

# ULTRIX

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## Guide to IBM Terminal Emulation for VAX Processors

**ULTRIX**

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**Guide to IBM Terminal Emulation  
for VAX Processors**

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This manual introduces the IBM 2780/3780 Terminal Emulator and provides setup, maintenance, and troubleshooting information for the Emulator.

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maynard, massachusetts**

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# About This Manual

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This guide provides introductory and setup information for the IBM 2780/3780 Terminal Emulator. It also explains how to maintain and troubleshoot the Terminal Emulator.

## Audience

This guide is meant for the person responsible for maintaining networks on an ULTRIX operating system. This person is usually the system administrator, but could be a network administrator or the system administrator who is also a user of a MicroVAX processor running the ULTRIX operating system. This guide assumes that you are familiar with the ULTRIX system commands, the system configuration, the naming conventions, and an editor such as `vi` or `ed`. It also assumes that you know the names and addresses of the other systems on the network.

## Organization

This manual consists of two chapters and an index.

- |           |   |
|-----------|---|
| Chapter 1 | Overview of the IBM 2780/3780 Terminal Emulator   |
|           | Provides an overview of the Terminal Emulator. It discusses both the hardware and software needs and also how to use the emulator.  |
| Chapter 2 | Using and Maintaining the IBM 2780/3780 Terminal Emulator   |
|           | Describes the tasks you perform to use and maintain the Terminal Emulator. It also provides information on how to interpret the error messages for your system and peripherals. |

## Conventions

The following conventions are used in this manual:

- |                            |   |
|----------------------------|---|
| <code>%</code>             | The default user prompt is your system name followed by a right angle bracket. In this manual, a percent sign ( <code>%</code> ) is used to represent this prompt.  |
| <code>#</code>             | A number sign is the default superuser prompt.  |
| <b>user input</b>          | This bold typeface is used in interactive examples to indicate typed user input.  |
| <code>system output</code> | This typeface is used in interactive examples to indicate system output and also in code examples and other screen displays. In text, this typeface is used to indicate the exact name of a command, option, partition, pathname, directory, or file. |

UPPERCASE lowercase	The ULTRIX system differentiates between lowercase and uppercase characters. Literal strings that appear in text, examples, syntax descriptions, and function definitions must be typed exactly as shown.
<i>filename</i>	In examples, syntax descriptions, and function definitions, italics are used to indicate variable values; and in text, to give references to other documents.
[ ]	In syntax descriptions and function definitions, brackets indicate items that are optional.
cat(1)	Cross-references to the <i>ULTRIX Reference Pages</i> include the appropriate section number in parentheses. For example, a reference to cat(1) indicates that you can find the material on the cat command in Section 1 of the reference pages.

# Overview of the IBM 2780/3780 Terminal Emulator

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# 1

This chapter provides an overview of the IBM 2780/3780 Terminal Emulator. It discusses the hardware and software requirements of the Terminal Emulator, as well as describing its features and giving an introduction to using it. The chapter is broken down into the following sections:

- The Terminal Emulator
- Terminal Emulator features
- Terminal Emulator hardware requirements
- Terminal Emulator software requirements
- Setting up the Terminal Emulator
- Overview of using the Terminal Emulator

For step-by-step instructions on how to use and maintain the Terminal Emulator, read Chapter 2.

## 1.1 The Terminal Emulator

The IBM 2780/3780 Terminal Emulator is a software package that allows your ULTRIX operating system to emulate an IBM 2780 or 3780 terminal. The Terminal Emulator uses the Binary Synchronous Communications (BSC) protocol to send and receive files across a communications line connected to an IBM system that supports 2780/3780 devices.

Major software components of the Terminal Emulator include:

- The 2780e and 3780e programs  
These programs, which are called on the command line, prepare your files.
- The 2780d program  
This program, which is called automatically by the 2780e or 3780e program, sends the prepared files.

## 1.2 Terminal Emulator Features

The 2780/3780 Terminal Emulator has the following features:

- Multiuser Support  
Several ULTRIX users can use the Terminal Emulator simultaneously. The Terminal Emulator sends files one at a time in the order requested.



- **Mail Notification**  
You can request that the Terminal Emulator send you ULTRIX operating system mail messages when a file has been sent and received. The file name and time of transaction are included in the mail message.
- **ASCII/EBCDIC Translation**  
The supported IBM systems require EBCDIC characters. The Terminal Emulator automatically translates the ASCII characters into EBCDIC characters when sending files to the IBM system, and EBCDIC characters into ASCII characters when receiving files.
- **Transparent Data Transfer**  
When data is sent in this mode, any characters can be in the message text. Special characters are not interpreted.
- **Nontransparent Data Transfer**  
When data is sent in this mode, special control characters cannot be in the message text.

