different than the current state). For example:

```
$ SHOW SYSTEM
```

1.2.1.4 Installation Dialogue

When the installation procedure prompts for the template monitor's name, it is now possible to type a question mark followed by a <CR>. The installation procedure will then list all the .SIL files in SY:[0,1]. The following is a sample display:

```
Use template monitor ?      <Y >
Template monitor's name ?   <SY0:[0,1]V96 .SIL> ?

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

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

    File .Typ      Creation
RSTV94.SIL      28-Oct-87
RSTV95.SIL      17-Nov-87
V96.SIL         14-Jun-88
SYSGEN.SIL      23-Jun-88

Template monitor's name ?   <SY0:[0,1]V96 .SIL> V96
New Monitor name ?         <RSTS>
```

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1.2.1.5 Keyboard Numbering

The numbering of keyboards continues from 0 to maximum KB number - 1 for static keyboards. This numbering is based on the interface types found in your system and continues to be assigned in the following order:

- Single line interfaces (DL11-A/B/C/D/E)
- Static pseudo-keyboards
- Multiplexers
 - DJ11
 - DH11
 - DZ11/DZV11/DZQ11
 - DHV11/DHU11/DHQ11
- Dynamic keyboards

Terminals that are created dynamically are allocated starting at the highest physical interface KB number + 1. A system that was using LAT terminals and dynamic pseudo-keyboards would find these terminals numbered just above their existing terminal interfaces.

1.2.2 INIT.SYS

1.2.2.1 DSKINT Suboption Changes

The capability to format RX33 floppies has been added to the disk initialization function in INIT.SYS.

If the device size is 4500 blocks or less, DSKINT will now default the SATT.SYS and MFD placement locations to the beginning of the disk instead of the middle of the disk. Also, if DSKINT encounters an illegal placement value for SATT.SYS or the MFD, the following warning message is displayed:

```
Specified xxxx location is invalid - placing at nnn
```

The value xxxx will be either SATT.SYS for SATT placement value or [1,*] for MFD placement value. The value nnn will be the new placement value used by DSKINT.

1.2.2.2 Installing on Non-Primary MSCP Controllers

Prior to V9.6, INIT would enable only the primary disk and tape units. For sites that wished to install their software onto a non-primary disk (e.g., an MSCP disk at a CSR other than 172150), complex intermediate steps were required. This procedure has been simplified. Now, if the installation process determines that the specified DU disk unit cannot be found, it will prompt to determine if INIT should perform a full scan of the hardware in an attempt to locate the requested unit. INIT will prompt with the following dialogue:

```
That disk was not found during limited hardware scan.  
Do you want to perform a reboot with full hardware scan <YES>?
```

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If your system devices are at standard addresses and there are no non-standard devices on your system, this full scan will allow all the DU disks to be used during the installation. If, however, your system has any non-standard hardware, you will need to use the primary MSCP controller for the installation. Then, the HARDWARE CSR option can be used to identify the non-standard hardware prior to accessing the alternate MSCP controllers.

1.2.2.3 Configuration File

INIT.SYS now examines the file CONFIG.SYS in account [0,1] to determine terminal service configuration information. CONFIG.SYS is a new file that contains system configuration data. You should backup this file as it contains information set by SET SYSTEM commands. If this file is deleted, your system will revert to the initial defaults supplied by DIGITAL.

1.2.2.4 Monitor Loader

The loading of the monitor now requires a 12K word area of memory. This area must begin above 72K and end below 135K. While this is an increase in size of 4K over previous versions, the area available for use is 8K larger. This memory area is only used during the transition from INIT.SYS to the monitor. If this area cannot be created by INIT automatically, the system will print an error message and require the user to make changes to the memory table.

1.2.2.5 New HARDWARE Suboption

A new suboption has been added to the HARDWARE option of INIT.SYS. This suboption is called Engineering Change Order (ECO). This suboption is intended for DIGITAL Field Service engineers and will list the internal version numbers for those controllers for which this information is available. Listed below is an example of invoking this suboption and its printout:

```
Option <Start> ? HARDWARE ECO
Name   Address   SW Rev  HW Rev
RU0:   172150     3       1
MU0:   174500     4       1
```

1.2.2.6 New Device Recognized

INIT.SYS now recognizes the presence of the KXJ11-CA on the bus. A listing produced using the HARDWR LIST option of INIT will list the KXJ11-CA as device KJ: with its CSR address and programmable vector assignment.

1.2.2.7 Small Buffer Error Message

If the number of small buffers you have generated into your system is not large enough, INIT.SYS will report the following error during the start option:

```
??Not enough small buffers to start timesharing.
```

If this error occurs, you need to increase the number of small buffers that you generate into the system. In this way, you will continue to have the same number available during timesharing.

This error indicates the monitor does not have enough small buffers allocated to initialize all the required data structures.

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Use either of the following steps to correct this:

- Rerun the installation procedure and build a new monitor with more small buffers. You should increase the number of small buffers generated based on the number of terminal ports on your system. DIGITAL recommends that you increase the number of small buffers based on the following formula:
number of terminal ports * 3
- If you find that you cannot start your monitor after defining static pseudo-keyboards with the \$SET SYSTEM/PSEUDO_KEYBOARD command, perform the following commands from INIT:

```
<Start> REFRESH
06-Jun-88 02:03 PM
Disk? <RET>
Rebuild? NO
REFRESH suboption? FILE
File name? CONFIG.SYS
File exists. Delete it? YES
File name? <RET>
REFRESH suboption? <RET>
Option: <Start>
```

This will delete any previous configuration information (LAT, FMS, and static pseudo-keyboard configurations), but will allow your system to start. Upon starting the monitor, you will have to redefine the LAT, FMS, and the new static pseudo-keyboard configuration.

1.2.3 Monitor

1.2.3.1 Small Buffer Usage

Keyboard data structures in previous versions were allocated at installation time. The creation of these data structures reduced the number of allowable small buffers on the system. In V9.6, the keyboard data structures are allocated from the small buffer pool at the time of system startup.

The overall number of small buffers in use does not change as a result of this difference. However, since the number of available buffers is reduced at system startup, the installation procedure will compensate for this and increase the buffer count when using a template monitor from V9.5 and earlier.

If the number of small buffers you have generated into your system is not large enough, INIT.SYS will report the following error during the start option:

```
??Not enough small buffers to start timesharing.
```

1.2.3.2 Dynamic Pseudo-Keyboard Access

Dynamic pseudo-keyboards are devices that the monitor creates as needed. Access to dynamic pseudo-keyboards is limited by the number of other terminal devices on your system and by the EXQTA privilege. If the job has this privilege, the job is allowed to open as many dynamic pseudo-keyboards as possible. If, however, the job does not have the EXQTA privilege, the job is allowed to open just one dynamic pseudo-keyboard. Error 69 (?Quota exceeded) is returned if an attempt is made to open more than one dynamic pseudo-keyboard without EXQTA privileges. The total number of keyboards available is 128. Since dynamic pseudo-keyboards are created only when they are needed, their terminal characteristics cannot be set prior to their use. Otherwise, dynamic pseudo-keyboards are identical to static pseudo-keyboards. To access a dynamic pseudo-keyboard, you always open PK0: using mode 16. An example of Basic-Plus code using this feature follows:

```
OPEN "PK0:/MODE:16" AS FILE #1%  
    or  
OPEN "PK0:" AS FILE #1%, MODE 16%
```

Since this mode enables fully dynamic creation and use of pseudo-keyboards, the ?No room for user on device error will be returned either when all 128 keyboards are already in use, or when there are insufficient small buffers available to create the required data structures. The opening of "PK0:" multiple times with this mode creates a new pseudo-keyboard each time.

1.2.3.3 Additional Data Returned After PK Open

The KB number corresponding to a PK is now returned in FQSIZM after a PK open. The number is returned as KBnumber * 1. This method works for both static and dynamic pseudo-keyboards.

