

Rec 3-5-90  
Alc

# EMULEX FIELD CHANGE ORDER

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PAGE 1 OF 1

EMULEX TERMINAL SERVER - PERFORMANCE 4000 SOFTWARE

DATE 24-OCT-89

CHANGE STATUS:

<input type="checkbox"/>	MANDATORY	<input checked="" type="checkbox"/>	I.D. NOTICE
<input type="checkbox"/>	NON-MANDATORY	<input checked="" type="checkbox"/>	INFORMATION
<input type="checkbox"/>	AS REQUIRED	<input type="checkbox"/>	DOCUMENTATION CHANGE
		<input type="checkbox"/>	OTHER

PROBLEM OR CHANGE DESCRIPTION:

VARIOUS PROBLEMS CORRECTED.  
SEE RELEASE NOTES FOR PERFORMANCE 4000 VERSION 1.03.  
(EMULEX DOCUMENT NUMBER ER2052901-00)

RELEASE NOTES ARE INCLUDED AS PART OF THE PERFORMANCE 4000 SOFTWARE UPDATE SERVICE. OTHERS WHO REQUIRE THIS INFORMATION SHOULD CONTACT THE EMULEX TECHNICAL SUPPORT DEPARTMENT.

SUMMARY OF CHANGE:

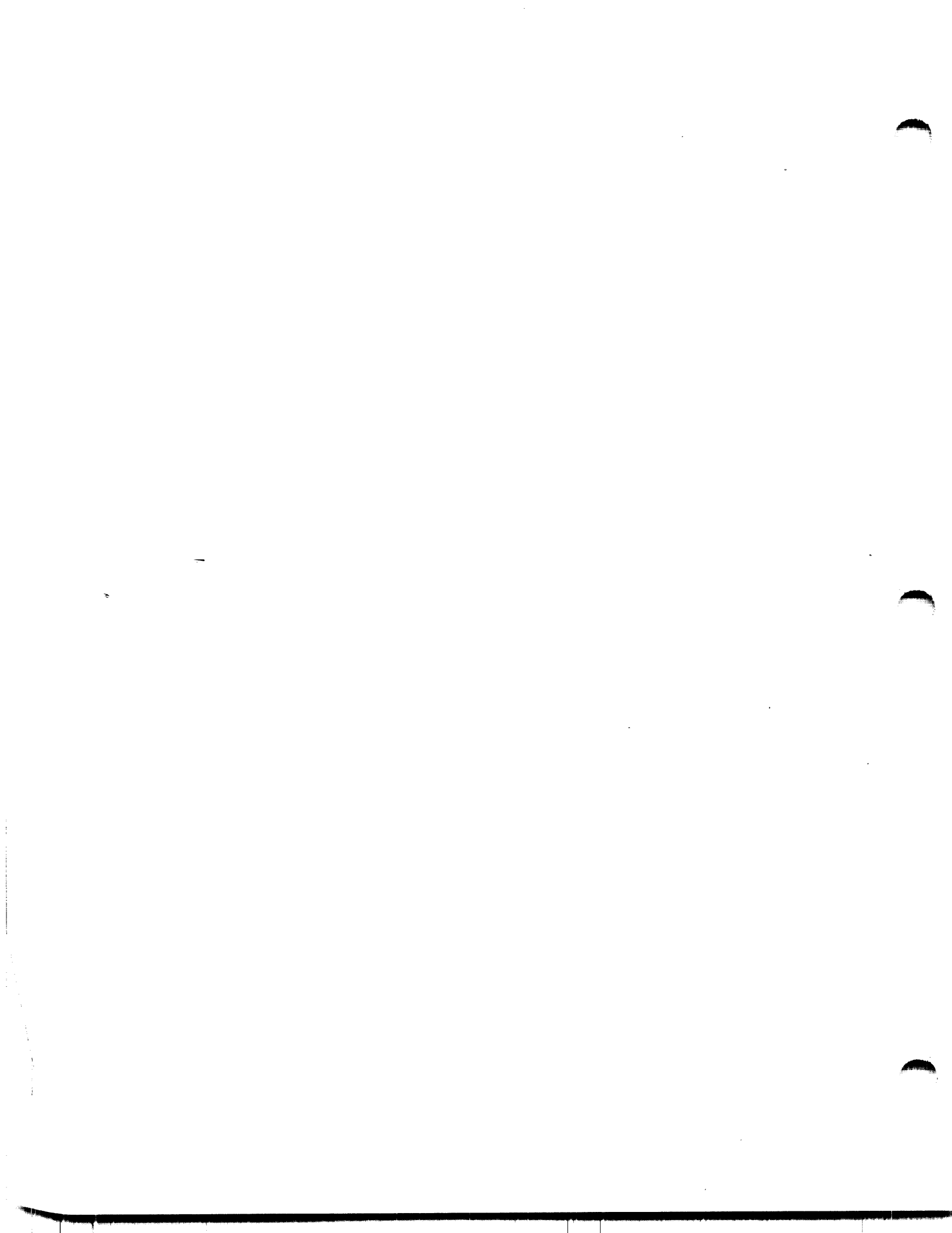
REVISION "G" UPDATE - VERSION 1.03 SOFTWARE  
 9-TRACK TAPE DISTRIBUTION PART NUMBER: ER2060302-00G  
 RX50 DISTRIBUTION PART NUMBER: ER2060702-00G  
 TK50 DISTRIBUTION PART NUMBER: ER2062002-00G

EFFECTIVITY:

IF EXPERIENCING PERFORMANCE 4000 PROBLEMS, PLEASE SEE RELEASE NOTES OR CONTACT EMULEX TECHNICAL SUPPORT FOR ASSISTANCE. OUTSIDE CALIFORNIA: 800-854-7112  
 IN CALIFORNIA: 714-662-5600

APPROVAL:

ENGINEERING: KEN J. WAGNER	TECH SUPPORT: <i>[Signature]</i> 10/2/89
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# EMULEX CORPORATION

Performance 4000 Terminal Server

Sep 9, 1989

Release Notes For Version 1.03

The Performance 4000 V1.03 release notes provide update information relative to this version that is not documented elsewhere. This includes *new features, current problems, bug fixes, and management hints*. To quickly locate items of interest see the table of contents on page iii.

In order to receive all updates you should subscribe to the Performance 4000 Software Update Service (contact your distributor or Emulex for more information).

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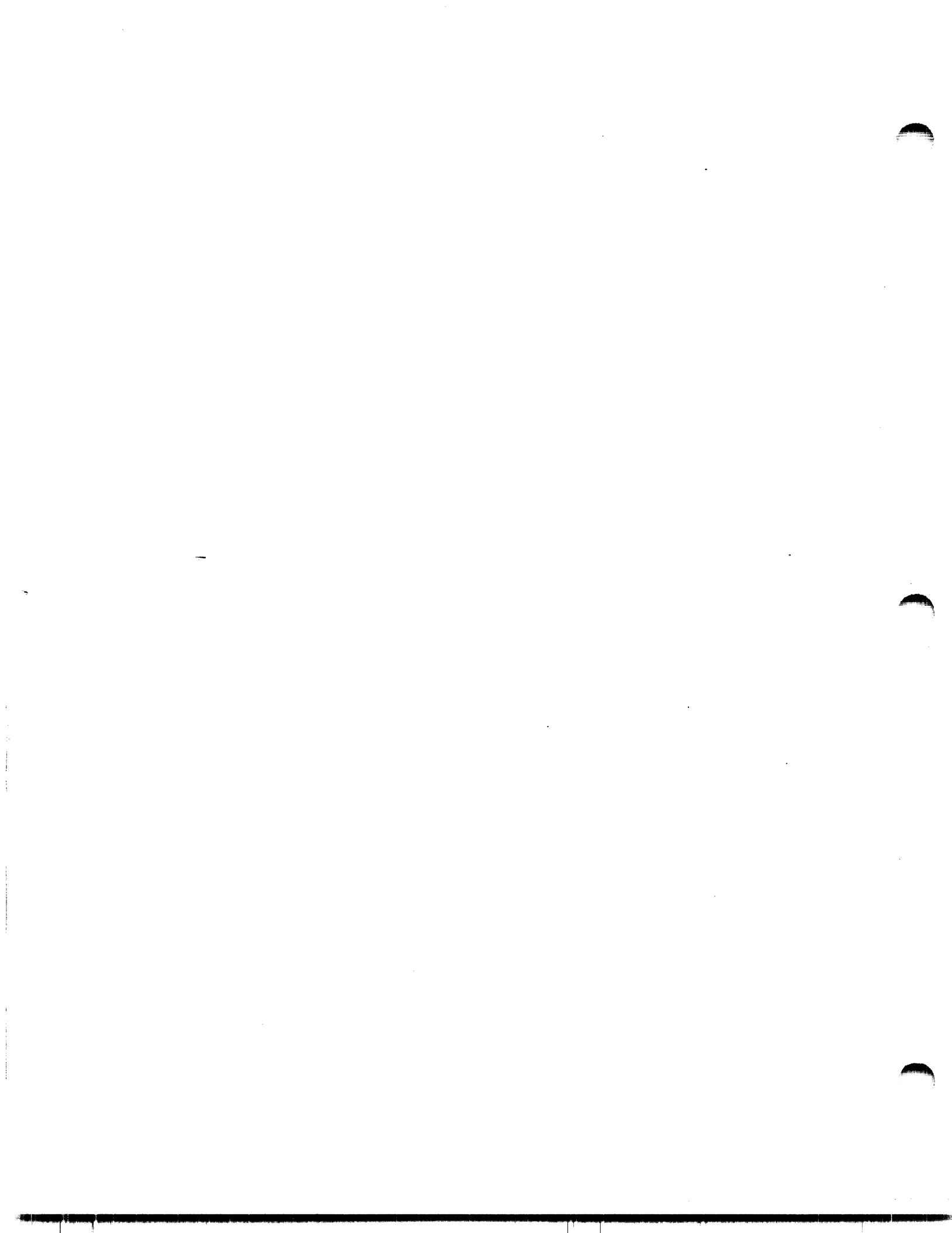


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## 1. PRODUCT OVERVIEW:

The Performance 4000 is an Ethernet terminal server that is compatible with the DECserver family (100, 200, 500). The user interface is a superset of the DECserver 200, with extra commands, increased displays, and added command recall/line editing functions. The Performance 4000 is made up of two units:

- \* **Base Unit.** The base unit contains either 12 or 16 serial ports and one parallel printer port. The first 4 ports of the 16 port configuration may be partial (RJ12) or full (DB25) modem control.
- \* **Expansion Unit.** The expansion unit can add 16 ports to the base unit with the first 4 ports being either full or partial modem control. Each base unit can accommodate one expansion unit.

The operational software for the Performance 4000 is actually stored in a file on the VAX/VMS Host. This file is then loaded from the host whenever power is applied to the server.

The firmware that allows the P4000 to load its operational software over the network is contained in a pair of PROMs on a pluggable module in the base unit. This software was upgraded from version 1.3 to 1.5 to support the crash dump and NCP LOAD capabilities of the version 1.03 operational software. To be upgraded to the latest load/dump firmware, contact the Emulex Customer Service department at the address on page 2.

## 2. PROBLEM REPORTING:

Please report any additional problems as well as suggestions for enhancement to:

Emulex Corporation  
Attention: P4000 Technical Support  
3545 Harbor Boulevard  
Costa Mesa, CA, 92626  
(714) 662-5600

Be sure to include specifics of your environment:

- \* The version of the server software (which is displayed with the SHOW SERVER command) and PerformancePak (which is displayed with the SHOW SERVER CHAR HARDWARE command) you are using.
- \* How often the problem occurs and if it is repeatable.
- \* Any messages that are output to the console port (be sure you have a console port defined, and Emulex options 5-6 enabled for messages).
- \* Your network configuration, including operating system revision(s).

Emulex may request that you send in a crash dump from the P4000, if possible. Obtaining a crash dump file is explained in section 5.3.

### 3. BUG FIXES IN THIS RELEASE:

This chapter lists some of the problems that have been addressed in this software release.

#### 3.1 3404 Errors With 200ms Circuit Timer.

On version 1.02 servers, setting the circuit timer to its maximum value of 200ms and starting a connection will cause a 3404 non-fatal console error to be generated every 200ms. Setting the circuit timer to any lower value (80ms is the default) will eliminate the problem. This problem has been corrected in version 1.03.

#### 3.2 3707 Errors on Connections.

Under certain conditions on version 1.02 servers, attempting a connection can result in the message:

```
Server - 3707 - #*!%?
```

with some random garbage as the message. The message is erroneous; the invalid message number and garbage text is caused by an incorrect pointer to the message within the server. The correct error message is:

```
Server - 719 - Insufficient resources
```

This condition is caused by having all 64 of the session information blocks in use in the server. The session information blocks could truly represent 64 sessions, but more likely they are corrupted session information blocks caused by a bug in the HIC queue processing routine. If that routine tries to start a queued HIC request on a printer port where the printer is offline, or to a non-existent serial port, the session information block will be corrupted and not reusable. This will repeat every two seconds until the printer is back online, the queue entry is deleted, or all of the session information blocks are corrupted. If this happens, all succeeding connection attempts will get the 3707 error. These problems have been corrected in version 1.03.

#### 3.3 4026 Errors on Login to Ultrix 3.0 Hosts.

Logging in to an Ultrix V3.0 host from a version 1.02 server would log a non-fatal 4026 warning to the console port. This problem has been corrected in version 1.03.

### 3.4 4041 Errors on Dedicated Service Ports.

Creating a dedicated LAT service and LAT service port on a VMS host, and attempting to connect to it from a version 1.02 server when there is a read or write outstanding, will cause the server to log a 4041 non-fatal console error, and hang the port. The port can be cleared by hitting the <BREAK> key. This problem has been corrected in version 1.03.

### 3.5 Command Line Editing: Invalid Escape Sequences.

Entering an invalid escape sequence (e.g. <ESC><ESC>) on a version 1.02 server can cause the server to incorrectly echo the command line, or misposition the cursor within the command line. Version 1.03 has been modified to print a bell character when it encounters an invalid escape sequence, and not to store those characters in the command buffer. The only acceptable escape sequences are the arrow keys and the HELP key when the port type is set to VT100 or ANSI. All escape characters are rejected if the port type is set to SOFTCOPY or HARDCOPY. Note that version 1.03 systems will echo the HELP key as if the user had typed 'HELP' followed by a space.

### 3.6 Command Line Editing: Softcopy Character Insertion.

On a version 1.02 server, on a port set for type SOFTCOPY, the following sequence will cause a command line editing error:

1. Enter some characters of a command.
2. Hit <BACKSPACE> to return to the beginning of the command line.
3. Hit ^A to go from overstrike mode to insert mode.
4. Type any printing character.

The character will echo, and the command line will be refreshed, but the cursor will be left at the end of the line, instead of at the current cursor position. The command line is still intact. This has been fixed in version 1.03.

### 3.7 CONNECT with Invalid Port Name Specified.

Connecting from a version 1.02 server and specifying an invalid port name for the service port (e.g. CONNECT SERVICE1 DESTINATION GARBAGE) will return the incorrect error message "232 - Service is in use". It will also affect the status of the service as it exists on the connecting server, so that an immediate retry attempt from the same server will return the error "255 - Service not available". The condition will clear typically in 10-30 seconds, upon reception of a multicast packet from the server offering the service in question. These problems have been corrected in version 1.03.



### 3.8 Crash: 3424 Errors.

Large volumes of HIC connection requests in a short period of time can cause version 1.02 servers to crash with a 3424 software exception. This has been fixed in version 1.03 by limiting the number of simultaneous HIC requests that will be processed.

### 3.9 Crash: Server at 100% and Front Panel Button Pressed.

Version 1.02 servers can crash if the server is operating at or near 100% CPU utilization, and the front panel buttons are held down. This problem has been corrected in 1.03.

### 3.10 CR/LF on Disconnect.

Version 1.02 servers print out an extra carriage return and line feed to service ports upon disconnection, which can cause misalignment of printer forms. This problem had been worked around by an interim hardcopy patch to the 1.02 server software. The problem has been corrected in version 1.03.

### 3.11 Dedicated Ports Can Get to Username Prompt.

On version 1.02 servers, users on dedicated service ports can get to the 'Username:' prompt and log in locally under the following conditions:

1. A privileged user issues the command `INIT DELAY n DISABLE` where `n` is greater than 0.
2. A user on a dedicated service port types `<CR>` to log in and connect, which fails because connections have been disabled by the `INIT` command.
3. The user types `<CR>` again and gets the 'Username:' prompt. He can log in to the local 'Server>' prompt and issue commands, but he cannot connect to any service.

This problem has been corrected in version 1.03.

### 3.12 DISCONNECT SESSSION with No Sessions.

Entering the command `DISCONNECT SESSION` on a version 1.02 server, when there are no active sessions for the port, will result in the erroneous status message 'Session 250 disconnected from <garbage>'. Entering the command only as `DISCONNECT` does not exhibit the problem. This problem has been fixed in version 1.03.

### 3.13 HIC Requests: Non-Existent Server Ports.

HIC requests to non-existent ports (i.e. ports 1-4 of a twelve-line server and ports 17-32 of a sixteen-line server) will be entered in the server queue on a version 1.02 server. This causes no immediate problem, but under extreme conditions it can fill the server queue. Requests for non-existent ports are rejected by version 1.03 servers.

### 3.14 HIC Requests: QUEUE Versus NOQUEUE.

Version 1.02 servers ignore the packet field that specifies whether the request should be queued if the service or port is not currently available. This field is determined in VMS by the LATCP command SET PORT LTAn:/[NO]QUEUE. Version 1.02 servers will unconditionally queue the request. This problem has been fixed in version 1.03.

### 3.15 HIC Requests: Solicitation Reject Counter.

Version 1.02 servers do not properly increment the 'Solicitations Rejected' counter for HIC requests that do not match the server group codes, though the HIC request is properly rejected. The counter is correctly incremented on version 1.03 servers.

### 3.16 Logout Messages Truncated at Low Baud Rates.

On version 1.02 servers the logout port message and session disconnect messages can be truncated at 75 and 110 baud, especially if there are multiple session disconnect messages. The timers have been increased for version 1.03 servers to accommodate the maximum message length.

### 3.17 NCP LOAD Command.

The NCP LOAD command is supposed to cause the specified server to reboot, and load its operational software from the host where the command was executed. In version 1.02 servers, the LOAD command correctly causes the server to reboot, but the server will load randomly from whatever host answers its multicast load request. This has been corrected in version 1.03, if you are using version 1.5 loader/dump prompts. The version of prompts is shown in the SHOW SERVER HARDWARE command next to the the header "PerformancePak:".

### 3.18 Packed Group Codes.

Setting a server to Emulex option bit 3 on tells the server to pack group codes within a packet into the smallest number of bytes that will hold all of the set bits. On version 1.02 servers, the group codes are not packed on all of the packets where it is possible. This causes no real problem, and is only an optimization. These packets are normally used only when starting up a virtual circuit or a session, and not for the majority of LAT traffic, so the performance difference is so slight that it is not measurable. Version 1.03 servers will pack group codes on all transmitted packets that contain group codes.

### 3.19 Ports Hanging in CONNECTING State.

On version 1.02 servers, under certain conditions having to do with disconnecting one session while an unrelated session is being connected, the session being connected can become hung. Issuing a `SHOW SESSION` command will show the session as being in the `CONNECTING` state. The problem is correctable by logging out the port and retrying the operation. This problem has been fixed in version 1.03.

### 3.20 RCF Connections: Garbage in Output Stream.

Certain types of RCF packets are mistakenly processed as input data in version 1.02 servers. This can cause garbage to be intermittantly output to the terminal that is initiating the RCF connection. This problem has been corrected in version 1.03.

### 3.21 RCF Connections: Loss of Connection on Busy Servers.

Version 1.02 servers that operate consistently at 70-100% CPU usage can occasionally drop RCF connections. The timeout values for these connections has been increased in version 1.03 to be more tolerant of this condition.

### 3.22 Service Ratings: Incrementing Upon Disconnect.

Version 1.02 servers do not immediately update the ratings for local service upon disconnection from those services. When a connection to a service is made, the rating is immediately decremented, but when the session is disconnected, the rating is not immediately incremented. The rating will be correctly set upon the next connection attempt, so there is no harmful effect of this condition. This problem has been corrected in version 1.03.

### 3.23 SET PORT SPEED on Non-Existent Ports.

Issuing the command `SET PORT n SPEED xxx` or `CHANGE PORT n SPEED xxx` on a version 1.02 server, where port `n` is a non-existent port, can corrupt server memory and cause the server to crash with a variety of symptoms. Using `DEFINE PORT n SPEED xxx` does not cause the problem. This problem has been corrected in version 1.03.

### 3.24 SET SERVER MAINTENANCE PASSWORD nnn.

On version 1.02 servers, issuing the command `SET SERVER MAINTENANCE PASSWORD nnn` will cause a syntax error. The command will still prompt for the password and verification, then error when it tries to parse the password that was specified on the end of the command line. On version 1.03 servers, the maintenance password can be specified at the end of the command line, but the maintenance password must be contained in double quotes.

### 3.25 SHOW PORT on Non-Existent Ports.

Issuing a SHOW PORT command on a 1.02 server and specifying a range of port numbers that includes non-existent ports, will display the information for the port in the range up to the first non-existent port, then terminate. This problem has been corrected in version 1.03.

### 3.26 SHOW PORT n SESSIONS.

Issuing a SHOW PORT n SESSIONS or SHOW PORT n STATUS on a version 1.02 server can display uninitialized garbage in certain fields if the session is currently in the process of connecting. These fields are the session type, node, port, and service name. These fields are pre-cleared in version 1.03 so they will display as blank if they are not yet set up.

### 3.27 SHOW PORT n STATUS on HIC Port.

Issuing a SHOW PORT n STATUS on a 1.02 server, where port n is a HIC application port with a HIC connection starting or active, can display an invalid or garbaged service name in the 'Connected to Service' field. This problem has been corrected in version 1.03

### 3.28 TEST PORT on Logged-In Port.

Version 1.02 servers will reject an attempt to perform a TEST PORT n command on a port that is logged in. This restriction has been removed in version 1.03 to be compatible with the DECserver 200.

### 3.29 TEST PORT 33 Slow.

On version 1.02 servers, the command TEST PORT 33 operates very slowly. This is because the timing loop incorrectly tries to use the baud rate field for port 33. TEST PORT 33 does work correctly to test the port; it just waits an inordinately long time between characters. This problem has been corrected in version 1.03.

### 3.30 TEST PORT LOOP INTERNAL: 3406 Crashes.

Issuing a TEST PORT n LOOP INTERNAL command to an non-existent port (e.g. port 31 on a sixteen-line server) will cause a version 1.02 server to crash with a fatal 3406 error. This problem has been corrected in version 1.03.

### 3.31 TEST PORT LOOP INTERNAL Fails.

Issuing a TEST PORT n LOOP INTERNAL command on a version 1.02 server will show all of the transmitted bytes to have miscompared, because of a misalignment of the transmit and receive buffers. This problem has been fixed in 1.03.

### 3.32 ZERO COUNTERS PORT ALL.

Version 1.02 servers will reject the command ZERO COUNTERS PORT xxx if xxx is the keyword 'ALL' or a port range. Specifying a single port number is accepted. Version 1.03 systems will handle all three forms of the command, as well as allowing the port specification to come before the keyword COUNTERS, as in ZERO PORT ALL COUNTERS.

## 4. KNOWN PROBLEMS WITH THIS RELEASE:

This chapter lists known outstanding bugs with this software release. Many of these errors are cosmetic in nature and have convenient workarounds.

### 4.1 BROADCAST to Flow-Controlled Port.

Using the BROADCAST command to send a message to another port can hang the broadcasting port if the receiving port is flow controlled. If the receiving port is XON'd, the broadcasting port will be released. This problem is intermittent, and will be corrected in a future release.

### 4.2 Command Line Editing: Insertion Overflow.

The command line editor in the server will incorrectly echo characters being inserted, when the insertion will cause the command line to go off the end of the screen. The following example demonstrates this:

1. Set the port type to VT100 or ANSI.
2. Enter a command line that almost reaches the right side of the screen.
3. Use <BACKSPACE> and/or the arrow keys to position the cursor in the middle of the command line.
4. Use ^A to go from overstrike to insert mode.
5. Enter more characters. The command line to the right of the cursor will be reprinted and moved over a character at a time until the right side of the command line hits the right edge of the screen. At that time, new characters will be echoed over the same cursor position, and the command line will not be reprinted.

This problem occurs because the P4000 uses the <BACKSPACE> character or a relative cursor-positioning function to move the cursor back from the right edge after reprinting the command line. When characters are overstruck at the right side of the screen, the resulting backspacing is thrown off. The characters are correctly inserted in the command line, and typing ^R will show the leftmost part of the command line correctly. This limitation is being investigated for possible correction in a future release.

### 4.3 LIST SERVER STATUS Clears the Screen.

LIST SERVER STATUS correctly returns the error message "790 - Specified option is not valid with LIST", but before it prints the message it clears the screen in preparation for the display. This problem is cosmetic only and will be corrected in a future release.

#### 4.4 LN03-R Printer and Secure Server Mode.

The LN03-R printer requires a special print symbiont for VMS. This symbiont requires the the VMS terminal parameter `SECURE_SERVER` to be set for the LAT application port. The P4000 does not currently work with the `SECURE_SERVER` feature set, so the P4000 does not currently support the LN03-R printer.

#### 4.5 Logout Reason Code Only Received From Local Mode.

If a port is logged out by a privileged user or by server shutdown, the logout reason code will only be sent to the port if the port is currently in local mode, i.e. at the `Server>` prompt or executing a local command. If the port is connected to a session the logout reason code will not be printed. The "port n logged out" message and the session disconnect messages will be printed in any case. This limitation is being investigated for possible correction in a future release.

