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Preface

This manual is a getting-started guide for first-time terminal server users and nontechnical users. It contains introductory information about the terminal server and the commands available through the Xyplex UNIX® Operating System-Like Interface (ULI). This manual is for people who want to use the terminal server to gain access to resources on the network, rather than the individual who installs and manages the terminal server.

Although you do not need to be an expert on networks, you need to be familiar with the operating systems of any hosts where you want to make connections. Some knowledge of the Telnet and Rlogin protocols is also helpful.

Organization

This manual contains the following chapters:

Chapter 1	**Describes the purpose of the TCP/IP-LAT terminal server in a local area network (LAN), and how to get started using terminal server commands. It includes a tutorial on using the ULI commands to establish and manage jobs with resources on the network. This chapter is useful to all users, and especially those who are new to using the Xyplex terminal server.**
Chapter 2	**Describes the ULI commands available to users at all ports where the ULI is enabled. Most users will only use the ULI commands in this chapter.**
Chapter 3	**Describes the ULI commands available to users at ports where Superuser mode is enabled.**
Appendix A	**Describes how to use hot keys during a Tn3270 session and includes keymaps for several types of terminals. This appendix is useful for those who using the Tn3270 protocol to establish jobs with IBM hosts.**

Conventions

Throughout this manual, the word "Enter" means type something and then press the New Line, Carriage Return key, or Enter key; for example, "Enter the `connect` command" means type the word `connect` and then press the New Line, Carriage Return, or Enter key.

This manual also uses the following conventions:

`command  required[optional][`***optional***`]`

Where	Means
`command`	**You must enter the command, or its accepted abbreviation, as shown.**
`required`	**You must enter an argument, or its accepted abbreviation, as shown.**
`[optional]` `[`***optional***`]`	**You have the option of entering this argument or variable. Do not type the [*optional*] brackets; they only set off what is optional.**

Additionally, this manual uses certain symbols in special ways:

Symbol	Means
↵	**Press the New Line, Carriage Return <CR>, or Enter key on your terminal's keyboard.**
`Xyplex%`	**This is the default ULI prompt.**
`Xyplex#`	**This is the default ULI prompt for a port with Superuser mode enabled.**
`Xyplex>`	**This is the default Xyplex command interface prompt at Nonprivileged ports.**
$	**This is the Digital Equipment Corporation (DEC) VAX/VMS™ prompt.**
%	**This is the UNIX® C shell prompt.**

In examples, this manual uses

`This typeface to show your entry and.`

`responses and screens from the Xyplex terminal server.`

This typeface to show responses from remote hosts and devices on the network. This typeface also shows commands or arguments that are variable, such as "hostname."

Related Documentation

The following manuals provide information that you may find useful with this manual:

The *Xyplex TCP/IP-LAT Software Management Guide*

This manual describes the configuration, setup, and management of a terminal server software communications package, supplied by Xyplex, Inc. This manual is written for network managers, and terminal server, UNIX®, and VAX system managers.

The *Xyplex TCP/IP-LAT Commands Reference Guide*

This manual describes individual terminal server commands in detail. It is written for all terminal server users, although many commands can only be used at Privileged ports.

If you have questions about this product...

At your convenience, please forward these to Xyplex at the following addresses:

Internet Mail: **support@xyplex.com**

United States Mail: **Xyplex, Inc.**
295 Foster Street
Littleton, MA 01460

Attn: Manager, Customer Support

If you have comments about this guide...

To help us in our effort to improve the quality, usefulness, and technical accuracy of the product documentation you receive, Xyplex is interested in any comments or suggestions that you have about this guide, or any technical corrections that you believe should be made. At your convenience, please forward these to Xyplex at the following addresses:

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295 Foster Street
Littleton, MA 01460

Attn: Manager, Technical Documentation

Software Upgrade Information

For information on software upgrades contact your local representative, or call Xyplex directly at

In the United States:	**(800) 338-5316**
In Europe:	**+44 81 759-1633**
In Asia:	**+65 336-0431**

End of Preface

Chapter 1

Getting Started

The Xyplex TCP/IP-LAT Terminal Server is combination of hardware and software which allows you to establish jobs at UNIX hosts from serial devices, such as terminals, over the Local Area Network (LAN). The terminal you use can be connected directly to the terminal server, or to a network host, or through a modem. To make the connections to LAN devices, you enter commands through the terminal server's UNIX® Operating System-Like Interface (ULI). Figure 1-1 shows a user at a terminal connected directly to the terminal server.

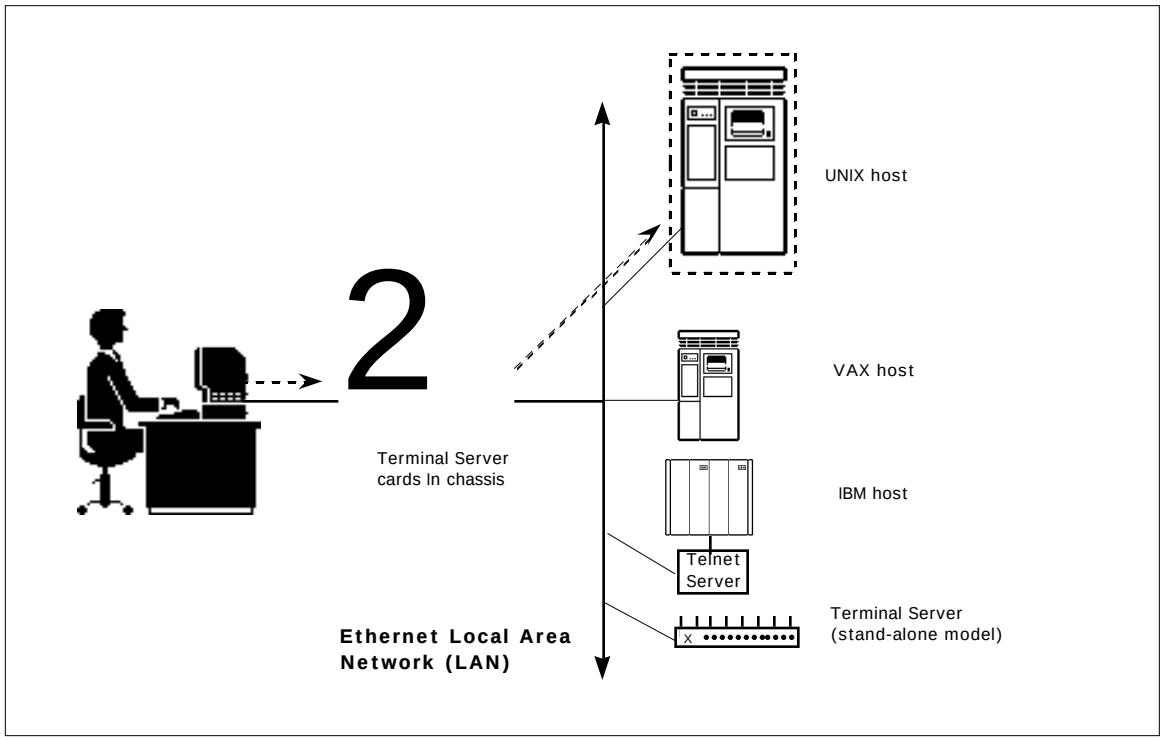


Figure 1-1. Connecting To a Host Through the Terminal Server

The user in Figure 1-1 has made a connection to the UNIX host through the terminal server. He can now read databases, send mail, and run applications on this host. He can also connect to the VAX host, the IBM® host, or a serial device such as a printer on the other terminal server. occasional

This chapter describes how to use the terminal server to establish jobs on the network. The topics include the following:

- **About Terminal Server Ports**
- **Logging on To the Port**
- **Establishing a Job**
- **Establishing Multiple Jobs**
- **Terminating a Job and Logging Out the Port**

About Terminal Server Ports

When you log on to the terminal server you make a connection with a terminal server *port.* A port is the interface between a terminal and the other devices on the network, including hosts, printers, and other terminal servers. Each port has a set of characteristics and privileges that determine how you can use it. The network manager defines these characteristics and privileges with terminal server commands.

From the terminal server port, you can enter commands such as those described in Chapter 2 of this manual. With these commands, you can do the following:

- **Establish jobs with hosts on the network.**
- **Display information about network destinations, printer queues, and certain network activity.**
- **Modify some characteristics of the terminal server port.**

About the Command Interface

The TCP/IP-LAT Terminal Server supports two command interfaces: the Xyplex ULI, and the Xyplex DEC-Like Interface (DLI). Each interface supports a set of commands, and many of these commands provide similar functions for each interface. A terminal server port can support one interface or both interfaces simultaneously.

This manual describes commands available through the ULI. See the manual *Using the TCP/IP-LAT Terminal Server,* or the *TCP/IP-LAT Commands Reference Guide* for more information about commands available through the DLI.

Logging On To the Port

How you log on to a terminal server port depends on whether your terminal is directly connected to the terminal server, connected through a modem, or connected to another device on the network such as a host or another Xyplex product. Figure 1-2 shows these three types of connections.

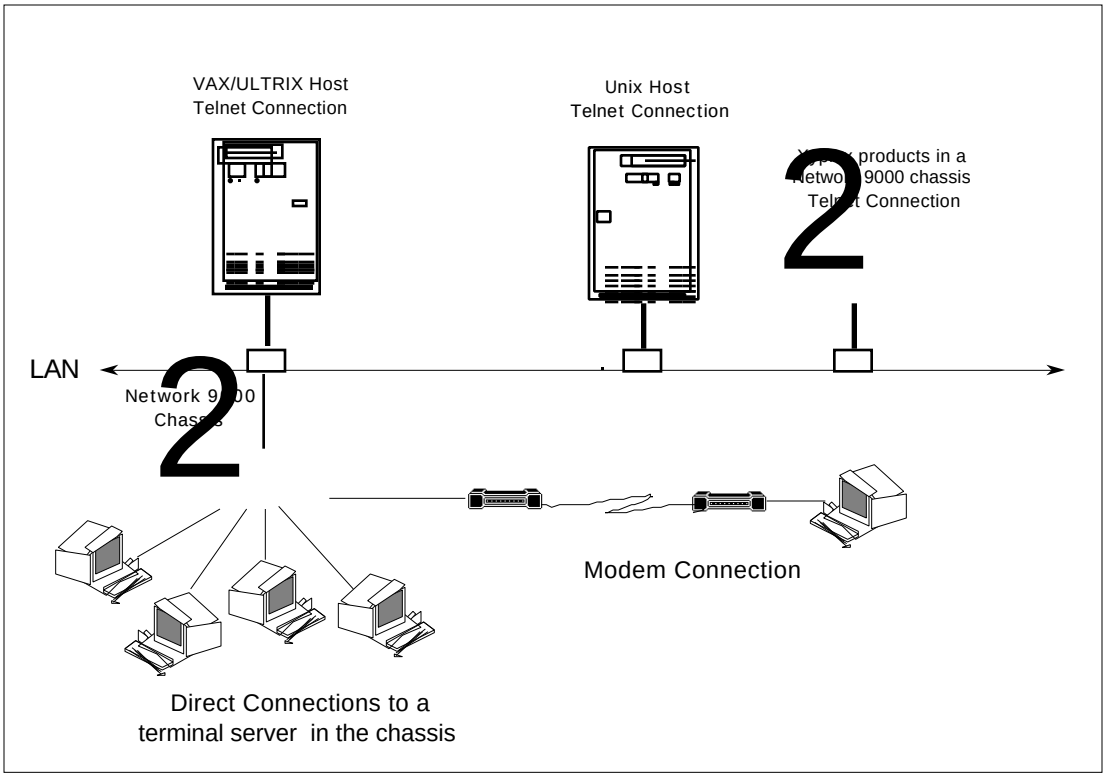


Figure 1-2. Direct and Remote Connections To the Terminal Server

Direct connection: If your terminal is directly connected to a terminal server port, press the <New Line> or <Return> key until one of the Xyplex login prompts in Table 1-1 appears on the screen.