To determine the Keyboard number, use a statement similar to the following, immediately after the Basic-Plus open statement:

```
KB%=ASCII(MID(SYS(CHR$(12%)),4%,1%))
```

1.2.3.4 No Conditional Sleep Mode for KB Devices

A new mode has been added in V9.6 that will allow a program to conditionally sleep even if there is some condition on the channel that would normally block a conditional sleep. If you use this mode on a multi-terminal service master channel, it will also affect all the slave terminals. It is therefore recommended that this mode not be used on multi-terminal service channels unless the I/O processing of the application is very well understood. To use this new mode, specify the mode value 512 (decimal) in the open statement for the terminal. For example:

```
100 OPEN "KB10:" AS FILE 1%, MODE 512%  
    or  
100 OPEN "KB10:/MO:512" AS FILE 1%  
    . . .  
200 PUT #1
```

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1.2.3.5 New RSX EXTM\$ Directive

A new RSX directive, EXTM\$, has been added to RSTS V9.6. This directive is similar to the current EXTK\$ directive. Both directives are used to extend the tasks virtual address Data space. However, when using I&D space tasks, there are additional features available in the new EXTM\$ directive. In tasks built without I&D space (TKB /-ID option) the EXTM\$ directive will behave exactly as the EXTK\$ directive.

The difference between EXTM\$ and EXTK\$ functions is in the way that Resident Library D space is treated during task memory expansion. Resident Libraries are mapped with both I and D space APRs mapped identically; this is done by default. The EXTK\$ directive will not override this mapping. If an attempt is made to extend into an APR used by the library, it will cause an error. EXTM\$ will, if allowed by the APR mask, unmap the D space APRs (only) from the library and include them in the memory extension space. This will leave the resident library mapped in the I space only.

The APR mask provides a method of reserving one or more APRs in the D space for resident library use. If, for example, a resident library is built such that its instruction I space uses APRs 5, 6, and 7 but all the needed data space is contained in APR 7, then by reserving APR 7 for the library, the task can extend its usable D space into APRs 5 and 6. This reservation is done by setting the APR 7 bit in the APR mask word in the EXTM\$ call.

If an EXTM\$ extension of memory requires the use of an APR whose bit is set in the APR mask word, an error will be generated.

The Task Builder has automated the process of constructing the APR mask word for the combination of libraries used in building the task. This data is available to the program at execution time. See Section 1.2.7, Task Builder for details.

The Macro directives (EXTM\$, EXTM\$C, EXTM\$\$) for this feature are included in the library RSXMAC.SML.

The layout of the DPB for the EXTM\$ function is as follows:

```
DPB--> 89.           Extend memory code
DPB+1-> 3.           number of words of data in the DPB
DPB+2-> size increment number of 32 word slivers to extend size by
DPB+4-> APR mask word see Discussion
```

Discussion:

The SIZE INCREMENT is a word value representing the number of 32 word memory blocks by which the task D space is to be increased. This value is the same as for the EXTK\$ directive.

The APR MASK WORD allows the caller to pass information about user D space APR registers which are to be protected from being expanded into by the task D space. This mask specifies which D space APRs are to remain available for resident library (or dynamic region) D space mapping.

In the normal EXTK\$ directive, this APR MASK WORD is a zero which tells RSTS not to expand task D space beyond the base APR of the lowest mapped library or dynamic region.

The APR MASK WORD allows the user to control how the task extension is to work. The different types of extension uses fall into three general categories as shown in the following table:

Table 1-2: APR MASK WORD Control of Task Extension Use

| APR MASK WORD | Description | | |
|---------------|---|-------------------------|-------|
| 0 | If zero, the EXTMS\$ behaves as an EXTK\$ on RSTS, that is, extension is only allowed up to the base of the first library APR. | | |
| 1 | If one, the EXTMS\$ behaves as an EXTK\$ on RSX-11M/M+, that is, extension is allowed thru APR7 remapping the D space of any libraries. However, it is not allowed to extend past the beginning of a dynamic region. | | |
| <any other> | For all other values the APR MASK WORD acts like a memory protection flag. An EXTMS\$ request is not allowed to extend task D space into an APR that is above the current task D space and that the bit representing the APR is set (see below). It also is not allowed to extend past the beginning of a dynamic region. | | |
| | Bit 7 | Represents APR 7 | <200> |
| | Bit 6 | Represents APR 6 | <100> |
| | Bit 5 | Represents APR 5 | <40> |
| | Bit 4 | Represents APR 4 | <20> |
| | Bit 3 | Represents APR 3 | <10> |
| | Bit 2 | Represents APR 2 | <4> |
| | Bit 1 | Represents APR 1 | <2> |
| | Bit 0 | Must be set for EXTMS\$ | <1> |

NOTE

If I&D space is not turned on (/ID), then all EXTMS\$ requests behave as though they are EXTK\$ requests (i.e. the APR MASK WORD is zero).

It is possible to protect one or more D space APRs in the library space from being remapped by a task extension by setting the bit in the APR MASK WORD that represents it.

The lowest bit set above the current task D space determines the protection line above which a request will fail. For example, if only Bit 3 is set, then APRs 3 through 7 are protected even though Bits 4 through 7 are not set.

CAUTION

Care must be taken in using this call to remap D space away from a library. If the library is not coded in an I only manner, indeterminate program behavior is likely to occur.

1.2.4 Device Drivers

The magnetic tape "Skip Record" and "Backspace" MAGTAPE or SPEC% functions (Basic-Plus and BP2) and .SPEC calls (Macro) have been enhanced to allow skipping forward or backward one tape mark on TMSCP drives (TK50 and TU81). This was done to circumvent a restriction on the TK50 with backspacing over tape marks. See Section 1.1.6, TK50 Hardware Update for details.

The procedure for skipping forward or backspacing one tape mark on TMSCP drives is to use the appropriate .SPEC call or magtape function ("Skip Record" or "Backspace"), passing a zero as the parameter indicating number of records to be skipped. In both cases, the tape will be positioned after the tape mark in the direction of tape motion, and the value returned by the call will be the number of tape marks NOT skipped (0 if a tape mark was found, and 1 if not).

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Since this variation of the .SPEC call or function uses a hardware command that is unique to TMSCP, other tape drives (MT, MM, and MS) will not work this way in V9.6, but will continue to work as they have in the past. For those drivers, passing a value of zero has the same effect as passing a value of 65535. The driver will skip records in the forward or reverse direction until a tape mark is passed. The tape will be positioned after the tape mark in the direction of tape motion as in the TMSCP variation previously described. However, the value returned by the call will be the number of RECORDS not skipped as is documented today.

1.2.5 File Processor (FIP) File Name String Scan

The File Name String Scan directive has been enhanced to improve compatibility with some VMS style wildcard operations. The asterisk character (*) can now be used at the end of a file name or type to replace all question marks. For example:

```
ABC*.*      is equivalent to      ABC???.*  
A*.B*      is equivalent to      A?????.B??
```

The asterisk can only be used at the end of a file name or type; it cannot be used at the beginning or in the middle. For example, the following are illegal:

```
AB*E.*  *A.ABC  *. *A  *A*.BAS
```

Since PIP, DIRECT, BACKUP, and other utilities that allow wildcard operations use the File Name String Scan directive, these utilities will now automatically allow this type of syntax.

1.2.6 Commonly Used System Programs (CUSPs)

1.2.6.1 LOGIN and LOGOUT

- The LOGIN and LOGOUT programs send messages to OPSER (or to KB0: if OPSER is not running) which contain the keyboard number for activity on dialup lines. For terminals on Terminal Servers (LAT terminals), this display will contain the server name and the port name. This information will aid in identifying where the actual activity occurred.
- LOGIN has also been modified to pass the LAT information to [0,1]LOGIN.COM. LOGIN.COM was modified to pass this LAT information to the group and user LOGIN.COM in Parameter P5. The [0,1]LOGIN.COM was also modified to execute a SET TERM/INQUIRE command for LAT terminals.
- If you receive the message "?Logins are disabled – please try again later" upon connecting from a terminal server to a RSTS system, the session is not disconnected. Instead, the terminal waits for logins to become enabled, whereby hitting a carriage return will start the login sequence. The only way to get back to the terminal server prompt is to use the local key sequence, which is usually the BREAK key.

