

**ULTRIX-32
Guide to
IBM Terminal Emulation**

Order No. AA-MF04A-TE

ULTRIX-32 Operating System, Version 3.0

Digital Equipment Corporation

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This manual was written and produced by the ULTRIX Documentation Group in Nashua, New Hampshire.

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About This Manual

The objective of this guide is to provide introductory and setup information for the 2780/3780 IBM Terminal Emulator. This guide also explains how to maintain and troubleshoot the 2780/3780 IBM 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 manager, but could be a network manager or the system manager who is also a user of a MicroVAX processor running the ULTRIX operating system. This guide assumes that the reader is familiar with the ULTRIX system commands, the system configuration, the naming conventions and an editor, such as vi or ed. It also assumes that the reader knows 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 2780/3780 Terminal Emulator
Provides an overview of the 2780/3780 Terminal Emulator. It discusses both the hardware and software needs and also how to use the emulator.
- Chapter 2 Using and Maintaining the 2780/3780 Terminal Emulator
Describes the tasks you perform to use and maintain the 2780/3780 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:

- special In text, each mention of a specific command, option, partition, pathname, directory, or file is presented in this type.

command(x)	In text, cross-references to the command documentation include the section number in the reference manual where the commands are documented. For example: See the cat(1) command. This indicates that you can find the material on the cat command in Section 1 of the reference pages.
literal	In syntax descriptions, this type indicates terms that are constant and must be typed just as they are presented.
<i>italics</i>	In syntax descriptions, this type indicates terms that are variable.
[]	In syntax descriptions, square brackets indicate terms that are optional.
...	In syntax descriptions, a horizontal ellipsis indicates that the preceding item can be repeated one or more times.
function	In function definitions, the function itself is shown in this type. The function arguments are shown in italics.
UPPERCASE	The ULTRIX system differentiates between lowercase and uppercase characters. Enter uppercase characters only where specifically indicated by an example or a syntax line.
example	In examples, computer output text is printed in this type.
example	In examples, user input is printed in this bold type.
%	This is the default user prompt in multiuser mode.
#	This is the default superuser prompt.
>>>	This is the console subsystem prompt.
.	In examples, a vertical ellipsis indicates that not all of the lines of the example are shown.
.	
.	
<KEYNAME>	In examples, a word or abbreviation in angle brackets indicates that you must press the named key on the terminal keyboard.
<CTRL/x>	In examples, symbols like this indicate that you must hold down the CTRL key while you type the key that follows the slash. Use of this combination of keys may appear on your terminal screen as the letter preceded by the circumflex character. In some instances, it may not appear

Overview of the 2780/3780 Terminal Emulator 1

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

- The 2780/3780 Terminal Emulator
- 2780/3780 Terminal Emulator features
- 2780/3780 Terminal Emulator hardware requirements
- 2780/3780 Terminal Emulator software requirements
- Setting up the 2780/3780 Terminal Emulator
- Overview of using the 2780/3780 Terminal Emulator

For step-by-step instructions on how to use and maintain the 2780/3780 Terminal Emulator, read Chapter 2.

1.1 The 2780/3780 Terminal Emulator

The 2780/3780 Terminal Emulator is a software package that allows your ULTRIX operating system to emulate a 2780 or 3780 IBM terminal. The 2780/3780 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 2780/3780 Terminal Emulator include:

- The 2780e and 3780e programs. These programs, which are called on the command line, prepare your files.

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- The 2780d program. This program, which is called automatically by the 2780e or 3780e program, sends the prepared files.

1.2 2780/3780 Terminal Emulator Features

The 2780/3780 Terminal Emulator has the following features:

- Multiuser Support – Several ULTRIX users can use the 2780/3780 Terminal Emulator simultaneously. The 2780/3780 Terminal Emulator sends files one at a time in the order requested.
- Mail Notification – You can request that the 2780/3780 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 2780/3780 Terminal Emulator automatically translates the ASCII characters in your files into EBCDIC characters and EBCDIC characters into ASCII characters.
- 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 2780/3780 Terminal Emulator Hardware Requirements

The following hardware is required on the IBM side of the communications line to implement the 2780/3780 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 side)

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

The following hardware is required for the VAX configuration:

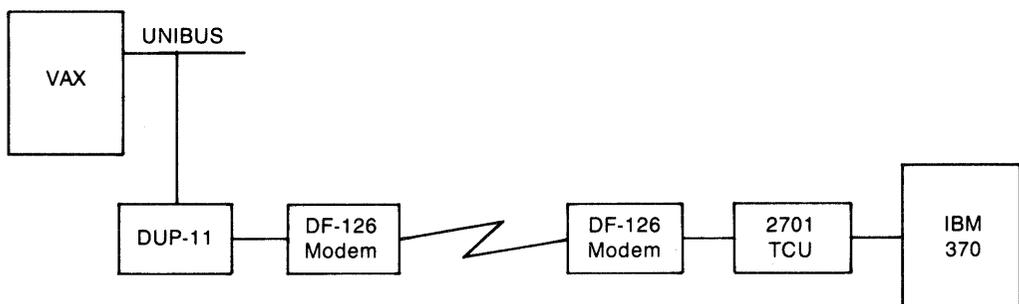
- A VAX processor
- A DUP-11 data communications device
- A DF126 synchronous modem:

- 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

The following diagram illustrates a VAX hardware configuration.



ZK-0030U-HC

Figure 1-1: Hardware Configuration

Private telephone lines are not supported in the VAX or MicroVAX configuration. In addition, the 2780/3780 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 2780/3780 Terminal Emulator 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 2780/3780 Terminal Emulator, the VAX or MicroVAX processor must be running the ULTRIX operating system. The following files and directories are of particular importance:

- `/usr/spool/rje` - This is the spool directory. 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 is a log of error messages.

1.5 Setting Up the 2780/3780 Terminal Emulator

The system manager sets up and maintains the 2780/3780 Terminal Emulator. As system manager, 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 2780/3780 Terminal Emulator on your running ULTRIX system, you must modify two files:

- `/usr/sys/conf/SYSTEM-NAME` – The system configuration file which contains global, system image, device, and pseudodevice definitions.
- `/etc/rc.local` – The system startup file which, among other things, contains network information.

To make these modifications, you need to know:

- The VAX hardware configuration, specifically the system and communications device
- 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 `dup0` and the DPV-11 device as `dpv0`, where 0 is the unit number of the device.

After you make these edits, you must rebuild the kernel. See the Guide to System 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 form:

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

The interface argument is the communications device that BSC uses, which is either `dup0` or `dpv0`. 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/bsconfig dpv0 bsc 1
# /etc/bsconfig dup0 bsc 1
```

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

1.6 Overview of Using the 2780/3780 Terminal Emulator

The 2780/3780 Terminal Emulator sends files to the IBM system for processing. When the files are processed, the 2780/3780 Terminal Emulator receives the output files on the ULTRIX operating system. To use the 2780/3780 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 2780/3780 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 have the option of specifying one or more switches 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:

- How the 2780/3780 Terminal Emulator prepares your files
- How the 2780/3780 Terminal Emulator transmits your files
- How the 2780/3780 Terminal Emulator receives files

1.6.1 How the 2780/3780 Terminal Emulator Prepares Your Files

Both the 2780e and 3780e commands store some of the JCL statements, as well as 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 file. 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 of Chapter 2.

1.6.2 How the 2780/3780 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 manager 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 2780/3780 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 file name with the form *Rjedaytime* 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.

Using and Maintaining the 2780/3780 Terminal Emulator 2

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

- Using the 2780/3780 Terminal Emulator
- Maintaining the 2780/3780 Terminal Emulator
- Interpreting error messages

2.1 Using The 2780/3780 Terminal Emulator

Using the 2780/3780 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 manager, which resides in the spool directory on the ULTRIX operating system.
- In a file you create, such as `Remote1`, which resides in any directory.

When you send any file, the `2780e` or `3780e` command automatically 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. The following is an example of a set of JCL statements used by an IBM system to execute a file and by the 2780/3780 Terminal Emulator to receive the file:

```
//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 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 that it is important to include this JCL statement in each file. If the comment card is not included, the 2780d program can misplace your incoming files.

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 form:

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

For example:

```
% /etc/bscconfig dpv0 bsc 1
```

See Section 1.5.2 of Chapter 1 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 service representative.