Connection from a Modem: If you are dialing in through a modem, use the same procedure as the direct connection. After dialing in, press the <New Line> or <Return> key until one of the Xyplex login prompts in Table 1-1 appears on the screen.

Connection from the Network: If your terminal is connected to another Xyplex product on the network, use the Xyplex TELNET CONSOLE or TELNET CONNECT commands to log on to the command interface of the terminal server. The *TCP/IP-LAT Commands Reference Guide* describes these commands in detail.

If your terminal is connected to a UNIX host, you can connect to the terminal server through Telnet with the host-specific Telnet command. Consult the host documentation for information about these commands.

Table 1-1. Xyplex Login Prompts

#	**Enter your login password and press the Return key. The default password on most terminal servers is *access*, but the password you use may be different. When you enter the correct password, the** Enter username> **prompt appears.**
Enter username>	**Enter a username and press the Return key. You can enter any username between 1 and 16 characters, or enter <CTRL><Z> to automatically assign the username PORT_*x* at this port, where *x* is the port number. When you enter the username correctly, the** Xyplex% **prompt appears.**
Xyplex%	**This is the default ULI command prompt, and it means that you are logged in to a port where the ULI is enabled. When you see this prompt, you can enter ULI commands.**

***Note*: These are the default prompts. The prompts on your system may be different.**

If the Xyplex> **prompt appears on the screen after you enter a username, it indicates that the DLI is enabled at the port. You can open the ULI with the** uli **command from the DLI if the port is configured to support both interfaces. When you do, the ULI prompt appears on the screen:**

```
Xyplex> uli
Xyplex%
```

If the port does not support the ULI, one of the following error message appears:

```
Xyplex -1753- ULI is not available on this port
```

This message indicates that the ULI is not enabled on the port, although it might be enabled on the terminal server.

```
Xyplex -1759- ULI is not enabled
```

This message indicates that the ULI is not enabled on the terminal server.

See the network manager if you cannot open the ULI from your port.

Managing Jobs

The connection between a terminal server port and a device on the network is called a *job* or *session*. Job is the typical term that many UNIX users call a connection to a device on the network. Session is the term that the terminal server command interface displays when it updates the terminal screen with information about network connections. The two terms are synonymous.

You can establish a job with a LAT service or a Telnet destination. You can establish several jobs at different network locations and move among them while you work. The next sections explain how to establish and manage jobs.

Establishing a Job

To establish a job with a host on the network, you will usually use one of the following commands: `rlogin`, `telnet`, **or** `connect`. **Usually, you enter the command with the name or address of a network destination.**

You can view a list of the different network destinations with the `hosts` **command. When you enter the** `hosts` **command, a display similar to the following appears on the screen:**

```
Xyplex% hosts
```

```
      Internet                        Domain      11 July 1993 14:25:43
Entry Address           TTL   SRC     Name

1     140.179.50.201    100   Pri     UNIXHOST.COM
2     140.179.119.3      24   Sec     SUN.COM
3     140.179.80.113           Loc     MAX5000.COM
```

The second column in the display shows the Internet addresses that you can use to establish a job. The last column shows the domain names for those Internet addresses. See Chapter 2 for a complete description of all fields in the `hosts` **display.**

Connecting to a host with the `rlogin` **or** `telnet` **commands: Enter the** `rlogin` **or** `telnet` **command and either the domain name or Internet address of the host. Some Rlogin implementations allow you to enter a host username on the command line. If you do not include a username, the terminal server sends the port username to the host. In either case, the host does not prompt you for a username; only a password. You do not include a username with the** `telnet` **command.**

This example uses the rlogin command with the username Chris to connect to the host Boston.COM:

```
Xyplex% rlogin boston.com -l chris

Xyplex -010- Session 1 to BOSTON.COM established

      Welcome to Boston.Com

      Password:
```

This example uses the `telnet` **command to connect to the host Development4**

```
Xyplex% telnet development4

Xyplex -010- Session 2 to DEVELOPMENT4 established

      You have reached the Engineering host Development4

      Username:
```

Connecting to a host with the `connect` command: You can use the `connect` command to establish a job with a LAT service or a Telnet destination. The network manager can create a predefined LAT or Telnet service for a port. When this is the case, you need only enter the `connect` command, without a destination name, and the terminal server will attempt to establish a job with predefined service. You may also be able to specify a destination name.

Enter a service name, node name, or terminal server port name to establish a job with a LAT service. Enter a domain name, an Internet address, or an Internet address and a telnet port number to establish a job with a Telnet service. This example uses the `connect` command with a LAT service name:

```
Xyplex% connect financevax
```

```
Xyplex -010- Session 3 to FINANCEVAX established

      Welcome to the Finance Department VAX

      Username:
```

Establishing Multiple Jobs

While working on a host after you have established a job there, you can press the Break key or the local-switch character and return to the ULI prompt. (See the `stty` command in Chapter 2 for more information about the local-switch character.) From the ULI prompt, you can establish a job at another host. When you have two or more jobs established, you can use the `fg` command to bring a previously suspended job into the foreground.

This procedure allows you to establish two or more jobs and switch among them. By default, terminal server ports support up to four simultaneous jobs, and the network manager can enable a port to support up to sixteen jobs.

Suspending a Job

When you suspend a job, you reopen the ULI without terminating the connection to the remote resource. Later, you can resume the job and continue with your work. To suspend a job, press the Break key or the local-switch character during the job. (A local-switch character is a control character sequence that you or the network manager can specify with the ULI `stty` command. Chapter 2 explains how to do this.) The `Xyplex%` prompt appears, and you can enter any ULI command, including the `connect`, `telnet`, and `rlogin` commands.

In this example, a user suspends a job on a VAX/VMS host:

```
$  <Break>

Xyplex%
```

The user can now establish a new job or resume a current job.

Resuming a Job

Each time you establish a job, the terminal server software assigns it a *job number* (session number). The job number appears in a display line right above the logon banner of the remote host. In the previous example, the job number for the connection to FINANCE.SUN.COM was 1:

```
Xyplex -010- Session 1 to FINANCE.SUN.COM established
```

You can use a job number with the `fg` **command to open a suspended job:**

```
Xyplex% fg 1 ↵

Xyplex -012- FINANCE.SUN.COM session 1 resumed
```

Viewing the Jobs at Your Port

The `jobs` **command displays all of active jobs, their job numbers, the command used to establish the job and the host where the job is active. The display is similar to this one, with three active jobs:**

```
Xyplex% jobs ↵

 1    telnet finance.sun.com
+2    rlogin accounts.host
 3    connect developmentvax
```

The second column lists the job numbers. A plus sign + in front of a job number indicates the current job.

Terminating a Job and Logging Out the Port

If you are currently logged on to a host or service, enter the normal log-off command of the host or service to terminate the job (session). In this example, the user Johnson logs off of a UNIX host:

```
% logout ↵

JOHNSON     logged out at 25-AUG-1993 16:00:21.12

Xyplex -011- Session 1 disconnected from FINANCE.SUN.COM
Xyplex -101- 2 other session(s) active

Xyplex%
```

When the host or service accepts your logoff request, the terminal server terminates the job. It also displays a message that indicates if you still have active jobs.

If the ULI is open on the port, use the `kill` **command to terminate a particular job, or all jobs. The** `kill` **command in the following example terminates job 1:**

```
Xyplex% kill %1 ↵

Xyplex -011- Session 1 disconnected from FINANCE.SUN.COM

Xyplex -101- 2 other session(s) active

Xyplex%
```

The `jobs` **command displays a list of jobs with their job numbers.**

***Note*: If you use the** `exit` **command, and the port is configured to support the ULI only, the terminal server logs out the port and terminates all active jobs.**

The logout command terminates any active jobs and logs out of the port. When you do this, the terminal server disconnects any jobs that are still active.

```
Xyplex% logout ↵

Xyplex -020- Logged out port 12 on server X3E8C at 22 Sep 1993 16:12:00
```

The log out message includes your port number and the name of the terminal server, as well as the date and time you logged off.

Locking the Port

The ULI `lock` **command prevents access to a port until you unlock it. This command is useful if you will be away from your port for a period of time, but do not want to log off the port or terminate jobs. It prevents other users from gaining access to network resources from your port, or opening your jobs.**

When you enter the `lock` **command, the ULI prompts you to enter a password. You use this password later to unlock the port. Chapter 2 describes the** `lock` **command in detail.**

Changing Port Characteristics

The ULI `stty` **command allows you to change some port characteristics. These include control characters, such as the local-switch character and the end-of-file (eof) character, and the port baud rate. To check the current settings of these characteristics, enter the** `stty` **command without arguments.**

```
Xyplex% stty ↵

speed    9600 baud; parity none
bchar    8; stopb 2;
broadcast
erase       kill  eol   rprnt    lnext    cncl     eof   local
^H          ^U    ^E    ^R       ^N       ^Z       None  None
```

Chapter 2 explains the `stty` **command in detail, including each of these port characteristics.**

If Problems Occur

Do not be concerned if you make a mistake, such as a typing error, when you enter a command. The command interface displays an error message and often some information that helps you correct the command. In any case, you can reenter the command correctly, or recall and edit the command line with the editing characters described in Chapter 2.

If the `rlogin`, `connect`, **or** `telnet` **commands return a "host unknown" message, check that you entered the service name, domain name, or Internet address correctly and that the host is up and running. You can enter the** `hosts` **command to view the list of hosts available on the network.**

If you are unsure of the syntax for a command, check Chapter 3 of this manual or use the `help` **command. Entering** `help` **without arguments displays a list of available ULI commands. Entering** `help` **with a command name displays the syntax for the command and a brief description of its purpose.**

End of Chapter

Chapter 2

Using the ULI Commands

This chapter describes the ULI commands and how to enter them. Table 2-1 lists these commands.