### 1.3 Hardware Requirements

The following hardware is required on the IBM end of the communications line to implement the Terminal Emulator:

- IBM computer (3031, 3032, 3033, or 370 set up for a 2780 or 3780 terminal)
- IBM Transmission Control Unit (3705, 2701, 2703, or 3704)
- Bell series 200 modem (baud rate must match that of the modem on the ULTRIX system)

On the VAX processor side of the communications line, there are two possible hardware configurations, depending on whether you have a VAX or a MicroVAX processor.

The following hardware is required for the VAX configuration:

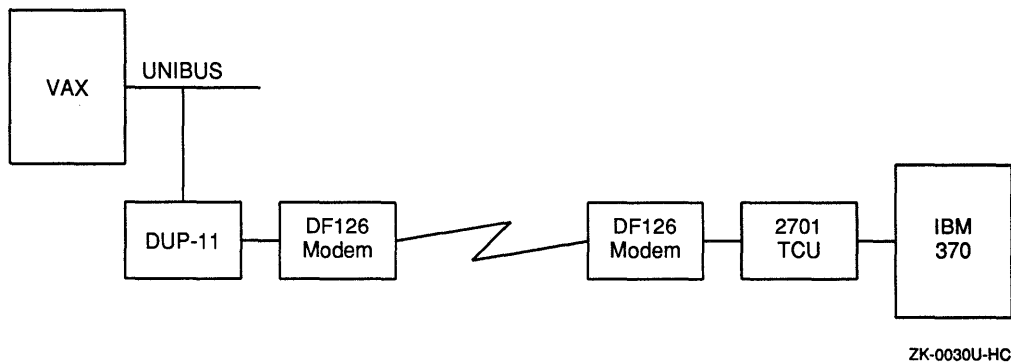
- A VAX processor
- A DUP-11 data communications device
- A DF126 synchronous modem:
  - Half-duplex
  - 1200 or 2400 baud
- A telephone line:
  - Voice or data grade
  - Dialup
  - Half-duplex or full-duplex
- A telephone

The following hardware is required for the MicroVAX configuration:

- A MicroVAX processor
- A DPV-11 data communications device
- A DF126 synchronous modem:
  - Half-duplex
  - 1200 or 2400 baud
- A telephone line:
  - Voice or data grade
  - Dialup
  - Half-duplex or full-duplex
- A telephone

Figure 1-1 illustrates a typical hardware configuration.

**Figure 1-1: Typical Hardware Configuration**



Private telephone lines are not supported in the VAX or MicroVAX configuration. In addition, the Terminal Emulator does not have autodial capabilities. However, you can autodial through an asynchronous terminal. For more information, see the DF126 modem documentation.

## 1.4 Software Requirements

The IBM system can be running one of several operating system configurations, for example, the OS/VS2 operating system with the Job Entry Subsystem JES2 or JES3. Note that the configuration must be set up to support an IBM 2780 or 3780 remote batch terminal.

To use the Terminal Emulator, the VAX or MicroVAX processor must be running the ULTRIX operating system. The files and directories shown in Table 1-1 are of particular importance.

**Table 1-1: Files Used by the Terminal Emulator**

File	Description
/usr/spool/rje	This directory stores files before they are sent and after they are received, in addition to storing accounting information.
/usr/spool/rje/.rjed	This file contains the process identification number for the running 2780d program.
/usr/spool/rje/acctlog	This file is a log of file transmissions.
/usr/adm/rjelog	This file is a log of error messages.

## 1.5 Setting Up the Terminal Emulator

The system administrator sets up and maintains the Terminal Emulator. As system administrator, you should have a working knowledge of operations performed by 2780 or 3780 remote batch terminals and communications tools such as phone lines and modems.

To set up the Terminal Emulator on your running ULTRIX system, you must modify two existing files, described in Table 1-2.

**Table 1-2: Existing Files Modified for the Terminal Emulator**

File	Description
/sys/conf/vax/ <i>HOSTNAME</i>	The system configuration file, which contains global, system image, device, and pseudodevice definitions.
/etc/rc.local	The system startup file, which contains, among other things, network information.