1.2.6.2 SHUTUP

SHUTUP can now be run from terminals other than KB0:. This includes dialup, local, or LAT lines. SHUTUP cannot be run from pseudo-keyboards (e.g., SET HOST connections). In addition, SHUTUP will now ask if you wish to automatically RESTART the system. This allows the system configuration parameters to be changed, and the system restarted directly from your terminal. As always, INIT.SYS will continue to use KB0: for its operations. If INIT.SYS fails to restart the monitor, you must determine this by examining the console terminal (KB0:).

The automatic restart feature of SHUTUP will not work if a DCL log file is open by the job. The system will return to the "Start timesharing <yes>" prompt and wait for a response instead of automatically restarting.

```
$RUN $$SHUTUP
SHUTUP   V9.6   RSTS V9.6 LAT Land
07:58 PM 30-Mar-88 #####      Set-up Dialogue Phase      #####
Type '^' to any query to backup one question
Allow Print/Batch Services jobs to complete <YES>?
Minutes until system shutdown (0-99) <5>?
Minutes until logins are disabled (0-4) <0>?
Minutes until new network activity is disabled (0-4) <4>?
Shutdown with automatic RESTART <NO>? YES
```

At this point, the system will proceed with the shutdown, automatically restart the monitor, and invoke the system startup procedure.

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1.2.7 Task Builder

The Task Builder can now provide information about the allocation of D space APRs for a task to the program at execution time. This has been done to work together with the new EXTM\$ memory extend function to maximize the amount of D space memory that a task may request.

The goal of this function is to allow programmers to build tasks with libraries that have both I only and I&D code in them and for the Task Builder to calculate the minimum number of APRs that this task will require to satisfy the D space needs of all the libraries used by the task.

To effectively utilize this feature, each library to be used should be organized such that all DATA space required in the library is located at the highest address in the library space. The user must know at the time the library is task built how many APRs contain D space because this information is required as input to the Task Builder in the /LI switch.

As part of the information the Task Builder associates with each individual resident library, a bit mask representing the APRs used by the library is kept. The default value that is kept represents the I space APRs. RSTS will load the library with I&D space equivalent and therefore automatically protects any D space which may exist in the library.

The saved bit mask value may however be modified by the programmer in the library switch given to the Task Builder. The /LI switch which is required to build a library, may now include a value in the range 0 to 377 in the following format:

```
/LI[:nnn]
```

The value nnn is the desired mask value.

The meaning of each bit in the mask value is the same as described in the EXTM\$ function and is given in the following table:

| | | |
|-------|------------------|-------|
| Bit 7 | Represents APR 7 | <200> |
| Bit 6 | Represents APR 6 | <100> |
| Bit 5 | Represents APR 5 | <40> |
| Bit 4 | Represents APR 4 | <20> |
| Bit 3 | Represents APR 3 | <10> |
| Bit 2 | Represents APR 2 | <4> |
| Bit 1 | Represents APR 1 | <2> |
| Bit 0 | Represents APR 0 | <1> |

Through this switch value, the programmer can inform the Task Builder which APRs contain D space requirements for this individual library. This switch value, rather than the default, will be associated with this library when it is used by the Task Builder in future applications that reference this library.

It is important to note that for libraries built by Task Builders prior to V9.6 that the mask value is zero by definition. This means that the library is defined as having I only code. If, however, the library does have D space requirements, those requirements may be protected at the time the application task is built, as described in the following paragraphs:

At the coding level, the application programmer must do two things to use this feature:

- Use the EXTM\$ memory extension function instead of the EXTK\$ function for extending memory. Please see Section 1.2.3.5, New RSX EXTM\$ Directive for further details on the use of the EXTM\$ function.

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- Provide a properly addressed memory location for the Task Builder to fill in the APR usage mask data.

The following lines of code provide the properly addressed location for the Task Builder to fill in:

```
        .PSECT  $$TSKP,D
$TSKP::
        .PSECT  .....
```

This PSECT can go anywhere in the coding. However, if it is not at the end of the code, reset the PSECT back to your required PSECT.

Please note that for the EXTM\$ function to work beyond what the EXTK\$ does and therefore for any of this to have significance the application task must be built with I&D space on (/ID switch).

The value loaded into \$TSKP by the Task Builder and readable on execution of the program will be one of two values:

- Either the value computed by the Task Builder based on the application task and all referenced libraries
- An override value provided by an option line

If the Task Builder generates the value in \$TSKP, it will be the logical OR of the application tasks allocated D space APR mask and the associated APR bit masks for all libraries referenced by the task build.

For example, a task that uses two libraries where LIB1 uses APRs 6 and 7 and LIB2 uses APRs 5, 6, and 7 and the task has 5KW of data space the computed value would be 343 octal as determinable from the APR representation table shown previously.

It is possible also to explicitly set the value in \$TSKP at the time of the application task build. This is how a programmer who knows a library has additional available D space can inform the task of such knowledge. The following three option lines have been amended to include this new level of information (refer to the respective sections in the *Task Builder Manual* for further details on the use of the listed options):

```
LIBR =name:accesscode[:baseAPR[:bitmask]]
RESLIB =file/accesscode[:baseAPR[:bitmask]]
CLSTR =lib1,lib2,lib3...libn:accesscode[:baseAPR[:bitmask]]
```

Where the bitmask is the value logically ORed with the tasks allocated D space mask and loaded by the Task Builder in location \$TSKP.

Important notes on this feature are as follows:

When using cluster libraries, the bitmask value applies to all libraries the same, therefore, the most limiting required value must be used.

When relocation of a position independent coded library (PIC) is being done by the base APR value, the bitmask value MUST be specified because the value associated with the library was based on its original base and is not valid at the new base. The usual method would be to shift the bitmask value of the library one bit up or down for each APR of relocation shift that is done and then combine it with the other mask values required.

See Section 1.2.3.5, New RSX EXTM\$ Directive for more details on the EXTM\$ function.

If using libraries that were built by versions of the Task Builder before V9.6 and the library contains any D space, then the bitmask value must be specified to protect that D space at the time the application is task built. As of RSTS/E V9.6, the only DIGITAL-supplied library that can take advantage of this feature is RMSRES. RMSRES is built as I only code, therefore all the D APRs are available to the MACRO-11 programmer through this feature. As of V9.6, all the languages supported by DIGITAL on RSTS/E use

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New Features

the EXTK\$ function and therefore cannot take advantage of this feature. New versions of many of these languages may support this feature in the future.

1.2.8 DCL

1.2.8.1 HELP

The new DCL LAT commands are included in the online HELP files.

1.2.8.2 LATMGR

LATMGR is a new program for V9.6. This program works in conjunction with DCL to process all LAT related commands. See Section 1.1.3, DCL LAT Commands for details on the DCL LAT commands.

1.2.8.3 SHOW TERMINAL Command

The SHOW TERMINAL command will now list the LAT server and port name for those connections coming from LAT terminal servers.

1.2.8.4 SET and SHOW SYSTEM Command

Several new DCL commands are now available for new system-related configuration options. These commands create, modify, or show the configuration data in the CONFIG.SYS file located in account [0,1]. These commands are:

`$ SET SYSTEM`

`/[NO]LAT`

The `/[NO]LAT` qualifier is used to specify whether the LAT software is to be loaded upon system reboot.

NOTE

The LAT software will only be loaded if Ethernet hardware exists on the system and DECnet/E is present.

`/[NO]FMS`

The `/[NO]FMS` qualifier is used to specify whether the FMS software is to be loaded upon system reboot.

`/PSEUDO_KEYBOARDS=n`

The `/PSEUDO_KEYBOARDS=n` qualifier is used to specify the maximum number of static pseudo keyboards which will be available on the system. The minimum value allowed is 1, the maximum is 127. This parameter change will take effect upon system reboot.