Table 2-1. ULI Commands

Command	Description
`alias [`***name*** `[`***word-list***`]]`	**Create and display command aliases.**
`arp -a |` **ip-addr**	**Display the Internet-to-Ethernet address translation table.**
`connect [`***service***`[-n`***node-name***`] [d-`***dest-name***`]]`	**Establish a job with a LAT service.**
`connect [`***rhost*** `[-p`***telnet-port-number***`]]`	**Establish a job with a Telnet destination.**
`dli [`***cmd***`]`	**Open the Xyplex DEC-like command interface from the ULI, and execute a Xyplex command.**
`exit`	**Terminate the ULI or disable Superuser mode.**
`fg [%] | [%]`***job*** `|` ***host-name***	**Reopen a job.**
`help [cmd[cmd ...]]` `?`	**Display information about commands and keywords.**
`history[`***n***`][-r[`***n***`]][-h[`***n***`]]`	**Display a list of ULI events at your port.**
`hosts`	**Display a list of available domain names.**
`ifconfig -a`	**Display network parameters.**
`jobs`	**Display a list of currently active jobs.**
`kill [%] | [%]`***job*** `| -a`	**Terminate one or more jobs.**
`lock`	**Temporarily suspend access to a port.**
`logout`	**Terminate all jobs and log out the port.**
`lpq -P`***printer*** `[`***job#...***`]`	**Display the contents of a printer queue.**
`netstat [-n] | -a[n] | -i[n] | -I[n] [`***interface***`] | -r[n] | -s[n]`	**Display network statistics collected by the communications server.**
`ppp +`	**Enable the Point-to-Point Protocol (PPP).**
`queues [-a] | -h` ***host-name*** `|` `-s` ***service-name*** `|` `-p` ***port-number*** `|` `-e` ***entry***	**Display the service connection queue.**
`rlogin` ***rhost*** `[-l`***username***`]`	**Use the Rlogin protocol to establish a job with a remote host.**

(*continues...*)

Table 2-1. ULI Commands (*continued*)

Command	Description
services -c[*service-name*] | -s[*service-name*] | -S[*service-name*]	**Display information about LAT services.**
set [history=*n*] | [ignoreeof=*cnt*] | [prompt="*string*"]	**Change and display the values of the ULI variables.**
slip +[c]	**Enable the SLIP or CSLIP protocol.**
source /*pathname*/*script-name*	**Execute a script file.**
stty [-a]|*option*	**Set and display port parameters that control terminal characteristics.**
su [*password*]	**Gain access to Superuser mode. (Authorized users only)**
telnet *rhost* [*telnet-port-number*]	**Use the Telnet protocol to establish a job at a Telnet destination.**
tn3270 *rhost* [*telnet-port-number*]	**Use the Telnet protocol to provide 3270 access to an IBM host.**
unalias *name*	**Delete the alias you specify.**
unset history | ignoreeof | prompt	**Reset the values of ULI variables to their default values.**
who [am i] whoami	**Display the name and port numbers of all users on the terminal server, or the current user.**
xremote [*rhost*]	**Establish an Xremote session.**

Entering Commands

Enter commands at the ULI prompt. The ULI prompt at nonprivileged ports is this:

```
Xyplex%
```

This chapter includes commands available to all users. Chapter 3 describes commands that are available to users at ports with Superuser mode enabled.

Most ULI commands support two or more arguments or variables. Separate the arguments or variables with a space. The maximum length of a command line is 132 characters.

The ULI is case-sensitive. The interface interprets `Connect` **and** `connect` **as different commands because one has an upper-case letter and one is entirely in lower-case letters. Be sure to enter the exact letters when you specify a command, argument, or variable name. Otherwise, the interface might not recognize it.**

Abbreviating Commands

You can abbreviate ULI commands to the shortest unambiguous string of characters that the ULI can interpret. For example, you can abbreviate the `lock` **command to** `loc`**. You cannot abbreviate it to** `lo`**, however, because the** `logout` **command also begins with** `lo`**.**

Editing the Command Line

You can change, correct, or edit the command line before you press the Return key, or recall previous command lines, with special keys and control characters. To use control characters, press the Control key and the second character simultaneously. Table 2-1 lists these editing keys and the control characters that come predefined with the terminal server software.

Users at ports with access to the DLI can change the defaults for the editing characters with the SET PORT command from the Xyplex command interface, so the characters on your port may not have the same functions as the ones shown in Table 2-2. The DLI SHOW/LIST PORTS ALTERNATE CHARACTERISTICS command displays the control character sequences for the editing functions at your port.

Table 2-2. Editing Characters

Key Sequence	Function
<CTRL> <A>	Alternates between insert character mode and overstrike character. Overstrike mode is the default. This function does not apply to hardcopy terminals.
<CTRL> <B> or up arrow key ↑	Recalls the previous command.
<CTRL> <D> or left-arrow key ←	Moves the cursor one position to the left. This function does not apply to hardcopy terminals.
<CTRL> <E>	Moves the cursor to the end of the current command line. This function does not apply to hardcopy terminals.
<CTRL> <F> or right-arrow key →	Moves the cursor one position to the right. This function does not apply to hardcopy terminals.
<CTRL> <H>	Moves the cursor to the beginning of the command line. This function does not apply to hardcopy terminals.
<CTRL> <N> or down-arrow key ↓	Recalls the next command in the command history.
<CTRL> <R>	Redisplays the current command line. This command is useful after you have deleted characters on a hardcopy terminal.
<CTRL> <U>	Deletes all characters from the cursor position to the beginning of the command line.
<CTRL> <V>	Quotes the next character, so that the terminal server interprets it as a variable. (This function is useful if you want to redefine control characters.)
<CTRL> <X>	Deletes the current command line.
<CTRL> <Z>	Cancels an interactive operation, such as changing a password, or deletes the current command line.
<DELETE> or <backspace>	Deletes the character to the left of the cursor. On hardcopy terminals, the terminal server adds a backslash (\) to previously printed characters to indicate that you have deleted them.

The following example shows how to use the command line recall and editing features. Suppose that you enter the following command, which contains a typographical error:

```
Xyplex> cnnect accountsvax
```

The terminal server would not accept the command because you spelled `connect` **incorrectly. Instead of retyping the whole command line, however, you could use the up-arrow key or <CTRL><B> to recall the incorrect command and then edit it:**

```
Xyplex> ↑

Xyplex> cnnect accountsvax
```

The cursor appears at the end of the command line. Next, type <CTRL><H> to move the cursor to the beginning of the command line. Press the right-arrow key (or type <CTRL><F>) so that the cursor is under the letter `n` **in** `cnnect`**. Type <CTRL><A> to enter insert mode, and then add the letter** `o` **to spell** `connect`**. Press the Return key to enter the correct command.**

The `alias` **command creates an alias or displays the aliases you specify. An alias is a name that you give to a command string. When you enter the alias name, the ULI executes the command.**

The ULI supports an alias area for each port that contains 512 characters. Each alias you create reduces the number of available characters in the area by the number of characters in the alias name and the command string. If you have used up all available characters in the area, and then attempt to create another alias, the interface displays an error message.

Each alias can include only one command, unless the command is `dli`**. If you use** `dli`**, you can follow it with a command from the Xyplex command interface. You can also use the** `source` **command in an alias to execute a script file. A script file can include two or more commands.**

Synopsis:

`alias` **[*name* [*word-list*]]**

Where	**Means**
[*name*]	**A character string that specifies the alias that you want to display or create. To create an alias, you must follow the name with a word-list. If you enter only the** `alias` **command, it displays a list of all aliases. You cannot use "alias" as the name for an alias.**
[*word-list*]	**The command string for the alias. You can include one ULI command, or the** `dli` **command followed by a command from the Xyplex command set.**

Examples

1. The `alias` **command without arguments displays all aliases and the commands associated with them.**

```
Xyplex% alias ↵

tt    arp -a
ibm   tn3270 ibm@some.college.edu
vax   connect vax
```

2. The `alias` **command with a name lists the alias by that name.**

```
Xyplex% alias tt ↵

tt    arp -a
```

3. The `alias` **command with a name and a word list creates a new alias. This example uses the** `dli` **command to open the Xyplex command interface and execute the SHOW SERVER STATUS command.**

```
Xyplex% alias stat dli show server status ↵
```

When a user enters this alias, the Show Server Status display appears on the screen:

```
Xyplex% stat ↵

Address:   08-00-87-00-27-71 Name:   MAX5000                    Number:    0
                         Cur     High    Max

 Active Ports:              1       1   9       Minutes to shutdown          N/A
 Active Users:              1       1   9       Discarded Nodes              0
 Queue Entries              0       0   3       Resource Errors              0

 Available Services        21      30   N/A     Port Framing Errors:         0
 Local Services:            1       1    10     Port Parity Errors:          0
 Reachable Nodes:          18      18   100     Port Overrun Errors:         0

 Active Circuits:           0       0    16     Primary Host:            UNIXVAX
 Connected Nodes:           0       0    16     Load Address:     192.12.119.200
 Connected Sessions:        0       0    64     Dump Address:     192.12.119.200
 % CPU Used:                4      20   100     Console User      None Available
 % Memory Used:            16      20   100

 Selftest Status: Normal
 Software Status: Normal
```

The `arp` command displays the Internet-to-Ethernet address translation table.

Synopsis

`arp -a|`***ip-addr***

Where	Means
`-a`	**Display the entire translation table.**
ip-addr	**Display the translation table for the Internet address you specify.**

Example

1. This command displays the entire translation table.

```
Xyplex% arp -a
? (140.179.80.90) at 00-80-F1-00-17-A5
? (140.179.83.113) at 08-00-87-4F-A4-12
? (140.179.80.70) at 08-00-02-0B-5C-DC
```

Where	Means
?	**The ULI did not resolve the domain name for this entry in the translation table. If the ULI does resolve the domain name for an entry, the name appears in this column.**
(*internet-address*)	**An Internet address that is mapped to the Ethernet address.**
ethernet-address	**An Ethernet Address that is mapped to the Internet address.**

The connect **command establishes a job with a LAT service or Telnet destination, depending on the arguments you include with it. If you enter the** connect **command without arguments, the ULI will attempt to make a connection to a predefined destination. If the network manager has not predefined a destination for your port, an error messages appears. Enter the** connect **command again with a destination name.**

Synopsis

connect **[*service-name*[**-n *node-name*]**[**-d*dest-name*]]**

connect**[*rhost*** [-p ***telnet-port-number*]]

Where	**Means**
service-name	**The name of a LAT service.**
-n ***node-name***	**The name of the node that offers the service.**
-d ***dest-name***	**The name of a terminal server port that offers the service.**
rhost	**The domain name or Internet address of a Telnet destination.**
-p ***telnet-port-number***	**The target Internet protocol or physical port number of the Telnet *number* destination. The default value for the *telnet-port-number* is 23.**

Examples

1. This command establishes a session with a LAT service.

```
Xyplex% connect financevax ↵

Xyplex -010- Session 2 to FINANCEVAX established

      Welcome to Financevax

Username:
```

2. This command establishes a session with a domain name.

```
Xyplex% connect dev.sun.com ↵

Xyplex -010- Session 3 to DEV.SUN.COM established

             This is the Engineering Sun Workstation

Username:
```

The `dli` command provides access to the Xyplex command interface from the ULI. You can enter this command at the ULI prompt, include it as the first command in an alias, or include it as the first command in a script. In an alias or a script, this command opens the Xyplex command interface before executing a Xyplex command.