#### 4.6 MONITOR Command Cancelled with Arrow Key.

Aborting a `MONITOR` command with an arrow key escape sequence will cause the `<ESCAPE>` character to abort the command, and the character following the `<ESCAPE>` will be echoed and inserted in the command line. A future release of the server software will flush the input buffer when the `MONITOR` command is aborted.

#### 4.7 Node Session Counters Do Not Reflect HIC Connections.

The Sessions counter in the `SHOW NODE SUMMARY` display does not currently include HIC connections from the node, only local connections to the node. This problem will be corrected in a future release.

#### 4.8 Ratings on Overlapped Service Ports.

If two services on a server both point to the same port, making a connection to one service does not update the service rating of the other service. For example:

- \* `SERVICE1` and `SERVICE2` are created on the same server, both pointing to port 12 as their service port. With no connections, both services will have a service rating of 255.
- \* A connection is made to `SERVICE1`. `SERVICE1`'s service rating goes to 0, as there are no other ports for that service. `SERVICE2`'s service rating is still at 255, however.
- \* A request is made for a connection to `SERVICE2`. The connection request is rejected, as port 12 is in use. However, at the requesting server, the rating for `SERVICE2` is still at 255, so the requesting service may fail over to `SERVICE2` indefinitely.

HIC connections by service name are not affected by this problem: if the service port is in use, the connection request will remain in the queue until a port is available. This problem will be addressed in a future release of the server software. The workaround for now is not to overlap service ports for services that will be directly connected to from another service (not HIC connected from an host).

#### 4.9 RCF Port Does Not Receive Broadcast Messages.

Asynchronous messages such as those from the BROADCAST command and server shutdown messages are not sent to the RCF port (port 34). This can cause the RCF port not to be informed of server shutdown. This limitation is being investigated for possible correction in a future release.

#### 4.10 RCF Port Does Not Flush Buffer on Logout.

Typing ^D to abort a master mode RCF connection (see section 5.4) can leave parts of the logout message in the output buffer, so the next RCF connection gets the message "Logged out port 34". This condition is inconsistent, and will be corrected in a future release.

#### 4.11 REMOVE QUEUE With Invalid Node or Entry.

Issuing the REMOVE QUEUE command with an invalid node name or entry number can result in multiple and illegal syntax error messages. For example,

```
REMOVE QUEUE NODE AAAAAAAAAAAAAAAAAAAAAAAAAAAAAA  
REMOVE QUEUE ENTRY 3333333333333333333333333333
```

will result in such messages. The problem is cosmetic only, and will be corrected in a future release.

#### 4.12 RESUME ? With No Sessions.

The RESUME ? command will display the sessions for the current port and prompt for which port to connect to. If there are no sessions, it will still prompt for which session to connect to. If the user responds with just a <CR>, a syntax error will be printed. A future release of the server software will cause RESUME ? not to prompt for a session number if there are no sessions.

#### 4.13 SET PORT 33 With Invalid Printer Options.

Trying to set port options on the printer port that are not valid for a parallel port (e.g. speed, parity, character size, etc.) will result in the message "702 - Keyword 'xxx' not known or ambiguous". The error message should reflect that the option is not valid for the printer port. This limitation is cosmetic, and will be corrected in a future release.



#### 4.14 SHOW PORT STATUS Does Not Display Remote Port.

The SHOW PORT STATUS 'Port:' field will show the port name of the slave port only if the port name was specified in the connection request. If the connection was made to a service only, with no port name specified, this field will remain blank. This information is available in one of the returned packets, and will be correctly displayed in a future release.

#### 4.15 TEST LOOP NODE xxx HELP FULL ASSIST NODE yyy.

The command TEST LOOP NODE xxx HELP FULL ASSIST NODE yyy is designed to test the network transmit and receive capabilities of the server using a secondary node to forward the data in a loop and back to the P4000. In certain network configurations, this command may hang when it receives only some of the return packets. The timeout message is not printed, as some of the packets have been received. If the network connection is truly not working, the timeout message is printed correctly. To work around the problem, use two separate commands specifying HELP TRANSMIT then HELP RECEIVE. This problem will be fixed in a future release.

#### 4.16 TEST PORT Returns Double Prompt.

Aborting the TEST PORT command with the <BREAK> key can result in the server prompt being printed twice. This is an architectural limitation caused by the asynchronous nature of TEST PORT; the problem is cosmetic only, and will not be corrected.

## **5. SOFTWARE CHANGES BETWEEN THIS VERSION AND 1.02:**

This chapter contains information about features that have been added to the P4000 since version 1.02, and other notes about using and managing the P4000. Some of these changes, such as crash dump, require the additional upgrade of the loader prompts to revision 1.5. For information on upgrading the loader firmware to revision 1.5, contact the Emulex Customer Service department at the address and telephone on page 2.

### **5.1 2065 Errors.**

The 2065 error was used on version 1.02 servers to indicate that the amount of receive buffer declared to the other side of a LAT connection is not currently available. The error does not mean data is lost; only that the potential for data loss is present if the other side of the connection should send its maximum amount of data immediately. The message was inserted as a debugging aid, but was found to cause more problems than it helped with, especially when used with broadcast messages, the console port, or the DIAG\_PORT option. The 2065 error has been removed from version 1.03. This change will not be noticeable to users.

### **5.2 2400 Errors on Illegal Front Panel Buttons.**

On version 1.02 servers, typing an illegal combination of front panel buttons, (e.g. holding down the 'Select' button and hitting the 'Next' button) will log an informational message #2400 on the console port. This message has been removed in version 1.03.

### **5.3 Command Line Editing: HELP Key.**

The HELP key on a VT2xx terminal is now echoed by the command line editor as if the user had typed HELP followed by a space.

### **5.4 Crash Dump.**

On version 1.03 servers that have the upgraded revision 1.5 loader prompts, the server now has the capability to upload server memory to a file on a host system in the event of a server error. This capability is called crash dump, and is useful for gathering information from failing field sites for analysis by Emulex Technical Support and Engineering. To get a crash dump, the following conditions must exist:

1. The server must be a software version 1.03 and the loader firmware at revision 1.5.
2. Crash dump must be enabled on the server. Use SHOW SERVER to see if dump is enabled, and CHANGE SERVER DUMP ENABLE to enable it.

3. At least one host must have the server node defined in the DECnet database with the P4KCONFIG command procedure, for the host to receive a crash dump request.
4. A crash must occur. The crash can take place on any one of the following conditions:
  - a. A privileged user issues the CRASH 300 command.
  - b. A fatal server error occurs.
  - c. A non-fatal server error occurs, and it has been explicitly watched for because a privileged user has issued a CRASH MESSAGE nnnn command.
  - d. A breakpoint in the code has been hit, that was set up by a privileged user issuing the command CRASH ADDRESS xxxx:yyyy command.

Options 4c and 4d should only occur under the explicit direction of Emulex Technical Support for troubleshooting a particular problem. Random execution of these commands **WILL CAUSE YOUR SERVER TO CRASH UNEXPLAINEDLY**. Do not send unsolicited crash dump information to Emulex. Please contact Emulex Technical Support if you are experiencing a problem; they will make the determination of whether you should obtain and send in a crash dump, and what information should accompany the crash dump.

When you first boot a server with the 1.03 software, you will get a message that the 'Extended Features' segment of the PROM is being initialized. This is a new section of internal PROM that holds the crash dump information. The message is normal.

Crash dumps are stored on the host in MOM\$LOAD: in a file name derived from "P4K" and the server name. The server command SHOW SERVER STATUS displays the name and address of the node that was last dumped to, so you can find the crash dump if you have the server defined on multiple hosts. Until the first time you get a crash dump, an invalid network address will be displayed in the address field. Note that the values displayed for the network address and network name come from the host settings in the DECnet database.

The host that was last dumped to successfully will be the default host for the next crash dump. The server will attempt to dump to that host first; if the host is not available or the dump fails for some reason, the server will send out a multicast dump request and will dump to the first host that responds to the request. Note that the only hosts that will respond are those with the server defined in the host's DECnet database.

## 5.5 Master Mode RCF Connections.

With version 1.03, the P4000 now has the ability to initiate an outgoing RCF connection to another server. Only one RCF connection can be active at any one time, whether it is slave RCF (from a host or another server) or master mode RCF (from the current server). If another port has a master mode RCF connection active, or if a host is accessing the RCF port, the CONNECT command will fail. The format for initiating an RCF connection is:

**CONNECT RCF NODE nodename [PASSWORD nnn] [TRIGGER]  
CONNECT RCF ADDRESS nn-nn-nn-nn-nn [PASSWORD nnn] [TRIGGER]**

The **PASSWORD** parameter is used to specify the maintenance password of the target server, if one exists. The default maintenance password is 0, meaning no password. The **TRIGGER** parameter is added to the command to cause the target server to reboot instead of establishing an ongoing RCF connection to it.

This is a privileged command. If a user types in the command, the P4000 will assume that the user is trying to connect to a service named RCF, and proceed accordingly. Typically, this will mean getting a syntax error parsing the rest of the command, or printing an error saying that the service RCF is unknown.

Master mode RCF does not currently support typeahead while the connection is being made. Wait for the message stating that the connection has been made before you commence typing. Master mode RCF does not support the use of the tilde (~) as a local switch character like the DECserver 500 does. There can be only one session in a master mode RCF connection.

To conserve server cpu time and lessen network activity, master mode RCF will extend the period of time between packets when there is no data to be sent to the slave (i.e. the user is not typing anything). This can result in a nominal echo delay for the first character typed after a pause.

Message 794 has been expanded to now read '794 - target does not respond, or password check failed'. This is to include two reasons why master mode RCF connections may fail: the remote node did not respond, or the maintenance password check failed on the remote node. There is currently no check to see if the node you are attempting to connect to is the local node; if you attempt to connect through RCF to the local node, message 794 will be printed after the timeout period.

## 5.6 P4K\_SETTINGS.COM to Save and Restore Server Settings.

The 1.03 distribution contains a command file called **P4K\_SETTINGS.COM**, and an associated executable image **P4K\_SETTINGS.EXE**, which is run by **P4K\_SETTINGS.COM**. The command file is used to save and restore the server settings, using the DEC utility TSM to log in to a server and display various information screens, then using the executable image to analyze those screens. To start the command file, use the DCL command:

```
@MOM$LOAD:P4K_SETTINGS
```

You will be asked whether you want to SAVE or RESTORE server settings, what the name of the server is, and (for SAVE) whether to use SHOW or LIST to display the current or stored settings. The SAVE option will create a command file named MOM\$LOAD:P4K\_servername\_SETTINGS.COM that contains all of the non-default server, port, and service parameters. The RESTORE option will set the server to the default settings by executing P4K\_nnn\_DEFAULTS.COM, then set up all of the specific server information from the saved settings file.

To use P4K\_SETTINGS, you must have installed P4K\_SETTINGS.COM and P4K\_SETTINGS.EXE from the distribution medium. You must have TSM installed, and you must have the specified server in the TSM database of servers. Also, TSM will be making an RCF connection to the server, so there can be no other RCF activity on the box. There are a few parameters that P4K\_SETTINGS cannot save for a server; the command file indicates what these parameters are after during a SAVE or RESTORE. P4K\_SETTINGS can be run as a batch file with parameters P1-P3 passed to it.

## 5.7 RSTS/RSX11M+ Support.

With version 1.03, the RSTS, RSX11M, and RSX11M+ operating systems are now fully supported. Version 1.03 has been extensively tested under the RSTS and RSX operating systems and certified to be working.

## 5.8 SET PORT TYPE AUTO.

The SET PORT TYPE AUTO command has been removed from 1.03. The command was originally intended as to correspond to the DCL command SET TERMINAL /INQUIRE, but due to the lack of a cohesive standard between terminal vendors for establishing terminal type, the command is being removed.

## 5.9 SET SERVER EMULEX Options.

The Performance 4000 now supports a new set of user selectable options that enable various features. The command syntax and definitions are listed below:

**SET/DEFINE/CHANGE SERVER EMULEX option-list [ENABLE|DISABLE]**

Options:

- 0 = Enable unknown frames (bypass protocol frame filter)
- 1,2 = Reserved
- 3 = Pack group codes into the smallest number of bytes
- 4 = Host Initiated Requests announce supported services
- 5 = Print Information-Only messages to the console port
- 6 = Print Non-Fatal error message to the console port

Sample syntax: CHANGE SERVER EMULEX 0,3 ENABLED

**Option description:**

- 0) The frame checker is a protocol filter that tests the validity of each frame before it is acted upon. Under certain circumstances it may inhibit a previously undefined LAT frame from being processed. Having an option to bypass this check allows for better supportability of newer (even un-announced) LAT products.

While frame validation is a welcome safeguard against potentially harmful packets, it does have a performance impact. By allowing the option to bypass this check the user may experience a significant performance improvement. Only the network manager can make the decision as to whether or not this is a fair tradeoff on the network in question.

Packet filtering has been made more robust and complete in version 1.03. Certain types of randomized data in packets could get by the previous filter and crash the server in the worst cases under version 1.02. Every effort has been made to minimize this risk under version 1.03.

- 3) Pack group codes...The DECserver 200 packs group codes into the least number of bytes possible. All other DEC LAT devices send group codes in a bit mask made up of 32 bytes. By enabling this option the Performance 4000 will pack group codes exactly like the DS200 thereby, in some cases, sending smaller packets (best case 31 bytes less).
- 4) Announce supported services...When this option is disabled (default) the Performance 4000 announces supported services during a HIC (host initiated connect) request like the DECserver 500 (the DS500 doesn't build a list of local services, it merely sends its node information). This results in significantly faster HIC response time when there are many local services defined.

When enabled the Performance 4000 behaves like the DECserver 200 (sends not only node information but also a full list of all local services). With all supported operating systems there is no known advantage in enabling this feature, it is offered so that the Server may emulate either the DECserver 200 or 50).

- 5) Informational messages are used primarily as a network management or debugging aid. These message include "Server has zero idle time" and "3503 - heavy network activity". Emulex recommends that under normal circumstances option 5 should be DISABLED. The option should be turned on to troubleshoot network problems and/or at the request of Emulex Technical Support only.

- 6) Non-Fatal warning messages are also used primarily as a network management or debugging aid. Emulex recommends that under normal circumstances option 6 should be **DISABLED**. The option should be turned on to troubleshoot network problems and/or at the request of Emulex Technical Support only.

### 5.10 Service Ratings: Non-Existent Ports.

On version 1.02 servers, service ratings of local services can be thrown off by having non-existent ports included in the service port list. For example, on a sixteen-line server, using the command:

```
SET SERVICE SERVICE1 PORTS 15-17
```

will cause a service to be created spanning three ports, two of which exist. The rating for this service should start at 255 and decrement by one for each port in use, then drop to 0 when no ports are available. In the example case, however, when ports 15-16 are in use, the service rating will still be 253, but the rating should really be zero since no connection can be made to this service. On version 1.03 servers, non-existent ports are not included in the ratings calculations.

### 5.11 SHOW PORT STATUS Displays Flow Control Status.

The SHOW PORT *n* STATUS display has been expanded to report whether the input or output stream of the selected port has been flow controlled, either with XON/XOFF or through modem controls.

### 5.12 SHOW SERVER COUNTERS ELT.

The SHOW SERVER COUNTERS ELT display has been expanded to report the maximum consecutive retransmit count. This count can be used as a network evaluation aid; the higher the number, the more fragile the connections, and the more retransmit traffic that exists on the network. If this count is ever at the maximum retry count, this indicates that at least one virtual circuit has been broken because the retransmit count was exceeded.

### 5.13 Ultrix-32 Support.

Version 1.03 now fully supports the Ultrix-32 operating system. Using the P4000 under Ultrix is more fully explained in section 8 of this document. Using Ultrix on previous version of the software could generate non-fatal 3111 and 3112 errors, and fatal 2025 errors. These problems have been corrected with version 1.03.

## 6. MISCELLANEOUS NOTES:

### 6.1 BROADCAST Messages Can Display in Graphics Characters.

Asynchronous messages such as those generated by the BROADCAST command or server shutdown can be generated in graphics characters if the server was doing a SHOW or MONITOR command, or the current user program in a connection had set the terminal to graphics mode. There is currently no plan to add characters to the asynchronous messages to turn off the graphics mode, as such character sequences would be too dependent on terminal type.

### 6.2 CONNECT Aborted by ^X.

If the local switch character (e.g. ^X) is typed after a CONNECT command, just before the message is printed saying that the session is connected, it is possible for a session to be created but not made the current session. For example, then typing the command DISCONNECT will print the error message 'no current session'. Typing the command RESUME will resume the session in question and make it the current session.

### 6.3 CONNECT Favors Local Service.

The CONNECT command will favor a local service over a remote service of the same name. For example, if you offer a service called PRINTER1 on the local server, and any number of remote servers also offer a service of the same name, a CONNECT command will always try to connect to the local service before attempting to connect to any remote server. This is done to minimize the amount of Ethernet traffic. This favoritism can be overridden by explicitly specifying the node on the CONNECT command.

### 6.4 Dedicated Port Connections Echo a Bell.

Typing a <CR> on a port that is set up as a dedicated port to a particular service will echo the <CR> with a bell character to alert the user that a connection attempt is being made. The bell character is output in lieu of the connection messages that are printed on non-dedicated ports. The character only become a concern where it may affect other communications hardware directly connected to the server port.

### 6.5 INIT DIAGNOSE Returns Error 799.

The INIT DIAGNOSE command is not supported on the P4000, and any attempt to use it will print the error '799 - parameter DIAGNOSE not supported'.



## 6.6 Modem Activity Can Cause Port to Fail Self Test.

Heavy modem signal activity on a line during server self-test can cause the port to fail self-test and be disabled. Sufficient modem activity has only been observed in the field on modem control lines that were 'floating'; these sites were corrected by properly terminating modem lines.

## 6.7 MONITOR QUEUE SERVICE.

Issuing a `MONITOR QUEUE SERVICE xxx` command where `xxx` is not a valid local service will be accepted, and the queue will be monitored. The only way any entries will ever be displayed, however, is if a privileged user creates the service in question, and then an entry is queued to it.

## 6.8 Service Ratings.

The P4000 currently uses the same service rating scheme as the DECserver 200 version 1.0. The service rating starts at 255, and is decremented by one for every port that is in use, or set to 0 if all of the ports for that service are in use. The service with the highest rating will be the one chosen if multiple servers offer a service with the same name.

The DECserver 200 version 2.0 has changed the algorithm used to calculate service ratings. The new algorithm produces consistently lower service ratings than the old algorithm. On a network with only the old or only the new type of ratings, connection attempts are spread out correctly. On a network with P4000s and DECserver 200 V2.0 servers with services of the same name, the distribution of connection attempts will be heavily weighted in favor of the P4000s.

Emulex is currently investigating whether to implement the new ratings method in a future release. In the mean time, Emulex recommends that you use different service names for P4000 services than you use for DECserver 200 V2.0 services, or that you trade in all of your DECserver 200s for Emulex P4000s.

## 6.9 SET PORT AUTOBAUD ENABLE.

Using the command `SET PORT n AUTOBAUD ENABLE` requires the terminal attached to the port to be set for 8-bit no parity, or 7-bit even parity for autobaud to work correctly.

## 6.10 SET PORT SPEED 38400 on 32-Line Server.

The P4000 does not support setting ports to 38400 baud on 32-line servers. If you attempt the command `SET PORT SPEED 38400` on a 32-line server, the error message reads "illegal baud rate". A future version of the server will have an error message that more accurately reflects that the baud rate is unacceptable for 32-line servers.

## 6.11 SHOW SERVER ALARMS.

There is an undocumented command SHOW SERVER ALARMS that will display the number of non-fatal console errors that have occurred since the server was last booted, and the error number and times of the most recent 16 errors. This can be used to display non-fatal error information in lieu of (or in addition to) settings Emulex option 6 enabled to display all non-fatal errors to the console port.

## 6.12 Start Slot Retries Unlimited.

There is currently no limit on the number of start slot retries that the server will make to a host. This is only a problem in the unlikely event that the host is responding to packets enough to keep a virtual circuit alive, but is not responding to start slots. This has only been observed in the case of a corrupt VMS system. If such a condition exists, the server will re-send a start slot every ten seconds until the host responds, or until the user types the local switch character (or BREAK) to abort the connection attempt.

## 7. MANUAL CHANGES (REVISION "A" ONLY):

### 7.1 Page 3-2 Incorrect Syntax of SET PORT.

SET PORT VT100 should read SET PORT TYPE VT100.

### 7.2 Page 3-4 Replace the description of Ctrl-U and Ctrl-Z.

Ctrl-U - Aborts the current command line without causing the command to be executed.  
Ctrl-Z - Aborts the entering of passwords.

### 7.3 Page 3-13 To clarify dedicated and preferred services.

Users who commonly connect to a particular service but on occasion require a connection to a different service can have their port configured for a preferred service with autoconnect enabled. With this configuration, upon logging into the port and responding to the server password and username prompts (if enabled) the user is automatically connected to the preferred service. If the user requires a connection to a different service, he can hit the break key to enter local mode (e.g. get the Server> prompt) and then issue a new connect command.

The difference between a dedicated port and a preferred service port is that the dedicated port user *cannot* get into local server mode and have access to other services whereas the preferred service port *may* get into local mode if desired.

### 7.4 Page 3-15 To clarify the use of modems.

AUTOBAUD *must* be disabled if the modem is a dial-out modem. Autobaud *may* be enabled if the modem is a dial-in modem.

If your modem has a fallback speed, and supports alternate speed modem protocol signals DSRS and SMI, you may set the ALTERNATE SPEED option (see section 5-23).

If a port is attached to an alternate speed or multiple speed ~~modem~~ and the modem is a dial-in modem, the alternate speed option can be disabled and the autobaud option can be enabled to support the fallback speed(s).

### 7.5 Page 5-23 Replace the description of ALTERNATE [SPEED].

Default: NONE. Specifies the fallback speed for a dual speed modem. In order for this option to work, the modem must support alternate speed modem protocol signals DSRS and SMI. This option will not work on modems that support more than 1 fallback speed. If the modem supports an alternate speed and does not support DSRS and SMI or it is a multiple speed modem (3 speed) *and the modem is a dial-in modem*, the alternate speed option can be disabled and the autobaud option can be enabled to support the fallback speed(s). Example:

CHANGE PORT x SPEED 2400 ALTERNATE SPEED 1200

See appendix C for more information.

#### 7.6 Page 5-27 Replace the description of DCDLOGOUT with.

Default: ENABLED. When disabled, the server logs out a port immediately if DCD (full modem port) or DSR (partial modem port) is lost. If enabled, and DCD is lost, the server waits two seconds and if DCD is still not present, logs out the port.

This option should be disabled if the device is a null modem device such as a data switch or computer port.

#### 7.7 Page 5-28 Replace the description of DSRLOGOUT with.

Default: DISABLED. When this option is enabled, the server logs out a port if the device attached to the port deasserts a modem signal (usually DTR) that is connected to the DSR pin on the server (this typically happens when the device is powered off). If DSRLOGOUT is enabled, the MODEM CONTROL option must be disabled. Example:

CHANGE PORT x DSRLOGOUT ENABLED MODEM DISABLE

The DSRLOGOUT option is intended for use on ports that have terminals attached. When the terminal is powered off, server port DSR is lost, causing the server to logout the port. Note that the port DOES NOT DEASSERT DTR to the device as required by data switch and computer ports. Therefore, never enable the DSRLOGOUT option on a port if the attached device is a data switch or computer port. Instead, enable MODEM CONTROLS. The modem control option will deassert DTR to the device if server DSR is lost, or the port's LAT session is disconnected for any reason.

#### 7.8 Page 5-28 Replace the description of DTRWAIT with.

Default: Disabled. When disabled, the modem signals DTR and RTS (full modem port) or DTR (partial modem port) are asserted as soon as the server initializes and remain asserted except for a 5 second period when the port is being logged out (at which time they are deasserted). When enabled, DTR and RTS (DTR partial modem port) remain deasserted until either of the following occur:

1. A LAT connection is made to the port.
2. A RING (full modem port) or DSR (partial modem port) is detected.

If DTRWAIT is enabled, the MODEM CONTROL option must also be enabled. Example:

**CHANGE PORT x DTRWAIT ENABLE MODEM ENABLE**

The following is generally true:

- If a modem is on a full modem port, enable DTRWAIT.
- If a modem is on a partial modem port, and the port access is remote, enable DTRWAIT.
- If a modem is on a partial modem port, and the port access is local or dynamic, disable DTRWAIT.
- If a data switch or computer port is on a full or partial modem port, disable DTRWAIT.

#### 7.9 Page 5-34 SET PORT TYPE AUTO.

SET PORT TYPE AUTO is no longer supported. A specific port type must be entered.

#### 7.10 Page 5-41 Maintenance Password Syntax.

The example for SET/DEFINE/CHANGE SERVER MAINTENANCE PASSWORD is incorrect. The maintenance password must be enclosed in quotation marks if it is specified on the end of the command line. Alternatively, if you enter the command line without any password specified, you will be prompted for the password and verification.

#### 7.11 Page 5-42 Change to NODE LIMIT.

The default node limit has been increased from 48 to 125.

#### 7.12 Page 5-46 Change to the description of SOFTWARE option.

"This option is not valid with the SET or CHANGE commands, only DEFINE."

#### 7.13 Page 5-47 Local Service Limit.

The number of local services offered by a single P4000 is 16.

#### 7.14 Page A-13 The Parallel Port Printer Cable drawing is incorrect.

The bottom pin number on the Dataproducts Printer connector should be pin 44, NOT pin 48.

### 7.15 Page B-2Change Valid Baud Rate List.

Delete the following baud rates from the speed table: 50, 200. Add baud rate 2000.

### 7.16 Page C-2Change ELT multicast address.

From "AA-00-04-00-1E-04" to "09-00-2B-00-00-0F".