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`/[NO]STATISTICS[=RESET]`

The `/STATISTICS` qualifier is used to turn monitor statistics on and off. (Note that this qualifier does not use `CONFIG.SYS`.) This command replaces the use of Bits 14 and 15 in the switch register. The `RESET` parameter will reset the statistics counters to 0. The system starts with statistics turned off. Once statistics have been turned on, the `SET SYSTEM/NOSTATISTICS` command will cause the statistics to be frozen. The `SET SYSTEM/STATISTICS` command will unfreeze them. `SET SYSTEM/STATISTICS=RESET` will reset the statistics counters to zero.

`$ SHOW SYSTEM`

This command will now show the state of `LAT`, `FMS`, `STATISTICS`, and the number of static pseudo-keyboards in addition to the information previously displayed. The following is a full listing from the `SHOW SYSTEM` command:

```
$ SHOW SYSTEM
System name:           RSTS V9.6 LAT-Land
Date format:          Alphabetic
Time format:          AM PM
Magtape label default:  DOS
Magtape density default: 1600 BPI
Power fail restart delay: 300 seconds
Hangup:              Delayed
Monitor Statistics:   Disabled

Job limit:            63
Current jobs:         5

Password Prompting:   All users
Last System Password change: 17-Mar-88 at 03:16 PM

LAT is installed
FMS is installed
Pseudo keyboards configured: 10
Current Pseudo keyboards: 10
```

1.2.8.5 New DCL `$WAIT` Command

A new command has been added to DCL to place the current job in a wait state until a specified period of time has elapsed. The `$WAIT` command is useful in DCL command files that wish to suspend execution for a some period of time.

Command format: `$WAIT [delta-time]`

The optional parameter `delta-time` has the format: `hh:mm:ss` to specify hours, minutes, and seconds. If not specified, the `delta-time` is set to `00:00:00`.

Examples:

```
$WAIT                ! no action
$WAIT 00:00:01       ! wait for one second
$WAIT 00:01:00       ! wait for one minute
$WAIT 01:00:00       ! wait for one hour
$WAIT 01:01:01       ! wait 1 hour, 1 minute, 1 second
```

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New Features

The maximum value that can be specified for each field is: 23 for hours, 59 for minutes, and 59 for seconds. To specify 60 minutes as 00:60:00 is illegal and should be specified as 01:00:00.

Fields of the delta-time may be omitted but the delta-time must not begin with a colon even if the number of hours is zero.

Examples:

```
$WAIT 00:01 ! valid, wait for 1 minute
$WAIT ::1 ! invalid, delta-time starts with ":"
$WAIT 00::01 ! valid, wait for 1 second
$WAIT 1 ! valid, wait for 1 hour
```

The \$WAIT command on VMS also allows for specification of hundredths of a second. The RSTS \$WAIT command will also parse this field but it will be ignored since RSTS cannot execute a wait time of less than one second. The \$WAIT command will only be terminated by pressing Control/C or when the specified wait time has expired. Those are the only conditions that will terminate the command. Pressing RETURN will not terminate the command. If the executing job is suspended for any period of time, the wait may take longer than expected.

The syntax and format of the \$WAIT command is compatible with the VMS \$WAIT command.

1.2.8.6 New /CONFIRM Qualifier for REMOVE/JOB

The qualifiers /[NO]QUERY and its synonym /[NO]CONFIRM have been added to the REMOVE/JOB command. The default is now /QUERY. This will cause a SHOW JOB display for the job you want to remove. You will then be prompted if you really want to remove this job.

1.2.8.7 PBS

The following new features have been added to the Print/Batch Services package:

- PBS now has the /[NO]WRAP qualifier available for print commands. The /[NO]WRAP qualifier enables printers to print all the characters on a line that exceed the form width. The /TRUNCATE qualifier takes precedence over this qualifier. Specifying /WRAP, which is the default, causes PBS to print characters that exceed the form width on the next line. Specifying /NOWRAP will cause the characters to be printed on the same line. Any entries that have not been printed BEFORE V9.6 is installed will acquire the /NOWRAP attribute. Any print entries made AFTER the update is installed will default to /WRAP.

For files that have not been printed, this behavior differs from the current default where PBS will wrap untruncated lines. You can either print the entry before the update, or delete the entry and resubmit it after the update.

Chapter 2

Differences Between V9.5 and V9.6

2.1 Installation

2.1.1 Installation Dialogue

The installation dialogue now supplies a default device. The device that you booted is used for the default. An example of that portion of the installation dialogue is:

```
Please mount the RSTS Installation media and enter the name
and unit number of the device.
Valid device types are: 'MM', 'MS', 'MT', 'MU', 'DM', 'DL' or 'SY'
(a response of SY allows monitor only)
Installation device? <_MU0:> : <CR>
```

The prompts in the installation dialogue did not always have the same format. This has been fixed.

2.1.2 Installation Dialogue for Terminals

Because of the new terminal driver in RSTS V9.6, the installation dialogue does not ask any terminal interface configuration questions. Those questions have been removed. Also, CTRL/T support and multiple private delimiters are now included in all monitors. The FMS support question has also been removed from the installation dialogue. FMS support is enabled or disabled with the SET SYSTEM command as explained in Section 1.2.1.3, Enabling FMS-11 Support.

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Differences Between V9.5 and V9.6

2.1.3 Installation Dialogue Removal

The Extended Line Printer driver question and the Monitor Statistics question have been removed from the installation dialogue. Both are now included in all systems. See Section 1.2.8.4, SET and SHOW SYSTEM Command for information about turning statistics on and off.

The question for the number of KMC11 devices has been removed. Instead, the IBM simultaneous links question will be asked. Since KMC11 devices could only be used for IBM interconnect, this question will also control the number of KMC11 devices configured into the monitor. Note that you cannot include all three of the following on your RSTS system:

- IBM Interconnect
- TU56 DECTape
- Magtape (MM, MT, MS, MU)

NOTE

IBM communications software for RSTS is no longer supported by Digital Equipment Corporation. This software is available through the DECUS library.

2.2 INIT

2.2.1 INIT

In V9.5, a problem existed in INIT.SYS that occasionally caused an "Unexpected trap through the vector at 4" error message if an attempt was made to access a non-existent MSCP disk unit. This problem has been corrected for V9.6.

The INIT.SYS message "Defaults cannot be set until a SIL has been installed" has been clarified to read "Defaults cannot be changed until a SIL has been STARTed".

2.3 Monitor

2.3.1 Monitor PEEKs

Due to the significant number of changes in terminal service data structures, many undocumented and unsupported PEEK sequences will no longer return the expected data.

2.3.2 Changes to Terminal Service Sources

The terminal service device driver no longer needs to be assembled during the installation procedure. This results in a change in the time required to build a monitor (the exact change will depend on the CPU being used). Since these driver sources are no longer required for installation, they are no longer distributed on the binary kit. Customers who require sources for the terminal driver will need to purchase a RSTS/E source kit. Order numbers for the source kit are:

QR430-EM 1600 BPI media
QR430-FR Fiche

Note that the installation procedure will automatically delete the terminal service sources from previous releases of RSTS.

2.3.3 Corrections in Terminal Service

2.3.3.1 Log Files

Occasionally a DCL or BATCH log file line would be overwritten due to a missing line feed in the log file. This happened after a program issued an RSX read and then exited to DCL. This problem has been fixed.

2.3.3.2 DHU/DHV Hung Lines

Under unusual timing conditions, terminals on DHU/DHV multiplexers could become hung. An XOFF character was sent to the terminal to stop input but no XON character was ever sent to allow input to continue. This problem has been fixed.

2.3.4 Device Drivers

2.3.4.1 DEUNA Ethernet Driver

Under some conditions, it was possible to hang a user job in an XE state when attempting a transmit command to a DELUA controller which was initialized successfully during system startup, but which was subsequently rendered inoperable due to a simple failure such as cable removal. This problem has been fixed.

2.3.4.2 MSCP Disks

The code that performs automatic bad block replacement (BBR) on RA- and RC-series MSCP disks has been enhanced to include better error detection and reduce the number of events logged in the system error log file when a BBR occurs.