Some ports only support the ULI. This command does not function at these ports.

See the *TCP/IP-LAT Command's Reference Manual* and the *TCP/IP-LAT Software Management Guide* for more information about the Xyplex command set.

Synopsis

`dli [`***cmd***`]`

Where	**Means**
cmd	**Any Xyplex command appropriate to the privilege level of the port.**

Examples

1. This command opens the Xyplex command interface.

```
Xyplex% dli ↵

Xyplex>
```

2. This command executes the SET SESSION PASSALL command from the Xyplex command interface. After the interface executes the command, the ULI prompt appears on the screen.

```
Xyplex% dli set session passall ↵

Xyplex%
```

***Note*: These are the default ULI and DLI prompts. The prompts on your display may be different.**

The `exit` command terminates the ULI or disables Superuser mode, depending on the configuration of the port. At a Nonprivileged port that supports both the ULI and the DLI, the `exit` command closes the ULI and opens the Xyplex interface. At a Nonprivileged port that supports only the ULI, the `exit` command disconnects any active jobs, and logs out the port. If the port has Superuser mode enabled, the `exit` command disables superuser mode, and the ULI remains open.

Synopsis

```
exit
```

Examples

1. This command terminates the ULI and opens the DLI at a port that supports both interfaces.

```
Xyplex% exit ↵

Xyplex>
```

2. This command terminates the ULI, disconnects all open sessions, and logs out the port at a port that supports only the ULI.

```
Xyplex% exit ↵

Xyplex -020- Logged out port 12 on server X3E8C at 22 Sep 1993 16:12:00
```

3. This command disables Superuser mode, but maintains the ULI.

```
Xyplex# exit ↵

Xyplex%
```

The `fg` command brings the most recent, lowest-numbered job, or the job you specify, into the foreground.

The interface assigns a number to each job. You can specify a job number in the command line to bring a specific job into the foreground. The `jobs` command displays the active jobs at your port, their associated job (session) numbers, and the names of the hosts where they are connected.

You can also use the local-switch character to change jobs. The `stty` command displays and sets the local switch character.

Synopsis

`fg` **[%] | [%]*job* | *host-name***

Where	Means
`[%]`	**Bring the current or lowest-numbered job into the foreground.**
`[%]`***job***	**Bring the job associated with the job number you specify into the foreground.**
host-name	**Bring the job at the host with the domain name you specify into the foreground. If more than one job exists on that host, the interface brings the lowest-numbered job to the foreground.**

Examples

1. This command brings job number 3 into the foreground.

```
Xyplex% fg%3
Xyplex -012- FINANCE.SUN.COM session 3 resumed
%
```

2. This command brings the job at net accounts.sun.com into the foreground.

```
Xyplex% fg accounts.sun.com
Xyplex -012- ACCOUNTS.SUN.COM session 1 resumed
%
```

The help **and** ? **commands display information about commands and their arguments and variables.**

If you enter the help **or** ? **command without arguments, the interface displays a list of commands. You select one from the list and enter the command again with an argument.**

The ULI does not display Superuser commands at a nonprivileged port.

Synopsis

help **[*cmd* [*cmd* . . .]]**

? **[*cmd* [*cmd* . . .]]**

Where	**Means**
cmd	**Display information about the command you specify in this variable.**

Examples

1. This command displays a list of commands available at a nonprivileged port.

```
Xyplex% help
Commands are:
       ?, alias, arp, connect, dli, exit, fg, help, history, hosts, ifconfig, jobs,
       kill, lock, logout, lpc, lpq, netstat, ppp, queues, rlogin, services, set,
       slip, source, stty, su, telnet, tn3270, unalias, unset, who, whoami,
        xremote
```

2. This command displays information about the alias **command.**

```
Xyplex% help alias
   alias [name [word-list]]
        - displays and alters user defined aliases
```

The `history` **command displays a log of ULI commands executed at this port. The arguments you specify determine whether the display includes the entire log or a portion of it.**

Without arguments, this command displays the entire log. By default, the events appear in the order of least recent to most recent. The `set` **command determines the maximum number of command lines in the history log. The default is 255 lines.**

The ULI supports the !! history substitution character. Entering !! at the `Xyplex%` **prompt executes the most recently entered command.**

Synopsis

`history` [***n***] [`-r`**[*n*]] [**`-h`[***n***]]**

Where	Means
n	**Display only the *n* most recent ULI events. The history command without arguments displays the maximum number of lines in the history file. Valid values for *n* are 0 through the maximum number of lines.**
`-r` [***n***]	**Display the events in the order of most recent to least recent, rather than the default (least recent to most recent).**
`-h` [***n***]	**Display the event log without leading numbers.**
`!!`	**Repeat the previous command**

Examples

1. This command displays the entire event log. The order of the events is least recent to most recent.

```
Xyplex% history
   1  hosts
   2  telnet financevax
   3  connect development.sun.com
   4  jobs
   5  fg 2
   6  kill 1
   7  kill 3
   8  help
   9  help alias
   10 history
```

2. This command displays the most recent 3 commands in the event log.

```
Xyplex% history 3
   9  help alias
   10 history
   11 history 3
```

The hosts **command displays information about available domain names on the network.**

Synopsis

```
hosts
```

Example

This example displays all known available domains on the network.

```
Xyplex% hosts

      Internet                          Domain      11 July 1993 14:25:43
Entry Address           TTL   SRC   Name

1     140.179.50.201      100   Pri   UNIXHOST.COM
2     140.179.119.3        24   Sec   SUN.COM
3     140.179.80.113           Loc   MAX5000.COM
```

Where	Means
Entry	**The entry number that the terminal server assigns to the domain name.**
Internet Address	**The Internet address of the domain.**
TTL	**The number of hours that the terminal server retains information from the primary or secondary domain-name server about the domain. This number is the time-to-live (TTL) value. (Locally defined domains do not have a TTL.)**
SRC	**The source of the information about the domain. Possible sources are the following:**

Source	Means
Loc	**The terminal server manager defined the domain with a terminal server command (the DLI DEFINE/SET DOMAIN command). This is a local source.**
Pri	**The terminal server obtained information about the domain from the Primary domain name server.**
Sec	**The terminal server obtained information about the domain from the Secondary domain name server.**
Who	**The terminal server obtained information about the domain from the** rwhod **daemon.**

Domain Name	**The domain name.**

The `ifconfig` command displays terminal server Internet characteristics. These characteristics include the Internet address, the Internet subnet mask, and the Internet broadcast address. The TCP/IP-LAT Software Management Guide describes these characteristics in detail. (See Chapter 3 for information about how to change these characteristics with `ifconfig`.)

Synopsis

```
ifconfig -a
```

Where	Means
`-a`	**Display Internet characteristics.**

Example

This command displays Internet characteristics.

```
Xyplex% ifconfig -a
e1:   flags=<UP,RUNNING>
      inet 140.179.248.114  netmask 255.255.128.0 broadcast 255.255.255.255
s16:  flags=<UP,BROADCAST,RUNNING>
      inet 140.1.2.1        netmask 255.255.255.255
p23:  flags=<UP,RUNNING>
      inet 140.1.3.1
```

Where	Means	
`e1` `s`*x* `p`*x*	**A network link name. These names mean the following:**	
	Link	**Means**
	`e1`	**The Ethernet link. The Ethernet link always appears in the ifconfig display.**
	`s`*x*	**The SLIP link and the port number where SLIP is enabled. The SLIP link only appears if this protocol is enabled on a port.**
	`p`*x*	**The Point-to-Point Protocol (PPP) link and the port number where PPP is enabled. The PPP link only appears if this protocol is enabled on a port.**
flags	**The status of the link. The status can be <UP,RUNNING> for all links or <UP,BROADCAST,RUNNING> for SLIP links if the BROADCAST characteristic is enabled.**	
inet	**The Internet address of the terminal server.**	
netmask	**The Internet subnet mask of the terminal server.**	
broadcast	**The Internet broadcast address of the terminal server.**	

The `jobs` **command displays a list of active jobs and their job numbers. Use these job numbers with the** `fg` **command to bring a particular job to the foreground.**

Synopsis

```
jobs
```

Example

This command lists the active jobs at a terminal server port.

```
Xyplex% jobs ↵
 1    telnet development.sun
+2    rlogin engineering.host
 3    connect FINANCEVAX
```

The plus sign + in front of a job number indicates the current job. The second column lists the ULI command which created the job.

The `kill` **command terminates one or more jobs.**

Synopsis

`kill [%] | [%]`***job*** `| -a`

Where	**Means**
`[%]`	**Terminate the current job. Using % is the same as not using any arguments.**
`[%]`***job***	**Terminate the job you specify with a job number. Use the** `jobs` **command to display a list of jobs and their job numbers.**
`-a`	**Terminate all active jobs**

Example

This command terminates job number 1.

```
Xyplex% kill 1 ↵

Xyplex -011- Session 1 disconnected from FinanceSUN.COM

Xyplex%
```

lock

The `lock` **command disables access to a terminal server port without terminating active jobs or logging out the port. The ULI prompts you for a password before it locks the port. You use this password to "unlock" the port when you want to regain access to it and open the ULI. The terminal server LOCK characteristic must be enabled to use the** `lock` **command.**

Locking a port prevents other users from establishing jobs and gaining access to network resources through it if you are away. If you are at a port with Superuser enabled, locking the port prevents other users from entering commands that are not available through Nonprivileged ports.

If you forget the unlock password, a user at a port with Superuser enabled must log out your port before you can use it again. This terminates any active jobs.