To make these modifications, you need to know:

- The VAX hardware configuration, specifically the system and communications devices
- The format of the configuration file
- How to rebuild the kernel

### 1.5.1 Modifying the System Configuration File

To modify the system configuration file, add:

- The BSC protocol as an option and pseudodevice.
- The DUP-11 (VAX) or DPV-11 (MicroVAX) as a device. Specify the DUP-11 device as `dup n` and the DPV-11 device as `dpv n`, where *n* is the unit number of the device (usually 0).

After you make these edits, you must rebuild the kernel. See the *Guide to Configuration File Maintenance* for more information on editing the configuration file and rebuilding the kernel.

## 1.5.2 Modifying the System Startup File

Two command lines are added as comments to `/etc/rc.local` during the installation of the ULTRIX operating system. Each command line has the following form:

```
/etc/bssconfig interface protocol [ identification ]
```

The *interface* argument is the communications device that BSC uses, which is either `dup0` or `dvp0`. The *protocol* argument is the communications protocol used to send and receive data across the communications line. The *identification* argument is an optional parameter included here for compatibility with the TCP/IP program `ifconfig.c`, also listed in the `/etc/rc.local` file.

The following comment lines are already placed in the `/etc/rc.local` file:

```
# /etc/bssconfig dpv0 bsc 1  
# /etc/bssconfig dup0 bsc 1
```

Activate the command line that describes your configuration by removing the number sign (`#`). Then reboot your system or run the `/etc/bssconfig` command. Either of these procedures causes the `bssconfig` program to place the command line information in the appropriate kernel data structures.

## 1.6 Overview of Using the Terminal Emulator

The Terminal Emulator sends files to the IBM system for processing. When the files are processed, the Terminal Emulator receives the output files on the ULTRIX operating system. To use the Terminal Emulator, you need a working knowledge of operations performed by 2780 or 3780 remote batch terminals and specifically the Job Control Language (JCL), which gives the IBM system instructions on how to execute a file.

A file or set of files sent to an IBM system for execution is called a **job**. Before sending a job, you must do the following:

- Include a series of JCL statements in each file. These control statements introduce outgoing files to the IBM system, provide accounting information, direct the IBM operating system about what must be done, request hardware devices, execute the job, and send files to the ULTRIX operating system.
- Start the Terminal Emulator. Depending on which terminal you are emulating, type either `2780e` or `3780e` on the command line. You must supply the name of the file or files you are sending, and you can specify one or more options that affect how the file is transmitted. (See Section 2.1.2.)
- Dial the IBM system.

The following sections provide an overview of the sending and receiving process.

### 1.6.1 How the Terminal Emulator Prepares Your Files

The 2780e and 3780e commands store some of the JCL statements along with other information in a control file that resides in `/usr/spool/rje`. This control file contains your user identification number and user name, the names of the files you are sending, the names of the files that you expect in return, and so on. All control file names begin with `cf`, for example, `cfA000xxx`.

Both 2780e and 3780e copy the actual data files you are sending into `/usr/spool/rje` and rename them. These file names begin with `df` and have a letter and number scheme similar to that of their corresponding control files. There can be several data files associated with a single control file. For example, you can have a single control file `cfA001xxx` associated with the data files `dfA001xxx` and `dfB001xxx`.

As the 2780e or 3780e command reads in your command line and copies and renames your files, it can generate errors. Messages about these errors appear on your terminal screen. For more information on error messages, see Section 2.3.

### 1.6.2 How the Terminal Emulator Transmits Your Files

Once the files are renamed and ready to send, the 2780e and 3780e commands call the 2780d program to send the data. As long as there are control files in the spool directory, 2780d sends data files.

The file that contains the 2780d process identification number, `/usr/spool/rje/.rjed`, regulates the use of the 2780d program.

Note that once 2780d sends all the data files associated with the control file, the associated control file is renamed with a file name beginning with `zf`, for example, `zfA001xxx`. This renamed control file awaits the arrival of the returning files.

If the 2780d program generates errors during transmission, messages appear in the error log file `/usr/adm/rjelog`. Some situations require the system administrator to act; others are handled by the BSC protocol. For example, if there is an error in receiving data from the IBM system, the BSC protocol tries to reestablish the connection and receive the file a second time.

Remember that 2780d sends the files in batch mode. Therefore, do not expect immediate results or interaction with the IBM system. See 2780d(8) in the *ULTRIX Reference Pages* for further information.