You can choose one or more of the 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 a 3780 IBM 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, be sure to specify the -C option on the command line. For example:

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

Note that this option is not valid if your system is emulating a 2780 IBM 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, type `-m` on the command line. For example:

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

These 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 a superuser. When logged in as a superuser, use the `-a` option. For example:

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

The 2780d program processes any priority jobs you specify, as well as priority jobs specified by others, before 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 manager.

Note that if another user sends files and thus calls the 2780d program during or any time after you enter this command line, the option is ineffective and 2780d will send your 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 a 2780 IBM Terminal, use the `-t` option.

If you are emulating a 3780 IBM Terminal, use:

`-t` when the IBM system does not accept 80-column card records in transparent mode

`-tb` when the IBM system accepts 80-column card records in transparent mode

For example:

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

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

For example:

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

Note that this option can also be used 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 form:

```
Ruserpidseq
```

The letter `R` indicates that your file was processed on a remote system, the `user` variable 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.

Be sure, however, that you anticipate the number of files correctly, because if you specify two files and three files return, 2780d gives the third a file name with the form `Rjedaytime` and leaves the file 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/Rjedaytime` and even if you request mail, 2780d will have no way of locating and informing you of each file's arrival.

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.

Be sure, however, that you anticipate the number of files correctly. If you specify two files and three files return, 2780d gives the third file a file name with the form *Rjedaytime* and places it 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/Rjedaytime`. Even if you request mail, 2780d will have no way of locating and informing you of each file's arrival.

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 path name 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 manager 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 *Rjedaytime*.

- 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 *Rjedaytime*.
- If the 2780d program cannot rename the file, the file remains in `/usr/spool/rje/rjtemp.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 2780/3780 Terminal Emulator

As system manager, you are responsible for maintaining the 2780/3780 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 periodically

2.2.1 Creating the Default Sign-On Card

As system manager, it is your responsibility to create 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, be sure to inform all users so they can specify the correct file name on the 2780e or 3780e command line.

2.2.2 Disabling the 2780/3780 Terminal Emulator

You should disable the 2780/3780 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 2780/3780 Terminal Emulator 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 lock
```

3. Give the `lock` file group execute privileges with the `chmod` command.

Only the superuser can prepare and send files when the 2780/3780 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 2780/3780 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 gone down during transmission.
- The spool directory is full and you have disabled the 2780/3780 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 which has the form:

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

For example,

```
% /etc/bsccnfig 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 recordsinfile
```

For example:

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

Note that 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 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 Periodically

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

To clean the spool directory do the following:

1. Make sure that the 2780d program is not running by getting a list of running processes with the `ps-aqx` command.
2. Disable the 2780/3780 Terminal Emulator by creating a file named `lock` and giving it group execute privileges with the `chmod` command.
3. Remove excess files from the directory with the `rm` command.
4. Remove `/usr/spool/rje/lock` with the `rm` command.

2.3 Interpreting Error Messages

The 2780e, 3780e, and 2780d programs 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 subsections.

2.3.1 2780e/3780e Error Messages

Once you have started it, the 2780/3780 Terminal Emulator generates error messages about a variety of conditions. The error messages and their meaning are as follows:

Cannot access *filename*

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

RJE is disabled

The 2780/3780 Terminal Emulator is disabled with the `lock` file and you cannot submit files during this time. Wait until the system manager enables the 2780d program.

Spool directory is full

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

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. 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 which is not valid. No action is required. 2780e or 3780e accepts the command line without 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: 3780e [options] sendfiles [-o receivefiles]

usage: 2780e [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 is a list of error messages that can be generated during file transmission. These messages are listed in the file /usr/adm/rjelog. The system manager is responsible for correcting these conditions.

.LP 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

This information message appears when 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: 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 2780/3780 Terminal Emulator with the /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

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 user intervention is necessary.

no space in directory to receive

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

1. Disable the 2780/3780 Terminal Emulator with the /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 2780/3780 Terminal Emulator with the /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 up.

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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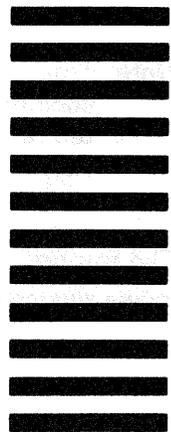
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