Synopsis

```
lock
```

Example

```
Xyplex% lock ↵
Lock Password>xxxxx ↵
```

When you enter the `lock` **command, the ULI prompts you for a Lock Password. The password can include from 1 to 16 characters. Choose a password that you can remember, because you will use it later to unlock the port. The password does not appear on the screen. After the you enter the Lock Password, the interface prompts you to enter it again, to verify its contents.**

```
Verification>xxxxx ↵
```

After the ULI verifies the password, it displays a message indicating that the port is locked, and the Unlock Password prompt:

```
Xyplex -019- Port 6 locked
Unlock Password>
```

Enter the Lock password at the `Unlock Password>` **prompt to open the ULI.**

logout

The `logout` **command terminates all jobs on a port and logs out the port.**

Synopsis

```
logout
```

Example

```
Xyplex% logout ↵
Xyplex -020- Logged out port 12 on server X003E8C at 13 June 1993 11:15:23
```

The `lpq` command displays the contents of a print queue.

Synopsis

`lpq -P`***printer*** **[*job#...*]**

Where	**Means**
`-P`***printer***	**The name of a printer queue.**
[*job#*]	**One or more job numbers in the printer queue.**

Example

This command displays the complete printer queue.

```
Xyplex% lpq -Pport5
```

```
LPD Queue      : port5
Queue Port(s)  : 5
Status         : ENABLED, ACTIVE
LF->CR         : ENABLED
```

Job Status	Remote Host	Job #	File name	File Size	Port
PRINTING/Data	Financevax	1	dfA257Fin	157839	5
WAITING/Port	Engineering2	2	dfA097Eng	21643	0
WAITING/Port	AccountsHost	3	dfA036Acc	905792	0

Where	**Means**
LPD queue:	**The name of the LPD queue specified with a Xyplex command.**
Queue Port(s):	**The ports associated with the queue.**
Status:	**The state of the print queue, which can be one of the following:** **ENABLED/ACTIVE** **ENABLED/IDLE** **DISABLED/IDLE** **DISABLED/ACTIVE**
LF->CR	**The status of the LFCR characteristic, which determines whether or not the terminal server converts line feeds to linefeed/carriage returns. The status can be ENABLED or DISABLED. You can use the Xyplex DEFINE/SET SERVER LPD QUEUE "queuename" LFCR ENABLED/DISABLED command or the ULI `lpc create` command with the `-l` or `+l` arguments to specify this characteristic.**

Where	Means
Job Status	The state of the current job on the print queue. The Job Status can be one of the following:

Job Status	Means
INITIALIZED	The job was recently created on the queue.
WAITING/Port	The print job is on the queue and is waiting for an available port.
ASSIGNED/Port	The print job is assigned to a port.
PRINTING/Data	The queue is receiving data from the print job and sending it to the assigned port.
PRINTING/Control	The queue is receiving the control file from the print job. (The terminal server ignores this portion of the print job.)
ABORTED	The job was aborted before it started printing.
ABORTED/Flushing	The job was aborted after it started printing.
COMPLETED	The print job is finished.
ERROR	A problem occurred during the file transfer from the remote host. If this message appears, try sending the job again. If the error still occurs, check with the network manager.

Remote Host	The name of the host which sent the print job to the queue.
Job #	The number of the job in the queue.
File name	The name of the file being sent. This is the name that the host assigned to the file, not the name that the user assigned to the file. The last three letters indicate the host where the job was created.
File size	The size of the print file, in bytes.
Port	The port assigned to process the print job.

The `netstat` **command displays different types of network statistics and information that the terminal server obtains from the network.**

Synopsis

`netstat` **[**`-n` | `-a[-n]` | `-i[n]` | `-I[n]` **[*interface*]** | `-r[n]` | `-s[n]`

Where	Means
`-n`	**Display network connections by Internet address. This is the default display.**
`-a[n]`	**Display a list of active connections.**
`-i[n]`	**Display the state of hardware statistics.**
`-I[n]` **[*interface*]**	**Display the state of a particular hardware interface. The possible values for the interface variable are the following:**
	`e1` **The Ethernet link.**
	`s`***x*** **The SLIP link. The *x* variable indicates the port number where SLIP is enabled.**
	`p`***x*** **The Point-to-Point Protocol (PPP) link. The *x* variable indicates the port number where PPP is enabled.**
`-r[n]`	**Display routing tables. This table includes the destination host or network, and one or more gateways that will forward packets.**
`-s[n]`	**Display protocol statistics. This information includes the number of packets sent and received through different protocols, as well as a history of different errors.**

Examples

1. This command displays active Internet connections.

```
Xyplex% netstat -n
```

```
Active Internet connections
Proto  Recv-Q Send-Q     Local Address         Foreign Address       (state)
tcp          0      0    140.179.80.113.2000   140.179.83.36.3512    ESTABLISHED
udp          0      0    140.179.80.113.4321   *.*                   LISTEN
```

Where	Means
Proto	**The type of protocol used to make the connection.**
Recv-Q	**The size of the receive queue, in bytes.**
Send-Q	**The size of the send queue, in bytes.**
Local Address	**The Internet address of the terminal server and the port.**

Where	Means
Foreign Address	**The Internet address of the Telnet host.**
(state)	**The status of the connection.**

2. This command displays the state of the hardware interfaces.

```
Xyplex% netstat -i
```

Name	Mtu	Net/Dest	Address	Ipkts	Ierrs	Opkts	Oerrs	Collis
e1	1500	140.179.0.0	140.179.83.11	54321	0	4321	0	0
s3	1006	140.1.0.0	140.1.1.1	67	0	63	0	0
p5	1500	140.2.0.0	140.2.1.1	0	0	0	0	0

Where	Means
Name	**The hardware interface. The interfaces that can appear include the Ethernet link (e1), the SLIP link and port number where SLIP is enabled (s*x*), and the PPP link and port number where PPP is enabled (p*x*)**
Mtu	**The Maximum Transmission Unit (Mtu), which indicates the size, in bytes, of the largest packet that the port can transmit to the network.**
Net/Dest	**The Internet address (Network/Destination) of the Telnet destination on the network.**
Address	**The local Internet address.**
Ipkts	**The total number of packets received at this port (input packets).**
Opkts	**The total number of packets transmitted by this port (output packets).**
Ierrs	**The number of Input errors that have occurred on this interface since the terminal server was last initialized.**
Oerrs	**The number of Output errors that have occurred on this interface since the terminal server was last initialized.**
Collis	**The number of packet collisions that have occurred on this interface since the terminal server was last initialized.**

3. This command displays protocol statistics. The first column lists the protocol and the second column lists the activity for that protocol.

```
Xyplex% netstat -s

tcp
      12345 packets sent
      234 packets retransmitted
      23456 packets received
      1234 checksum errors
      37 active opens
      6 passive opens
      0 failed attempts
      1 establish resets
      7 total resets
      0 segments queued
udp
      0 receive message errors
      12345 no port messages
      2345 messages received
      1234 messages sent
ip
      67890 total packets received
      0 bad header checksums
      1234 header errors
      2345 unknown protocol received
      0 fragments received
      0 fragments dropped
      0 maximum fragments queued
      0 failed reassemblies
      12345 packets forwarded
      123 packets not forwardable
      45678 packets sent
      33 no routes sent
icmp
      89 messages received
      78 destination unreachable received
      0 time-to-live exceeded received
      0 parameter problem received
      0 source quench received
      0 redirect received
      0 echo received
      0 timestamp received
      0 information requests received
      0 unknown messages received
      4 messages sent
      0 destination unreachable sent
      0 time-to-live exceeded sent
      0 parameter problem sent
      0 source quench sent
      0 redirect sent
      0 echo sent
      0 timestamp sent
      0 information requests sent
```

The `ppp` **command enables the Point-to-Point Protocol (PPP) on your port. The Xyplex implementation of PPP allows a personal computer, another terminal server, or a dialup router that also supports PPP to gain access to the Internet through a terminal server port. When you enable PPP, the** `Xyplex%` **prompt disappears, and you cannot enter commands. To exit from PPP, a user at a port with Superuser mode enabled must log out your port .**

The network manager must enable PPP on the terminal server and specify certain terminal server and port characteristics before you can use the `ppp` **command. The *TCP/IP-LAT Software management Guide* explains how to do this.**

Synopsis

```
ppp +
```

Where	**Means**
+	**Enable the Point-to-Point Protocol.**

Example

```
Xyplex% ppp +
```

(No further messages appear on the screen after you enable PPP.)

The queues **command displays the service connection queue, which is the list of requests to services offered by terminal server.**

Synopsis

queues **[**-a**]** | -h ***host-name*** | -s ***service-name*** | -p ***port-number*** | -e ***entry***

Where	Means
[-a]	**Display all connection request entries in the connection queue.**
-h ***host-name***	**Display all connection requests from the host you specify in the *host-name* variable.**
-s ***service-name***	**Display all connection requests to the service you specify in the *service-name* variable.**
-p ***port-number***	**Display all connection requests to the port you specify in the *port-number* variable.**
-e ***entry***	**Display the entry you specify in the *entry* variable.**

Example

```
Xyplex% queues
```

```
Position Entry Source Node       Service        Port Name
1        111   FINANCEVAX        LASER
2        115   FINANCEVAX                       3
3        116   ENGINEERING       MODEM          4 PORT_4
```

Where	Means
Position	**The relative position of the request in the queue.**
Entry	**The job number of each queued request.**
Source Node	**The node that originated the request.**
Service	**The name of the requested service.**
Port Name	**The number and name of the port that offers the service. Information appears in this column only if the connection request included the port name.**

The `rlogin` command connects to a remote host through the rlogin protocol. To do this, the terminal server passes a username to the remote host which can be the username of the port or a name that you enter on the command line.

A network manager can implement the Rlogin function on a host in different ways. Some implementations allow you to specify a username with the `rlogin` command and bypass the login routine on the host. Other implementations may function differently. Check with the network manager if you have questions about how to use the `rlogin` command.