### 1.6.3 How the Terminal Emulator Receives Files

The 2780d program receives files from the IBM system and places them in `/usr/spool/rje/rjetemp.out`. Then, by default, the 2780d program gives each file a name of the form `Rje daytime` and places each file in the spool directory. For example:

```
Rje05133550
```

In this example, 05 is the day of the month, 13 is the hour, 35 is the number of minutes, and 50 is the number of seconds.

Note that you can assign names to these incoming files. You specify these file names on the 2780e or 3780e command line when sending files to the IBM system for execution. If 2780d has problems renaming the files, the files remain in /usr/spool/rje/rjetemp.out.

**Note**

The 2780d program always initiates communication with the IBM system and will not respond to unsolicited calls from the IBM system.



---

This chapter provides instructions for using and maintaining the IBM 2780/3780 Terminal Emulator. It is divided into the following sections:

- Using the Terminal Emulator
- Maintaining the Terminal Emulator
- Interpreting error messages

## 2.1 Using the Terminal Emulator

Using the Terminal Emulator entails the following steps:

- Preparing your files
- Sending your files
- Resolving problems
- Locating incoming files

### 2.1.1 Preparing Your Files

Prepare your files by including JCL statements. The first JCL statement you include is called a **sign-on card** and specifies the remote line that connects to the IBM system you are using. This sign-on information can be located in one of two places:

- In a file named `signon`, created by the system administrator, which resides in the spool directory on the ULTRIX operating system.
- In a file you create, such as `Remotel`, which resides in any directory.

When you send any file, by default the `2780e` or `3780e` command incorporates and uses the information contained in `signon`. If you want to use sign-on information residing in a file of your choice, you must specify the pathname of the file on the `2780e` or `3780e` command line, as described in Section 2.1.2.9.

The following is an example of a sign-on card:

```
/*SIGNON                                RMT9
```

Place all other JCL statements at the beginning of each file you are sending. Example 2-1 shows a sample set of JCL statements used by an IBM system to execute a file and by the Terminal Emulator to receive the file.



## Example 2-1: Sample JCL Statements

```
//UNIXTEST JOB ,GODDARD,CLASS=A,MSGCLASS=A,MSGLEVEL=1,  
// USER=ULTRIX1,PASSWORD=DODODO  
//* usr=(lee,jcl.lee)  
//STEP010 EXEC PGM=IEBPTPCH  
//SYSPRINT DD SYSOUT=*  
//SYSUT1 DD DSN=SYS1.MACLIB,DISP=SHR  
//SYSUT2 DD SYSOUT=A,DCB=BLKSIZE=81  
//SYSIN DD *  
PRINT TYPORG=PO,MAXFLDS=10,MAXNAME=10  
MEMBER NAME=GETMAIN  
RECORD FIELD=(80)  
/*  
//
```

The third line in Example 2-1 is a JCL statement called a **comment card**. A comment card supplies user and job name information used by the 2780d daemon to place the returning files. In this example, `lee` is the user name and `jcl.lee` is the name of the file 2780d is sending.

### Note

You must include a comment card in each file. If the comment card is not included, the 2780d program can misplace your incoming files. Even if you request mail, 2780d will have no way to locate the files and inform you of their arrival.

## 2.1.2 Sending Your Files

To send files to the IBM system:

1. Make sure that all cables are connected.
2. Be sure your modem's transmit ready light is on. If it is not, enter a command that has the following form:

```
/etc/bsccnfig interface protocol [ identification ]
```

For example:

```
% /etc/bsccnfig dpv0 bsc 1
```

See Section 1.5.2 for more information.

3. Type 2780e or 3780e (depending on which IBM terminal you are emulating) along with the name of the file or files you want to send. For example:

```
% 2780e fileA
```

4. Place a call to the IBM system. If more than one minute elapses before you complete the call, the 2780d program stops trying to establish the connection. To reestablish the connection, type 2780d on the command line and redial the IBM system.
5. Once the connection is made and you hear a tone, press the data button on your modem. If you get error messages saying that the line is down or notice that the modem's receive data light does not go on, then your modem may not be synchronized with the modem connected to the IBM system. To solve this problem, do the following:

- a. Make sure your modem works by running tests specified in the DF126 modem documentation.
- b. Unplug and plug in the modem power cable, and try sending your files again.
- c. If you still cannot send your data, verify that the baud rate matches the baud rate of the modem on the IBM side of the configuration.
- d. If you still have problems, call your Digital field service representative.