## 8. ULTRIX-32 INFORMATION:

This chapter contains information on using the P4000 under the Ultrix-32 operating system. More complete information on using terminal servers under Ultrix can be found in the DEC Ultrix documentation.

### 8.1 Making an ULTRIX-32 System a P4000 Load Host

#### Editing the Configuration File:

If you intend your host system to be a load host add the following entries to the configuration file if they are not already present:

```
options DLI
pseudo-device dli
```

The configuration file can be found in the directory `/sys/conf` and has the name of your system, e.g. if your system name is `ROYAL` then your configuration file will be in `/sys/conf/ROYAL`. You must rebuild your kernel to make sure the changes take effect.

#### Editing the rc.local File:

Editing the `/etc/rc.local` file allows you to start the network interface and the `mop_mom` daemon on system boot-up.

To start the network interface (Unibus DEUNA, DELUA):

```
/etc/ifconfig de0 '/bin/hostname'
```

To start the network interface (Q-Bus DEQNA, DELQA):

```
/etc/ifconfig qe0 '/bin/hostname'
```

To start the network interface (Micro-VAX 2000 DESVA):

```
/etc/ifconfig se0 '/bin/hostname'
```

To start the network interface (BI DEBNT, DEBNA):

```
/etc/ifconfig ni0 '/bin/hostname'
```

To start the `mop_mop` daemon (these commands must come after the command to start the network interface):

```
if [ -f /etc/mop_mom ]; then
    /usr/etc/mop_mom &
fi
```

The command above will cause your host to load all servers that it has the requested software for, and to accept dumps from all servers requesting to do so. If this is not desired for your node, you may alternatively use the command below to cause the mop\_mom daemon to search the nodes database and support only servers that it finds there. Use the Emulex utility /usr/lib/dnet/p4kconfig to manage this database.

```
if [ -f /etc/mop_mom ]; then
    LOADDUMP_SECURE=on /usr/etc/mop_mom &
fi
```

### **Installing the Terminal Server Software:**

You now must install the terminal server software image on your host. To do this mount your media on your host and make sure it is write protected. From a terminal type the following syntax. Replacing the '?' symbol with the device number.

```
setld -l /dev/rmt?h
```

From here the setld utility will prompt you on completing the installation.

### **Making Your Changes Effective:**

To make your changes effective you must now reboot your system. Type the following command to shutdown the system and reboot.

```
/etc/shutdown -r "Rebooting For Terminal Server Support"
```

### **Prepare Server and Host for Downloading:**

You may use any of the three ways of down-line load a terminal server to load software to the Performance 4000. The first method and simplest is to connect the terminal server to the net and power it up. The server will automatically request its software from your host. Remember that if you used the LOADDUMP\_SECURE options that this node must be in your database or the request will be ignored. Secondly you may use the load command from the host to load the server. Again the server must be in the nodes database; use the p4kconfig utility provide to manage this database. Syntax as follows.

```
/etc/load willie -p [nnnn...]
```

Where willie is the name of the server and 'nnnn' is the service password. Thirdly you may use the trigger command. The difference between load and trigger is that load will force the server to accept the software defined in the nodes database whereas trigger will allow the server to request the software name defined in its own local database. Currently the Performance 4000 does not support directed software loading so there is no effective difference between trigger and load. Syntax for trigger is.



```
/etc/trigger willie -p [nnnnn...]
```

Where willie is the name of the server and 'nnnnn' is the service password.

### **Confirming Down Load Succeeded:**

Type the following command to see if the down was successful.

```
more /usr/spool/mqueue/syslog
```

If the load was successful you should see entries similar to the following:

```
Jun 13 12:22:17 localhost: 2459 mop_dumpload: sending volunteer assistance for system
load, (target node Ethernet address = 00-00-c9-00-29-8B Jun 13 12:22:18 localhost: 2459
mop_dumpload: sending system image, (target node Ethernet address = 00-00-c9-00-29-8B)
```

## **8.2 Supporting Printers From an ULTRIX-32 Host**

### **Matching Printer and Server Hardware Settings:**

First determine your printer's characteristics. Make a list of the printer's character size, flow control method, parity and speed. Execute the following P4000 command:

```
Server> SHOW PORT n HARDWARE
```

Where n is the number of the port you wish to connect your printer to. Now change the port settings using commands similar to the ones below:

```
Server> CHANGE PORT n ACCESS REMOTE
Server> CHANGE PORT n SPEED 9600
Server> CHANGE PORT n AUTOBAUD DISABLE
```

For further information on setting port configuration see the Performance 4000 Terminal Server Manual.

### **Testing the Printer Port:**

After you have connect the printer to the port you have configured on the terminal server, execut the following P4000 command:

```
Server> TEST PORT n
```

You should see a rotating character pattern being output to your printer. If you do not get the test pattern, check your printer and port settings.

## Selecting Names for Server and Port:

If you have not already done so you must now select a name for your terminal server and port. The current settings for these items can be viewed with the following P4000 commands:

```
Server> SHOW SERVER NET
Server> SHOW PORT n LOCAL
```

The settings can be changed with P4000 commands similar to the ones show below:

```
Server> CHANGE SERVER NAME ROYAL
Server> CHANGE PORT n NAME PRINTER_1
```

## Selecting a LAT Terminal Line:

To have succesful printer connections you must prevent others from logging in on the LAT terminal line that you select. To disable logins, edit the file `/etc/rc.local` and select the LAT terminal device (they are identified by a major device number of 39). Place the following command in the file after the local daemons section:

```
if [ -f /etc/lcp ]; then
    /etc/lcp -s -h /dev/tty12 >/dev/console
fi
```

To have this command take effect without rebooting your system, execute the following comamnd:

```
/etc/lcp -s -h /dev/tty12
```

Next you must change the entry for the LAT terminal line in the `/etc/ttys` file. An entry for the line you have selected should look like this:

```
tty12 "/etc/getty T9600" vt100 off nomodem # LAT Printer
```

To make this change take effect immediately type the following.

```
kill -HUP 1
```

## Editing the printcap file:

Now you must make an entry for your printer in the `/etc/printcap` file. A sample entry is shown below.

```
lp1lla05!Terminal Server Printer:\
:fs#023:\
:fc#0177777:\
:lp=/dev/tty12:\
:ts=ROYAL:\
:os=LAZER:\
:op=PORT_33:\
:lf=/usr/adm/lpd-errs:\
:if=/usr/lib/lpdfilters/lpf:\
:af=/usr/adm/lp1acct:\
:sd=/usr/spool/lp1:
```

'lp' is the LAT terminal line you have selected.

'ts' is the name of your terminal server.

'os' is the name of the service on your server

'po' is the name of the port on your terminal server which printer is connected to.

The entries os and po may be used together or may be used separately, but one of them must always be present. For information on other entries in this example consult your DEC ULTRIX documentation.

### Setting Up Spool Directories:

Now you must set up the spool directory that you just defined in the /etc/printcap file. If your entry was as ours above you would type.

```
cd /usr/spool mkdir lp1 chown daemon lp1
```

### Testing the Printer From ULTRIX-32:

You are now ready to print files from your ULTRIX-32 system to the printer connected to your terminal server. Use the following syntax to print files to you printer.

```
lpr -Plp1 <file name here>
```

## 8.3 Host-Initiated Connections (HIC)

This section describes the necessary host commands to allow application programs to make host initiated connections to the Performance 4000 Terminal server.

### Setting Up ULTRIX-32:

To define the connection between the host and the terminal server type the following command.

```
lcp -h /dev/tty<nn>:<server name>:<port name>
```

Where <nn> is the number of the tty you have selected, <server name> is the name of your target server and <port name> is the name of the target port. For example.

```
lcp -h /dev/tty12:ROYAL:PORT_16
```

Use the kill command to make this change effect immediately.

```
kill -HUP 1
```

Also you need to change the /etc/ttys file to prevent others from logging in on your LAT terminal line. The entry for the tty should look like this.

```
tty12 "/etc/getty T9600" vt100 off nomodem # HIC Port
```

For further information on HIC connections consult your DEC ULTRIX-32 documentation.

## 8.4 Server Maintenance

### 8.4.1 Downline Loading

The loading of server software is identical whether the load request is made by server or host. By default the Performance 4000 will request the file P4K000E.sys. This file should be present in the directory /usr/lib/dnet for load to be successful. Also network access must be defined in the file rc.local as the mop\_mom daemon must be start there as well. For further details please see preivous sections.

### 8.4.2 Upline Dumping (Crash Dump)

Your host will accept up-line loading from terminal servers if properly configured. Up-line dumps are the memory image of a terminal server and are useful tool in determining terminal server operational problems. To enable up-line loading first type the command on the terminal server privledged port.

```
change dump enabled
```

Next if have not already done so follow the instruction for making ULTRIX-32 a load host. Finally you must insure that nodes you wish to accept dumps from are defined in your nodes data base. Use the utility /usr/lib/dnet/p4kconfig detailed later in the document to make these entries.

### 8.4.3 Remote Console Facility (RCF/ccr)

The console carrier requester (ccr) command allows you to set up logical connections to remote nodes on your network and manage them. All commands available through local or privileged mode are available through this type of connection. For more information on practical uses consult the Performance 4000 manual under RCF, remote console facility. To use this feature again the node must be defined in the nodes database. Use the utility /usr/lib/dnet/p4kconfig detailed later in this document to make the appropriate entry. Next type the following from a terminal logged in a super-user.

```
/etc/ccr willie
```

Where willie is the node name. If no other node currently has a active or pending console connection you should see.

```
ccr: Remote console reserved
```

Now type <CR>. You see a prompt as follows.

```
#
```

Now type the maintenance password. The default password on Performance 4000 terminal servers is "access". Press <CR> and you should now be logged in. To end the connection at any time Press <CTRL D>. You should see the following and be returned to your host prompt.

```
ccr: Remote console released
```

### 8.4.4 The p4kconfig Utility for ULTRIX-32

This utility eliminates the need for memorizing many cumbersome commands and associated syntaxes by providing a menu driven and prompted interface to host management of terminal servers. In addition any time an incorrect response is given to a prompt detailed help will be given to assist the user in his task. Below is a summary of the features.

**Show Known Servers:**

Selecting this option all the nodes/servers that you have defined using the p4kconfig utility. This display is generated from p4kconfigs private database.

**Add a Server:**

This option allows you to add nodes/servers in a prompted fashion. Be prepared to provide the server name, type, service circuit and ethernet address.

#### **Swap or Modify a Server:**

This option allows you to modify a portion of an entry in the case the entry was made in error or a new piece of hardware is being swapped in a particular nodes place.

#### **Delete a Server:**

Selecting this option allows to delete nodes from both the p4kconfig and host's nodes data base simultaneously.

#### **Restore Existing Servers:**

This option provides great convience in the event the host's nodes database is inadvertently deleted. This option will restore all the node/servers defined in the p4kconfig's private database to the nodes database.

#### **Show Nodes Data Base:**

This option allows you to confirm that the nodes entered with p4kconfig are indeed in the host's nodes database by displaying it for you. Note: other nodes you have not entered with p4kconfig will be displayed here if they have been defined by other sources.



# ENGINEERING CHANGE ORDER

ECO NO. 05816 ISSUE DATE 12/15/89  
 ECR NO. SHEET 1 OF 1

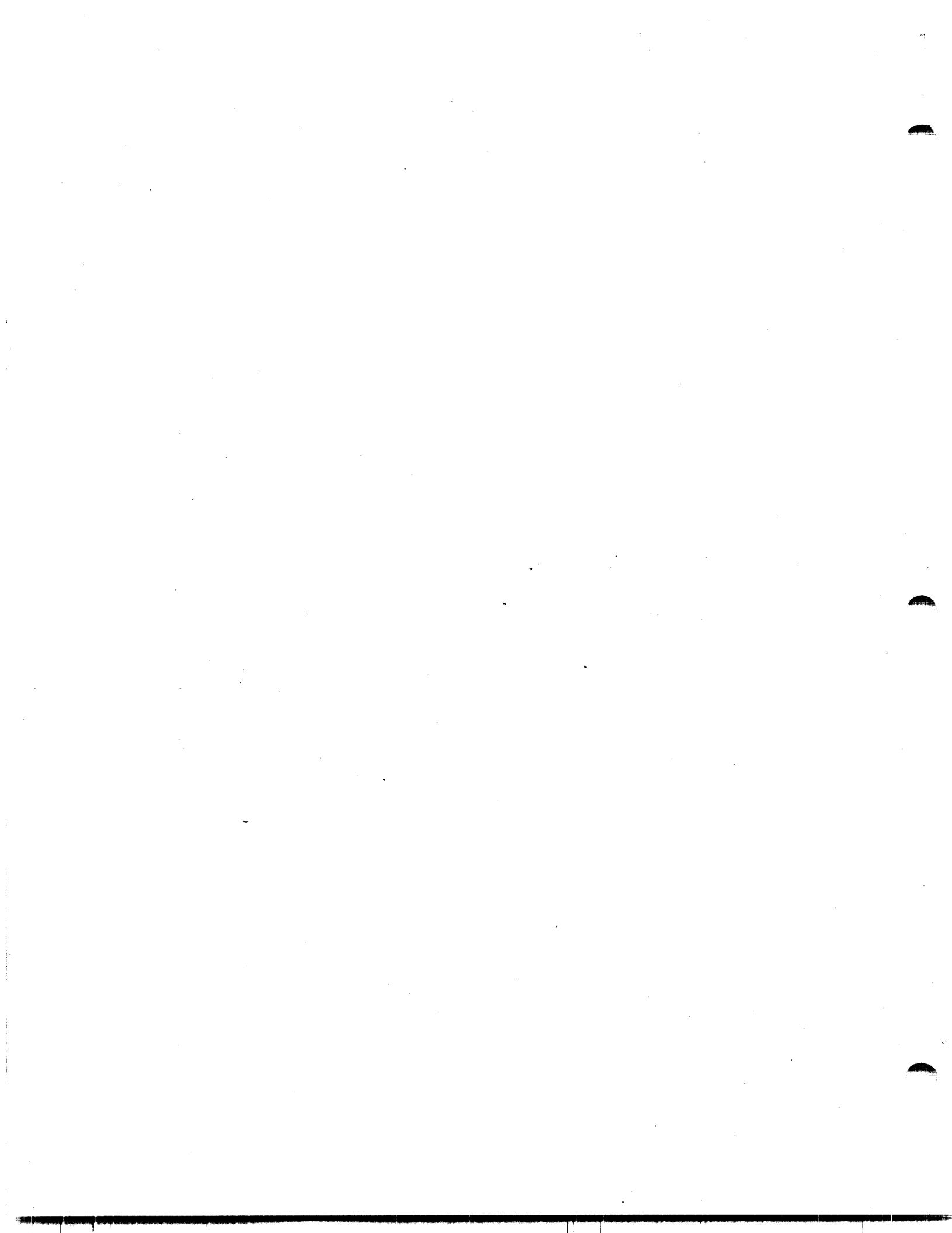
REQUESTER K. DeGroot	DATE 12/14/89	APPROVAL <i>[Signature]</i>	DATE 12-14-89	MODEL/EQUIPMENT AFFECTED P4000T
<b>EFFECTIVITY</b> <input type="checkbox"/> ALL UNITS IN HOUSE <input type="checkbox"/> ALL UNITS IN PROCESS <input checked="" type="checkbox"/> NEXT BUY/BUILD <input type="checkbox"/> RECORD	<b>AFFECTED</b> <input type="checkbox"/> MANUALS <input type="checkbox"/> FIRMWARE <input type="checkbox"/> SOFTWARE <input type="checkbox"/> DIAGNOSTICS <input type="checkbox"/> PRODUCTION TOOLING <input type="checkbox"/> CONFIGURATOR	<b>MATERIAL DISPOSITION</b> 1. USE AS IS 2. REWORK 3. PHASE-IN 4. NOT APPLICABLE 5. SCRAP	<b>TYPE</b> <input type="checkbox"/> CORRECTIVE <input type="checkbox"/> MAINTAINABILITY <input type="checkbox"/> RECORD CHANGE <input type="checkbox"/> DEVIATION	<b>PRIORITY</b> <input type="checkbox"/> 1 CRITICAL <input type="checkbox"/> 2 URGENT <input checked="" type="checkbox"/> 3 ROUTINE
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ER2052903-00	-	A	Release Notes P4000	3	4	4	4	4	4
ER2060307-00	-	A	Software P4000T VMS Tape	3	4	4	4	4	4
ER2060907-00	-	A	Master Source	3	4	4	4	4	4
ER2062007-00	-	A	TK50	3	4	4	4	4	4
ER2060308-00	-	A	Software P4000T Unix Tape	3	4	4	4	4	4
ER2060408-00	-	A	Cartridge	3	4	4	4	4	4
ER2060908-00	-	A	Master Source	3	4	4	4	4	4
ER2062008-00	-	A	TK50	3	4	4	4	4	4
ER2011743-00	-	A	Prom Set&P/L P4000 TCP/IP	3	4	4	4	4	4
ER2011745-00	-	A	Prom Set&P/L P4000 Selfload	3	4	4	4	4	4

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**PERFORMANCE 4000-T  
ETHERNET TERMINAL SERVER  
SYSTEM MANAGER'S MANUAL**



## WARNING

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## Emulex Product Warranty

**SERVER WARRANTY:** Emulex warrants for a period of twelve (12) months from the date of shipment that each Emulex Performance 4000 base unit or expansion unit supplied shall be free from defects in material and workmanship.

**CABLE WARRANTY:** All Emulex provided cables are warranted for ninety (90) days from the time of shipment.

The above warranties shall not apply to expendable components such as fuses, bulbs, and the like, nor to connectors, adaptors, and other items not a part of the basic product. Emulex shall have no obligation to make repairs or to cause replacement required through normal wear and tear or necessitated in whole or in part by catastrophe, fault or negligence of the user, improper or unauthorized use of the product, or use of the product in such a manner for which it was not designed, or by causes external to the product, such as but not limited to, power failure or air conditioning. Emulex's sole obligation hereunder shall be to repair or replace any defective product, and, unless otherwise stated, pay return transportation cost for such replacement. Purchaser shall provide labor for removal of the defective product, shipping charges for return to Emulex and installation of its replacement.

THE EXPRESSED WARRANTIES SET FORTH IN THIS AGREEMENT ARE IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING WITHOUT LIMITATION, ANY WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, AND ALL OTHER WARRANTIES ARE HEREBY DISCLAIMED AND EXCLUDED BY EMULEX. THE STATED EXPRESS WARRANTIES ARE IN LIEU OF ALL OBLIGATIONS OR LIABILITIES ON THE PART OF EMULEX FOR DAMAGES, INCLUDING BUT NOT LIMITED TO SPECIAL, INDIRECT, OR CONSEQUENTIAL DAMAGES ARISING OUT OF, OR IN CONNECTION WITH THE USE OR PERFORMANCE OF THE PRODUCT.

**RETURNED MATERIAL:** Warranty claims must be received by Emulex within the applicable warranty period. A replaced product, or part thereof, shall become the property of Emulex and shall be returned to Emulex at Purchaser's expense. All returned material must be accompanied by a RETURN MATERIALS AUTHORIZATION (RMA) number assigned by Emulex.

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## 1.1 Overview

---

This manual describes how to install and configure the Emulex Performance 4000-T Ethernet Terminal Server.

If you want to get the Performance 4000-T installed as quickly as possible without enabling any special features, you need to read only the first three sections of this manual:

- **Section 1 (Introduction)** is the section you are reading now.
- **Section 2 (Installation)** describes physical installation, cabling, and host software loading.
- **Section 3 (Configuration)** describes how to set server options and individual port options.

It is strongly recommended that system managers familiarize themselves with the TCP/IP Technical Notes provided in Appendix C.

Subsequent sections and appendices contain detailed command and configuration information, troubleshooting suggestions, and cabling diagrams. Although these sections can be skipped if you just want to get the server up and running, they are required reading if you want to become familiar with some of the more sophisticated features of the Performance 4000-T.

If, during your reading, you come across any terms that you are not familiar with, check the glossary in the back of the manual. Most technical terms are defined there.

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### 1.1.1 Related Documents

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Emulex offers several Ethernet accessories for the Performance 4000-T, such as transceivers and repeaters, which come with their own instruction manuals.

Thus, although this manual completely describes how to install and configure the Performance 4000-T itself, you may also need to refer to these manuals during the installation of the Performance 4000-T.

---

## 1.2 General Description

---

The Performance 4000-T is an Ethernet terminal server designed to connect asynchronous terminals to host computers in a TCP/IP Ethernet environment.

The Performance 4000-T is made up of two units:

- **Base Unit.** The base unit contains either 12 or 16 serial ports and one parallel printer port. The base unit contains the server's operational software and is a required part of all Performance 4000-T systems.
- **Expansion Unit.** The expansion unit is optional and contains 16 additional serial ports. Each base unit can accommodate one expansion unit.

The serial ports on both the base unit and the expansion unit support partial modem controls. As an option, most models can be ordered with full modem controls on some lines. Most models also provide a single parallel printer port.

The PerformancePak is a small printed circuit board that plugs into the front of the base unit. The PerformancePak contains all or some of the Performance 4000-T's operational software, depending on whether you have the Self Load PerformancePak or the Network Load PerformancePak. The following PerformancePaks are available for the Performance 4000-T:

- **Network Load PerformancePak.** The Network Load PerformancePak contains several of the operational software modules, such as the power-up self-test. However, most of the operational software is downloaded to the server from a host CPU running TCP/IP or DECnet, whenever the server is powered on.
- **Self Load PerformancePak.** The Self Load PerformancePak contains all the TCP/IP operational software in the EPROM chips on the PerformancePak. The software does not need to be downloaded from a host CPU.

Figure 1-1 shows a Performance 4000-T base unit, expansion unit, and a PerformancePak.

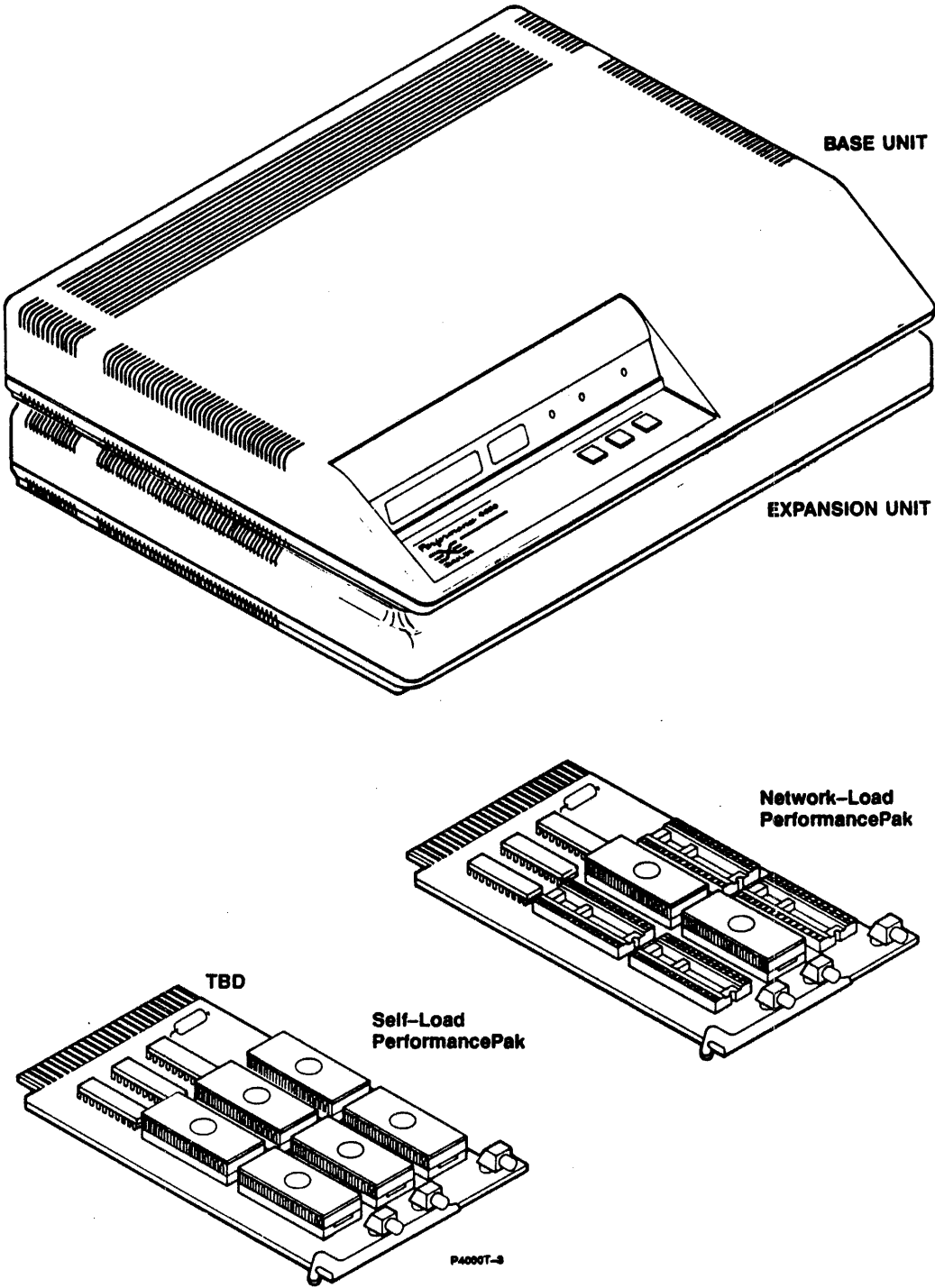


Figure 1-1. The Performance 4000-T Ethernet Terminal Server

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## 1.2.1 How the Terminal Server Works

---

The Performance 4000-T connects to a TCP/IP Ethernet network and supports up to 32 asynchronous terminals. Terminal users who are connected to the server can connect to any device on the network, including host CPUs, printers, other terminal servers, and anything else you wish to make accessible.