Synopsis

`rlogin` ***rhost*** **[**`-l` ***username***]

Where	**Means**
rhost	**The domain name or Internet address of the remote host where you want to make a connection.**
[`-l` ***username***]	**Specify a username for the log-on sequence on the remote host. If you do not specify a username, the terminal server uses the username of the port .**

Example

This command logs on to a remote host with the username Chris.

```
Xyplex% rlogin bostonhq.com -l chris
Welcome to the BostonHQ
Password:
```

The `services` **command displays information about LAT services. The type of information depends on the argument you use.**

You can display information about a specific service or all services. If you include a service name in the command line, you can also use the asterisk character `*` **as a template to select a subset of names. For example, the command** `services -c ab*`**, displays all available names that began with** `ab`**. The command** `services -c ab*c`**, displays names that begin with** `ab` **and end with** `c`**.**

Synopsis

`services -c` **[*service-name*]** | `-s` **[*service-name*]** | `-S` **[*service-name*]**

Where	**Means**
`-c` **[*service-name*]**	**Display the characteristics of one or more services.**
`-s` **[*service-name*]**	**Display the status of one or more services.**
`-S` **[*service-name*]**	**Display a summary of information about one or more services.**

Example

```
Xyplex% services -c printer ↵

Service: PRINTER                                  11 July 1993 17:33:36
Identification: Terminal Server printer Queue
Ports: 2, 7
Rating:  255
Enabled Characteristics:
Connections, Queueing

Xyplex% services -s printer ↵
Service PRINTER - Available
Node Name         Status      Rating      Identification
MAX5000           Reachable   255         Terminal Server Printer Queue

Xyplex% services -S ↵
Service Name      Status         Identification

FINANCEVAX        Available      Corporate MicroVAX II
LASER             Available      Shared Laser Printer
MODEM             Available
PRINTER           Available      Terminal Server Print Queue
```

The `set` **command displays or changes the values of some ULI variables. Using the** `set` **command without arguments displays the current settings for these variables.**

You can use the `set` **command to change the command interface prompt with the** `prompt="`***string***`"` **argument. Doing so changes the prompt in the Xyplex command interface as well as the ULI.**

Synopsis

`set` **[**`history=`***n***`]** | **[**`ignoreeof=`***cnt***`]** | **[**`prompt="`***string***`"]**

Where	**Means**
[`history=`***n***`]**	**Limit the history log to the number of command lines you specify in the *n* variable. The default is 255 lines, which is also the maximum. The history log is limited to 600 bytes of information, and the actual number of lines in the log cannot exceed this limit.**
[`ignoreeof=`***cnt***`]**	**Ignore the number of end-of-file (eof) characters that you specify in the *cnt* variable before responding to an eof character. The default is 255, which is also the maximum. If you plan to use an eof character, you can set this counter to a lower value, such as 2 or 3. You define an eof character with the** `stty` **command and the** `eof` ***c*** **argument, where *c* is the** `eof` **character.**
[`prompt="`***string***`"]**	**Change the command interface prompt to the one you specify in the "*string*" variable. The default prompt is** `Xyplex%`**. The string can include up to 20 characters. Enclose the character string in quotes.**

Examples

1. This command displays the current values of the ULI variables.

```
Xyplex% set ↵

history     255
ignoreeof   255
prompt      Xyplex
```

2. This command changes the value of the `ignoreeof` **counter.**

```
Xyplex% set ignoreeof=2 ↵

Xyplex%
```

The `slip` command enables the SLIP or CSLIP (compressed SLIP) protocol. These protocols enable you to run Internet protocols over a serial line. When you enable SLIP or CSLIP, the `Xyplex%` prompt no longer appears on the screen and you cannot enter ULI commands. To exit from SLIP or CSLIP, a user at another port must log out your port.

The network manager must enable SLIP or CSLIP on the terminal server and specify certain terminal server and port characteristics before you can use the `slip` command. The *TCP/IP-LAT Software Management Guide* explains how to do this.

Synopsis

```
slip +[c]
```

Where	**Means**
[c]	**Enable the CSLIP protocol.**

Example

This command enables SLIP on the port.

```
Xyplex% slip +
```

(No further messages appear on the screen after you enable SLIP or CSLIP.)

The `source` command locates a script file and executes the commands in the script file.

Script files reside on a host system and contain a collection of Xyplex terminal server commands. You or the network manager can create these scripts with the host's text editor if you have the appropriate privileges on the host. You can execute a script file with the `source` command, or the network manager can specify that the terminal server execute a script automatically when you log on to a port. The *TCP/IP-LAT Software Management Guide* describes how to create scripts.

Once you execute a script, you cannot stop it. The session management characters and the <Break> key do not function while a script is executing.

Synopsis

source /*pathname*/*script-name*

Where	Means
/pathname/ script-name	**Execute the script file you specify in the *script-name* portion of the variable at the location you specify in the *pathname* portion of the variable. Include the complete pathname to the file, and precede each directory name or filename with a backslash (/). The pathname/script-name combination must not exceed 64 characters.**

Example

This command executes a script called `loginsetup` in the directory `/scripts/chris`.

```
Xyplex% source /scripts/chris/loginsetup ↵

Searching for script file.  Please wait. . .
```

The terminal server's response to this command depends on the contents of the script file. At some ports, the commands in the script appear on the screen as the terminal server executes them. If the file contains a command such as `connect` or `rlogin`, you might see the logon banner of a remote host. The script could contain a Xyplex command such as SET PORT TELNET TN3270 DEVICE to specify the type of terminal emulation to run during a Tn3270 session, or SET SESSION to change the data transparency mode of a session. Unlike the `connect` or `rlogin` commands, these commands do not necessarily cause any visible response from the terminal server.

If the terminal server cannot find the script file, or the port does not have access to the script file, an error message appears at your terminal. A message such as "Temporary resource conflict - Please try again" might appear if many other users attempt to execute the script file at the same time that you do. If this message appears, wait a few minutes and then try again.

The stty **command displays and sets port parameters that control terminal characteristics. Initializing the terminal server or logging out the port returns the parameters to their original values.**

Many of these characteristics are the ULI equivalents of DLI session management and editing functions, and port characteristics. For example, the stty local c character is the Xyplex Local Switch character.

Synopsis

stty **[**-a**]** | ***option***

Where	**Means**
[-a]	**Display the current settings of port characteristics. This argument is optional.**
option	**One of the following** stty **options:**
parity ***argument***	**Set the parity type. Valid values are** even**,** mark**,** none**, and** odd**. The default is** none**.**
erase ***c***	**Set the erase line character. The default is ^H.**
kill ***c***	**Set the line erase (kill) character. The default is ^U.**
lnext ***c***	**Set the next line (lnext) character. The default is ^N.**
eof ***c***	**Set the end-of-file (eof) character. Using this character in Superuser mode returns the port to Nonprivileged mode. Using this character in Nonprivileged mode logs out the port or opens the Xyplex command interface if the port supports it. You may have to enter this character more than once to use the function, depending on the value of the** ignoreeof **counter. See the set command for information about the** ignoreeof **counter. No default exists for this character.**
eol ***c***	**Set the end-of-line (eol) character. The default is ^E.**
local ***c***	**Set the local switch character. No default exists for this character. This character is equivalent to the DLI Local Switch character, and any change you make to the ULI** local **character applies to the DLI Local Switch character as well.**
rprnt ***c***	**Set the redisplay (rprnt) character. The default is ^R.**
cncl ***c***	**Set the cancel (cncl) character. Using this character cancels an interactive operation, such as changing a password, or deletes the current command line. The default is ^Z.**

Where	Means
number	**Set the port speed or baud rate. Valid values are 50, 75, 110, 134, 150, 300, 600, 1200, 1800, 2000, 2400, 4800, 9600, 19200, 38400, 56000, 57600, 64000, 76800, and 115200. The default is 9600.**
bchar ***number***	**Sets the number of data bits-per-character. Valid values are 7 and 8. The default is 8.**
stopb ***number***	**Set the stop bits that the terminal server uses for data synchronization. The default is 0, which indicates that the terminal server calculates stop bits based on the port speed. Other valid values are 1, 1.5, and 2.**
[-] broadcast	**Enables or disables messages broadcast from other ports on the terminal server.**

Examples

1. This command displays the settings of the port parameters. This example shows the default values.

```
Xyplex% stty ↵
speed 9600 baud; parity none
bchar 8; stopb 2;
broadcast
erase    kill  eol   rprnt    lnext    cncl     eof   local
^H       ^U    ^E    ^R       ^N       ^Z       None  None
```

2. This command sets the local switch character to <CTRL> k.

```
Xyplex% stty local ^k ↵

Xyplex%
```

The `su` **command enables Superuser mode at the port. While in Superuser mode, you can use certain commands only available in this mode. You can also gain access to the Xyplex command interface, even if you could not open this interface when the port was in Nonprivileged mode. Chapter 3 describes the ULI commands available at ports with Superuser mode enabled.**

When you enter the `su` **command, the ULI prompts you for a password. The Xyplex factory default password for this command is** `system`**, but the network manager can change this. You must enter the password to gain access to Superuser mode. After you enter the correct password, the Superuser prompt** `Xyplex#` **appears on the screen.**

Synopsis

`su [`***password***`]`

Where	**Means**
password	**The password you must enter to gain access to Superuser mode. If you do not include the password, the interface prompts you for it.**

Example

This command enables Superuser mode on the port.

```
Xyplex% su ↵
Password: xxxxx ↵
Xyplex#
```

telnet

The `telnet` command uses the Telnet protocol to establish a connection with the host you specify.

Synopsis

`telnet` ***rhost*** **[*telnet-port-number*]**

Where	Means
rhost	**The domain name or Internet address of the Telnet destination where you want to establish a job.**
[*telnet-port-number*]	**The target Internet protocol or physical port number of the destination.**

Example

This command uses an Internet address to establish a job with a Telnet host.

```
Xyplex% telnet 140.179.64.7

           Welcome to the Engineering UNIX Workstation

Username:
```

tn3270

The `tn3270` command uses the Telnet protocol to provide 3270 access to the IBM host you specify. When you log on to the IBM host, your terminal's keyboard will emulate an IBM display station keyboard. Appendix A describes IBM terminal keyboard emulation in detail.

Synopsis

`tn3270` ***rhost*** **[*telnet-port-number*]**

Where	Means
rhost	**The domain name or Internet address of the Telnet destination where you want to establish a job.**
[*telnet-port-number*]	**The target Internet protocol or physical port number of the destination.**

Example

```
Xyplex% tn3270 accountshost

Xyplex  -010-  Session 3 to IBMHOST.COM established

      This is IBMhost.COM

      Username:
```

The unalias **command deletes the alias you specify. See the description of the** alias **command, earlier in this chapter, for more information about how to create an alias.**

Synopsis

unalias ***alias-name***

Where	**Means**
alias-name	**The name of the alias you want to delete.**

Example

This example deletes the alias named stat**.**

```
Xyplex% unalias stat ↵
Xyplex%
```

unset

The unset **command resets one or more ULI variables to their default values, or to none. See the** set **command for information about how to change ULI variables.**

Synopsis

unset history | ignoreeof | prompt

Where	**Means**
history	**Reset the number of command lines allowed in the history log to 255. The** set **command changes the number of lines allowed in the history log.**
ignoreeof	**Reset the value of the ignoreeof counter to 255. The ignoreeof counter determines how many end-of-file characters to ignore before processing one.**
prompt	**Reset the ULI prompt to <null>. When you do, only the** % **character appears as the prompt. (To change the prompt to** Xyplex% **, use the** set **command.)**

Example

This command resets the Xyplex% **prompt to** %**.**

```
Xyplex% unset prompt ↵
%
```

The `who` **command displays the names and port numbers of users currently logged onto the terminal server.**

Synopsis

```
who [am i]
whoami
```

Where	Means
`who`	**Display information about all users logged onto the terminal server**
`am i` `whoami`	**Display information about the current user only.**

Examples

1. This command displays information about all users currently logged on to the terminal server.

```
Xyplex% who
smith       port 0      19 Jun 1993 16:06:01
jones       port 5      19 Jun 1993 10:41:02
swenson     port 8      19 Jun 1993 12:00:03
alciere     port 10     19 Jun 1993 08:19:13
```

2. This command displays information about the user logged on to the port.

```
Xyplex% whoami i
smith       port 0      19 Jun 1993 16:06:01
```

The `xremote` **command establishes an Xremote job. You can specify the domain name or Internet address of the X Display Manager (XDM) host with this command. If you do not specify an XDM host, the interface searches for a predefined XDM host.**

Using this command requires that the Xremote protocol be enabled on the terminal server and that the appropriate Xremote parameters be specified on the terminal server and the port. The *TCP/IP-LAT Software Management Guide* describes how to configure the terminal server for Xremote support.