You can choose one or more of the job options listed in Table 2-1 when you send and receive files.

**Table 2-1: Job Options**

Action	Option
Turning off space compression (3780)	-C
Requesting mail messages	-m
Requesting top priority	-a
Temporarily suspending file transmission	-q
Sending files transparently (2780)	-t
Sending files transparently (3780)	-t, -tb
Sending multiple record data packets (2780)	-b
Specifying default names for incoming files	-# <i>num</i>
Specifying unique names for incoming files	-o <i>file</i>
Specifying a unique sign-on card	-S <i>file</i>

The job options listed in Table 2-1 are described in the following subsections.

**2.1.2.1 Turning Off Space Compression** – When your system is emulating an IBM 3780 terminal, the 2780d program removes spaces from the files you are sending. When the output files arrive at the IBM system, the IBM software inserts these spaces and expands the data to its original form.

In some cases, the IBM system may not be able to expand spaces; check with the IBM system administrator. If the IBM system is not set up for space compression, specify the -C option on the command line. For example:

```
% 3780e -C fileA
```

This option is not valid if your system is emulating an IBM 2780 terminal.

**2.1.2.2 Requesting Mail Messages** – By default, you receive mail messages about the following error conditions:

- The 2780d program cannot copy the contents of rjetemp.out to an output file name.
- There is no sign-on card to send.
- The IBM system is unable to receive the sign-on card.

If you would like additional mail indicating that the 2780/3780 Terminal Emulator has sent and received your files successfully, include the `-m` option on the command line. For example:

```
% 3780e -m fileA
```

These confirmation messages include the time and file name.

**2.1.2.3 Requesting Top Priority** – To request that your job have top priority on the ULTRIX operating system, you must be the superuser and use the `-a` option. For example:

```
% 3780e -a fileA
```

The 2780d program processes any priority jobs specified by the superuser before processing nonpriority jobs, and in the order submitted.

Note that when you use the `-a` option, the 2780e or 3780e command renames the control file with a file name beginning with `af` instead of `cf`.

**2.1.2.4 Temporarily Suspending File Transmission** – Specifying the `-q` option allows the 2780e or 3780e command to place your files in the spool area without calling 2780d to transmit them. This option is useful if the IBM system is down and you want to prepare your files for transmission and then transmit them at a later time. For example:

```
% 3780e -q fileA
```

The use of this option should be regulated by the system administrator.

If another user sends files and thus calls the 2780d program any time after you enter this command line, your use of the `-q` option is overridden, and your files are processed along with the other user's files.

**2.1.2.5 Sending Files Transparently** – If you have any BSC protocol or other special characters in your files, send the files transparently.

If you are emulating an IBM 2780 terminal, use the `-t` option.

If you are emulating an IBM 3780 terminal for an IBM system that accepts 80-column card records in transparent mode, use the `-tb` option. If the IBM system does not accept 80-column card records in transparent mode, use the `-t` option. For example:

```
% 3780e -tb fileA
```

**2.1.2.6 Sending Multiple-Record Data Packets** – If you are emulating an IBM 2780 terminal and the IBM system you are connected to accepts multiple-record transmissions, use the `-b` option. For example:

```
% 2780e -b fileA
```

You can also use this option when sending files in transparent mode:

```
% 2780e -b -t fileA
```

**2.1.2.7 Specifying Default Names for Incoming Files** – When you use the `-#` option, the 2780d program labels the specified number of incoming files associated with the job with default file names. For example:

```
% 3780e fileA -#2
```

The default names have the following form:

*Ruserpidseq*

The letter *R* indicates that your file was processed on a remote system, *user* is your user name, *pid* is the process identification number, and *seq* is a sequential number that increments for each file received. For example:

```
Rlee40951
```

The word *lee* is the user name, the number 4095 is the process identification number, and 1 stands for the first file received in this job.

If the comment card information is correct, 2780d places these received files in your home directory.

If you specify a number of files smaller than the number actually returned, 2780d gives the extra files names of this form:

*Rjedaytime*

These extra files are left in the spool directory.

In addition, if the comment card information is missing from your outgoing files, 2780d places the returning files in `/usr/spool/rje/Rje daytime`.

**2.1.2.8 Specifying Unique Names for Incoming Files** – To specify unique names for incoming files, use the `-o` option. For example:

```
% 3780e fileA -o rje.lee
```

If the comment card information is correct, 2780d places these files in your home directory.