Unlike ordinary asynchronous controllers, which limit terminal users to connections with a single CPU, terminal servers allow users to connect to multiple CPUs and to keep multiple sessions active with different CPUs at the same time. This allows ordinary users to make full use of the benefits of the Ethernet network.

Multiple sessions are possible because users connected to the server can break out of CPU sessions and enter *local mode*, a mode in which commands may be given to the server itself. Typical server commands allow users to change port parameters, connect to other CPUs, view active sessions, and so forth. Network entities are usually referred to as hosts, nodes, and TCP ports. Be sure you know what these terms mean:

- **Host.** A host is a CPU on the network. A host is often referred to as a CPU, a host CPU, a remote host, or simply a computer. They all mean the same thing.
- **Node.** A node is any device on the network. A host is a node, for example, and so is a terminal server, a printer server, and so forth.
- **TCP Port.** A TCP port is the endpoint for a communications link on the network. A TCP port is identified by a TCP port number or TCP port name. For example, a host typically has several ports active at any time. In particular, it will usually have a TELNET port (23) ready to accept connections from the network. A terminal server port connected to a printer is often defined as a service so that host CPUs can send print jobs to it.

### NOTE

The word SERVICE is used in several of the commands and several subsections of the manual as a synonym for TCP Port. For example, SET SERVICE. The keyword SERVICE is used for compatibility with LAT terminology. Check the Glossary for other unfamiliar terms.



## 1.3 Ordering Information

The basic Performance 4000-T requires each of the hardware items listed in Table 1-1, and one of the software media listed in Table 1-2 (which must be ordered separately). Optional items and accessories are listed in Table 1-3. Consult your Emulex sales representative for details about new models and options not listed.

Table 1-1. Performance 4000-T Required Hardware Components

Qty.	Model Number	Description
1	P4012-NLT	12-Port TCP/IP base unit with Network-Load PerformancePak.
	P4012-SLT	12-Port TCP/IP base unit with Self-Load PerformancePak.
	P4016-NLT	16-Port TCP/IP base unit with Network-Load PerformancePak.
	P4016-SLT	16-Port TCP/IP base unit with Self-Load PerformancePak.
	P4016M-NLT	16-Port TCP/IP base unit with Network-Load PerformancePak and full modem controls on first four ports.
	P4016M-SLT	16-Port TCP/IP base unit with Self-Load PerformancePak and full modem controls on first four ports.
1	--	Power Cord
4	--	Rubber feet
1	ER2051009-00	Performance 4000-T System Manager's Manual
	PK4002-T PK4002-SLT	Spare Network Load PerformancePak Spare Self Load PerformancePak  <b>Note:</b> Base units include PerformancePaks. The model numbers above are for PerformancePaks ordered separately.

The host software kit is ordered separately. One of the software media listed in the following table should be selected.

Table 1-2. Performance 4000-T Required Software Components

Qty.	Model Number	Description
1	<b>TCP/IP Software</b>	
	PS4002SUN	Sun 1/4-inch cartridge tape, TFTP network load.
	PS4002SUN-C	Sun 1/4-inch cartridge tape, TFTP network load, with one-year software update service.
	PS4002MT1600	1600bpi 9-track tape, TFTP network load.
	PS4002MT1600-C	1600 bpi 9-track tape, TFTP network load, with one-year software update service.
	PS4004MT1600	1600 bpi 9-track tape, DECnet network load.
	PS4004MT1600-C	1600 bpi 9-track tape, DECnet network load, with one-year software update service.
	PS4004TK50	TK50 cartridge tape, DECnet network load.
	PS4004TK50-C	TK50 cartridge tape, DECnet network load, with one-year software update service.
	<b>LAT Software</b>	
	PS4003MT1600-C	1600 bpi 9-track tape, Ultrix network load, with one-year software update service.
	PS4003TK50-C	TK50 cartridge tape, Ultrix network load, with one-year software update service.

Table 1-3. Performance 4000-T Options and Accessories

Model Number	Description
PE4016-N PE4016M-N	16-Port Expansion Unit 16-Port Expansion Unit with full modem controls on first four ports
P0007RMS	Rack-mount shelf
P4901TNI P4901TNS P4901TBNC	Transceiver (non-intrusive cable piercing) Transceiver (N-series tap) Transceiver (BNC type for thinwire Ethernet cable)
P4902	Multiport transceiver. Connects up to eight devices to a single Ethernet tap.
P4903/05	Transceiver cable, 5 meters.
P4904	Ethernet repeater. Connects multiple Ethernet segments.
P4905	Multiport Ethernet repeater. Connects up to six thinwire segments and two thickwire segments.
P0002/10	Serial port modem cable, 10 feet (25-pin male to female)
P0005M P0005F	RJ12-to-25-pin adapter (male) RJ12-to-25-pin adapter (female)
P0006/1 P0006/25 P0006/100	RJ12 crossover (terminal) cable, 1 foot RJ12 crossover (terminal) cable, 25 feet RJ12 crossover (terminal) cable, 100 feet
P0008/1 P0008/25 P0008/100	RJ12 straight (modem) cable, 1 foot RJ12 straight (modem) cable, 25 feet RJ12 straight (modem) cable, 100 feet
P4906SK	Cable starter kit. Includes 12 P0005M adapters, 12 P0008/1 one-foot cables, and one P4903/05 transceiver cable.

## 1.4 Hardware and Software Requirements

### 1.4.1 Hardware Requirements

The Performance 4000-T is compatible with both Ethernet Version 2 and IEEE 802.3. It connects to most Ethernet or 802.3 transceivers (thickwire, thinwire, or fiber optic).

### 1.4.2 Software Requirements

The Performance 4000-T can be supported from several operating systems. Your software requirements will differ, depending on whether you intend to use your host system for connections only, or for downloading and dumping of Performance 4000-T software. Some of the operating systems that are supported are listed below. Call Emulex for information about other operating systems that are not listed.

- VMS (Version 4.5)
- Ultrix-32 (Version 2.0)
- SunOS (X.x)
- AT&T System V Release 3

The table below lists functionalities that can be supported by hosts on a TCP/IP network. Use this table to help determine the software needed to support the functions that you want your host system to perform.

Table 1-4. Software Required for TCP/IP Functions

Function	Required Software				
	TCP	BOOTP	TFTP	MOP	UDP
TCP Connects	X				
TFTP Load		X	X		
MOP Load				X	
SELF Load *					
TFTP Dump		X	X		
MOP Dump				X	
NODE Table Support					X

\* For the "SELF LOAD" function, the server software resides on a PROM on the Performance 4000-T server itself.

### 1.4.3 Serial and Parallel Ports

Different models of the Performance 4000-T contain different numbers and types of I/O ports. The following types of ports are supported:

- **Partial modem serial ports.** These ports use modular RJ12 jacks and support two modem signals. They can be connected to local terminals, serial printers, full-duplex modems, data switches, and computer ports.
- **Full modem serial ports.** These ports use DB25P connectors and support eight modem signals. They can be connected to local terminals, serial printers, full-duplex modems, data switches, and computer ports.
- **Parallel port.** This port uses a DB25S connector and can be configured as either a Centronics or Dataproducts port.

The following table describes the different port configurations that are available by combining different base and expansion units.

Table 1-5. Performance 4000-T Port Configurations Available

Total Serial Ports	Base Unit	Expansion Unit	Partial Modem Ports	Full Modem Ports	Parallel Printer Port
12	yes	no	12	0	no
16	yes	no	16	0	yes
16	yes	no	12	4	yes
28	yes	yes	28	0	no
28	yes	yes	24	4	no
32	yes	yes	32	0	yes
32	yes	yes	28	4	yes
32	yes	yes	24	8	yes

Appendix A contains pin/signal assignments for the Performance 4000-T serial and parallel ports.

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## 1.5 Features

---

The Performance 4000-T contains a variety of features designed to enhance system performance and make configuration and maintenance simple. These include:

- **TCP/IP compatible.** The Performance 4000-T supports the TCP/IP network protocol as defined by the U.S.A. Department of Defense (D.O.D.). For a more detailed description of the Performance 4000-T TCP/IP protocol support, refer to Appendix C of this manual.
- **Small size.** The Performance 4000-T supports 32 serial ports and one parallel port in a package with a height of only 4.5 inches. A rack-mount shelf is available that allows the Performance 4000-T to be mounted in any standard 19-inch equipment rack.
- **Standard connections.** The Performance 4000-T connects to the Ethernet cable via any standard IEEE 802.3 15-pin transceiver. The Performance 4000-T is compatible with most thin and thickwire Ethernet cables, and with fiber-optic and broadband devices.
- **Multiple sessions.** Users connected to the Performance 4000-T can connect to any host CPU on the network that supports the TCP/IP protocol and can switch between hosts without using any CPU power. Performance 4000-T users can also connect to any TCP/IP server that supports remote services. Users can keep multiple sessions active on different hosts (or the same host) and switch between sessions with the touch of a key.

Alternatively, user ports can be configured so that they are dedicated to a single CPU. This simplifies login for users who need access to only one CPU.

- **Nonvolatile memory.** Most parameters on the Performance 4000-T can be saved in nonvolatile memory. Changes to server parameters can be temporary or permanent.
- **Multi-level help system.** The Performance 4000-T contains help screens for all server commands.
- **Easy configuration.** The Performance 4000-T uses a simple, yet powerful, command structure that gives both users and system managers quick access to all server features.
- **PC file transfers.** The Performance 4000-T supports file transfers between PCs connected to different ports on the server and between PCs and host CPUs.
- **Typeahead.** The Performance 4000-T contains a typeahead buffer that is active for all ports in local mode.
- **Command line recall.** The Performance 4000-T remembers previous command lines and can recall them with a touch of the up-arrow key. Recalled command lines can be edited before they are re-entered.
- **Remote Console Facility.** The Performance 4000-T can be reconfigured from either a host CPU or another Performance 4000-T via TCP port number 2048 (Remote Console Facility, RCF). The RCF port is a pseudo server port (server port 34). There is no physical port on the server.
- **Power-up diagnostics.** A complete set of internal diagnostics and Ethernet cable diagnostics are run when the Performance 4000-T is powered up. The result of the diagnostics is displayed on the server's front panel.
- **Complete statistics.** The Performance 4000-T maintains complete statistics for every port. This includes traffic and error counts that can be continuously monitored or printed.
- **Verbose Mode.** Performance 4000-T ports can be enabled for Verbose mode. This port option displays all TELNET option negotiations with a remote node on the user's terminal.

- **Downline Loadable Node Table.** This feature allows the network manager to create a text file on a network load host containing node names and their associated IP addresses. This file may also contain TCP port names and their associated TCP port numbers. The file is downline loaded into the Performance 4000-T TCP/IP server upon server initialization or upon server command. The server uses this information when making connections to resolve node names and TCP port names.
- **Raw TCP Mode (TELNET disabled).** This feature, when enabled on a connection, inhibits the TELNET command and option negotiation.



## 1.6 Hardware and Software Block Diagrams

Figure 1-2 is a hardware block diagram for the Performance 4000-T.

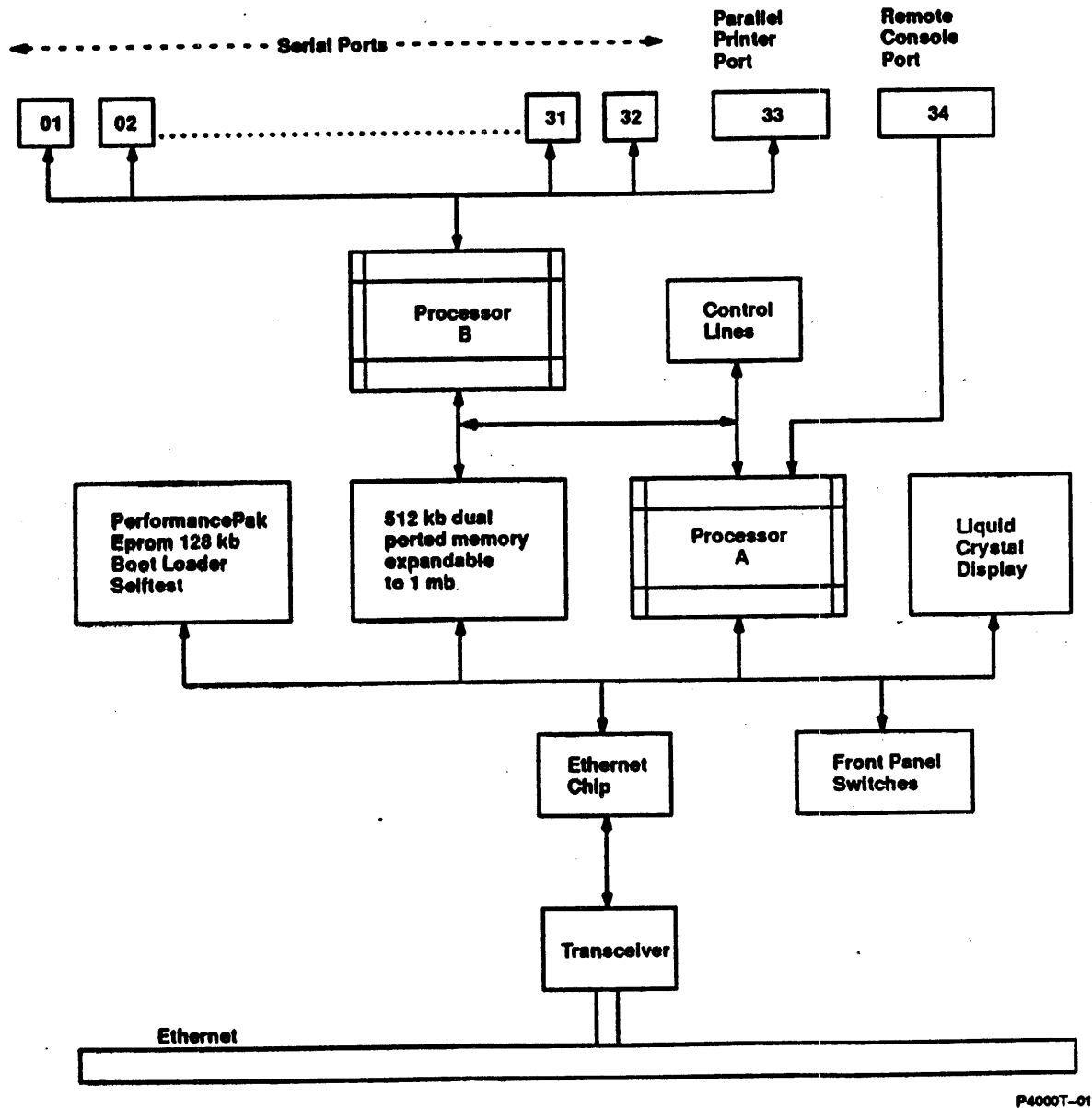
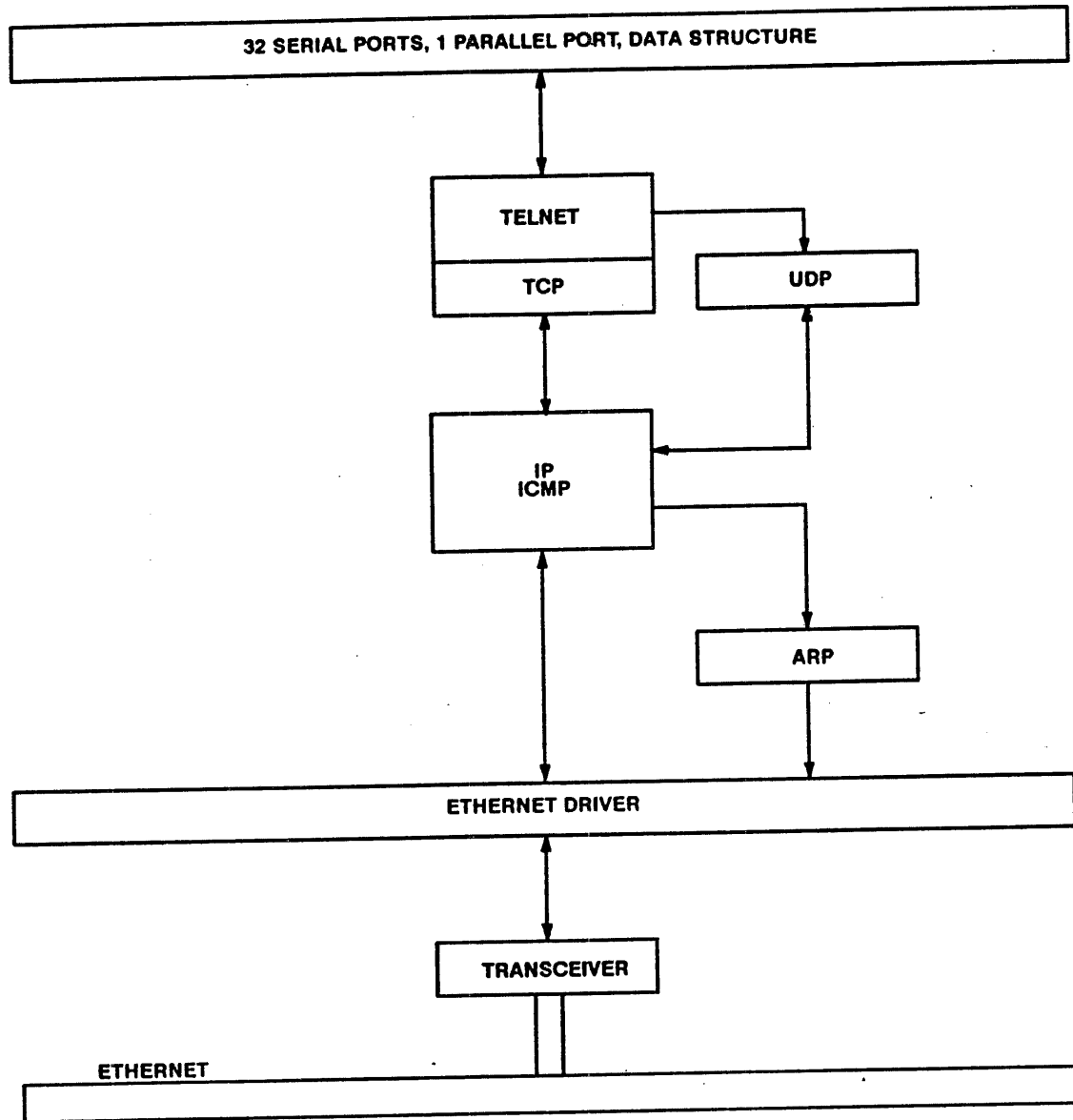


Figure 1-2. Performance 4000-T Hardware Block Diagram

Figure 1-3 is a software block diagram for the Performance 4000-T. The terms TELNET, TCP, UDP, and ARP are TCP/IP terminology.



P4000T-2

Figure 1-3. Performance 4000-T Software Block Diagram

## 2.1 Overview

This section describes how to install and cable the Performance 4000-T. This is a short process and is summarized in the installation checklist on the next page. Use this checklist to make sure you don't skip any steps.

Figure 2-1, below, shows what the completed physical installation should look like.

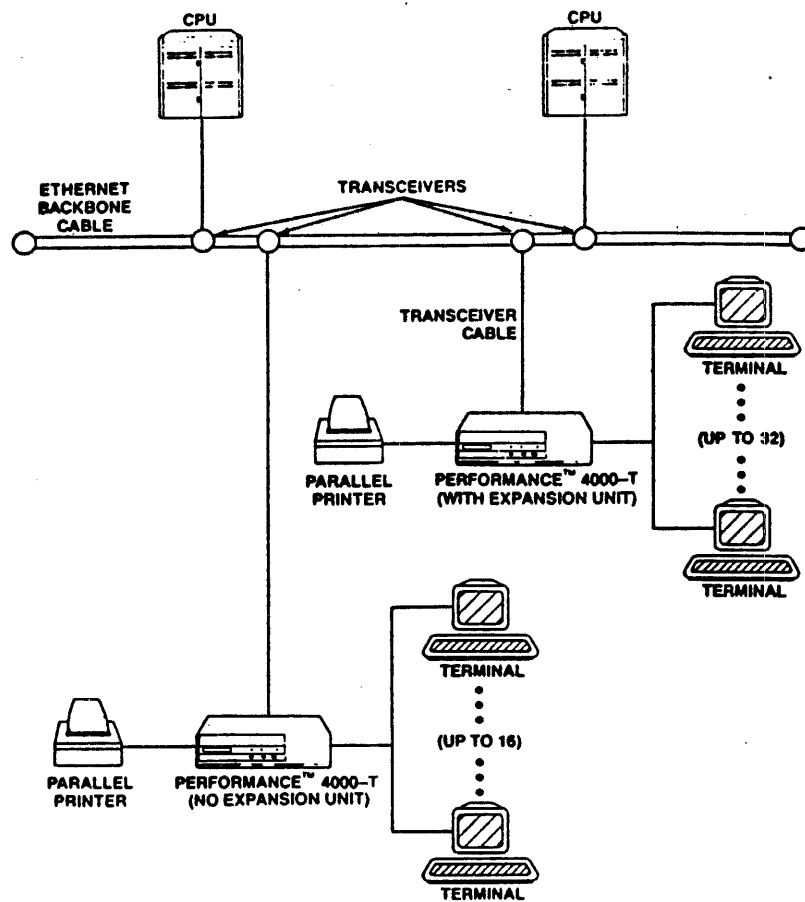


Figure 2-1. Typical Performance 4000-T Installation

### PERFORMANCE 4000-T INSTALLATION CHECKLIST

- 1. Install the PerformancePak.
- 2. If you have an expansion unit, cable it to the base unit and then attach the two units to each other.
- 3. Pick a location for the Performance 4000-T, and run a cable from the Ethernet port on the back of the server to either an Ethernet transceiver or a port on an Ethernet multiport transceiver. If you need instructions on installing your Ethernet transceiver, refer to its manual.
- 4. Cable terminals and printers to the serial and parallel ports on the Performance 4000-T. This step may be performed later, if you wish, but at least one terminal should be attached now so it can be used as a console port. The lowest numbered port should be set as the console port; port number 1 for a 16-port unit, or 5 for a 12-port unit.
- 5. Determine whether you have a Network Load or a Self Load PerformancePak. If your PerformancePak is Self Load, proceed to step 6. If it is Network Load, you must install and configure the Performance 4000-T host software. A software installation procedure for a UNIX host is provided in subsection 2.6. A procedure for a DECnet host is provided in subsection 2.7.
- 6. Power up the Performance 4000-T and make sure that it passes its self-test. If it does not, refer to Section 6, Troubleshooting.

**The following steps require you to set options on the Performance 4000-T.**

- 7. Set options for individual ports.
- 8. If necessary, set internal server options. You must at least set the IP address and the subnet mask via the SET SERVER command.
- 9. Create TCP ports (also referred to as services), and set related options if required.
- 10. Log in to a host and make sure everything is working properly. If you encounter any problems, refer to Section 6, Troubleshooting, or call Emulex Technical Support.

## 2.2 Installing the PerformancePak

PerformancePaks are shipped separately from the server and must be installed before the server can be used. One PerformancePak is required for each base unit.

### NOTE

Be sure that the Performance 4000-T is unplugged before you install (or remove) the PerformancePak.

Installation of the PerformancePak is illustrated in Figure 2-2. Simply remove the front panel on the Performance 4000-T by sliding it left and gently pushing on the left hand corner, insert the PerformancePak (component side up), seat the PerformancePak with its metal lever, and replace the server's front panel.

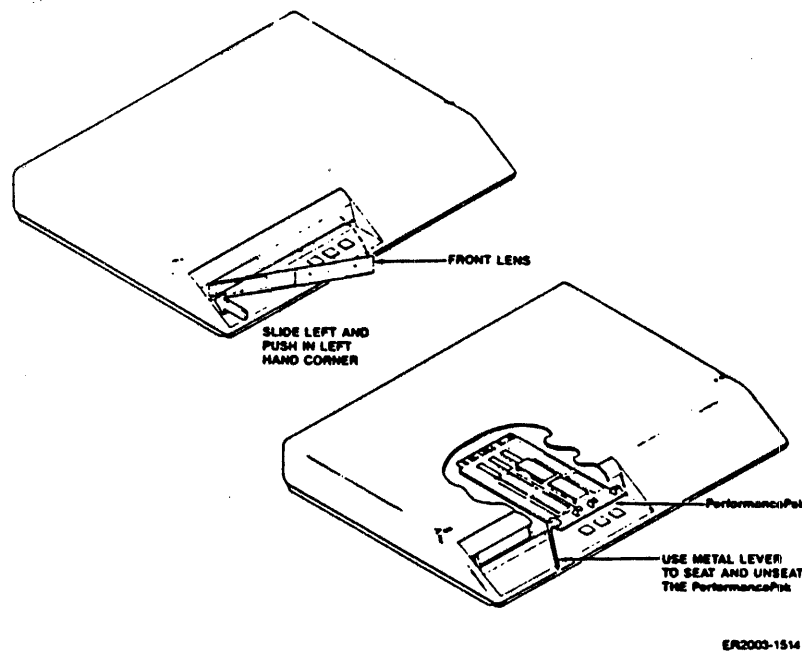
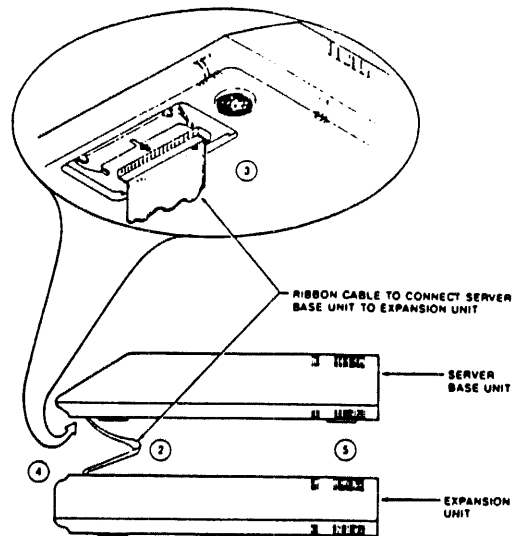


Figure 2-2. Installing the PerformancePak



### DIRECTIONS

1. PRY THE CABLE COVER OFF THE BOTTOM OF THE BASE UNIT, AS SHOWN IN THE TOP ILLUSTRATION. REMOVE THE RUBBER FEET.
2. PULL THE 50-PIN CABLE OUT OF THE TOP OF THE EXPANSION UNIT.
3. PLUG THE FREE END OF THE 50-PIN CABLE INTO THE SERVER BASE UNIT, AS SHOWN IN THE BOTTOM ILLUSTRATION. BE SURE NOT TO TWIST THE CABLE.
4. PLACE ANY EXCESS CABLE IN THE RECESSED AREA OF THE EXPANSION UNIT.
5. SET THE BASE UNIT ON TOP OF THE EXPANSION UNIT AND PRESS THEM TOGETHER SO THAT THE FEET ON THE BASE UNIT LOCK TO THE INDENTATIONS IN THE TOP OF THE EXPANSION UNIT.