Synopsis

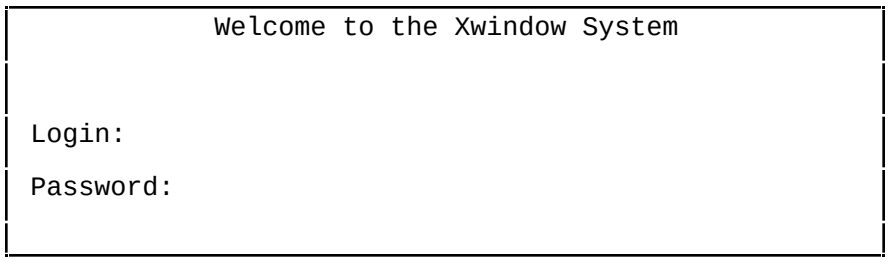
`xremote` **[*rhost*]**

Where	**Means**
rhost	**The domain name or Internet address of the XDM host.**

Example

This command includes the Internet address of the XDM host.

```
Xyplex% xremote 130.183.70.6
```



End of Chapter

Chapter 3

Using the ULI Superuser Commands

This chapter describes the commands that require Superuser mode to be enabled on the port. Some commands are available in Nonprivileged mode as well, without certain options. These are noted in the command descriptions.

If Superuser mode is not already enabled, use the `su` **command to enable it. When you enter this command, the ULI prompts you for a password. The Xyplex factory default for this password is** `system`**, but the password on your terminal server may be different. The password does not appear on the screen when you enter it.**

```
Xyplex% su ↵

Password> xxxxx ↵

Xyplex#
```

The `Xyplex#` **prompt indicates that Superuser mode is enabled.**

Table 3-1 lists the commands described in this chapter.

Table 3-1. ULI Commands That Require Superuser Mode

Command	Description
`arp -a` | **ip-addr** | `-d` ***ip-addr*** | `-s` ***ip-addr ethernet-addr***	**Display or modify the Internet-to-Ethernet address translation table.**
`boot` **[**`-o`**]** **[*minutes*]** | `-c` | `-d`	**Initialize the terminal server and optionally create a dump file.**
`ifconfig [-a]` | ***interface*** `[`***ip-addr***`]` `[netmask` ***net-mask***`]` `[broadcast` ***bip-addr***`]`	**Display and modify network parameters.**
`logout` **[**`-p` ***port#***]	**Terminate all jobs and log out the port.**
`lpc ?` | `help` | `abort` | `clean` | `create [-p` ***ports***`]` **[*args*]** | `delete` | `disable` | `enable` | `exit` | `quit` | `status`	**Manage line printers.**
`lprm -P` ***printer job#...***	**Remove one or more entries from a printer queue.**
`ping [-l]` ***rhost***	**Use ICMP to generate a response from a host.**

Several of the commands in this chapter, such as `arp` **and** `ifconfig`**, require that you be familiar with how to modify Internet characteristics on the terminal server. Other commands, such as** `lpc` **and** `lprm` **require that the LPD daemon be enabled on the terminal server. See the *TCP/IP-LAT Software Management Guide* for information about Internet characteristics and how to enable UNIX daemons, including the LPD daemon.**

The `arp` **command displays, creates, and deletes entries in the Internet-to-Ethernet address translation table. Users at all ports can display these translation tables, and users at ports with Superuser enabled can create and delete entries in the table.**

The terminal server builds this table automatically as it "learns" Internet addresses through arp broadcasts or through communication between terminal server ports and hosts on the network. Usually, you do not have to create entries in the table. You can create an entry to replace an entry that has changed. For example, if a host changes its Internet address, you can create an entry for an existing Ethernet address with the new Internet address.

Synopsis

`arp -a | ip-addr | -d ip-addr |-s ip-addr ethernet-addr`

Where	Means
`-a`	**Display the entire translation table.**
ip-addr	**Display the translation table for the Internet address you specify.**
`-d` ***ip-addr***	**Delete the entry corresponding to the Internet address you specify.**
`-s` ***ip-addr ethernet-addr***	**Create an entry for the Internet address-Ethernet address combination you specify.**

Examples

Chapter 2 describes a sample `arp` **display.**

1. This command deletes a translation table.

```
Xyplex# arp -d 140.179.80.90
Xyplex#
```

2. This command creates an entry in the translation table entry.

```
Xyplex# arp -s 140.179.83.113 08-00-20-0B-5C-DC
Xyplex#
```

The `boot` command initializes the terminal server and optionally generates a dump file. Using the `boot` command is equivalent to powering on the terminal server. All characteristics are restored to their values in the permanent database.

You can specify a delay period, in minutes, before the initialization takes place. The default is one minute. When you enter the `boot` command without a delay, or with the default delay, the terminal server broadcasts a warning immediately to all ports notifying users that they need to log off. When you specify a delay time between 2 and 29 minutes, the terminal server broadcasts a warning immediately, and then every minute for each of the last five minutes before the boot takes place. When you specify a delay of 30 minutes or more, the terminal server broadcasts a message immediately, once every 30 minutes prior to boot time, and then once every minute for the last five minutes.

If you attempt to boot with a 0-minute delay, and unsaved parameters are outstanding, the terminal server does not execute the initialization unless you include the `-o` argument. This argument causes the initialization to take place whether unsaved parameters exist or not. Using the `-d` switch to generate a dump file also causes the initialization to take place whether unsaved parameters exist or not.

Synopsis

`boot` **[**`-o`**]** **[*minutes*]** | `-c` | `-d`

Where	Means
[`-o`**]**	**Complete the initialization even if unsaved parameters are outstanding.**
[*minutes*]	**Initializes after delaying number of minutes you specify. Valid values are in the range of whole numbers from 0 to 32767. The default is 1 minute.**
`-c`	**Cancel a previously entered boot command.**
`-d`	**Generate a dump file and initialize. Using this switch causes the initialization to take place whether unsaved parameters exist or not.**

Example

This command initializes the terminal server after a 3 minute delay.

```
Xyplex# boot -o 3
```

After the user enters the command, the terminal server broadcasts a message such as the following to all ports:

```
Xyplex -501- From port x, username

Xyplex -199- Terminal Server shutdown in 3 minutes


Xyplex#
```

The `ifconfig` **command displays and modifies terminal server Internet characteristics. These characteristics include the Internet address, the Internet subnet mask, and the Internet broadcast address. You cannot change the terminal server Internet address and the Internet broadcast address during active Telnet sessions. While all users can display these characteristics, only users at ports with Superuser mode enabled can change them.**

Using `ifconfig` **to change Internet characteristics changes the values for these characteristics in both the permanent and operational databases of the terminal server. You do not have to boot or initialize the terminal server for the changes to take effect. The *TCP/IP-LAT Software Management Guide* explains more about Internet characteristics and the permanent and operational databases.**

Synopsis

`ifconfig -a | `***interface*** **[***ip-addr***] [**`netmask` ***net-mask***] [**`broadcast` ***bip-addr***]

Where	Means
`-a`	**Display Internet characteristics.**
interface	**The name of the network interface that you are modifying. Valid interface names are the following:**

Interface	Means
`e1`	**The Ethernet link.**
`s#`	**A SLIP link, where # indicates the number of the port where SLIP is enabled.**
`p#`	**A Point-to Point Protocol (PPP) link, where # indicates the number of the port where PPP is enabled.**

[*ip-addr*]	**The Internet address of the terminal server. The default is 0.0.0.0.**
[`netmask` ***net-mask***]	**An Internet subnet mask. The terminal server assigns a default subnet mask based on the class of the Internet address, and the default is appropriate in most situations. For example, the default subnet mask for a class B Internet address is 255.255.0.0. The terminal server subnet mask AUTOCONFIGURE feature must be disabled before you can change the subnet mask.**
[`broadcast` ***bip-addr***]	**The Internet address that the terminal server uses for Internet broadcast messages. The default is 255.255.255.255.**

Examples

Chapter 2 shows an `ifconfig` **display and a description of the fields in the display.**

1. This command changes the terminal server Internet address for the Ethernet link.

```
Xyplex# ifconfig e1 140.178.30.5 ↵

Xyplex#
```

2. This command changes the Internet subnet mask for the Ethernet link.

```
Xyplex# ifconfig e1 netmask 255.255.255.128 ↵

Xyplex#
```

The `logout` command terminates all jobs on a port and logs out the port. All users can logout their own ports, and users at ports with Superuser enabled can log out other ports.