If you specify a number of files smaller than the number actually returned, 2780d gives the extra files names of this form:

*Rjedaytime*

These extra files are left in the spool directory.

In addition, if the comment card information is missing from your outgoing files, 2780d places the returning files in `/usr/spool/rje/Rje daytime`.

**2.1.2.9 Specifying a Unique Sign-On Card** – Instead of using the default sign-on card that is located in `signon` in the spool directory, you can create a file for the same type of information. You can create several sign-on cards, one for each remote line used. To specify a unique sign-on card on the command line, include `-S` and the pathname of the file that contains the sign-on information. For example:

```
% 3780e -S /temp/signonA fileA
```

### 2.1.3 Resolving Problems

If there are problems as the 2780e or 3780e command reads in your command line and copies and renames your files for transmission, the program generates errors. Messages about these errors appear on your terminal screen. These messages and the appropriate action to take are detailed in Section 2.3.1.

If your files are prepared successfully, the 2780d program automatically transmits them to the IBM system. If any errors are generated during file transmission they are listed in `/usr/adm/rjelog`. These messages and the action the system administrator must take are detailed in Section 2.3.2.

### 2.1.4 Locating Incoming Files

The 2780d program transmits files to, and receives files from, the IBM system. The following list summarizes where the 2780d program places files it receives on the ULTRIX operating system:

- If you do not specify any options, the 2780d program places your files in `/usr/spool/rje` with the file name `Rje daytime`.
- If you specify the `-#` option and your comment card is complete, the 2780d program places your files in your home directory with the file name `Ruserpidseq`.
- If you specify the `-o` option and your comment card is complete, the 2780d program places your files in your home directory with the unique file name.
- If your comment card is not complete, the 2780d program places your files in `/usr/spool/rje` with the file name `Rje daytime`.
- If the 2780d program cannot rename the file, the file remains in `/usr/spool/rje/rjetemp.out`. Once you receive all files from that job, you need to delete the remaining control file (`zf*`) located in the spool directory.

## 2.2 Maintaining the Terminal Emulator

As system administrator, you are responsible for maintaining the Terminal Emulator. Specifically, you are responsible for the following tasks:

- Creating the default sign-on card
- Disabling the emulator
- Reestablishing the connection to the IBM system
- Obtaining a record of file transfers
- Cleaning and monitoring a record of file transfer problems
- Cleaning the spool directory

### 2.2.1 Creating the Default Sign-On Card

You are responsible for creating the default sign-on card. This JCL statement specifies the remote line the 2780d program uses to communicate with the IBM system. For example:

```
/*SIGNON
```

```
RMT9
```

Enter this information in a file named `signon` and place this file in the `/usr/spool/rje` directory. This default sign-on information is used by all files sent to the IBM system, unless the user specifies otherwise on the 2780e or 3780e command line.

In addition to the default you can create several sign-on cards with unique file names, one for each remote line used. If you choose to create several sign-on cards, however, inform all users so they can specify the correct file name on the 2780e or 3780e command line.

## 2.2.2 Disabling the Terminal Emulator

You should disable the Terminal Emulator under the following circumstances:

- The IBM system is down.
- The communications line is down.
- You want to clean the spool area because it is too full to accept files.

To disable the Terminal Emulator, log in as superuser and do the following:

1. Use the `ps -aqx` command to get a listing of all processes running on the ULTRIX system. Make sure 2780d is not running.
2. Create an empty file in `/usr/spool/rje` with the file name of `lock`. For example:  

```
# touch /usr/spool/rje/lock
```
3. Give the `lock` file group execute privileges with the `chmod` command.

Only the superuser can prepare and send files when the Terminal Emulator is disabled.

To allow users to run 2780e or 3780e, remove the `lock` file from the spool area with the `rm` command.

An alternate method of disabling the Terminal Emulator is to request that all users specify the `-q` option on their command line. In this way, users prepare files during the day, and you send them when computer resources are not in demand. However, this method is not as secure as the first, because once a user runs 2780d and the connection is made, all prepared files are sent to the IBM system.

## 2.2.3 Reestablishing the Connection to the IBM System

You need to reestablish the connection with the IBM system when a file or set of files is prepared but not sent for the following reasons:

- The IBM system has failed during transmission.
- The spool directory is full and you have disabled the Terminal Emulator in order to clear excess files.
- The 2780d program has terminated.
- The user has not completed the call to the IBM system within the one-minute time limit.