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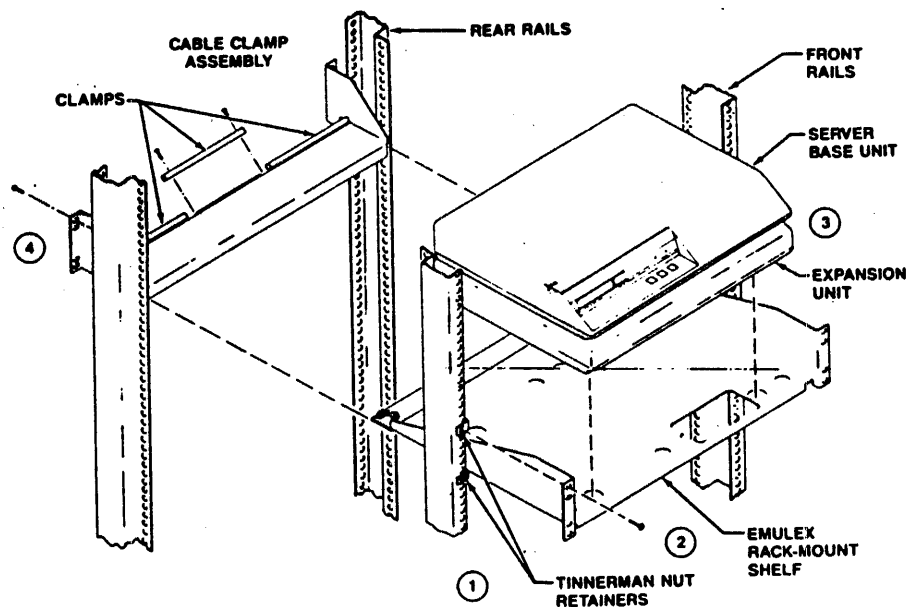
Figure 2-3. Attaching the Expansion Unit to the Base Unit

## 2.3 Attaching the Expansion Unit (Optional)

If you did not order an expansion unit with your Performance 4000-T, skip this section and go straight to section 2.4, Installing the Base Unit. The expansion unit attaches to the bottom of the base unit via a single short cable. To attach the expansion unit to the base unit, use the following steps:

1. Be sure the base unit is powered off.
2. Remove the four rubber feet on the bottom of the base unit. They are attached with phillips-head screws. Turn them over and reinstall them in the base unit. The reverse side of the feet that is now showing has a velcro-like covering that attaches to the expansion unit.
3. Find the small plastic cover on the bottom of the base unit (its location is shown in Figure 2-3). Pull it off with a screwdriver.

4. Pull out the cable that is connected to the top of the expansion unit and connect the free end to the bottom of the base unit. The cable connection should be straight across; be sure not to twist the cable in the middle.
5. Place any excess cable into the recessed area in the expansion unit.
6. Press the two units together. The feet on the bottom of the base unit fit into the four indentations on the top of the expansion unit. Velcro surfaces on the feet of the base unit and the indentation on the expansion unit hold the two units together securely.



*Figure 2-4. Installing the Rubber Feet and the Rack-Mount Shelf*

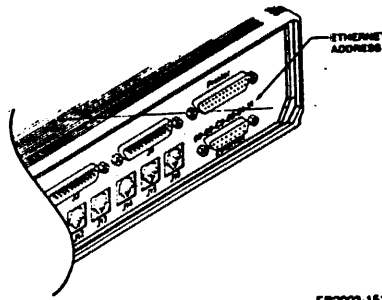
---

## 2.4 Installing the Base Unit

---

The base unit is now ready to be installed and connected to an Ethernet transceiver. Use the following steps:

1. Select a location for the server that has adequate cooling and power. Set the voltage select switch on the rear of the server to the proper position (either 110 VAC or 220 VAC). Note that some models of the Performance 4000-T automatically select the correct voltage and do not have a voltage select switch.
2. If the site will not be readily accessible after installation, copy down the unit's Ethernet address, located on the rear just above the Ethernet port. You will need this address later during the configuration process.



3. If you are installing the Performance 4000-T in an Emulex rack-mount shelf, install the shelf now, as shown in Figure 2-4. Do not stack Performance 4000-T base units directly on top of each other. You must allow a few inches of space between units to insure adequate cooling.
4. Run a transceiver cable from the Ethernet port on the back of the Performance 4000-T to either (1) an Ethernet transceiver or (2) a port on an Ethernet multiport transceiver. Both transceivers and cables are available from Emulex (see Section 1 for model numbers and ordering information).

Refer to the user's manual that came with your transceiver for detailed instructions on how to install the transceiver and cable it to the Performance 4000-T.



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## 2.5 Cabling

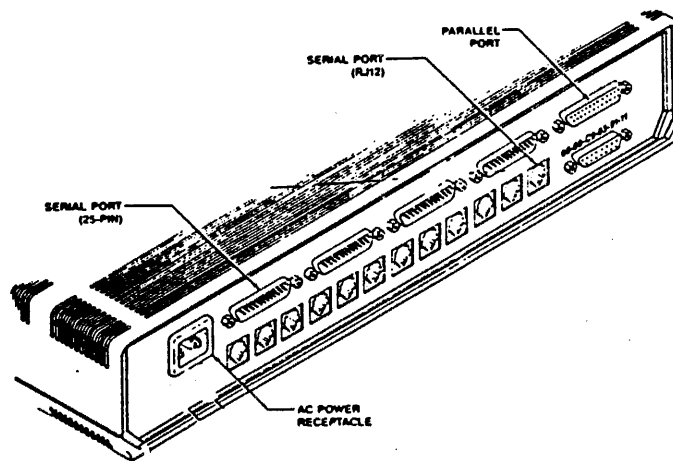
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Different models of the Performance 4000-T contain different numbers and types of I/O ports. The following types of ports are supported:

- **Partial modem serial ports (RJ12).** These ports support data signals plus two modem signals and can be connected to local terminals and most full-duplex modems.
- **Full modem serial ports (DB25P).** These ports have eight modem controls and support full-duplex modems, terminals, and a wide range of devices that require modem controls. Note that half-duplex modems are not supported on either type of serial port.
- **Parallel port (DB25S).** This port uses a 25-pin S female connector and can be configured as either a standard Centronics or Dataproducts port.

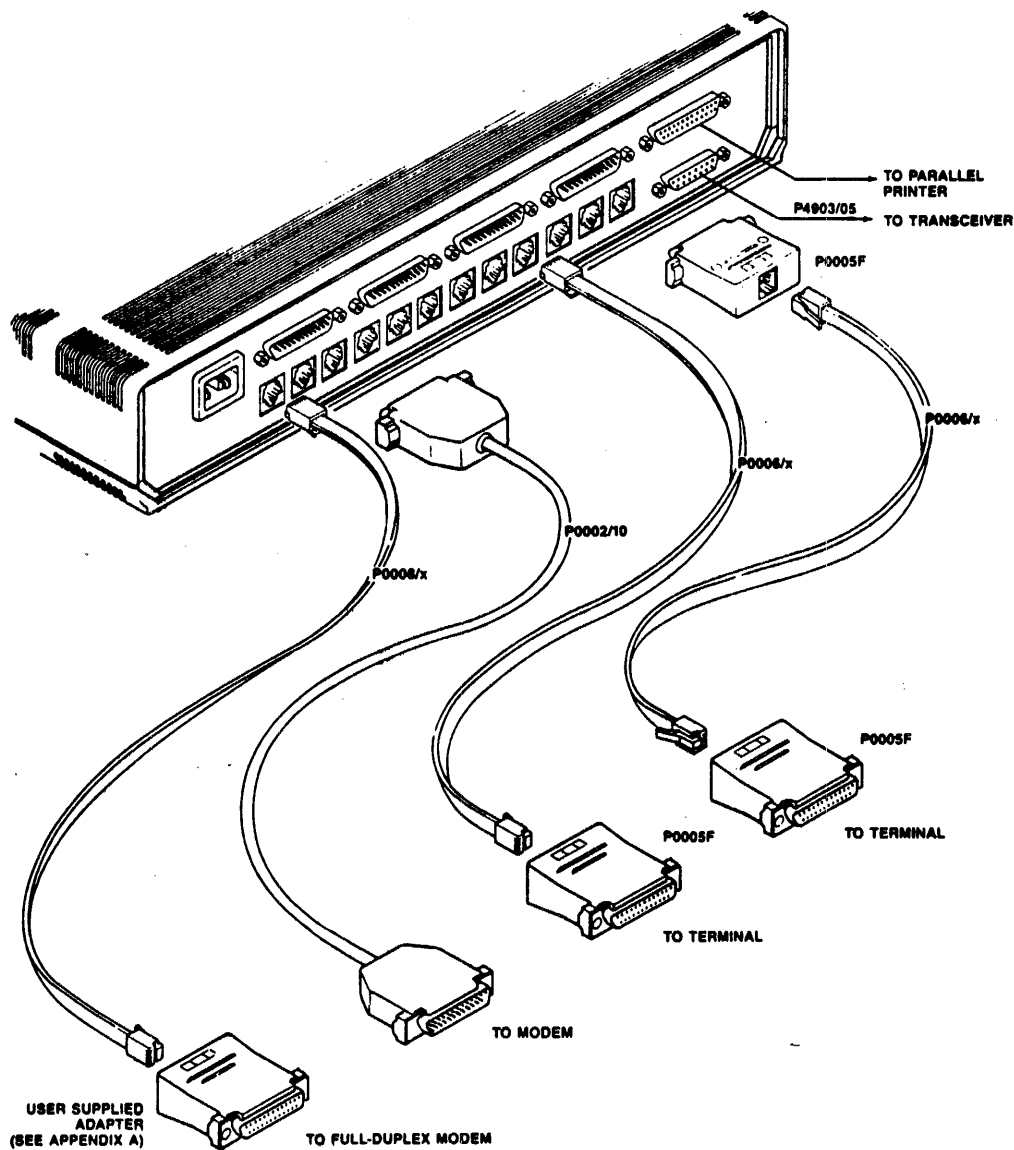
Although it is not necessary to cable all your terminals at this time, you should connect a terminal to the lowest numbered port. The lowest port number is 1 on a 16-port base unit, or 5 on a 1-port base unit. This port is set at the factory to be the console port. It displays all status messages during initialization. Set the terminal for 9600 baud, 8-bit characters, and no parity (these parameters, as well as the console port number, can be changed after the server is installed and operating, if you wish).

Refer to Appendix A for pin/signal assignments for these ports and for sample cabling diagrams for common applications.



ER2003-1518

Figure 2-5. Location of Ports on Rear of Performance 4000-T



ER2003-1630

Figure 2-6. Cabling the Performance 4000-T

---

## 2.6 Installing the Performance 4000-T Software on UNIX Host Systems (Optional)

---

This installation procedure is intended for use by system managers who have Unix or "Unix-like" systems. Systems that are derived from BSD 4.3 or AT&T System V have been addressed in this procedure. However, all systems may not be alike and you may have to make modifications to fit your system. To that end we have provided the source code for our boot programs and for the configure utility. The `bd.c` and `bdskt.c` utilities are written in the "C" language, and the utility `load_config` (`load_config.v` for System V) is written in Bourne shell script.

---

### 2.6.1 Getting Started

---

Log on to your host system as a superuser. The Emulex TCP/IP load software resides in the directory `'/emlx'`. Check to see whether you already have a directory named `'/emlx'`. If you do, you must move those files to another directory, because the installation procedure will overwrite any files that are currently there. To do this, type the following:

```
ls /emlx
```

If you get an error message of "directory or file not found", or a similar message, then continue with the installation. If you do **not** get an error message, then you already have a directory with this name, and you must either rename the existing directory, or move all of the files from this directory to a safe location now.

If you receive an error that is different form "directory or file not found", check the command you have entered for syntax errors, and try again. Once you have ensured that there is no directory `'/emlx'`, or that any data in a preexisting `'/emlx'` directory is in a safe place, then continue.

---

### 2.6.2 Move the Software to Your Disk with 'tar'

---

Move the distribution files form the media to the `'/emlx'` directory with the following command:

```
tar xvf {DEV}
```

where DEV is the system-specific device for your tape or floppy drive.

When the system prompt returns, enter the following command:

```
cd /emlx
ls
```

The following files should be present:

```
P4KT00E
bd.c
bdskt.c
ip.awk
load_config (load_config.v for System V)
```

---

### **2.6.3 Run the load\_config Utility**

---

You must now add the servers that you wish to load to the database. Use the **load\_config** utility to do this portion of the installation. To run the utility, type the following:

```
/emlx/load_config
```

For AT&T System V users, the utility is named **load\_config.v**, and to run it you should type the following:

```
/emlx/load_config.v
```

The utility will now display a menu with several choices, as shown in Figure 2-7.

```

Welcome to TCP/IP Load Configuration

      EMULEX
      Terminal Server
      Configuration Utility

1. Show Known Servers
2. Add a Server
3. Swap or Modify a Server
4. Delete a Server
5. Identify Host IP
q. Quit

Enter choice:
```

*Figure 2-7. The Unix Host Server Configuration Utility Main Menu*

Descriptions of the `load_config` (and `load_config.v`) utility main menu options follow:

- **Option 1. Show Known Servers.** This option allows you to see the servers that you have already configured with the utility. Initially the database will be non-existent since you are just now creating it.
- **Option 2. Add a Server.** This options allows you to add servers to the database.
- **Option 3. Swap or modify a server.** This option allows you to swap servers to the database.
- **Option 4. Delete a Server.** This option will allow you to delete a server that you no longer wish to load.
- **Option 5. Identify Host IP.** This option will be needed only once. It provides your host IP address to the `bd` or `bdskt` programs.

First choose **Option 5**. You will then be prompted by the utility to enter your host's IP address.

Once you have entered your host IP address, select **Option 2**. You will then be prompted to indicate which server or servers you wish your host to support. You'll need to know the server's Ethernet address and IP address.

---

## 2.6.4 Check the `/etc/inetd.conf` File

---

Check the `/etc/inetd.conf` file to make sure that the `tftpd` daemon is present and configured properly. To do this, enter the following:

```
cat /etc/inetd.conf
```

There should be an entry for `tftp`. If there is no entry, then consult your host documentation under `inetd`, and add a new entry for the `tftpd` daemon. Next check to make sure that no security switches have been set for the `tftpd` daemon; these switches may need to be removed. telltale signs of these switches are `-r` and `-s` options in the column of the `tftp` entry, but be advised that these differ from system to system. So please consult your host documentation for proper setup of the `tftpd` daemon.

---

## 2.6.5 Start the `inetd` Daemon

---

First check to see if the `inetd` daemon is running; to do this, type the following:

```
ps -ax (BSD), or ps -ef (System V)
```

If the daemon is running and you have not made any changes to the `inetd.conf` file, you may now skip to the next section. If the daemon is running and you have made changes, you must send it a `SIGHUP` signal to cause it to reconfigure. Do this by entering the following:

```
kill -HUP n
```

where 'n' is the number of the task seen when you typed the '`ps -ax`' (or `ps -ef`) command.

The **inetd** daemon will now restart and read the **inetd.conf** file and make the appropriate updates. If the daemon was not running, start it by typing the following:

```
/usr/etc/inetd &
```

AT&T System V users should enter:

```
/etc/inetd &
```

You can confirm that the daemon is running by typing the following:

```
ps -ax (BSD) or ps -ef (System V)
```

again and looking for the **inetd** daemon in the display. If you have sent the **inetd** daemon a **SIGHUP** signal, you must wait until it returns to the idle state. If the **inetd** daemon remains in the sleeping state more than a few minutes, consult your system manual regarding the stopping and starting of the **inetd** daemon.

---

### **2.6.6 Compiling **bdskt.c** or **bd.c****

---

To compile the **bdskt.c** or **bd.c** utility, first run the **load\_config** utility and select option 5 on the utility main menu. Next, select the "Identify Host IP Option". Type the following to compile the **bdskt.c** utility:

```
cc bdskt.c -o bdskt
```

If this does not work on your system, consult your host documentation.

#### **NOTE for System V Users**

If your system does not support sockets, then you must use the Streams version of the boot programs **bd.c** and **bdskt.c**.



An example of the syntax that you could use for compiling **bd.c** on a System V follows:

```
cc bd.c -o bd -l nsl_s
```

The compile syntax for the **bdskt.c** utility may also be different for a System V, as follows:

```
cc bdskt.c -o bdskt -l socket
```

---

## 2.6.7 Starting bdskt or bd

---

To start **bdskt** and send messages to the host console as the server load, enter the following command for BSD 4.3 systems:

```
bdskt &
```

For AT&T system V, enter the following command:

```
nohup bd &
```

For BSD 4.3 systems, enter the following command to start **bdskt** and throw away console messages from **bdskt**:

```
bdskt > /dev/null &
```

For AT&T System V, enter the following alternate command:

```
nohup bd > /dev/null &
```

---

## 2.6.8 Load Your Servers

---

You are now ready to load your servers. Go to the server(s) you wish to load, and apply power. When the "Select Protocol" option appears on the server console, select the "T" option. If the "Select Protocol" option does not appear, then hold down the two leftmost buttons on the front of the server when applying power. For the remaining options press **<Return>**, with the exception of the option "load filename". Press **<Ctrl>-Z-<CR>** to clear this field.

The server should now begin to load. You should see a message on your host system console from the **bd** or **bdskt** program as the server loads if the output of these programs has not been redirected.

---

## **2.7 Installing the Performance 4000-T Software from a DECnet Host (Optional)**

You are required to install the Performance 4000 host software kit only if you have DECnet running on your network (as required if you are using a Network Load PerformancePak).

The most important part of the Emulex host software kit is a file named P4KT00E.SYS, the operational software for the server which is automatically downloaded into the server whenever it powers up. Since the server will not work unless this file is present, you may wish to install the host software kit on more than one host so that servers may still power up even if the primary load host is down.

The host software runs under VMS V4.5 (consult Emulex for information about other revisions) and requires that Phase IV or higher DECnet be up and running on the host. After the software is installed, it needs to be reinstalled only after major operating system upgrades (5.0, 6.0, etc.).

If you are updating your software kit (i.e., this is not the first time it has been installed on your network), be sure to update all copies. To be sure, first find the old version of the file named P4KT00E.SYS, rename it, and then power up the server. If it powers up normally the old software is still present on some other host and must either be renamed (for example, to P4KT00E\_OLD.SYS) or deleted. When the server reports it cannot find P4KT00E, you can be sure you have found all the copies. Now you may install the new software as described below and power up the server. If the new software works normally, you may then delete the copies of the old software.

The following steps explain how to install the Emulex software:

1. Make sure you have at least 1000 blocks free on your system disk.
2. Mount the distribution media and enter the following command:

```
$ @SYS$UPDATE:VMSINSTAL
```

The VMSINSTAL utility asks some introductory questions. Answer them appropriately.

3. VMSINSTAL asks which products should be installed. Answer with an asterisk.
4. Several paragraphs of instructions are printed out as the software is being installed. VMSINSTAL then asks if you wish to install anything more. Type EXIT.
5. If it does not already exist, VMSINSTAL creates the directory SYS\$COMMON:[DECSERVER]. When VMSINSTAL is finished, the following files have been copied into this directory:

**P4KT00E.SYS.** These is the operational software that is downloaded into the server when it powers up. If you are using a Self Load PerformancePak, you may delete this file.

**P4KCONFIG.COM.** This is the Server Configuration Utility. It must be run whenever a terminal server is removed or installed on the network.

**P4KCONFIG.DAT.** This data file is created when you run the Server Configuration Utility. It contains all server parameters.

**P4K 010 DEFAULTS.COM.** This command file may be used with the DEC Terminal Server Manager program to change all server options back to their factory defaults. It can be edited to set the server to different defaults if you wish.

**P4K000 010.RELEASE NOTES.** This file contains release notes for the software. You may delete it after printing, if you wish.

6. The instructions printed out by VMSINSTAL tell you to do two things:

First, if it has not already been done, insert in your system startup file (SYS\$MANAGER:SYSTARTUP.COM) the following logical definition, which equates the logical name MOM\$LOAD to a search string equal to SYS\$SYSROOT:[DECSERVER] (this is not necessary if you already have DECservers on your network):

```
DEFINE/SYSTEM/EXEC/NAME ATTRIBUTE=NO_ALIAS/NOLOG-  
MOM$LOAD 'current_defin',SYS$SYSROOT:[DECSERVER]
```

Second, add the newly installed Performance 4000 to the DECnet NCP database by using the Emulex Server Configuration Utility. This is described in the next section.

```
Emulex Server Configuration Utility  
  
1 - Show known servers  
2 - Add a server  
3 - Modify an existing server  
4 - Delete a server  
5 - Restore known servers  
6 - Import servers from DECserver database  
7 - Export servers to DECserver database  
  
^Z - Exit command procedure  
  
Enter desired function, 1 - 7:  
For Help with a menu option, enter ? followed by the number
```

*Figure 2-8. The DECnet Host Server Configuration Utility Main Menu*

---

## 2.7.1 Adding Servers To the DECnet Database

---

The VMSINSTAL procedure places the Emulex Server Configuration Utility in the directory MOM\$LOAD. If you are running DECnet, you must run the configuration utility to add the Performance 4000 to the permanent DECnet database. You must also run this utility if you need to remove a server from the network or modify its parameters.

To run the configuration utility, type the following:

```
@P4KCONFIG
```

The main menu appears, as shown in Figure 2-5. At any time, press "?" for help or <Ctrl-Y> to return to the main menu. The following paragraphs explain each menu option.

### 1 - Show known servers

This option lists all Emulex terminal servers that have been configured by the program so far. The parameters listed are the same ones entered by option 2, explained below.

### 2 - Add a server

This option asks the following questions about the server you are adding:

```
Enter server type for new server:  
Enter DECnet name for new server:  
Enter DECnet ID for new server:  
Enter Ethernet address for new server:  
Enter service circuit for new server:
```

*Server type* is normally P4000 for the Performance 4000. You may also configure a DECserver100 or 200 (DS100 and DS200). The designation UNKNW (Unknown) is reserved for future use.

The *DECnet name* may be one to six characters long. The first character must be alphabetic. Be sure to choose different names for every server on your network.

The *DECnet ID* is the address DECnet uses for the server. You must specify an area number (2-63) and a node number (1-1023). For example, the ID 2.31 designates area 2, node 31. The area number may be omitted if you use only node numbers.

The *Ethernet address* for the Performance 4000 is stamped directly above the Ethernet port on the server's rear panel.

The *service circuit* refers to the type of Ethernet adapter on the load host. Your choices are BNT-0 for BI Bus adapters, QNA-0 for Q-Bus adapters, UNA-0 for UNIBUS adapters, and SBA-0 for MicroVAX 2000 adapters. Use the number 1 instead of 0 if you are using the second Ethernet controller on a system.

### **3 - Modify existing server**

This option allows you to change any of the parameters you entered when you added a server. The questions asked are exactly the same as the questions for option 2.

### **4 - Delete a server**

This option allows you to delete a Performance 4000 from the DECnet database. It asks only for the DECnet name of the server you wish to delete. Respond with the name you assigned to the server when you added it to the DECnet database.

### **5 - Restore known server**

This option restores servers that have been deleted directly via an NCP command. It does not restore servers that have been deleted using this program.

### **6 - Import servers from DECserver database**

This option allows you to include all DEC terminal servers in the Emulex database. This is useful for two reasons: (1) the conversion utility checks to make sure no two servers have the same name, and (2) it is sometimes convenient to have all servers in a single database. This allows you to manipulate all your servers from within the P4KCONFIG program.

### 7 - Export servers to DECserver database

This is the opposite of option 6: it adds P4000 servers to the DEC database, DSVCONFIG.DAT (the P4000 is exported as server type DECserver 200). This is useful because certain DEC utilities (for example, the Terminal Server Manager) get configuration information from the DEC database. If the P4000 servers are not included, the DEC utilities do not know they exist.

## 2.8 TFTP/DECnet Protocol Selection

When the Performance 4000-T loader is first started or restarted (warm or cold start), it will first determine if it should do a network load or selfload. If you have a Self Load PerformancePak, the loader protocol selection will be bypassed.

If you have a Network Load PerformancePak, then the 3-bit Protocol Flag in EAROM will be read (only 1 bit will be used for now, the other two bits are reserved for future use) to determine whether the load protocol is DECNET or TFTP protocol. Note that the type of system software to be loaded is independent of the load protocol. In addition, there is another bit designated as the Dialogue Flag to determine if a dialogue with the operator is to be performed. The meaning of these bits are as follows:

Dialogue Flag	Protocol Flag
0 = dialogue	0 = DECNET
1 = no dialogue	1 = TFTP

If the Dialogue Flag is 0, the Operator Dialogue Mode will be entered. A number of questions will be displayed in sequence on the console port. The first question prompts for load protocol selection on the console as well as at the frontpanel. A detailed account of the Operator Dialogue Mode is described later in this section.