In addition, two new error status messages have been added to the display for MSCP errors. These new messages will allow the system manager to better detect disk problems. The messages are:

"Multicopy protection failure" - this indicates that the on-disk table that is used to hold bad block information has developed an excessive number of bad sectors within itself. While this is not an immediately fatal error, it does indicate that the unit may need replacement or reformatting in the near future. DIGITAL recommends that the data on the disk be backed up regularly and Field Service be alerted to the problem.

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Differences Between V9.5 and V9.6

"BBR Not Successful" – this message indicates that a bad block replacement attempt has failed in a severe manner. This error is caused by either probable media corruption or hardware failure. The data from the unit should be backed up as soon as possible. Field Service should be called to analyze the exact cause of the failure.

2.3.5 Virtual Disk as Part of the Public Structure

Since the File Processor selects the disk in the public structure with the most free space, data files and programs may have been lost if they were placed on the Virtual Disk and the system was shutdown or crashed. To prevent this, V9.6 requires the Virtual Disk to be mounted read-only when it is mounted as a public disk.

2.3.6 Correction to Disk Statistics

In previous versions of RSTS, the disk statistics code would incorrectly count disk I/O which caused new data to be read into the cache. Additionally, the disk statistics code would count DCL I/O as if it were overlay I/O. These problems have been corrected.

2.3.7 Monitor Statistics

The monitor statistics for KW11-P clock overruns are now kept at all times, whether or not other statistics are being gathered. This is consistent with the behavior of the terminal I/O statistics.

2.3.8 File Processor (FIP)

2.3.8.1 Sequential Get with Errors Correction

In V9.0 through V9.5, when GET statements without a RECORD modifier aborted with a record locked error and the program did a RESUME without a line number to retry the I/O, the correct record would not be returned. This problem has been fixed. The correct record is now returned.

2.3.8.2 File Truncate Correction

The problem with file truncate not updating disk usage has been corrected. Patch 3.5.11 is no longer required.

2.3.8.3 Certain Accounts Lock the System

The problem with certain account numbers locking the system has been corrected. Patch 3.5.12 is no longer required.

2.3.8.4 Directory Lookup SYS-CALL on Magtape

Previous to V9.6, the "Directory Lookup on Index" SYS call did not return the MSB of the file size if the device was a magnetic tape. The number of records in a file on magnetic tape was returned incorrectly if the file contained more than 65535 records. The SYS call has been fixed for V9.6 and now correctly returns the MSB of the file size.

2.3.9 Crash Dump Changes

In previous versions of RSTS, crash dumps were sometimes written incorrectly on Q-Bus systems having an RL02 system disk with an RLV12 controller. This problem has been corrected for V9.6.

2.4 Commonly Used System Programs (CUSPs)

2.4.1 DCL

2.4.1.1 BROADCAST Command

The message, KBn: disabled, is no longer displayed when executing a BROADCAST/ALL Command.

2.4.1.2 SHOW DEVICE Command

In the SHOW DEVICE display, KB0: is displayed as having TTO: as its controller, instead of KL0:. The first DL11 after KB0: will have KL0: as its controller. This is now compatible with the HARDWR LIST display of INIT.

2.4.1.3 HELP

The HELP program has been changed to make the CCL HELP command work as the DCL HELP command. The HELP program will now prompt for the next topic rather than exiting immediately.

2.4.2 BACKUP

The BACKUP program has been modified to use dynamic pseudo-keyboards when the /INITIALIZE command is used on disk media.

BACKUP now allows the asterisk (*) character to be used in place of multiple question mark (?) characters at the end of a file name or type. See Section 1.2.5, File Processor (FIP) File Name String Scan for additional information on this feature.

2.4.3 LOGIN and LOGOUT

The message displayed by RSTS/E when the system manager has disabled further logging in or the system has reached the maximum number of allowed users has been changed to:

```
?Logins are disabled - please try again later
```

This change has been made in order to make RSTS/E messages more user-friendly and similar to VAX/VMS.

2.4.4 ATPK and BUILD

The ATPK and BUILD programs will now use dynamic pseudo-keyboards rather than static pseudo-keyboards.

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Differences Between V9.5 and V9.6

2.4.5 PIP

Prior to V9.6, copying a file with the following attributes:

- RMS Sequential
- fixed length nospan records of 512 bytes
- maximum record length 512

to ANSI magtape would cause PIP to encounter a memory management trap and exit. PIP is now able to properly transfer RMS files with these attributes to ANSI magtape and back to disk with all data and attributes intact.

PIP no longer includes the [PPN] in the output filespec log message after transferring a file to ANSI magtape. The [PPN] is not stored on ANSI magtapes and is therefore not relevant.

PIP now allows the asterisk (*) character to be used in place of multiple question mark (?) characters at the end of a file name or type. See Section 1.2.5, File Processor (FIP) File Name String Scan for additional information on this feature.

2.4.6 PBS

The following changes have been made in the Print/Batch Services (PBS) package:

- PBS now takes advantage of dynamic pseudo-keyboards. All shareable batch servers will use dynamic pseudo-keyboards, while non-shareable servers will only use static pseudo-keyboards.
With these changes, it might be possible for shareable servers to be active while non-shareable servers are in a device-wait state. This will require that you have less than 128 total keyboards on your system. The system manager should ensure there are enough static pseudo-keyboards for the non-shareable servers. Sites that have a large number of total keyboards will be able to reduce the number of static pseudo-keyboards.
- For RSTS V9.5, line-feed characters at the top of a page would be ignored if the file did not have any RMS attributes, or had the CC:IMP attribute. PBS now behaves correctly in these cases.
- Prior to RSTS V9.6, PBS would not recognize C0 control characters in the middle of certain escape sequences. These characters are now passed on to the output device and PBS maintains the state of the escape sequence.
- Prior to RSTS V9.6, PBS would go into a steady run state if a print server on a modem line lost carrier while another keyboard print server was in use. This would only happen on systems with multi-terminal I/O support. This problem has been fixed.
- On PRINT and SUBMIT commands, PBS now allows the asterisk (*) character to be used in place of multiple question mark (?) characters at the end of a file name or type. See Section 1.2.5, File Processor (FIP) File Name String Scan for additional information on this feature.
- Prior to RSTS V9.6, PBS would not skip to the top of a new page before a carriage-return or line-feed was output below the bottom margin of a page. This problem is fixed.
- Prior to RSTS V9.6, PBS would incorrectly simulate a backspace from column two to column one on line printer servers that require backspace simulation. This problem is fixed.

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- Prior to RSTS V9.6, PBS would lose the capability of a server if a second DELETE/ENTRY command was issued before the entry was aborted. PBS now handles this case, and will display the following warning if an entry is already aborting:

```
%Print entry queue:[p,pn]name already deleted
```

2.4.7 SYSTAT

The SYSTAT program display for keyboard numbers has been changed. Rather than showing pseudo-keyboards in the format PnumberJnumber, the actual keyboard number in the format KnumberJnumber will be displayed. SYSTAT is now compiled with double-precision arithmetic to allow SYSTAT to handle the calculations for RA82 disks.

2.4.8 ANALYS

The ANALYS program display for keyboard numbers has been changed. Rather than showing pseudo-keyboards in the format PnumberJnumber, the actual keyboard number in the format KnumberJnumber will be displayed. Improvements have also been made in the crash dump annotations.

2.4.9 DISPLY

The DISPLY program display for keyboard numbers has been changed. Rather than showing pseudo-keyboards in the format PnumberJnumber, the actual keyboard number in the format KnumberJnumber will be displayed as in KB40J3.

The DISPLY program no longer changes a VT100, VT200, or VT300 type terminal into VT52 mode. The DISPLY program now uses ANSI mode for these terminal types. DISPLY still supports VT52 mode for VT52 terminals.