Reestablish the connection by typing 2780d on the command line and by redialing the IBM system. Use the following procedure to redial the IBM system:

1. Make sure that the modem's transmit ready light is on. If it is not, enter a command line in the following form:

```
/etc/bscconfig interface protocol [ identification ]
```

For example:

```
# /etc/bscconfig dpv0 bsc 1
```

2. Place the call to the IBM system.
3. Listen for the tone that indicates that the connection is made.
4. Press the data button on the modem.

For information on resolving modem problems, see Section 2.1.2.

## 2.2.4 Obtaining a Record of File Transfers

To obtain a record of file transfers, change to the spool directory and create a file named `acctlog` by typing:

```
% cd /usr/spool/rje  
% touch acctlog
```

When `acctlog` is created each file transfer appends an entry with the following form to the `acctlog` file:

```
date time filename user records-in-rufile
```

For example:

```
04/13 16:56:45 dfA000erehwon lee 1
```

The user is not specified for received files when the comment card information is incomplete.

Because each entry is appended to the `acctlog` file, you may need to remove entries daily.

## 2.2.5 Cleaning and Monitoring a Record of File Transfer Problems

All error messages sent to the 2780d program are recorded in `/usr/adm/rjelog` automatically. You do not have to create this file. Each entry has the following form:

```
program: message: reason
```

For example:

```
2780d: error in sending: Message too long
```

The `rjelog` file supplies the information you need to track errors. Because each entry is appended to the `rjelog` file, you may need to remove entries daily.

## 2.2.6 Cleaning the Spool Directory

You should clean the spool directory as part of your regular maintenance routine.

To clean the spool directory, do the following:

1. Use the `ps -aqx` command to get a listing of all processes running on the ULTRIX system. Make sure 2780d is not running.
2. Create an empty file in `/usr/spool/rje` with the file name of `lock`. For example:  

```
# touch /usr/spool/rje/lock
```
3. Give the `lock` file group execute privileges with the `chmod` command.
4. Remove excess files from the directory with the `rm` command.
5. Remove `/usr/spool/rje/lock` with the `rm` command.

## 2.3 Interpreting Error Messages

The 2780e, 3780e, and 2780d programs can generate error messages while preparing and transmitting your files. The 2780e or 3780e messages are displayed on the terminal screen during file preparation. The 2780d messages are listed in `/usr/adm/rjelog` during file transmission. These messages are described in the following sections.

### 2.3.1 2780e/3780e Error Messages

Once you have started it, the Terminal Emulator generates error messages about a variety of conditions. The error messages and their meanings are as follows:

*Cannot access filename*

The 2780e or 3780 program cannot access the named file. Make sure you have access permission for the file.

*RJE is disabled*

The Terminal Emulator is disabled with the `lock` file and you cannot submit files during this time. Wait until the system administrator enables the 2780d program.

*Spool directory is full*

The `/usr/spool/rje` directory is full. Remove your excess files and advise the system administrator of the situation.

*Who are you?*

Your user name cannot be found. Verify that your name is in the password file. If it is not, see your system administrator.

*filename is an archive file*

You cannot send the file because it is an archive file. Check the contents of the file.

*filename is a directory*

You have tried to send a directory to the IBM system. Resubmit the job to send a file instead of a directory.



*filename* is an empty file

The file contains no data. Check the file name.

*filename* is an executable program

You cannot send this file because it is an ULTRIX executable program. Check the contents of the file.

cannot change directory to *pathname*

The 2780e or 3780e program cannot change to the `/usr/spool/rje` directory or your current directory. Check the directory's access permissions and resubmit the job.

cannot get current directory

The 2780e or 3780e program cannot access the directory from which you have issued the command. Check permissions or change to another directory, and resubmit the job.

cannot open *filename*

The 2780e or 3780e program cannot access the file you are sending. Check that the file exists and verify that no other programs are trying to access it at the same time.

cannot rename *filename*

The 2780e or 3780e program cannot rename the temporary file. Resubmit the job.

file unreasonable

The file you are sending does not exist or cannot be found. Verify that the file exists and is readable, and resubmit the job.

cannot stat *filename*

The 2780e or 3780e program cannot obtain the status of the specified file. Be sure the file exists and check to see that the permissions and contents of the file are correct.

cannot touch *filename*

The 2780e or 3780e program cannot create the control file. Clear the spool directory of any excess files and resubmit the job.

empty input file

The file you are sending is empty. Check the contents of the file you want to send.