Regardless of the load protocol selection, once we pass this point the loader will stick to the selected protocol until low level retry (timeout, transmission, chip or packet sequence errors etc) expires. When this occurs, the operator is given a chance to change the protocol type and possibly other load parameters by entering the Operator Dialogue Mode.

Auto failover between protocols is avoided to eliminate complicated implementation (e.g. when there is a time out, the loader does not know if the protocol type is wrong or host set up has a problem).

Regardless of the load protocol type, when a load/dump request timeout (due to timeout, transmission error etc) and low level retry expires, the loader will display the following message on the console:

```
No response to load/dump request, retry in N minutes  
ESC key to change parameters or any other key to retry  
now:
```

In the message above, N is a non zero value (typically 5 or 15) as defined in the current loader retry delay sequence array. Note that a zero delay in the sequence will not cause the above retry message to be displayed.

Any character response other than <ESC> or no response in the specified time period will cause the loader to start all over again with the current parameter. Entering <ESC> will cause the loader to enter the Operator Dialogue Mode and prompt the operator to answer a series of questions. The questions are different according to the load protocol type.

Note that there is no response timeout in this mode since the operator may need time to find out what kind of change he wants to make. He can speed through an answer by a Carriage Return if the value shown in [ ] is the desired value.



The question series is listed below for the two load protocols.

a. DECNET load Operator Dialogue question series:

Select Load Protocol Type, D for DECNET, T for TFTP [D]: D  
Enter Load Filename, max 10 char [P4K4000E]:  
Are you sure? [Y]:  
Save changes? [Y]:

b. TFTP load Operator Dialogue question series:

Select Load Protocol Type, D for DECNET, T for TFTP [T]: T  
Enter P4000 IP address, CR if no change , Ctrl-Z to erase  
[000.000.000.000]:  
Enter Load Host IP address, CR if no change, Ctrl-Z to erase  
[255.255.255.255]:

Enter Load Host name, max 16 char, CR if no change, Ctrl-Z to  
erase [ ]:

Enter Load Filename, max 16 char, CR if no change, Ctrl-Z to erase  
[P4KT00E]:  
Are you sure? [Y]:  
Save changes? [Y]:

The Load Protocol Type selection is the single most important question so it is also displayed in a brief form on the frontpanel to ensure the P4000 can be brought up without the need of a terminal as a console port. The Frontpanel display is as follows:

"Load Protocol? "

The "next" and "last" keys will scroll the LCD display back and forth between "DECNET load" and "TFTP load". The selection is made when the "select" key is depressed with the desired Load Protocol Type displayed on the LCD.

During the display of other questions in a series, the Frontpanel keys are disabled.

A new Server Message to identify the Load Protocol will be sent to the Console Port in the beginning of every netload. The message content is as follows:

Server -900- Load Protocol selected: DECNET

or

Server -900- Load Protocol selected: TFTP

---

## **2.9 Power-Up and Verification**

---

Once your Performance 4000-T system is completely installed and cabled, power it up by plugging it into an AC outlet. If the server has been previously installed, you may wish to restore all options to their factory settings by holding down the Next and Last buttons on the front panel as you plug in the server. The factory settings are all the parameters defined in the SET commands, as described in Section 5 of this manual.

Upon power-up, the server runs an internal self-test. Self-test results are shown on the server's front panel, which contains three LEDs and an LCD display (see Figure 2-8).

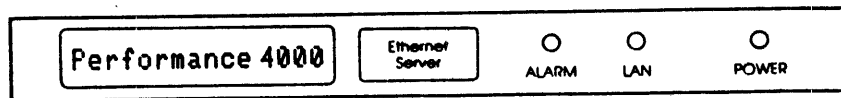
The Performance 4000-T power-up sequence goes like this:

1. The Power LED lights up and test names flash through the LCD display. If you are using the Network Load version of the Performance 4000-T, the server downloads its software from the load host and displays messages while it is doing this. The initials NL display for a Network Load PerformancePak, and the initials SL display for a Self Load PerformancePak.
2. If a fatal error occurs during the self-test, the Alarm LED lights and the name of the failed test appears in the LCD display. If a nonfatal error occurs, a message is displayed on a terminal connected to the console port and the server continues initializing. If either a fatal or nonfatal error occurs, refer to Section 6, Troubleshooting, for further help, or call Emulex Technical Support. All of the error messages that can be shown on the LCD display are explained in Appendix E.

3. If all tests pass and the network load completes, the front panel should be in the following state:

Alarm: Off  
LAN: Flickering (shows LAN activity)  
Power: On  
LCD Display: "Performance 4000"

Installation of the Performance 4000-T is now complete, and you are ready to finish up by configuring server and port options.



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*Figure 2-7. Performance 4000-T Front Panel LEDs and LCD Display*



---

## 3.1 Overview

---

This section explains how to set options on the Performance 4000-T and how to perform basic functions such as logging in to the server and connecting to host CPUs.

There is much more information available about configuring the server than is contained in this section, of course. After you have performed basic server configuration and your system is up and running, you may wish to consult the following sections:

- **Section 4 (Application Examples).** This section explains how to use some of the more advanced features of the Performance 4000-T.
- **Section 5 (Commands).** This section describes in detail all commands available for system tuning and configuration.

---

## 3.2 Logging In to the Server

---

### 3.2.1 Local Mode

---

The first step in configuring the Performance 4000-T is to plug a terminal into the lowest numbered port on the rear of the server. The terminal must be set to 9600 baud, 8-bit characters, and no parity (this can be changed later, if you wish).

Use the following steps to complete the login process:

1. Press the **<Return>** key several times until the server responds.
2. If this is the first time the server has been powered up, no password is required. Go to step 3.

If password protection has been previously enabled, the server displays a pound sign (#). Type in the login password (the default password is ACCESS). The password is not echoed on the screen.

3. Unless a permanent username has been configured for the port, you are asked for a username:

```
Enter username, or HELP>
```

You may enter a username of 1 to 16 characters that identifies you or `<ctrl-z>`, which assigns the port name "PORT\_n" as the username. Later on, you may wish to use the `CHANGE PORT USERNAME` command to assign a permanent name to the port so that you no longer get the username prompt when you log in.

4. The server displays the server prompt:

```
Server>
```

You are now in local mode and ready to begin configuring the server. Complete configuration instructions are given later in this section, but you may want to enter the following commands immediately:

- **SET PORT TYPE VT100.** Enter this command if you are using a VT series terminal or compatible.
- **SET PORT PAUSE ENABLED.** This command affects the way screens are displayed. Several of the `SHOW` commands, which are used to view current server settings, display several screens of information and require you to specify which screen you want. These screens are described fully in Section 5, but in the meantime you may wish to enter the `SET PORT PAUSE ENABLED` command, which forces the server to pause after each screen it displays, and then display the next screen when a particular key is pressed (the required key is listed at the bottom of the screen). This is a convenience until you are more familiar with the various `SHOW` commands, but remember that if it is enabled you must press the `<return>` key to stop displaying screens and return to local mode.

#### NOTE

In the examples that appear throughout the rest of this manual, all user input is shown in red.

---

### 3.2.2 Gaining Access to Privileged Commands

---

Server configuration commands can be issued only by privileged users. To gain access to privileged commands, type the following command and enter the privileged password. Note the prompt change when you are in privileged mode:

```
Server> SET PRIVILEGED
Password> (enter the password here)
Server>>
```

The privileged password is set at the factory to SYSTEM. After entering this, you should change it immediately by typing:

```
Server>> CHANGE SERVER PRIVILEGED PASSWORD
Privileged password>
```

If you have forgotten the privileged password, you may restore the password to SYSTEM by resetting the server to its factory defaults (see subsection 3.2.5). Be sure to return the port you are using to nonprivileged access as soon as you are finished configuring the server. This is done by typing:

```
Server>> SET NOPRIVILEGED
Server>
```

---

### 3.2.3 Command Line Editing

---

Table 3-1 lists the functions of all special command line editing keys for softcopy terminals, that is, terminals with a display monitor. Table 3-2 describes editing keys for hardcopy terminals, such as teletype stations.

Table 3-1. Command Line Editing Keys for Display Terminals

Key	Usage
Return	Causes the current command line to be executed.
Rubout/Delete	Erases the character immediately to the left of the cursor (this is usually the last character entered).
Backspace or Ctrl-H	Moves the cursor to the beginning of the line without deleting any characters on the line.
Ctrl-E	Moves the cursor to the end of the line.
Break	Aborts the command line or any display that might be in progress (this key may be disabled later via the SET PORT BREAK command).
Ctrl-B	Recalls the previous command line.
Ctrl-R	Redisplays the current command line. This is useful to verify the effects of command line editing.
Ctrl-U	Aborts the entering of commands without causing the command to be executed.
Ctrl-Z	Aborts the entering of passwords.
<p>The following features are available on ANSI and VT100 terminals only if the server port has been configured as type VT100 or ANSI. <b>Note:</b> Some keys have different functions during server displays (see the SHOW command for details).</p>	
Ctrl-A	Toggle Insert Mode. Insert mode causes characters to be "inserted" into the command line at the cursor position. Pressing <b>&lt;Return&gt;</b> or <b>&lt;Ctrl-A&gt;</b> returns you to overstrike mode.
Up Arrow	Recalls the previous command line.
Down Arrow	Recalls the subsequent command line (after one or more up-arrows).
Left Arrow or Ctrl-D	Moves the cursor left without erasing any characters.
Right Arrow or Ctrl-F	Moves the cursor right without erasing any characters.
Linefeed or Ctrl-J	Deletes the previous word.



---

### 3.2.4 The HELP Command

---

You can get on-line information about server commands at any time by using the help command. To activate it, type HELP:

```
Server> HELP
```

The server displays a list of commands. To get information about a particular command, type HELP followed by the command name:

```
Server> HELP SET
```

The server displays a screen of information about the command. You can also go directly to a particular command option by typing the option name:

```
Server> HELP SET PORT BROADCAST
```

Note that information about privileged commands is available only to privileged users. A hints screen is available to help new users. Simply type HELP HINTS to display a screen of introductory information about the Performance 4000-T.

---

### 3.2.5 Returning to the Factory Port and Server Settings

---

If you make some mistakes while you are configuring options (or at any other time) and want to start over, you can erase the server's internal memory and get back the original factory settings as follows:

1. Remove power from the Performance 4000-T.
2. Hold down the Next and Last keys on the server's front panel and restore power to the server. Hold the keys down until the message "EAROM RESET" appears (this takes about two seconds).

The message "EAROM RESET" indicates that the nonvolatile memory has been reset to the factory default settings. Any option changes you have made are erased. All TCP port (also referred to as service) options and server options are reset to their original factory settings. For more information on the default port and server settings, see the SET/DEFINE/CHANGE PORT (Table 5-12) and the SET/DEFINE/CHANGE SERVER (Table 5-16) command option descriptions in Section 5 of this manual.

---

## 3.3 Configuring the Server

---

Although the server can generally be used without any special configuration, it is a good idea to go through the server options and see if there are any you would like to change. Three sets of options can be changed:

- **PORT Options.** These options affect individual ports on the server. For example, you may wish to set such things as speed, parity, and flow control type individually on each port.
- **SERVER Options.** These are options that affect the entire server.
- **TCP Port (SERVICE) Options.** These are options used to create TCP ports (services) on the server. For example, if you have a printer connected to a port on the server, you may wish to define that port as a "service" named PRINTER with the SET SERVICE command.

All of these options are modified by either the SET, DEFINE, or CHANGE command. Each of these three commands works slightly differently:

- **SET** - Options are modified temporarily. The old values return the next time the server is reinitialized. Port options modified by a SET command return to their old values when the port is logged in or out.
- **DEFINE** - Options are not modified until the server is reinitialized, but are then changed permanently (unless the server is reset to its factory settings). Port options modified by a DEFINE command become permanent when the port is logged in or out.
- **CHANGE** - Options are modified immediately and permanently (unless the server is reset to its factory settings). This is the most common command.

Thus, there are a total of four commands that can be used to modify various options:

- SET/DEFINE/CHANGE NODE
- SET/DEFINE/CHANGE PORT
- SET/DEFINE/CHANGE SERVER
- SET/DEFINE/CHANGE SERVICE

These commands are described on the following pages.

---

### 3.3.1 Setting Port Options

---

The CHANGE PORT command and all the options it affects are described fully in subsection 5.26. Note that nonprivileged users are allowed to change some options on their own ports (see subsection 5.26 for details) but only a privileged user can change another port's options. Examples of port setup for different devices (terminals, modems, etc.) are given in subsection 3.4.

For the most part, the options affected by the CHANGE PORT command are standard serial port settings: baud rates, parity, modem controls, etc. For example, the following command sets the baud rate of port 12 to 9600 bps:

```
Server>> CHANGE PORT 12 SPEED 9600
```

You may specify several ports or all ports with one command. The following line sets port 1 and ports 4-12 to 9600 baud:

```
Server>> CHANGE PORT 1,4-12 SPEED 9600
```

The following line sets all serial ports to 9600 baud:

```
Server>> CHANGE PORT ALL SPEED 9600
```

If no port number is specified, your own port is changed. You may also specify multiple options on a single line as long as the line does not exceed 132 characters. For example, if you want to configure your own port for a VT100-type terminal with the pause option enabled, enter the following (note that you are not required to be in privileged mode because you are changing your own port):

```
Server> CHANGE PORT TYPE VT100 PAUSE ENABLED
```

The word PORT is optional. The following line is functionally equivalent to the one above:

```
Server> CHANGE TYPE VT100 PAUSE ENABLED
```

You may also use the CHANGE command to configure the parallel port by specifying PRINTER instead of PORT 33. For example, the following command configures the parallel port for use with a Centronics type printer:

```
Server>> CHANGE PRINTER TYPE CENTRONICS
```

---

### 3.3.2 Setting Server Options

---

The CHANGE SERVER command and all the options that it affects are described fully in subsection 5.28. Note that server options can be modified only by a privileged user.

The options affected by the CHANGE SERVER command affect internal server operation and are set to standard values at the factory. Most of them can be safely left in their factory settings but a few are system dependent. At a minimum, you should consider changing the following options:

- CONSOLE PORT
- DOMAIN
- HEARTBEAT
- IP ADDRESS
- NAME
- PRIVILEGED PASSWORD
- SUBNET MASK

Some server options cannot be changed while sessions are active (they are noted individually in subsection 5.28). For these options, it is often convenient to use the DEFINE command and then issue a delayed INITIALIZE command to reinitialize the server at a later time when no sessions are active. The new options take effect when the reinitialization is complete.

---

### 3.3.3 Setting Service Options

---

The CHANGE SERVICE command and all the options that it affects are described fully in subsection 5.29. Note that TCP port (service) options can be modified only by a privileged user.

The CHANGE SERVICE command is used to define a server port(s) as a local TCP Port (service). This allows hosts or users to connect to the ports by simply specifying the node name or IP address, and the TCP port number or TCP port name. See the description of the CONNECT command (subsection 5.8) for further information. For example, if a dialout modem is connected to, say, port 1 on the server, you might want to define that port as a TCP port (service) named MODEM so that users can connect to the modem by entering the command CONNECT KING MODEM, where KING is a node name, and MODEM is a TCP port name.

---

---

Configuring a port as a service is only required for ports connected to devices that other users (or hosts) might want to connect to. This includes printers, modems, data switches, and so forth. If your server is used only for interactive terminals, there is no need to define any local services. Existing services may be eliminated by the CLEAR/PURGE/DELETE SERVICE command (see subsection 5.6 for details).

---

### **3.3.4 Setting Port Options for Local TCP Ports (Services)**

---

If you have defined any local services, you must set port options for each of the service's ports. For example, if you connect a serial printer to port 1 and define it as the service PRINTER, you must set the port options on port 1 so that it is compatible with your printer.

The following port options must always be set for all local services:

- ACCESS must be remote or dynamic
- AUTOBAUD must be disabled
- SPEED and PARITY must be set via the CHANGE PORT command

In addition, there are a number of port options that may need to be changed from their factory defaults depending on the type of service offered (printer, modem, etc.). Section 3.4 contains several examples of how to configure ports for specific devices. Be sure to read this section if you are unsure of how to set port options for local services. Even if a local service is defined properly, it will not work if its port options are set incorrectly.

---

## **3.4 Examples**

---

On the following pages are examples of Performance 4000-T commands. A person who is unfamiliar with the Performance 4000-T command set may wish to enter the commands as shown in order to become familiar with the Performance 4000-T command set.

Press Enter until the following prompt appears:

Enter username, or HELP> John Smith

# ACCESS *(this does not appear on the screen when you type it)*

Following are several HELP commands that will display online help for the Performance 4000-T commands. HELP is provided for the help utility itself; for several SET commands used in configuring nodes, ports, servers, and services; and for the SHOW command, which displays the current configuration settings and statistics.

Server> HELP

Server> HELP SET

Server> HELP SET NODE

Server> HELP SET PORT

Server> HELP SET SERVER

Server> HELP SET SERVICE

Server> HELP SHOW

Server> SET PRIVILEGED

Password> SYSTEM *(this does not appear on the screen when you type it)*

Server>> CHANGE SERVER NAME P4K001 IP 193.7.400.010  
SUBNET 255.255.255.0

This command identifies your server to the Performance 4000-T software. Be careful to enter the correct server name (i.e. node name), IP address, and subnet mask for your network. All IP addresses and node names within a network must be unique.

Server>> SHOW NODE

This command displays nodes known to the server; that is, nodes that have been entered into the node table via network broadcast.

Server>> CHANGE NODE NAME KING IP 193.7.400.020

This command enters node KING into the node table (not necessary if node KING is broadcasting).

---

```
Server>> CHANGE NODE NAME QUEEN IP 193.7.400.021
```

Enters node QUEEN into the node table (not necessary if node QUEEN is broadcasting).

```
Server>> SHOW NODE
```

This command shows all nodes that the server is aware of.

```
Server>> LIST NODE
```

This command shows nodes located in the server's nonvolatile memory. There is space in nonvolatile memory for four nodes.

```
Server>> SHOW NODE TABLE STATUS
```

```
Server>> SHOW NODE KING COUNTER
```

```
Server>> CHANGE PORT TELNET ECHO WONT DO SUPPRESS WILL DO
```

```
Server>> CONNECT KING
```

This command connects you to the node KING, port 23 (Telnet). Type **<Break>**.

```
Server>> CONNECT QUEEN
```

This command connects you to the node QUEEN, port 23 (Telnet). Type **<Break>**.

```
Server>> SHOW SESSION
```

```
Server>> DISCONNECT ALL
```

```
Server>> CHANGE PORT PAUSE ENABLE
```

```
Server>> CHANGE PORT TYPE VT100 (if terminal is VT100 type)
```

```
Server>> SHOW SERVER
```

Type **<Return>** to exit.

```
Server>> SHOW PORT
```

Type <Return> to exit.

```
Server>> MONITOR PORT ALL
```

Type <Return> to exit.

```
Server>> MONITOR USER
```

```
Server>> SHOW SERVICE
```

```
Server>> CHANGE SERVICE WRAP PORT 16 3000 TELNET DISABLE
```

```
Server>> CHANGE PORT 16 ACCESS REMOTE AUTOBAUD DISABLE
```

Install a loopback connector on server port 16 (data leads only).

```
Server>> SHOW SERVICE
```

```
Server>> SHOW SERVICE WRAP
```

```
Server>> SHOW SERVICE WRAP CHARACTERISTICS
```

```
Server>> CONNECT P4K001 3000 NOTELNET
```

You have just connected to a local service (TCP port) on your own node. If you enter characters, they should echo to your terminal via the loopback connector.

Type a BREAK, DISCONNECT, and CONNECT command for the same service (TCP port) from a remote node. The CONNECT command is the same if the remote node is a Performance 4000-T.

```
Server>> CONNECT 193.7.400.010 3000
```

Same as above.

```
Server>> DELETE SERVICE LOCAL ALL
```

```
Server>> SHOW SERVICE
```

Note that ALL refers to Ports 1-32. When the Printer Port (33) is included, it is specifically cited (as above).



---

### 3.4.1 Sample Port Setups

---

The following sections contain examples of how to set port options for a variety of devices. The following port setups are covered:

- Standard Terminals
- Dedicated Terminals
- PCs as Terminals
- Standard Printers
- Printers Using CTS/RTS or DSR/DTR Flow Control
- Modems
- Non-TCP/IP Hosts
- Data Switches

Port options are set via the SET/DEFINE/CHANGE PORT command. Note that for most devices nearly all of the port options can be left in their factory default settings (as shown in Table 5-12). In the examples that follow, options that are a matter of personal preference are not discussed. Only the options that *must* be changed in order to support a particular device are listed.

---

### 3.4.2 Standard Terminals

---

A standard terminal is any dumb, ANSI, or DEC compatible terminal that users use interactively. These terminals use the standard ASCII character set.

Standard terminals require no changes from the factory default port settings. You may wish to make the following changes, however:

- The default terminal type for all ports is SOFTCOPY. If you are using DEC VT series terminals or compatibles, issue the command CHANGE PORT ALL TYPE VT100. If you are unsure what terminal type you have, type HELP HINTS TERMINAL.
- You may wish to assign permanent usernames to terminal ports via the CHANGE PORT *x* USERNAME command. If this is not done, users are prompted for a username every time they log in. Note that this command may also be issued by individual users for their own ports.

- The default flow control type is XON/XOFF, the most common type. If your terminals use EIA flow control, you must issue the command CHANGE PORT ALL FLOW CONTROL DSR.
- All ports are set for autobaud operation. This allows the attached terminals to be set for any speed, but characters must be either 7-bit even parity or 8-bit no parity. If they are not, you may not use autobaud and must set all port options individually using the CHANGE PORT SPEED, PARITY, and CHARACTER options.

---

### 3.4.3 Dedicated Terminals

---

A dedicated terminal is one that connects directly to a node, skipping the username prompt and CONNECT command. For example, if you have a node named ACTG, a user is normally required to enter a password, a username, and a CONNECT command before logging in to the host.

If you wish, the password requirement can be deleted by the CHANGE PORT PASSWORD command. The username prompt can be disabled by assigning the port a permanent username via the CHANGE PORT USERNAME command.

You may also eliminate the CONNECT command. There are two ways this can be done:

- CHANGE PORT *x* AUTOCONNECT ENABLED PREFERRED *node*

When autoconnect is enabled, the port automatically connects the user to the specified node after the server login. If you then require a connection to a different node, press the "break" key to enter local mode and return to the Server > prompt, then issue the new CONNECT command.

- CHANGE PORT *x* DEDICATED *node*

This command is similar to the one above with one difference: the user does not receive the server login prompt and is not allowed to enter local mode. This means that the user cannot switch to another node. The port is connected permanently to the specified node, just as if it were hardwired to the node.

---

In summary, use the PREFERRED option when the autoconnect is simply a convenience for the user. Use the DEDICATED option when you want to prevent a user from accessing any other nodes (this makes the server transparent to the user). Note, however, that in both cases the user must still enter the login password if it is enabled for the port.

---

### 3.4.4 PCs

---

A PC running terminal emulation software can be set up just like any other terminal. No special options are required.

If you plan to use a PC for file transfers, you may need to set a few options differently:

- ACCESS should be set to DYNAMIC so that the PC can accept a connection from another device that wants to transfer a file. (Note that this port must be included on a TCP port offered by the server.)
- AUTOBAUD does not work with remote connections. If the port the PC is connected to is defined as a local TCP port and will be accepting connections from other devices, you must disable AUTOBAUD and set speed, parity, and character size via the CHANGE PORT command.
- TELNET BINARY WILL DO TBD
- FLOW CONTROL should be set to either CTS (for printers that use CTS/RTS flow control) or DSR (for DSR/DTR flow control). Partial modem ports may only be set to DSR and require a special cable if CTS flow control is used (see Appendix A for cable schematics).

Refer to section 4.6.2 for a complete discussion of using PCs for file transfers.

---

### 3.4.5 Serial Printers

---

A serial printer uses XON/XOFF flow control, requiring the following port settings:

- ACCESS REMOTE. A printer does not need to initiate connections; it only needs to accept them.

Some printers, such as hardcopy keyboard devices, can act as terminals as well as printers. For these devices, set ACCESS DYNAMIC so that connections can be originated as well as received. You may also wish to set INTERRUPTS ENABLED so that you can interrupt a print job by pressing a key on the keyboard.

- AUTOBAUD DISABLED. Autobaud does not work with remote connections. You must set the speed, parity, and character size via the CHANGE PORT command.

---

### 3.4.6 Parallel Printers

---

Printers connected to the parallel port (port 33) do not need to have these options configured. The only configuration necessary for parallel printers is to set TYPE to either CENTRONICS or DATAPRODUCTS (the default is Centronics).

---

### 3.4.7 Printers Using CTS/RTS or DSR/DTR Flow Control

---

Some printers use EIA modem signals for flow control rather than XON/XOFF characters. These printers should be set up like standard printers with two differences:

- FLOW CONTROL should be set to either CTS (for printers that use CTS/RTS flow control) or DSR (for DSR/DTR flow control). Partial modem ports may only be set to DSR and require a special cable if CTS flow control is used (see Appendix A for cable schematics).
- MODEM CONTROL must be disabled.

Note that printers that use modem signals for flow control must be connected with cables that carry the modem signals. See Appendix A for a diagram of the appropriate cables.