2.4.10 BPCREF

The BPCRF1 program chains to \$QUE.TSK to print the output file if the user specified /Q in the command line. For those installations where \$QUE and the rest of the OPSER Spooling Package have not been installed because PBS is used exclusively, BPCRF1 has been changed to try \$QUE first. Then, instead of reporting an error, it will send the print request to PBS and notify the user if it is attached.

2.4.11 RUNOFF

The RUNOFF program chains to \$QUE.TSK to print the output file if the user specified /Q on the output file name. For those installations where \$QUE and the rest of the OPSER Spooling Package have not been installed because PBS is used exclusively, RUNOFF has been changed to try \$QUE first, then, instead of simply reporting an error, it will send the print request to PBS, and notify the user of this if it is attached.

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Differences Between V9.5 and V9.6

2.4.12 DSKINT

Prior to V9.6, if DSKINT.TSK (or the DCL INITIALIZE command) encountered an unexpected error, it would abort with a ?Reserved Instruction Trap. DSKINT will now report the proper error message.

If the device size is 4500 blocks or less, DSKINT will now default the SATT.SYS and MFD placement locations to the beginning of the disk instead of the middle of the disk. Also, if DSKINT encounters an illegal placement value for SATT.SYS or the MFD, the following warning message is displayed:

```
Specified xxxx location is invalid - placing at nnn
```

The value xxxx will be either SATT.SYS for SATT placement value or [1,*] for MFD placement value. The value nnn will be the new placement value used by DSKINT.

2.4.13 SILUS

The SILUS program has been modified to allow up to 47 phases to be created in a monitor .SIL file. Applications that access the monitor .SIL file may need to be examined.

2.4.14 TKB

In RSTS V9.5, a problem in TKB may show up under some conditions. The problem occurs when the TKB command file contains a line specifying cluster libraries followed by a line specifying a non-clustered library. For example:

```
XYZ.TSK,XYZ.MAP,XYZ=XYZ.ODL/MP  
EXTTSK=512  
CLSTR=DBARRL,RMSRES:RO  
LIBR=XYZLIB:RO  
//
```

Once TKB detects a set of clustered libraries, it concludes that all the rest are clustered also. This problem has been fixed in V9.6.

2.5 Basic-Plus Run-Time System

The following corrections have been made to Basic-Plus for V9.6:

1. The CAT Command did not generate a directory listing as documented. The following problems occurred:
 - Some files were listed twice
 - Some marked-for-delete files, that should not have been listed at all, were listed as regular files.These problems have been fixed. Basic-Plus will give a catalog of only those files that are not marked-for-delete, and will list each file only once.
2. Error 21, (?Disk pack is not mounted), was not trappable during a CHAIN. An error 21, if encountered during a CHAIN, would clear user space and go back to the 'Ready' prompt.
Basic-Plus has been changed to allow users to trap an error 21 encountered during a CHAIN.

2.6 Layered Products

2.6.1 DECnet/E

2.6.1.1 Installation

Prior to RSTS V9.6, the layered product name for DECnet/E was DECNET V40. In RSTS V9.6, the name is changed to DECNET.

2.6.1.2 NCP

When attempting to set the RECALL TIMER for Point to Point or Multipoint circuits in NCP using a command like:

```
NCP DEFINE CIRCUIT <circuit-id> RECALL TIMER <value>
```

the error:

```
Listener Response - Parameter not applicable, Recall Timer
```

would be received. With RSTS V9.6, NCP has been updated. This command will work for all Point to Point and Multipoint circuits, but will continue to fail with "Parameter not applicable" for Ethernet circuits because the RECALL TIMER has no meaning with Ethernet circuits.

Also, with the updated NCP, a SHOW/LIST CIRCUIT <circuit-id> CHARACTERISTICS for an Ethernet circuit (UNA-0 or QNA-0) will no longer display the RECALL TIMER parameter because the RECALL TIMER has no meaning with Ethernet circuits.

2.6.1.3 NPKDVR

When the SET HOST command is issued to your RSTS system, it uses NPKDVR.TSK to create a job on a pseudo-keyboard for the other system. NPKDVR.TSK has been updated to use dynamic pseudo-keyboards for these connections. See Section 1.2.3.2, Dynamic Pseudo-Keyboards Access for more details on dynamic pseudo-keyboards.

2.6.2 DIBOL Changes

RSTS V9.6 contains changes for both RSTS DIBOL V5.2 and RSTS DIBOL V6.0. The installation procedure will detect which version of RSTS DIBOL is being installed and use the appropriate updated components. Online release notes are provided which document the changes made to RSTS DIBOL.

Chapter 3

Documentation Changes

The documentation for RSTS V9.6 consists of these release notes and a new *RSTS/E System Installation and Update Guide*.

3.1 Corrections

The following documentation errors will be corrected in a future version of RSTS:

- In the *RSTS/E System Directives Manual* on page 3–131, the second paragraph states in part, “ Unless data passed and returned show specific values for the XRB, it should be all zeros.”
The following statement will help to clarify how you should handle FIRQB and XRB:
When using SEND/RECEIVE calls, you must clear both FIRQB and XRB, even if XRB is not used.
- In the *RSTS/E Programming Manual* on page 9–3, the description of the confirmation data received in Byte 3 for a system call to PBS is incorrect. The data returned in Byte 3 is CHR\$(255%).
- In the *RSTS/E Programming Manual* on page 9–22, the documentation for the /COPIES field is incorrect. Byte 1 should be CHR\$(131%), not CHR\$(13%).

3.2 Additions

3.2.1 Programming Manual

This section describes changes or additions to the *RSTS/E Programming Manual*.

3.2.1.1 SHUTUP SYS–Call

You can now request an automatic reboot after shutdown by passing a flag value in Byte 3 of the SYS–call. The value 0 means norestart (stop in INIT.SYS), 1 means restart. Previous programs omitted this flag, so they always stopped within INIT.SYS.

The remaining Bytes (4–30) of the sys–call continue to be reserved and should be 0.

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Documentation Changes

3.2.1.2 Determining LAT Server and Port ID's

The name of the LAT terminal server and the port ID on the server can be determined from the following sys-call:

Data Passed

| Bytes | Meaning |
|-------|---|
| 1 | CHR\$(6%), the SYS call to FIP. |
| 2 | CHR\$(22%), the send/receive function code. |
| 3 | CHR\$(12%), the LAT SHOW function. |
| 4 | CHR\$(6%), the SESSION subfunction. |
| 5 | CHR\$(I%), the index of the session about which to return information. |
| 6 | CHR\$(L%), the length, in bytes, of the server name on which to restrict the session search. If this byte is 0%, sessions are reported based on the index across all servers. |
| 7 | CHR\$(K%), the keyboard number about which to report session information. If Byte 6 is not 0%, the system ignores this byte. |
| 8-10 | CHR\$(0%), reserved; should be 0%. |
| 11 | CHR\$(C%), the channel number for the I/O buffer that contains the extended parameter list, if any. Typically, the null device (NL:) is opened and associated with a MAP (for BP2, or FIELD from Basic-Plus) which describes the format of the information to pass or return. If this byte contains a channel number (any value from 1-12), a buffer defined by the length and offset values in Bytes 13-14 contains the extended parameter list for this directive. The parameter list should be left-justified in the buffer for channel C%, beginning at the offset value defined in Bytes 15-16. If this Byte is zero, a string beginning at Byte 41 contains the extended parameter list for this directive. |
| 12 | CHR\$(0%), reserved; should be 0%. |
| 13-14 | L%, the length (in bytes) of the extended parameter list from the channel buffer in the form CVT\$(SWAP%(L%)). If Byte 11 is non-zero, this length field can have any value between 0 and 512, subject to the restriction that the length of the extended parameter list is less than or equal to the buffer size minus the offset value defined in Bytes 15-16. To ensure all the data can be returned, the length of the buffer area should be 53 decimal bytes. If the length is zero, the system uses the whole buffer (that is, from the offset to the end of the buffer). If Byte 11 is zero, these bytes are ignored. |
| 15-16 | O%, the offset value in the form CVT\$(SWAP%(O%)). The value specifies the offset from the beginning of the buffer where the extended parameter list begins. The offset must be an even number in the range of zero to (size of buffer-1). If Byte 11 is zero, these bytes are ignored. |
| 17-24 | CHR\$(0%), reserved, must be 0. |
| 25-40 | NS\$, the name string, if any. The name string is the name of the server on which the search for sessions will be limited. A maximum of 16 bytes may be used for passing a name string to the directive. The server name is converted to uppercase characters for comparison purposes, and is returned to the extended parameter list exactly as it was reported by the server. |
| 40+ | PS\$, the optional extended parameter list. A maximum of 512 bytes in an extended parameter list may be passed with the directive. These bytes are ignored if Byte 11 is non-zero. |