error reading `.rjed`

The 2780e or 3780e program cannot read the `.rjed` file. To make the file readable, first be sure 2780d is not running. Then remove `/usr/spool/rje/.rjed`, restart 2780d, and redial the IBM system.

not allowed to prioritize your job

You have requested that your job be sent top priority but you are not superuser. Resubmit the job without using the `-a` option.

option *optionname* ignored

You have used an option that is not valid. No action is required; the 2780e or 3780e command accepts the command line but ignores that option.

temp file write error

The 2780e or 3780e program cannot write to the temporary file. Resubmit the job.

too many files - break up the job

You are sending too many files. Split the job and resubmit the files.

usage: 2780e [options] sendfiles [-o receivefiles]

usage: 3780e [options] sendfiles [-o receivefiles]

You have entered the command incorrectly. Resubmit the job, following the format displayed by the error message.

### 2.3.2 2780d File Transmission Error Messages

The following are error messages that can be generated during file transmission. These messages are listed in the file `/usr/adm/rjelog`. The system administrator is responsible for correcting these conditions.

No signon card available

No default sign-on card is in `/usr/spool/rje`. Place a default sign-on card in `/usr/spool/rje` with the file name of signon or have the user resubmit the job using the `-S` option to specify a unique sign-on card.

There has been a line error, will try to reconnect

There has been an error receiving files. The 2780d program will try to reconnect. No user intervention should be necessary.

*filename* cannot be opened

The 2780d program cannot open the file you sent. Check the file protections and resubmit the job.

cannot open `.rjed`

Another program may be accessing `.rjed`. If the 2780d program is not running, remove `.rjed` and start 2780d. If the 2780d program is running, wait until it stops. Note that by this time your files may already be sent.

cannot open `rjetemp.out`

The 2780d program cannot create the `rjetemp.out` file to hold incoming data. Check to see if there is enough space in the spool directory. If there is not, remove excess files and restart 2780d.

can't scan spool directory

The 2780d program cannot read the `/usr/spool/rje` directory. Do the following:

1. Check directory permissions.
2. Disable the Terminal Emulator by creating a `/usr/spool/rje/lock` file.

3. Remove excess files from the directory.
4. Remove `/usr/spool/rje/lock`.
5. Restart the 2780d program.
6. Redial the IBM system.

connect

The 2780d program is trying to connect to the IBM system but is failing. This error can occur when the call to the modem has not been made within the one-minute time limit. Reestablish the connection by calling the 2780d program and dialing the IBM system.

could not create *filename*; error trying to write to *filename*

The 2780d program could not rename `rjetemp.out` to a user's file name. The 2780d program will attempt to rename `rjetemp.out` to a default name but this can also fail. The owner is not informed unless the received file contains a comment card. Copy the file manually from `rjetemp.out` to your own directory.

error in sending

A file being sent to the IBM system is not being acknowledged. Restart 2780d and redial the IBM system.

error receiving

Data was not received completely by the 2780d program. The 2780d program attempts to reestablish the line and receive the file again. No intervention is necessary.

no space in directory to receive

The `/usr/spool/rje` directory is full. Do the following:

1. Disable the Terminal Emulator by creating a `/usr/spool/rje/lock` file.
2. Remove excess files from the directory.
3. Remove `/usr/spool/rje/lock`.
4. Restart 2780d.
5. Redial the IBM system.

not enough space in spool to do renames & links

The `/usr/spool/rje` directory is full. Do the following:

1. Disable the Terminal Emulator by creating a `/usr/spool/rje/lock` file.
2. Remove excess files from the directory.
3. Remove `/usr/spool/rje/lock`.
4. Restart 2780d.
5. Redial the IBM system.

rje line is down

The 2780d program has failed in its attempts to reconnect. The line cannot be

reestablished. Check modem and cable connections. Verify that the IBM system is running.

socket

The 2780d program cannot get an open socket to initiate the connection to the IBM system. Restart the 2780d program and redial the IBM system.



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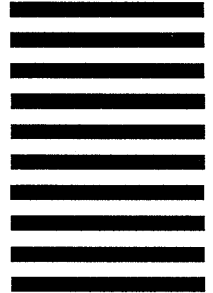
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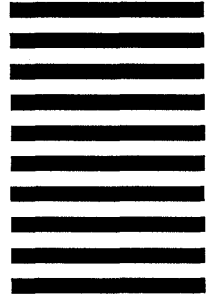
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