---

### 3.4.8 Modems

---

The following options should be set on ports connected to modems:

- MODEM CONTROL must be enabled.
- AUTOBAUD must be disabled if modem is dial out. Set the speed, parity, and character size via the CHANGE PORT command.
- If your modem has a fallback speed and supports alternate speed modem protocol signals DSRS and SMI, set the ALTERNATE SPEED option to reflect the fallback speed. If a port is attached to an alternate speed or multiple speed modem and the modem is dial-in, the alternate speed option can be disabled and the autobaud option enabled to support the fallback speed(s).
- PASSWORD should be enabled as a security feature.
- On partial modem ports (RJ12 connectors) DTRWAIT must be disabled for dial-in modems and enabled for dialout modems. ALTERNATE SPEED must be disabled.
- ACCESS should be set to LOCAL for dial-in modems, REMOTE for dialout modems, and DYNAMIC for dial-in/dialout modems.

Be sure to use the correct cables for connecting modems. Cabling diagrams are shown in Appendix A. Refer to Appendix C if you require more detailed information on Performance 4000-T modem signals.

---

### 3.4.9 Non-TCP/IP Hosts

---

The Performance 4000-T may be used to connect non-TCP/IP hosts to your Ethernet network. Figure 3-2 illustrates how a non-TCP/IP host can be connected to your Ethernet network by connecting serial ports on the host to serial ports on the Performance 4000-T.

Set port options as follows:

- ACCESS must be set to REMOTE or DYNAMIC.
- AUTOBAUD should be disabled. Set the speed, parity, and character size via the CHANGE PORT command.
- MODEM CONTROL should be enabled.
- Be sure to define the ports that the host is connected to as a TCP port (service). Users can then connect to the non-TCP/IP host by connecting to that TCP port.

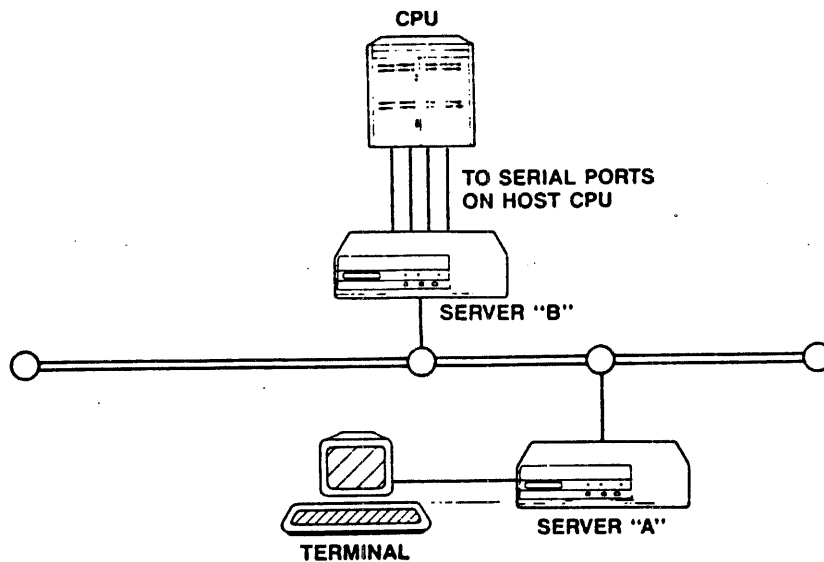


Figure 3-2. Connecting a Non-TCP/IP Host to the Performance 4000-T

---

### 3.4.10 Data Switches

---

You may attach a data switch to a port (or ports) on the Performance 4000-T in order to allow server users access to hosts or other devices connected to the data switch. Ports must be set up as follows:

- ACCESS should be DYNAMIC. If connections will be made in one direction only (for example, server users connecting to remote hosts on the switch, but not vice versa), access may be either local or remote, as appropriate.
- MODEM CONTROL should be enabled.
- DSRLOGOUT must be disabled.
- AUTOBAUD should be disabled if access is remote or dynamic. Set speed, parity, and character size via the CHANGE PORT command.
- BREAK may need to be set to REMOTE or DISABLED. This depends on the requirements of the data switch.
- Be sure to define the ports that the data switch is connected to as a TCP port (service). Users can then connect to the switch by connecting to that TCP port.

It is possible that you may need to set other port options in addition to the ones above. Different data switches have different requirements, and the only way to make sure your port options are set correctly is to refer to the technical documentation for your data switch.

---

## 3.5 Connecting to Services

---

After all server and port options have been configured, the server is ready for use. Once you have logged in to the server and gotten the `Server >` prompt, you are in *local mode* and may use the `CONNECT` command to connect to host CPUs and other services on the network.

---

The CONNECT command may be abbreviated C, so to connect to a host named KING, for example, you would enter the following and then log in to your account on the host normally:

```
Server> C KING
Server-010-Session 1 connected to node KING port 23
```

Port 23 is the TCP port number for the Well-Known TCP Port TELNET. If the CONNECT command does not specify a TCP port number or name, then the TELNET Well-Known TCP Port is selected by default.

After you have logged in to your account, you are in *connected mode*. You may exit connected mode in two ways:

- By logging off the Host. This disconnects your session.
- By pressing the **<Break>** key (unless you have disabled the break key via the CHANGE PORT BREAK command). This puts you back in local mode but keeps your session active. You may get back into it by entering the RESUME command.

By using the **<Break>** key to exit sessions, you can keep multiple sessions active and switch between them easily. To get a list of all your active sessions, get into local mode and issue the SHOW SESSIONS command.

To disconnect all your active sessions, get into local mode and either enter the command DISCONNECT ALL or simply log off the server by entering LOGOUT.

For a complete description of all server commands, refer to Section 5, Commands.



---

## **4.1 Overview**

---

This section describes some of the advanced features of the Performance 4000-T. It includes sections on initializing the server, using the front panel display, and other topics.

---

## **4.2 Initialization**

---

The Performance 4000-T can be initialized in the following ways:

- By removing then restoring the server's power.
- By issuing an INITIALIZE command. The INITIALIZE command has several options that can be used for such things as delaying initialization. Refer to Section 5, Commands, for further details.
- By issuing a CRASH 300 command. Note that this may upload a crash dump to the host from server memory.

When the server is initialized, all sessions are disconnected and the server runs through its self-test. If a Network Load PerformancePak is being used, the server then downloads its software from a load host. When downloading is complete, the server is ready for use.

---

## **4.3 Remote Console Facility Operation**

---

You do not have to be physically connected to the Performance 4000-T in order to issue server commands. The Remote Console Facility (RCF) allows you to log in to the Performance 4000-T from any host or server on your network that supports the TCP/IP protocol. This feature lets you control all the servers on your network from a single central terminal.

RCF allows you to connect to TCP Port Number 2048 of the server. This equates to a server port associated with the server's virtual port 34, not a TCP port. This port is called the remote console port.

The exact procedure for connecting to the remote port varies from device to device. However, most TELNET client programs allow you to specify a port number as well as a "host". To connect to the RCF, simply specify port number 2048 instead of defaulting to port 23.

---

### 4.3.1 Managing the Remote Console Facility (RCF)

---

Keep the following things in mind when you use the remote port:

- The server allows only one connection to the RCF. Thus, if you are connected and there are others who have a need to access the port, you should disconnect as soon as you know that you are finished with it.
- You can disconnect in one of two ways. One way is to log out with the Performance 4000-T LOGOUT command. If your terminal is on a remote Performance 4000-T, you can enter **<Break>** to return to local mode, then issue a Performance 4000-T DISCONNECT command.
- You may not permanently configure port options on the remote console port (i.e., you may not issue a CHANGE or DEFINE PORT command for port 34). Also, you may not include the remote port in a range of ports (for example, you may **not** issue the command CHANGE PORT 1-34).
- The remote port is permanently configured as follows: AUTOBAUD disabled, BREAK disabled, BROADCAST disabled, INACTIVITY LOGOUT disabled, SESSION LIMIT = 1, NAME = "Remote Console", and ECHO WILL, SUPPRESS GA WILL/DO". All other options are the same as the defaults for the physical ports (as listed in the SET PORT command options).

---

## 4.4 The Console Port

---

The Performance 4000-T has been designed so that all status and error messages that relate to the server as a whole are directed to one port, called the console (or diagnostic) port. This is the only port on the server that receives 900-series messages that concern fatal errors and down-line loading.

The console port is always port 1 on the 16 line unit and port 5 on the 12 line unit when the server is delivered from the factory, but you can define any other port as the console port by using the following command:

```
Server>> CHANGE SERVER CONSOLE x
```

The value *x* specifies the number of the port. To disable the console port, specify NONE.

If you want to place a modem or a user terminal on console port 1, either configure another port as the console or specify CONSOLE NONE.

### NOTES

The server transmits 900-series messages to the console port no matter what kind of access is specified for that port. Be sure that the device connected to that port can display messages.

If the device is a general access printer, these maintenance messages may appear within any data printing out on the printer.

---

#### 4.4.1 The Printer Port

---

The parallel printer port (port 33) can be configured as a TCP Port (service).

---

### 4.5 Using PCs

---

The following two sections describe how PCs connected to the server can connect to (1) printers and (2) other PCs that are defined as local TCP ports.

---

## 4.5.1 Connecting PCs to Printers

---

PCs may connect to printers as follows:

1. Using terminal emulation software, log in to the server normally.
2. From local mode, connect to the printer TCP port. If the TCP port is configured on node KING as TCP port #3000, then the following command would be used:

```
Server> CONNECT PRINT  
Password>
```

(The server prompts for a password only if one was enabled when the service was created.)

Note that the printer TCP port might contain several printers. In this case, the server connects the PC to the first available printer. This is probably all right if all the printers are identical, but if they are different it is a good idea to define them as separate TCP ports.

3. Exit the terminal emulation program and return to DOS.
4. Redirect printer output from your PC's parallel port to the serial port that connects it to the server (COM1, COM2, etc.). For DOS print functions, the following command is all you need:

```
A> MODE LPT1:=COM1:
```

If you are using an application program, refer to its documentation for instructions on how to redirect printer output.

5. The printer is now connected to the PC just as if a regular printer cable were run between the two. When you are finished printing, be sure to reenter local mode and disconnect from the printer. No one else can use the printer until this is done.

---

## 4.5.2 PC File Transfers

---

The following procedure shows how to set up file transfers between PCs attached to the Performance 4000-T:

1. Connect to the remote PC. If the receiving PC is defined as the service KING, for example, enter the following command:

```
Server> CONNECT KING 4000
```

2. Break out to local mode and configure your port to pass through the control characters that it normally intercepts:

```
Server> SET SESSION PASSALL  
Server> RESUME
```

NOTE: **PASSALL** disables XON/XOFF Flow Control to allow Binary data to pass unaltered. If the file to be transferred has no embedded XON/XOFF character, (11<sub>16</sub>, 13<sub>16</sub>) then set session to **PASTHRU**. This allows XON/XOFF to be honored.

3. Exit your terminal emulation program and return to DOS.
4. Run your file transfer program. It will work just as though there is a cable connected between your PC and the target computer.
5. When the file transfer is finished, return to local mode and disconnect from the target PC.

---

## 4.6 The Front Panel Display

---

The Performance 4000-T contains a 16-character LCD display on its front panel. This display is used to display selected status information.

Status information is arranged in menus. Menus and options within menus are chosen by the three buttons on the front panel. The Next button moves you through menu choices, the Last button moves you backward through menu choices, and the Select button executes a menu choice.

On the next two pages you will find two tables: Table 4-1 lists all the menu options available through the front panel display and Table 4-2 is an example of how to use the buttons to step through the menus.

Note the following things about the Performance 4000-T front panel display:

- All front panel options can also be executed on a normal terminal by a privileged user. The front panel is a convenience only; it is never required.
- You can advance through a single menu selection by pressing the appropriate button, or you can hold the button down and the menus will advance automatically.
- Most displays are shown for one minute, after which the default display ("Performance 4000") reappears.
- Pressing any button after a status display returns you to the last menu option selected.

Most of the menu options are self-explanatory. If you require further details about any of the options, however, the next three sections, following the two tables, describe each front panel menu option in detail.

Table 4-1. Front Panel Menu Options

Level One	Level Two
SERVER STATUS	NAME NUMBER ETHERNET ADDRESS IP ADDRESS #SESSIONS / CPU% TIME AND DATE EXIT
PORT STATUS	SELECT PORT* STATE MODEM CONTROLS-1 MODEM CONTROLS-2 SPEED/PARITY NUMBER SESSIONS EXIT
PRINTER STATUS	STATE STATUS EXIT
EXIT	
<p>* The PORT STATUS option requires you to choose a port. When the SELECTED PORT option appears, press Select and a port number appears. Then press Next until you get the port number you are interested in, and press Select.</p>	

Table 4-2. Example of Front Panel Menu Selection

Button	Display	Comment
	Performance 4000	Default display.
Next	Server Status	Pressing any button brings up the first menu option.
Next	Port Status	Pressing Next takes you to the next menu option.
Last	Server Status	Pressing Last takes you backward through menu options.
Select	Name	Pressing Select chooses a menu option. We are now in the level 2 menu.
Next	Number	Moving through level 2 options...
Next	Ethernet Address	
Select	Ethernet address for the server	
Next	IP address	
Select	IP address for the server	
Next-Last	Server Status	Pressing Next and Last together return you to level 1.
Last	Exit	Move backward to Exit.
Select	Performance 4000	And exit the menus.



---

## 4.6.1 Front Panel Displays: Server Status

---

The Server Status menu allows you to display server parameters. It has the following suboptions:

**Name.** The server name, as defined by the SET SERVER NAME command.

**Number.** The server ID number, as defined by the SET SERVER NUMBER command.

**Ethernet Address.** The server's physical Ethernet address (the address stamped on the rear panel of the server, just above the Ethernet port).

**IP Address.** The server IP Address, as defined by the SET SERVER IP ADDRESS command.

**#Session/CPU%.** The number of active sessions on the server and the percentage of internal microprocessor usage.

**Time and Date.** Displays the time and date.

---

## 4.6.2 Front Panel Displays: Port Status

---

The Port Status menu allows you to display information about each port on the server. It has the following suboptions:

**Select Port.** This option allows you to choose the number of the port you want status information about. If you make no choice, port 1 is chosen.

To select a port, press the Select button when the Select Port option comes up and then press Next (forward) or Last (backward) until you reach the desired port number. Press Select again and port selection is finished. This port number stays in memory until it is changed or the server is reinitialized.

**State.** Indicates the state of the port you have selected. The following states are displayed:

- IDLE - The port exists but is not active.
- WAKING UP - The port is responding to modem handshaking.
- LOGGING IN - A user is logging in to the port.
- LOGGING OFF - A user is logging off the port.

- LOCAL - The port is logged in but has no active sessions.
- CONNECTING - The port is connecting to a service.
- CONNECTED - The port is connected to a service.
- LOCKED - LOCK has been entered at the port.
  
- RESUME PENDING - The port is trying to resume a session.
- DIAGNOSTIC - TEST PORT has been executed for the port.
- AUTOBAUD - The port is in the process of autobauding.
- MONITORING - MONITOR has been executed at the port.
- SEALED - The user has incorrectly entered a password.
- TRANSITION - The port is changing from one state to another.

**Modem Controls-1.** Displays the incoming modem signals that are currently asserted on the port. The following signals may be displayed:

DSR, CTS, RI, CD, SMI (Full Modem)  
DSR (Partial Modem)

**Modem Controls-2.** Displays the outgoing modem signals that are currently asserted on the port. The following signals may be displayed:

DTR, RTS, DSRS (Full Modem)  
DTR (Partial Modem)

**Speed/Parity.** Displays the speed and parity settings of the selected port. If the port has different input and output speeds, the output speed is displayed.

**Number Sessions.** Displays the number of current sessions in use by the port. This includes both local and remote sessions and active and inactive sessions.

---

### **4.6.3 Front Panel Displays: Printer Status**

---

The Printer Status menu displays the current status of the printer port (port 33). It has two suboptions:

**State.** Indicates the state of the printer port:

- IDLE - The printer port exists but is not active.
- CONNECTED - The printer port is connected to a service.

**Status.** Indicates the current status of the printer:

- PRINTER RUNNING - This is the normal condition.
- PAPER EMPTY - The printer is out of paper.
- PRINTER OFF LINE - The printer is off line.
- POWER OFF - The printer is not on.
- PAPER ERROR - Indicates a paper jam or something similar.



## 5.1 Overview

This section contains detailed descriptions of all the Performance 4000-T local mode commands. The commands are listed in alphabetical order.

Nearly all server command keywords can be abbreviated, usually with just the first two or three letters of the command keyword. The following table includes many of the Performance 4000-T commands and option abbreviations, with the minimum acceptable abbreviations shown in capital letters at the beginning of each keyword.

Performance 4000-T Command Abbreviations Table

ACcess	CRASH 300	Groups	Monitor	RETransmit
ADdress	CTs	HARdcopy	MULTicast	RIng
ALL	DAte	Hardware	NAME	SECurity
ALTErnate	DCDlogout	Heartbeat	Network	SERVEr
ANnouncements	DEdicated	Help (or "?")	NODE	SERVEr
ANsi	DEFine	HINts	NODEs	SESSion
ASsistant	DElay	HOst	NONE	SEt
AUTHorized	DestInation	IdentIfication	NOPrivileged	Show
AUTOBaud	DIALup	INActivity	NOTification	SIze
AUTOConnect	DIsable	INItialize	NUmber	SOftcopy
AUTOPrompt	DIsabled	INPut	ODd	SOftware
AUTOReinit	DIsconnect	InterActive	OUtput	SPeed
BAckward	DSr	INternal	OverrIde	STatus
BREak	DSrlogout	INTerrupts	PARity	SUMmary
BROadcast	DTrwait	Keepalive	PASSall	SWitch
CAncel	DUmp	LIMit	PASSword	TErminAl
CHange	DYnamic	List	PASThru	TEst
CHaracter	ELt	LOCAl	PAUse	TIme
CHaracteristics	EMULEX	LOCK	POrt	TImer
CIrcuit	ENabled	LOGGing	PREferred	TRansmit
CLear	ENtry	LOGIn	PRIVileged	TYpe
CLS	ERrorlogoff	LOGout	PROMpt	USername
CODes	ETHerNet	LOOp	Purge	USers
Connect	EVEN	LOOpback	Queue	VerIfication
Connections	EXternal	LOSS	RCF	VT100
CONsole	FLow	MAIntenance	REceive	WElcome
CONtrol	FORward	MARK	REMOte	WIth
COUnT	FRontpanel	MESsage	REMOve	Xon
COunters	Full	MOdem	ResUme	ZEro

---

## 5.1.1 Format of Command Descriptions

---

The command descriptions that follow all have the same format. The format is the same as the one used on this page.

**Syntax** This line shows the command and its keywords. Command keywords are shown in all capitals. Command variables are shown in **bold**.

When keywords or combinations of keywords and variables are stacked in a vertical column surrounded by curly {brackets}, then you are required to include one of the expressions (and only one) in your command. Do not include brackets in the commands.

When keywords or combinations of keywords and variables are stacked in a vertical column surrounded by square [brackets], they are optional, and you may include none, one, or several of the expressions in your command. Do not include brackets in the commands. The command comments will mention any restrictions on combining optional expressions. When the phrase [options and modifiers] appears in a command, a separate options table is provided in which all the options and modifiers that may be specified are listed in alphabetical order.

**Privilege** This line describes whether nonprivileged users can execute the command (privileged users can always execute all commands without restrictions). It also describes additional restrictions, if any, on secure users (refer to the SET PORT SECURITY command for a description of secure users).

**Example** This line gives one or more examples of the command. All user input is shown in red.

**Comments** This line offers hints and explains any restrictions on using the command. For commands with several variables and optional keywords, a command options table explains the various options and modifiers that can be used with the command.

Table 5-1 describes several variables, including node name (**ndname**) and TCP port name (**tpname**), that appear in many commands and have the same meanings wherever they occur.

Table 5-1. COMMAND Options

Option	Definition
<b>ndname</b>	The name of a TCP node on the network. The node name may be from 1 to 64 characters long.
<b>tpname</b>	<p><b>tpname</b> is an abbreviation for TCP port name, which is the name of a TCP port on a node. The TCP port name may be from 1 to 16 characters long.</p> <p>All names (TCP node name and TCP port name) may contain the following characters:</p> <p>A-Z, 0-9, \$, _ (underscore), . (period)</p>
<b>ipadd</b>	The internet address of a TCP node on the network. Format: d.d.d.d, where "d" is equal to a decimal number from 0-255.
<b>tpnum</b>	<b>tpnum</b> is an abbreviation for TCP port number. The TCP port number is the number of a TCP port on a node.
<b>spnum</b>	<p><b>spnum</b> is an abbreviation for server port number. The number of a physical server port that a command applies to. It may be one port, several ports, or all ports. For example:</p> <pre> SET PORT 4           (port 4 only) SET PORT 4, 7-12    (port 4 plus 7 through 12) SET PORT ALL        (ports 1 through 32) </pre>

---

## 5.2 BACKWARDS

---

The BACKWARDS command places you back in the session that preceded your most recent one. If you have only a single active session, BACKWARDS places you in that session.

**Syntax**      BACKWARDS

**Privilege**     Available to all users.

**Comments**    The BACKWARDS command works in a circular fashion. Issuing the BACKWARDS command repeatedly will roll you through all your active sessions.

There are two other commands that place you back in your sessions: the FORWARDS command is similar to BACKWARDS but rolls you through your sessions in the opposite direction; the RESUME command can be used to switch into a specific session.

Note that you can also switch backward and forward between sessions from within the sessions themselves by using the FORWARDS and BACKWARDS keys. Refer to the SET PORT BACKWARDS SWITCH command for details.



## 5.3 BROADCAST

The BROADCAST command transmits a message to another port or ports on the server.

**Syntax**     **BROADCAST**   { **PORT** **spnum** }   "**message**"  
                                  { **ALL**                    }

**Privilege**   Nonprivileged users may broadcast messages only to a single port. Secure users may not use this command.

**Examples**    **BROADCAST** **PORT** 2, "System will shut down in 5 minutes"  
                 **BROADCAST** **PORT** 1, 6-32 "The laser printer is back up"  
                 **BROADCAST** **ALL** "Server ready"

**Comments**   The BROADCAST command works only if it has been enabled by the SET SERVER BROADCAST command. In addition, each target port must have broadcast enabled individually by the SET PORT BROADCAST command in order to receive broadcasts.

The broadcast message will not reach the target port if any of the following conditions is true: (1) the port is logged out; (2) the port's BROADCAST option is disabled; (3) the port is flow controlled and its output buffer is full; (4) the port's current session is in BINARY TRANSMIT mode (see SET SESSION). The sender is notified of all logged-in ports that do not receive a broadcast message.

Table 5-2. BROADCAST Options

Option	Definition
<b>PORT spnum</b>	<b>spnum</b> is an abbreviation for server port number. The port(s) to which the message is transmitted. It can be a single port or several ports.
<b>ALL</b>	Transmit the message to all ports.
<b>"message"</b>	The message to be transmitted. The message may be any length as long as the entire command does not exceed a single command line (132 characters). If the message is not enclosed in quotation marks, it is sent out in all capitals. All eight-bit non-ASCII characters are sent exactly as entered.

---

## 5.4 CHANGE

---

All CHANGE commands are described under the equivalent SET command.

---

## 5.5 CLEAR/PURGE/DELETE NODES

---

The CLEAR, PURGE, or DELETE NODES commands are used to delete a node that was created by the SET, DEFINE, or CHANGE NODE commands.

CLEAR NODES deletes a node temporarily; the node will return the next time the server is reinitialized. PURGE NODES deletes a node permanently but does not take effect until the server is reinitialized. To delete a node immediately and permanently, issue a DELETE NODES command.

Nodes that have several functions can be cleared for only one or two of those functions. For example, a Gateway node that is also a Nameserver may have only the Gateway function cleared by specifying GATEWAY in a CLEAR command. Unless NAMESERVER is specified, the node will still exist as a Nameserver.

**Syntax**    { CLEAR }    NODES [ NAME ]    { ndname }    [ GATEWAY  
              { PURGE }            IP            { ipadd }    [ NAMESERVER  
              { DELETE }         ALL            ]            TCPIP ]

**Privilege**    Available to privileged users only.

**Examples**    CLEAR NODES NAME P4K03  
              CLEAR NODES NAME P4K03.MRKTG.ABCINC.COM.  
              CLEAR NODES IP 185.011.021.001 GATEWAY  
              CLEAR NODES NAME P4K03 GATEWAY NAMESERVER TCPIP

**Comments**    The CLEAR NODES command will be rejected under one or more of the following conditions: (1) if there are ports with active sessions connected to the node; (2) if any service records for a remote TCP port reside on the node.

If the port that has sessions connected to the node is a dedicated port, you may forcibly disconnect the sessions via the DISCONNECT PORT command. If the node has any service records for remote TCP ports, you must clear those service records prior to clearing the node.

Specifying "ALL" will clear all nodes except for your own. You cannot clear your own node.

Table 5-3. CLEAR/PURGE/DELETE NODES Options

Option	Definition
<b>NAME ndname</b>	The name of the network node that offers the TCP port that you wish to clear, purge, or delete (as defined via the SET NODE command).
<b>IP ipadd</b>	The Internet address of the network node that you wish to clear, purge, or delete (as defined via the SET NODE command).  Format for the ip address is d.d.d.d, where "d" is a decimal number from 0-255.
<b>ALL</b>	Entering "CLEAR ALL" will clear all nodes on the network except your own node. You cannot clear your own node.
<b>GATEWAY</b>	GATEWAY Specifies that the node being cleared is a gateway node.
<b>NAMESERVER</b>	NAMESERVER Specifies that the node being cleared is a nameserver node.
<b>TCPIP</b>	TCPIP is any node that is not either a Gateway or Nameserver node. TCPIP is the default if Gateway and Nameserver are not specified.