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Documentation Changes

Data Returned

Data is returned to the extended parameter list or the I/O buffer associated with the channel number passed in Byte 11. The data is returned in four fields; the keyboard field, the server port name field, the server node name field, and the service name field. These fields are always present and are always shown in the following order:

Keyboard Field

The keyboard field returns the RSTS keyboard number on which the user is logged in. Also included in this field is a flag byte which indicates whether or not the user dialed into a LAT terminal server.

| Bytes | Meaning |
|-------|--|
| 1 | CHR\$(K%), the RSTS keyboard number on which the user is connected. |
| 2 | CHR\$(N%), where N% is a bitmask. Bit values are: (N% AND 128%) <> 0% indicates the user dialed into the LAT terminal server or the status was unknown. (N% AND 128%) = 0% indicates a line directly connected to the LAT terminal server. |

Server Port Name Field

The server port name is the name given to the port on which the user is connected. This field immediately follows the keyboard field.

| Bytes | Meaning |
|-------|---|
| 1 | CHR\$(L%), the length of the server port name which follows. |
| 2 | N\$, the server port name string whose length, in bytes, is previously described. |

Server Node Name Field

The server node name is the name of the server on which the user is connected. This field immediately follows the server port name field.

| Bytes | Meaning |
|-------|---|
| 1 | CHR\$(L%), the length of the server node name which follows. |
| 2 | N\$, the server node name string whose length, in bytes, is previously described. |

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Service Name Field

The service name is the name of the service which the user is running. This field immediately follows the server node name field.

| Bytes | Meaning |
|-------|---|
| 1 | CHRS(L%), the length of the service name which follows. |
| 2 | N\$, the service name string whose length, in bytes, is previously described. |

Privileges Required

None

Table 3-1: Possible Errors

| Meaning | ERR Value |
|--|-----------|
| ?CAN'T FIND FILE OR ACCOUNT There was no server matching the server specified in the sys-call. | 5 |
| ?NOT A VALID DEVICE The keyboard number was not a valid RSTS keyboard number. | 6 |
| ?DEVICE NOT AVAILABLE There was no session matching the specified index. | 8 |
| ?ILLEGAL SYS() USAGE The server name length is not in the range 1-16, or neither a keyboard nor an index was supplied. | 18 |
| ?DISK BLOCK IS INTERLOCKED The keyboard number was a valid keyboard number, but it cannot be a LAT terminal because it is not a dynamic keyboard. | 19 |
| ?ILLEGAL BYTE COUNT FOR I/O The buffer supplied did not begin on a word boundary. | 31 |
| ?MISSING SPECIAL FEATURE LAT is not installed on your system. | 66 |

3.2.1.3 User Request Packet Changes for /NOWRAP

The /[NO]WRAP qualifier added to PBS for V9.6 can be accessed via the User Request Packets as can other features of PBS. The following information describes how to use /[NO]WRAP from User Request Packets:

1. /[NO]WRAP Flag Field

This field applies to print requests only. It consists of a flag byte that determines whether PBS wraps the excess portion of lines that exceed the width of the request's form onto the next line. This field corresponds to the /[NO]WRAP file qualifier of the PRINT command.

If the flag is non-zero or you omit this field, PBS will wrap untruncated lines. If the flag byte is zero, PBS does not wrap the line and continues to send characters to the device.

The /[NO]TRUNCATE field has precedence over this field. That is, if /TRUNCATE is specified, the excess portion of a line will be truncated, regardless of the /WRAP setting.

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The format of the /[NO]WRAP flag field is:

| Byte | Specification |
|------|--|
| 1 | CHR\$(136%) |
| 2 | CHR\$(N%), where N% is the flag byte. Values are: 0% – No wrap 1% – Wrap (the default) |

Chapter 4

Known Problems and Restrictions

4.1 Installation

4.1.1 Booting Magnetic Tape

Magnetic tape distributions of RSTS or any bootable recovery tapes of RSTS must be booted from unit zero. This problem affects MM and MT drives. This problem will be corrected in a future release of RSTS.

4.1.2 Flag Files

The installation or update of RSTS leaves several zero length flag files (files used by the installation procedure to determine what parts of the installation have been completed) in various system accounts after installation.

Deleting any of these files may cause unpredictable results. In particular, deleting the flag file [1,2]VER096.SYS may cause certain layered product installations and updates to fail.

4.2 Initialization Code (INIT.SYS)

- If your installed monitor has a Virtual Disk defined (DV:), and you START a monitor that has no Virtual Disk defined, and then START your original monitor containing the Virtual Disk again, you will get ?Device not available errors when you attempt to access the Virtual Disk.

The workaround is to use the DEFAULT option of INIT.SYS to remove and then redefine the Virtual Disk for your original monitor.

- An unnecessary error message prints when an 800 BPI magnetic tape on a TE16 subsystem that uses a TM02 formatter is booted from the Option: prompt of INIT.SYS. For example:

```
MM0 Error  MTCS1  MTWC   MTFC   MTCS2  MTDS   MTER   MTTC
           144270  000000  001007  000100  154640  102100  102300
```

The error message you receive may be different. This message prints as a result of the density autosizing process that occurs on TM02 formatters and does not represent a true hardware error.

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Known Problems and Restrictions

4.3 Monitor

4.3.1 DB and DR Disk Drivers

The DB and DR disk drivers may count or log errors for the wrong disk unit if there is heavy DB/DR disk activity and an attempt is made to mount a unit that is spun down or off-line.

This problem will be corrected in a future release of RSTS.

4.3.2 MSCP Disk Driver

On systems having multiple UDA50-A MSCP controllers, a system crash may result if disk unit numbers are swapped between two drives on different UDA50-A controllers during timesharing.

The preferred workaround is to only swap drive numbers when timesharing is not up. The best method is to shut the system down and swap the unit numbers when the Start timesharing prompt appears. After swapping the unit numbers, reboot the system disk and restart timesharing.

4.3.3 TMSCP Tape Driver

If your system contains only one TMSCP tape drive (TU81 or TK50), it must be designated unit 0. If you have two drives and unit 0 does not work, you must make the working drive unit 0 and disconnect the non-working drive. This restriction will be fixed in a future release of RSTS.

NOTE

The controller number must also match the drive number. For example:

```
Valid
Name      Address Vector Comments
MU0:     174500 P350  TU81    Units: 0 (TU81)
MU1:     160504 P354  TK50    Units: 1 (TK50)
```

```
Invalid
Name      Address Vector Comments
MU0:     174500 P350  TU81    Units: 1 (TU81)
MU1:     160504 P354  TK50    Units: 0 (TK50)
```

4.4 Commonly Used System Programs (CUSPs)

4.4.1 DCL

4.4.1.1 Directory

The DCL DIRECTORY command shows incorrect file sizes for magnetic tape files containing more than 65535 records. This is a restriction for V9.6 and will be fixed in a future release.

4.4.1.2 Time

DCL interprets 12:00 PM as midnight instead of noon.

4.4.1.3 DCL F\$MID Function

The DCL function "F\$MID" gives the error "?Invalid character" if the second parameter and closing parenthesis are missing. The correct error message is "?Additional argument required". This will be corrected in a future release.

4.4.1.4 MOUNT Command

When issuing a MOUNT command with the /OVER qualifier and without a pack label, the logical name, if specified, must not have a colon (:) appended.