Synopsis

`logout` **[**`-p` ***port#*****]**

Where	**Means**
[`-p` ***port#*****]**	**A terminal server port number.**

Example

This example logs out port 3 from another port.

```
Xyplex# logout -p 3
Xyplex#
```

The lpc **command manages line printers. The LPD daemon must be enabled before you can use this command. See the *TCP/IP-LAT Software Management Guide* for more information about the LPD daemon.**

This command requires that you enter an argument. If you enter the lpc **command without arguments, the** lpc> **prompt appears on the screen. You can then enter an** lpc **command. Once you enter** lpc **command mode, you must use the** exit **or** quit **commands to reopen the ULI. (Users at nonprivileged ports can display the status of printer queues only with the** lpc **command.)**

Synopsis

lpc ? **[*command*]** | help **[*command*]** | abort ***printer*** | clean ***printer*** | create ***printer*** **[**-p ***ports*****][*args*]** | delete ***printer*** | disable ***printer*** | enable ***printer*** | exit | quit | status ***printer***

Where	Means
? help **[*command*]**	**The help or ? arguments display a brief description of the** lpc **command you specify. If you do not specify a command, the ULI displays a list of all available commands.**
abort ***printer***	**Disable the printer you specify, and terminate any active print jobs associated with that printer.**
clean ***printer***	**Remove all jobs from the print queues of the printer you specify.**
create ***printer*** **[**-p ***ports*****][*args*]**	**Create a new LPD print queue with the name you specify in *printer* variable, which sends its output to the ports you specify in the *ports* variable. Valid arguments are the following:**

Argument	Means
+e	**Disable the queue.**
-e	**Enable the queue.**
+l	**Disable linefeed filtering.**
-l	**Enable linefeed filtering.**

delete ***printer***	**Delete the printer you specify and all of its active jobs.**
disable ***printer***	**Disable the printer you specify.**
enable ***printer***	**Enable the printer you specify.**
exit quit	**The exit or quit command closes lpc command mode**
status ***printer***	**Displays the status of the printer queues you specify. (Users at nonprivileged ports can display the status of print queues.)**

Examples

1. This command creates and enables a printer queue and enables linefeed filtering.

```
Xyplex# create laser2 -p 5,6,7 -e -l

Xyplex#
```

2. The following example displays the status of a printer queue .

```
Xyplex# lpc status laser2
LPD Queue      : laser2
Queue Ports    : 5,6,7
Status         : ENABLED,ACTIVE
LF->LFCR       : ENABLED

Xyplex#
```

Where	Means
LPD queue	**The name of the LPD queue. You can specify an LPD queue with the Xyplex DEFINE/SET SERVER LPD QUEUE "*queuename*" ENABLED/DISABLED command, or the ULI** `lpc create` **command described in this section.**
Queue Ports	**The ports assigned to the print queue.**
Status	**The status of the ports associated with this queue. The following status messages can appear in this field:**

Status	Means
DISABLED/IDLE	**The port is disabled and no jobs are waiting on the queue.**
DISABLED/ACTIVE	**The port is disabled with jobs waiting.**
ENABLED/IDLE	**The port is enabled with no jobs waiting.**
ENABLED/ACTIVE	**The port is enabled with active jobs.**

LF->LFCR	**The status of the LFCR characteristic, which determines whether or not the terminal server converts line feeds to linefeed/carriage returns. The status can be ENABLED or DISABLED. You can use the Xyplex DEFINE/SET SERVER LPD QUEUE "*queuename*" LFCR ENABLED/DISABLED command or the ULI** `lpc create` **command with the** `-l` **or** `+l` **arguments to specify this characteristic.**

3. This command removes all jobs from the print queues of the printer Laser2.

```
Xyplex# lpc ↵
lpc>
lpc> clean laser2 ↵
lpc> exit ↵
Xyplex#
```

The `lprm` command removes an entry from a print queue. Use the `lpq` command to display the contents, including the job numbers, of a print queue.

Synopsis

`lprm -P`***printer job#. . .***

Where	**Means**
`-P`***printer***	**The name of a print queue.**
job#. . .	**The numbers of one or more jobs on the printer queue.**

Example

This command removes job number 2 from the printer queue port 5.

```
Xyplex# lprm -Pport5 2
Xyplex#
```

ping

The `ping` command uses the Internet Control Message Protocol (ICMP) to generate a response from the host you specify.

Synopsis

`ping` **[**`-l`**]** ***rhost***

Where	**Means**
`-l`	**Generate the ICMP response in long format, which includes the Internet addresses of the Gateways between the local terminal server and the remote host.**
rhost	**The domain name or Internet address of the remote host where you want to generate an ICMP response.**

Example

1. This command generates an ICMP message from a remote host.

```
Xyplex# ping 117.204.2.7
Route:       117.204.2.7
             140.179.237.122
```

End of Chapter

Appendix A

Tn3270 Keyboard Maps

When you log on to the IBM host through the Tn3270 protocol, the terminal server interface redefines the functions of the keys on the terminal's keyboard to emulate those of an IBM 3270 Model 5 or Model 2 display station. This appendix describes how to use the keyboard during IBM terminal emulation, and includes these topics:

- **Using Hot Keys**
- **About the Port Keymap**

Using Hot Keys

Most terminals have screens that display twenty-four lines, while IBM Model 5 stations display twenty-seven lines plus a status line, and IBM Model 2 stations display twenty-four lines plus a status line. To view the extra display lines and the status lines, you use *hot keys*. When you press a hot key, the terminal displays the hidden display lines or the status line. When you press it again, the hidden lines disappear.

The Scroll Lower key

To view the three extra display lines on an IBM Model 5 display station screen, press the Scroll Lower function key. This key changes the display from the top twenty-four lines (1-24) to the bottom twenty-four lines (4-27). Pressing the Scroll Lower key again returns the display to lines 1-24. The Scroll Lower keys for the predefined keyboard maps are these:

VT100/102 and ANSI	**ESC L**
VT220/7-bit	**<CTRL><O>**
VT220/8-bit	**<CTRL><O>**

The network manager can change the predefined key sequence, so the Scroll Lower key sequence on your terminal may be different.

The Status Key

To view the status line on an IBM Model 2 or Model 5 display station, press the Status key. (On Model 5 this is the twenty-eighth line of the screen; on Model 2 this is the twenty-fifth line of the screen.) To view this line, use the Status key that applies to your terminal's keyboard map:

VT100/102 and ANSI	**ESC ?**
VT220/7-bit	**<CTRL><W>**
VT220/8-bit	**<CTRL><W>**

The network manager can change the predefined key sequence, so the Status key sequence on your terminal may be different

About the Port Keymap

The DLI SHOW PORT KEYMAP command displays the translation table of 3270 keyboard functions and the corresponding keys for those functions on your terminal. The table also includes the hexadecimal value for those keys, although you do not need these values for regular keyboard use. Tables 3-1, 3-2, and 3-3, at the end of this Chapter also show 3270 keyboard functions and the corresponding keys on terminal types Xyplex includes in the software.

Tables A-1, A-2, and A-3 show the IBM 3270 terminal functions and the corresponding VT100 and ANSI, VT200-7, and VT200-8 keys. Check with your network manager about other keymaps at your site.

Table A-1. VT100/102 and ANSI 3.64 Keyboard Map

IBM 3270 Terminal Function	VT100/102 and ANSI Terminal Key Sequence
Back Tab	ESC TAB
CentSign	ESC C
Cursor Down	Down Arrow (↓)
Cursor Left	Left Arrow (←)
Cursor Right	Right Arrow (→)
Cursor Up	Up Arrow (↑)
Clear	CTRL-C
Cursor Sel	ESC K
Delete	Delete
Dup (Duplicate)	CTRL-D
Enter	Return
Erase EOF	CTRL-E
Erase Input	ESC I
Fast Left	CTRL-V
Fast Right	CTRL-U
Field Mark	CTRL-F
Flush Input	ESC F
Home	ESC H
Insert Mode	ESC Delete
New Line	Linefeed
PA1	ESC ,
PA2	ESC .
PA3	ESC /
PF1	Numeric 1
PF2	Numeric 2
PF3	Numeric 3
PF4	Numeric 4
PF5	Numeric 5
PF6	Numeric 6
PF7	Numeric 7
PF8	Numeric 8
PF9	Numeric 9

PF10	PF1
PF11	PF2
PF12	PF3
PF13	ESC !
PF14	ESC @
PF15	ESC #
PF16	ESC $

IBM 3270 Terminal Function	VT100/102 and ANSI Terminal Key Sequence
PF17	ESC %
PF18	ESC ^
PF19	ESC &
PF20	ESC *
PF21	ESC (
PF22	ESC)
PF23	ESC _
PF24	ESC +
Print	CTRL-P
Refresh	ESC R
Reset	CTRL-R
Scroll Lower	ESC L
ShowKeys	CTRL-X
Status ON/OFF	ESC ?
Sys-Req	ESC S
Tab	Tab
Test	ESC T

Table A-2. VT220/7-bit Keyboard Map

IBM 3270 Terminal Function	VT220-7 Terminal Key Sequence
Back Tab	FIND
CentSign	CTRL-N
Clear	CTRL-C
Cursor Down	Down Arrow (↓)
Cursor Left	Left Arrow (←)
Cursor Right	Right Arrow (→)
Cursor Up	Up Arrow (↑)
Cursor Sel	CTRL-K
Delete	Delete (Arrow in box)
Dup (Duplicate)	CTRL-D
Enter	Return
Erase EOF	CTRL-E
Erase Input	Remove
Fast Right	CTRL-U
Fast Left	CTRL-V
Field Mark	CTRL-F
Flush Input	ESC F
Home	CTRL-H
Insert Mode	Insert Here
New Line	Select
PA1	F18
PA2	F19
PA3	F20
PF1	Numeric 1
PF2	Numeric 2
PF3	Numeric 3
PF4	Numeric 4
PF5	Numeric 5
PF6	Numeric 6
PF7	Numeric 7
PF8	Numeric 8
PF9	Numeric 9
PF10	PF1
PF11	PF2
PF12	PF3
PF13	F6
PF14	F7
PF15	F8
PF16	F9
PF17	F10
PF18	F11
PF19	F12
PF20	F13
PF21	F14

IBM 3270 Terminal Function	VT220-7 Terminal Key Sequence
PF22	Help
PF23	Do
PF24	F17
Print	CTRL-P
Refresh	Previous Screen
Reset	CTRL-R
Scroll Lower	CTRL-O
ShowKeys	CTRL-X
Status ON/OFF	CTRL-W
Seq	Next Screen
Tab	Tab
Test	CTRL-T

Table A-3. VT220/8-bit Keyboard Map

IBM 3270 Terminal Function	VT220-8 Terminal Key Sequence
Back Tab	FIND
CentSign	CTRL-N
Cursor Down	Down Arrow (↓)
Cursor Left	Left Arrow (←)
Cursor Right	Right Arrow (→)
Cursor Up	Up Arrow (↑)
Clear	CTRL-C
Cursor Sel	CTRL-K
Delete	Delete (Arrow in box)
Dup (Duplicate)	CTRL-D
Enter	Enter
Erase EOF	CTRL-E
Erase Input	Remove
Fast Right	CTRL-U
Fast Left	CTRL-V
Field Mark	CTRL-F
Flush Input	ESC F
Home	CTRL-H
Insert Mode	Insert
New Line	Select
PA1	F18
PA2	F19
PA3	F20
PF1	Numeric 1
PF2	Numeric 2
PF3	Numeric 3
PF4	Numeric 4
PF5	Numeric 5
PF6	Numeric 6
PF7	Numeric 7
PF8	Numeric 8
PF9	Numeric 9
PF10	PF1
PF11	PF2
PF12	PF3
PF13	F6
PF14	F7
PF15	F8
PF16	F9
PF17	F10
PF18	F11
PF19	F12
PF20	F13
PF21	F14
PF22	Help
PF23	Do

IBM 3270 Terminal Function	VT220-8 Terminal Key Sequence
PF24	F17
Print	CTRL-P
Refresh	Previous Screen
Reset	CTRL-R
Scroll Lower	CTRL-O
ShowKeys	CTRL-X
Status ON/OFF	CTRL-W
Sys Req	Next Screen
Tab	Tab
Test	CTRL-T

End of Appendix