Use a command of the following format:

```
MOUNT DUL:/OVER/PRIVATE S
```

rather than:

```
MOUNT DUL:/OVER/PRIVATE S:
```

4.4.1.5 GOSUB

Continuation lines cannot be used with the GOSUB command.

4.4.1.6 BROADCAST

Exclamation marks in continuation lines cannot be used with the BROADCAST command.

4.4.2 ANALYS Package

In the monitor dump section of the ANALYS report, the "virtual disk" area of the Memory Layout is incorrectly shown as "locked out." This will be fixed in a future release of RSTS.

4.4.3 LOGIN and LOGOUT

The LOGIN and LOGOUT programs control when to drop the carrier on a dial-up line. If you access the system from a captive account over a dial-up line and the command procedure you are running aborts abnormally, the carrier will not be dropped. A workaround to this problem is to trap all possible errors within the command procedure and exit by using the LOGOUT command.

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4.4.4 ODT

ODT.TSK will not display addresses greater than 177777(8) correctly. It accesses the correct location and displays the contents of the address correctly. It is only the display of the address that is incorrect.

4.4.5 PIP

The following problems have been reported and will remain as restrictions for V9.6 while they are being investigated for resolution in a future release:

- PIP cannot access files that are on a tape created on an RT-11 system. This problem will be fixed in a future release of RSTS.
- There is a restriction using the Open Next directive with PIP when copying files into themselves. If you are copying files into themselves on the system disk initialized as New Files Last (NFL), and you specify that disk's device name differently on the input and output side of the command line, PIP will continue copying files in an endless loop; it will not properly detect the last file in the directory. Under such circumstances, you must type CTRL/C to terminate the operation. For example, if your system disk is _DU1: and you issue the following command, PIP will loop endlessly copying files:

```
$ PIP _SY:[1,2]=_DU1:[1,2]*.*/*LOG
```

To prevent this, do not specify a device name for the system disk or specify the same device name on both the input and output side of the PIP command line (_SY: = _SY:, _SY0: = _SY0:, _DU1: = _DU1:, and so on.).

- It is only valid to copy RMS files to ANSI magtape. PIP will allow you to copy RMS files to DOS magtape, but the files' attributes will be lost and the files will be unusable. Safeguards will be implemented in future releases to prevent inadvertent copying of untranslatable RMS files to DOS magtape.

4.4.6 RT-11 Utilities on DU Disks Greater than Unit 9

The following utilities will not correctly print the disk name and unit number in error messages for disks with unit numbers greater than 9:

- LINK.SAV
- LIBR.SAV
- MACRO.SAV

For example, if the source file TEST01 does not exist on DU15:

```
$ RUN $MACRO
*DU15:TEST01=DU15:TEST01
?MACRO-F-File not found DVE:TEST01.MAC
DU15:TEST01=DU15:TEST01
```

This problem will be fixed in a future release of RSTS.

4.4.7 Log File Corruption

If the disk on which a DCL or BATCH log file is being written becomes full, as space becomes available the resultant log file may contain one or two blocks of random data.

4.5 RSX and RMS Tasks

Typically, you are allowed to omit one or both of the Project-Programmer Number (PPN) fields when specifying a file or account. You are also able to use logical names longer than six characters and logical names containing dollar signs. The following is a list of RSX and RMS tasks which do NOT allow you to specify one or more of these features:

Table 4-1: RSX and RMS Tasks

| Task Name | Handles Logical Names Longer than 6 Characters | Handles Logical Names Containing dollar (\$) Signs | Handles Omitted Fields(s) in PPN | Handles File Specification Containing Trailing Asterisk (*) |
|-----------|--|--|----------------------------------|---|
| TKB | YES | YES | NO | NA |
| MAC | YES | YES | NO | NA |
| PAT | NO | NO | YES | NO |
| LBR | NO | YES | NO | NA |
| RMSDEF | YES | NO | NO | NA |
| RMSDSP | YES | NO | NO | NO |

4.6 RMS-11

- RMS-11 does not correctly handle a file specification which contains an underscored device. RMS-11 ignores the underscore.
- Keyed access on a remote indexed file will incorrectly report a Record Not Found error when the target record's key size is described as zero on a key whose datatype is non-string. This is documented as a correct way to pass a nonstring key but currently only works correctly for local operations. This problem will be fixed in a future release of RSTS.

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4.7 Layered Products

4.7.1 DECnet/E

- The NCP Command to SET EXECUTOR SEGMENT BUFFER SIZE <n> does not work when the EXECUTOR STATE is ON. The command should fail with an appropriate error but instead appears to succeed without taking any action. This will be corrected in a future release of RSTS.
- When attempting to issue a command such as SHOW NODE <number> COUNTERS and the node <number> is not in your volatile database, NCP will report that the node does not exist, even though you may have an active link to it. The workaround is to ensure that all the nodes you normally access are defined in your volatile parameter file. This will be corrected in a future release of RSTS.
- DECnet/E will not successfully create a network parameter file for networks of greater than 26,000 nodes. In order to successfully create a node database (NETPRM.SYS), you must specify a Maximum Nodes value smaller than 26,000. This is a restriction to the current release of DECnet/E and may be lifted in any future release or update.
- When you SET HOST from RSTS to some versions of VMS, logging off the VMS system may display the following message:

```
%Logical link failure to remote node xxxxxxxx
NSP reason code = 0
Control returned to node xxxxxxxx
```

This error message is triggered by the receipt of an unexpected message from the VMS node during disconnect. When the message displays, no actual error has occurred and the user session is not otherwise affected.

When you SET HOST from some versions of VMS to RSTS, the same error may be displayed. In addition, the job on the RSTS system is left detached.

4.7.1.1 NFT and FAL

- NFT and FAL do not preserve correct protection codes when creating files. Protection codes for the output files are computed by adding together the default system protection code and the codes for executable (64), protected (128), or executable and privileged (64+128) as set on the input file. Note that these codes are decimal values.
- NFT and FAL do not correctly report the size of large files in directory operations. Where the value exceeds 65535, it requires more than 16 bits to be represented. The extra bits are ignored. Therefore, the value is misrepresented. This will be fixed in a future release of RSTS.
- NFT does not correctly handle the block mode switch during a wildcard copy operation. The switch is ignored after the first copy is performed. This will be fixed in a future release of RSTS.
- The NFT and FAL programs add RMS attributes to files when they are copied. Since RSTS V9.5, an NFT copy of a non-attributed stream file has resulted in the creation of an Implied Carriage Control output file. When RT-11 listings and maps are copied in this way, the PBS program is then unable to perform correct output of these files.

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The /NOA switch should be used to strip the attributes of the output file (see Chapter 4, Network File Transfer Utility, of the *DECNET/E Utilities Guide* for further information on the use of this switch).

This problem will be corrected in a future release.

4.7.1.2 FORTRAN-77

If you are using FORTRAN-77 V5.2, you may get undefined symbols when using the LINK/F77 command. This problem will be fixed in a future release of FORTRAN-77. Make the following additions to LB:RMS11M.ODL to correct this problem:

```
OTSLIO: .FCTR LB:[1,1]F77RMS/LB:$LSTI:$LSTO-$$FIOC-$$FIOD
```

becomes

```
OTSLIO: .FCTR LB:[1,1]F77RMS/LB:LICSB$:$LSTI:$LSTO-$$FIOC-$$FIOD
```

```
OTSMS2: .FCTR OTSVRT-LB:[1,1]F77RMS/LB:$VIRT:$MADBV
```

becomes

```
OTSMS2: .FCTR OTSVRT-LB:[1,1]F77RMS/LB:$VIRT:$MADBV:$MKADE
```

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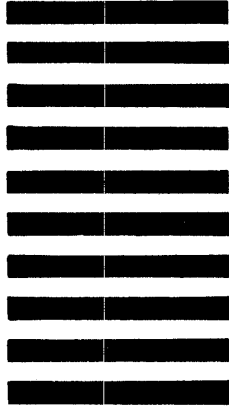
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