---

## 5.6 CLEAR/PURGE/DELETE SERVICES

---

The CLEAR, PURGE, and DELETE SERVICES commands are used to delete a TCP port that was created by the SET, DEFINE, or CHANGE SERVICE commands. The term "SERVICE" and "TCP port" have the same meaning.

CLEAR SERVICES deletes a local TCP port temporarily; the port will return the next time the server is reinitialized. PURGE SERVICES deletes a local TCP port permanently but does not take effect until the server is reinitialized. DELETE SERVICES deletes a local TCP port immediately and permanently. The PURGE and DELETE commands can be issued only for a local TCP port.

**Syntax**    { CLEAR    } SERVICES { LOCAL    tpname    }  
              { PURGE    }                    ALL  
              { DELETE }  
  { REMOTE [ NODE ] ndname tpname }  
  [ IP        ] ipadd    ALL  
  [ ALL       ]  
  { ALL       }                    }

**Privilege**    Available to privileged users only.

**Examples**    CLEAR SERVICE LOCAL PORT MODEM  
                  PURGE SERVICE LOCAL ALL

**Comments**    The CLEAR SERVICE command may not be issued if there are sessions connected to the TCP port. Sessions may be forcibly disconnected by logging out the TCP port (LOGOUT command), or by logging out the port that is connected to the TCP port. If the port connected to the TCP port is a dedicated port, the dedicated port's session can be terminated using the DISCONNECT PORT command.

Table 5-4. CLEAR/PURGE/DELETE SERVICES Options

Option	Definition
<b>tpname</b>	Specifies the name of a single TCP port to be cleared/purged/deleted.
<b>LOCAL</b>	Clear/purge/deletes a local TCP port. "CLEAR LOCAL <b>tpname</b> " clears a specified TCP port. "CLEAR LOCAL ALL" clears all local TCP ports.
<b>REMOTE</b>	Clear/purge/deletes the port(s) at a specified remote node. The node is specified by either a node name (NODE <b>ndname</b> ) or an ip address (IP <b>ipadd</b> ). Entering "CLEAR REMOTE ALL" clears all the TCP ports on the remote node.
<b>ALL</b>	Clear/purge/deletes all all local and remote TCP ports.

---

## 5.7 CLS

---

The CLS command clears the screen.

**Syntax** CLS

**Privilege** Available to all users.

**Comments** This command is valid only on ANSI and VT100 terminals.

---

## 5.8 CONNECT

---

The CONNECT command allows you to connect to (1) TCP ports on other TCP/IP nodes, and (2) local TCP ports.

In order to specify a node name, the user may specify either the full 1-64 character node name, or the 1-16 character local node name. If the node name specified ends with a period (.), then it is considered to be the full node name, including the 1-47 character domain name.

If the node name specified does **not** end with a period (although it may include periods within the node name), then it is considered to be a node name on the local network, and the server appends its domain name to the node name. The server's domain name is set by the SET SERVER DOMAIN NAME command.

If the CONNECT command specifies a node name rather than the node's IP address, then the server must resolve the node name (i.e., determine its IP address). If the server cannot resolve the node name, the user is notified. The user then has the option of reissuing the CONNECT command specifying the node's IP address.

If the CONNECT command specifies a TCP port name as opposed to a TCP port number, the server must resolve the TCP port name (determine its TCP port number). If the server cannot resolve the TCP port name, the user is notified. The user then has the option of reissuing the CONNECT command specifying the TCP port number.

**Syntax**      CONNECT [ [ NODE ] ndname ] [ [ tpname ] [ NOTELNET ]  
                   [ [ IP    ] ipadd    ] [ tpnum  
                   [ alias\_ndname ] [ RCF

**Privilege**    Available to all users.

**Examples**    CONNECT  
                   CONNECT KING  
                   CONNECT NODE KING.MRKTG.ABCINC.COM.  
                   CONNECT NODE KING 3000 NOTELNET

```

CONNECT 201.202.203.001
CONNECT IP 201.202.203.001 LZPRT NOTELNET
CONNECT IP 201.202.203.004 2048
CONNECT IP 201.202.203.001 RCF

```

**Comment** In order for the CONNECT command to work when no node name, IP address, TCP port name, or TCP port number is supplied, the port option PREFERRED NODE/TCP PORT must be enabled via the SET PORT PREFERRED command.

If no TCP port number is specified, then the port is TELNET by default. In this case, you cannot specify NOTELNET.

Table 5-5. CONNECT Options

Option	Definition
[ NODE ] ndname	The name of the network node that offers the TCP port to which you wish to connect.
[ IP ] ipadd	The Internet address of the network node that offers the TCP port that you wish to connect to. Format: d.d.d.d where "d" is a decimal number from 0-255.
alias_ndname	The alias for the name of the network node that offers the TCP port to which you wish to connect. The alias node name must end with a period (.) to show that it is a full node name.
tpname	The name of the TCP port to which you wish to connect. If no TCP port name or number is entered, the default TCP port is 23 (TELNET).
tpnum	The number of the TCP port that you wish to connect to. If no TCP port number or name is entered, then the default TCP port number is 23 (TELNET).
RCF	Connects you to the Remote Console Facility port.
NOTELNET	Specifies the session is not a TELNET session. This is sometimes referred to as RAW TCP.





Table 5-6. CONNECT PORT Options

Option	Definition
<b>spnum</b>	Server port number. The number for the server port to be connected. You may specify a single port only.
[NODE] <b>ndname</b>	The name of the network node that offers the TCP port to which you wish to connect.
[IP] <b>ipadd</b>	The internet address of the network node that offers the TCP port that you wish to connect to. Format: d.d.d.d where "d" is a decimal number from 0-255.
<b>tpname</b>	The name of the TCP port to which you wish to connect. If no TCP port name or number is entered, the default TCP port is 23 (TELNET).
<b>tpnum</b>	The number of the TCP port that you wish to connect to. If no TCP port number or name is entered, then the default TCP port is 23 (TELNET).
[RCF]	Connects you to the Remote Console Facility port.
[NOTELNET]	Specifies the session is not a TELNET session. This is sometimes referred to as RAW TCP.

---

## 5.10 CRASH 300

---

The CRASH 300 command immediately halts the server, executes an upline dump of the server's memory (if enabled by the SET SERVER DUMP command) to a dump host, and reinitializes the server. All users are logged off and all sessions are disconnected. The CRASH 300 command does not warn users that the server is about to go down.

The preferred method of initializing the server is to execute the INITIALIZE command. The INITIALIZE command sends a warning message to all users stating that the server is about to go down and does not execute an upline dump to a dump host.

**Syntax** CRASH 300

**Privilege** Available to privileged users only.

**Examples** The CRASH command will not work unless the server has been set to enable reinitialization and upline dumping of the server memory with the following SET SERVER commands:

```
SET SERVER AUTOREINIT ENABLE
```

```
SET SERVER DUMP ENABLE
```

**Comments** You may use the SHOW SERVER command to determine whether AUTOREINIT and DUMP ENABLED have been set.

---

## 5.11 DEFINE

---

All DEFINE commands are described under the equivalent SET command.

## 5.12 DISCONNECT

The DISCONNECT command disconnects your port from one or more of your active sessions.

**Syntax**     DISCONNECT [ [ SESSION ] num ]  
                                  ?  
                                  ALL

**Privilege**    Available to all users.

**Examples**    DISCONNECT  
                  DISCONNECT ?  
                  DISCONNECT SESSION 2  
                  DISCONNECT ALL  
                  DISCONNECT 1, 2-4

**Comments**    Use the SHOW SESSIONS command to get a numbered list of all your active sessions. You may specify a range of sessions in the DISCONNECT command, or a single session. If any entry that you specify in the range of sessions is invalid, none of the sessions disconnect, and an error message is issued.

Table 5-7. DISCONNECT Options

Option	Definition
[ SESSION ] num	Specifies the number of a single session you wish to disconnect. If no number is specified, then your most recent session is disconnected. The session number may be a range of numbers, as shown in the example.
?	If you enter "DISCONNECT ?", the server displays a list of your current sessions and prompts you for a session number.
ALL	Specifies that you want to disconnect all your active sessions.

---

## 5.13 DISCONNECT PORT

---

The DISCONNECT PORT command terminates the currently active session on another port that has been configured as a dedicated TCP port. Use the DISCONNECT command to end a session on your own port.

**Syntax** DISCONNECT PORT **spnum**

**Privilege** Available to privileged users only.

**Example** DISCONNECT PORT 9

**Comments** This command terminates the port's currently active session. If the port is configured for ACCESS LOCAL or DYNAMIC, it is placed in local mode; if it is configured for ACCESS REMOTE, it is logged out. Use the LOGOUT PORT command to terminate all active sessions on a port and log out the port.

Table 5-8. DISCONNECT PORT Options

Option	Definition
<b>spnum</b>	The port you wish to disconnect. It must be a single port.

---

## 5.14 FORWARDS

---

The FORWARDS command places you in the session that comes "after" your most recent one. If you have only a single active session, FORWARDS places you in that session.

**Syntax**      FORWARDS

**Privilege**    Available to all users.

**Comments**    The FORWARDS command works in a circular fashion. Issuing the FORWARDS command repeatedly will roll you through all your active sessions.

There are two other commands that place you back in your sessions. The BACKWARDS command is similar to FORWARDS, except that it rolls you through your sessions in the opposite direction. The RESUME command can be used to switch into a specific session.

Note that you can also switch forward and backward between sessions from within the sessions themselves by using the FORWARDS and BACKWARDS keys. Refer to the SET PORT BACKWARDS SWITCH command for details.

---

## 5.15 HELP

---

The HELP command is used to display information about particular commands. A question mark may be substituted for the word HELP (see examples below). MAN is a synonym for HELP.

**Syntax**    **HELP [ command name and options ]**  
              **MAN**

**Privilege**    Privileged users can display information about all the commands. Nonprivileged and secure users can display information only about the commands they are allowed to execute. A question mark (?) is equivalent to HELP.

**Examples**    ?  
                  HELP  
                  HELP SET  
                  HELP SET PORT SPEED  
                  ? SET PORT SPEED  
                  MAN SET PORT SPEED

**Comments**    Each HELP screen contains an explanation of the command and a list of command options. For example, the HELP screen displays all server commands, the HELP SET screen displays the SET options (PORT, SERVER, etc.), and the HELP SET PORT screen displays all the options that can be changed by the SET PORT command.

You may use the line editing keys to speed your use of the HELP command. For example, if you type HELP SET PORT then decide you want more information about the SPEED option, press the up-arrow (on a VT-type terminal) and the phrase HELP SET PORT appears. Simply add SPEED to the end of the line and press <Return>.

The command HELP HINTS displays a screen of introductory information about the Performance 4000-T for new users.



Table 5-10. INITIALIZE Options

Option	Definition
<b>DELAY minutes</b>	The number of minutes before the server is initialized. Use this option if you wish to delay initialization until no sessions are active (midnight, for example). The default is 1 minute; the range is from 0 to 32767 minutes.
<b>DISABLE</b>	Disables the CONNECT command. If this option is used, no connections can be made after the server finishes initialization. To reenale connections, issue the INITIALIZE command again without the DISABLE option.
<b>CANCEL</b>	Cancels a previously entered INITIALIZE command.

---

## 5.17 LIST

---

All LIST commands are described under the equivalent SHOW command. The LIST commands show the configuration for the server's nonvolatile RAM, while SHOW commands display the configuration for the server's volatile RAM.



---

## 5.18 LOAD NODETABLE

---

The LOAD NODETABLE command downline loads a host-resident node table created by the network manager on a network load host. The node specified in the command by either the node name or the IP address identifies the host node from which the node table will be loaded. The file name specified is the file name for the nodetable file.

If no node name or IP address is specified in the command, the server will downline load the node table file from the node specified by the SET SERVER PREFERRED NODETABLE NODE command. If no file name is specified, the server will downline load the file name specified by the SET SERVER PREFERRED FILE command.

**Syntax**      LOAD NODETABLE    [ NODE ndname ] [ FILE fname ]  
                                  [ IP    ipadd    ]

**Privilege**    Available to privileged users only.

**Example**      LOAD NODETABLE  
                  LOAD NODETABLE NODE KING  
                  LOAD NODETABLE IP 201.202.203.011  
                  LOAD NODETABLE NODE KING FILE EMLXNODES

---

## 5.19 LOCK

---

The LOCK command is used to lock a terminal without disconnecting your current sessions. When you enter the LOCK command, you are prompted for a password (it is not displayed on the screen) and the terminal is then disabled. To reenable the terminal, you must enter the password.

**Syntax**      LOCK

**Privilege**     Available to all users.

**Example**      Server> LOCK  
                 Lock Password> *(enter a password here)*  
                 Verification> *(enter the same password again)*  
                 Port 3 is locked  
                 Unlock Password> *(enter your password here to unlock the terminal)*

**Comments**    If a user forgets his password, a privileged user must logout the port (thus disconnecting all current sessions) before the port can be used again.

The LOCK command can be used only if the SERVER LOCK option is enabled.

## 5.20 LOGOUT

The LOGOUT command is used to log out a port.

**Syntax**    LOGOUT    [ PORT { **spnum**            } ]  
                                   { **ALL**                    } ]  
                                   { **spnum\_range** } ]

**Privilege**    Any user can log out his own port by entering LOGOUT without specifying a port number. Only a privileged user can log out another person's port.

**Examples**    LOGOUT  
                   LOGOUT PORT 2, 5-8  
                   LOGOUT PORT ALL

Table 5-11. LOGOUT Options

Option	Definition
PORT <b>spnum</b>	Logut the port specified by the server port number.
PORT ALL	Log out all ports.
PORT <b>spnum_range</b>	Logout a range of ports, as shown in the example commands.

## 5.21 MONITOR

All MONITOR commands are described under the equivalent SHOW command.

## 5.22 PURGE SERVICE

See CLEAR SERVICE.

## 5.23 RESUME

The RESUME command places you back in one of your active sessions.

**Syntax**     RESUME    [ [ SESSION ] number ]  
                                  ?

**Privilege**    Available to all users.

**Examples**    RESUME  
                  RESUME 2  
                  RESUME ?

**Comments**    If you enter the RESUME command without a session number, you are placed back in your current session. Your current session is normally the one you were most recently in.

Use the SHOW SESSIONS command to get a numbered list of your active sessions. An asterisk is placed next to your current session.

Table 5-12. RESUME Options

Option	Definition
SESSION number	The number of the session you wish to resume. The word SESSION is optional.
?	If you enter RESUME ?, the server displays a list of your current sessions and prompts you for a session number.

## 5.24 SET HOST

The SET HOST command connects you to network resources. It is identical to the CONNECT command. You may issue the SET HOST command using exactly the same syntax and options as the CONNECT command.

## 5.25 SET/DEFINE/CHANGE NODE

The SET/DEFINE/CHANGE NODE command adds (provided room exists) or modifies a node in the server's internal node table. The node name is made up of a 1-16 character local node name and a domain name of 1-47 characters. The node's name and domain name combine to form what is known as the full node name, which is 1-64 characters.

In order to specify the node name, the user may specify either the full 64-character node name, or the 16-character local node name. If the node name specified ends with a period (.), then it is considered to be the full node name, including the domain name.

If the node name specified does **not** end with a period (although it may include periods), then it is considered to be a local node name, and the server appends its domain name to the node name. The domain name for the local network is set by the SET SERVER DOMAIN NAME command.

When adding a node to the node table, it is recommended that both the node name and IP address be specified, as the primary purpose of the node table is to provide node name resolution. However, when modifying a node table entry, such as changing the node's identification, it is only necessary to specify one or the other.

<b>Syntax</b>	{SET        } NODE {NAME   ndname}   GATEWAY        [DEF][NETIP ipadd]
	{DEFINE    }        {IP     ipadd }   NAMESERVER [DEF]
	{CHANGE   }        {ALIAS  name  }   TCPIP

**Privilege**     Available to privileged users only.

**Examples**

```
SET NODE NAME P4K03
SET NODE NAME P4K03 ID "P4000-T server #3, marketing"
```

**Comments**     This command must identify a node by either a node name, an IP address, or an alias name. In addition, the command may specify whether the node is a Gateway, a Nameserver, or a TCPIP. If the node is a Gateway or Nameserver node, a network IP address may be specified with the NETIP option. In addition, an identification string can be set for the node.

Table 5-13. SET/DEFINE/CHANGE NODE Options

Option	Definition
<b>NAME ndname</b>	The name of the node that you are adding to the node table.
<b>IP ipadd</b>	The Internet address of the network node. The format for the IP address is as follows: d.d.d.d, where "d" is a decimal number from 0-255.
<b>ALIAS name</b>	The alias name for the node that you are adding to the node table.
<b>GATEWAY</b>	Indicates that the specified node is a Gateway node.
<b>NAMESERVER</b>	Indicates that the specified node is a Nameserver node.
<b>TCPIP</b>	Indicates that the specified node is a TCP/IP node. This is the default if neither Gateway or Nameserver is specified.
<b>ID "string"</b>	Sets an ID string for the specified node.
<b>DEFAULT</b>	Indicates that the specified node is the default.
<b>NETIP ipadd</b>	Indicates that the specified node is a remote node located at the specified network IP address.

---

## 5.26 SET/DEFINE/CHANGE PORT

---

The SET, DEFINE, and CHANGE PORT commands are used to change the options of individual ports on the server. If no port number is specified, your own port is changed. The commands work as follows:

- SET: Port options are changed temporarily. The old values return the next time the port is logged in or out.
- DEFINE: Port options are not changed until the port is logged in or out, but are then changed permanently.
- CHANGE: Port options are changed immediately and permanently.

When port options are changed permanently they are stored internally in nonvolatile memory. When they are changed temporarily they are stored in ordinary RAM and thus are lost when the port is logged out or the server is reinitialized.

**Syntax**     { SET     } [ PORT spnum ] [ options list ]  
              { DEFINE }  
              { CHANGE }

**Privilege**    Nonprivileged and secure users can change most options on their own ports, but never any other port. If privileged status is required to change an option, it is noted in the Options Table. Privileged users can change all options on all ports.

**Examples**    CHANGE USERNAME "John Smith"  
              CHANGE PORTS 5-10 AUTOBAUD DISABLED SPEED 1200

**Comments**    You may specify as many options as you like in a single line, up to a maximum of 132 characters. You do not need to specify options you do not want to change.

The parallel printer port is specified as either PORT 33 or PRINTER. To see the current settings of a port, use the SHOW PORT command.

Table 5-14. SET/DEFINE/CHANGE PORT Options

Option	Definition
<p><b>PORT spnum</b></p> <p>[ options list ]</p> <p><b>ACCESS type</b> (Privileged users only)</p>	<p>The physical server port you wish to change. It can be a single port, several ports (PORTS n-n), or PORT ALL, which affects all serial ports (1-32) but not the parallel port (port 33) or the Remote Console Facility (RCF, port 34). If no server port number is specified, your own port is changed (and the word PORT is optional). Be careful not to confuse server port number with TCP port number.</p> <p>All port options and modifiers are listed below in alphabetical order.</p> <p><b>Default: LOCAL.</b> Specifies the type of connections the port can make. Four types of access are supported:</p> <p><b>LOCAL:</b> Allows a port to originate connections to other devices. This is the standard setting for user terminals.</p> <p><b>REMOTE:</b> Allows a port to accept connections but not to originate them. This type of port is typically defined as a service (for example, a printer or a dial-out modem). Ports with ACCESS REMOTE must have AUTOBAUD disabled.</p> <p><b>DYNAMIC:</b> A combination of local and remote access. It is sometimes used for hardcopy terminals that are both printers and input devices. It is also used for dialin/dialout modems.</p> <p><b>NONE:</b> Disables all access to the port.</p> <p>If a port is currently active, ACCESS can be changed only by the DEFINE command, not SET or CHANGE. An example of the ACCESS option follows:</p> <pre>CHANGE PORT 3 ACCESS REMOTE</pre>

(continued next page)



Table 5-14. SET/DEFINE/CHANGE PORT Options (continued)

Option	Definition
<b>ALTERNATE [SPEED]</b> <i>(Privileged users only)</i>	<p><b>Default: NONE.</b> Specifies the fallback speed for a dual-speed modem only. In order for this option to work, the modem must support the DSRS and SMI signals. An example of the ALTERNATE SPEED option follows:</p> <pre>CHANGE PORT 3 SPEED 2400 ALTERNATE SPEED 1200</pre> <p>If the modem supports an alternate speed and does not support DSRS and SMI, or if it is a multiple speed dialin modem, you may disable the ALTERNATE SPEED option and enable the AUTOBAUD option to support fallback speed(s).</p>
<b>AUTOBAUD</b> <i>(Privileged users only)</i>	<p><b>Default: ENABLED.</b> Allows a port to automatically sense the speed of incoming characters. AUTOBAUD works with any standard speed (see SPEED). However, the terminal must be set for either 8-bit characters with no parity or 7-bit characters with even parity.</p> <p>If your port is set for AUTOBAUD operation, you must press the <b>&lt;Return&gt;</b> key twice when logging in to allow the port to sense the characters. AUTOBAUD must be disabled for ports set for remote or dynamic access (see ACCESS). An example command follows:</p> <pre>CHANGE PORT 3 AUTOBAUD DISABLED</pre>
<b>AUTOCONNECT</b>	<p><b>Default: DISABLED.</b> When AUTOCONNECT is enabled, the server connects you directly to a particular node and TCP port at server login, just as if you had a hardwired connection to the node. If the node is down, the server will keep attempting to connect to the node every 20 seconds until the connection is successful, or until the user enters a <b>&lt;Break&gt;</b>. The interval between attempts to connect is determined by the KEEPALIVE timer, whose default is 20 seconds. The PREFERRED option specifies the node and TCP port to which you will connect. An example of the AUTOCONNECT and PREFERRED options follows:</p> <pre>CHANGE PORT AUTOCONNECT ENABLED PREFERRED P4K03.MRKTG.ABCINC.COM PORT TELNET</pre>

*(continued next page)*

Table 5-14. SET/DEFINE/CHANGE PORT Options (continued)

Option	Definition
<b>AUTOCONNECT</b> <i>(continued)</i>	<p>Note that although the AUTOCONNECT option automatically connects you to a node and port, it does not prevent you from returning to local mode (via the <b>&lt;Break&gt;</b> key) and connecting to another node and port if desired.</p>
<b>BACKWARD [SWITCH] key</b>	<p><b>Default: NONE.</b> The BACKWARD SWITCH key allows you to switch backward immediately to a previous session. You must specify an uppercase letter for the key, because when switch characters are defined, lowercase characters are converted to uppercase.</p> <p>To specify a control character, hold down the control key while pressing the second key. As an alternate method, type a carat (^) followed by the character. Be careful not to specify a backward switch character that is also used by the host operating system or the server's line editing feature (e.g., <b>&lt;Ctrl-C&gt;</b>, <b>&lt;Ctrl-B&gt;</b>, or <b>&lt;Ctrl-Y&gt;</b>). An example of this option follows:</p> <pre>CHANGE PORT 3 BACKWARD SWITCH ^L</pre> <p>See also FORWARD SWITCH, which allows you to switch to less recent sessions. The FORWARD and BACKWARD switches move you back and forth between sessions.</p>
<b>BREAK</b>	<p><b>Default: LOCAL.</b> This option defines how the <b>&lt;Break&gt;</b> key works. An example command and option descriptions follow:</p> <pre>CHANGE PORT 3 BREAK REMOTE</pre> <p><b>LOCAL:</b> The <b>&lt;Break&gt;</b> key returns you to local mode if you are in the middle of a session.</p> <p><b>REMOTE:</b> Breaks are passed through to the remote node (for TELNET connections only).</p> <p><b>DISABLED:</b> Break characters are ignored when you are in a session.</p>

*(continued next page)*

Table 5-14. SET/DEFINE/CHANGE PORT Options (continued)

Option	Definition
BROADCAST	<p><b>Default: ENABLED.</b> This option allows a port to receive broadcast messages from other ports. For example:</p> <pre>CHANGE PORT 3 BROADCAST ENABLED</pre>
CHARACTER [SIZE]	<p><b>Default: 8.</b> This option defines the number of bits per character. The allowed settings are 5, 6, 7, and 8. For example:</p> <pre>CHANGE PORT 3 CHARACTER SIZE 7</pre>
DCDLOGOUT DELAY (Privileged users only)	<p><b>Default: ENABLED.</b> If enabled, the server waits two seconds for DCD, then logs out the port if the carrier is still not present. When disabled, the server logs out a port immediately if the DCD (full modem port) or DSR (partial modem port) signal is lost. Disable this option if device is a null modem device such as a data switch or computer port. For example:</p> <pre>CHANGE PORT 3 DCDLOGOUT DISABLED</pre>
DEDICATED (Privileged users only)	<p><b>Default: NONE.</b> If a node name and TCP port name or number are specified with the DEDICATED option, you are automatically connected to that TCP port upon server login (this makes the server transparent to the user). The TCP port specified must be on the local network. You may not enter local mode or connect to any other TCP ports. If the server port is currently active, you must use the DEFINE command only (not SET/CHANGE). If no TCP port name or number is specified, then the default port is TELNET. The NONE option allows you to deselect the current dedicated port. The DEDICATED option command syntax and examples follow:</p> <pre>SET PORT DEDICATED [ NODE {ndname} [ PORT tpname ]                     [ IP   {ipadd } [   tptime ]                     [ NONE ] [       NONE ] ] ]</pre> <pre>DEFINE PORT DEDICATED KNIGHT CHANGE PORT 3 DEDICATED KING</pre>

(continued next page)

Table 5-14. SET/DEFINE/CHANGE PORT Options (continued)

Option	Definition
<b>DSRLOGOUT</b> <i>(Privileged users only)</i>	<p><b>Default: DISABLED.</b> When this option is enabled, the server logs out a port if the device attached to the port deasserts a modem signal (usually DTR) that is connected to the DSR pin on the server (this typically happens when the device is powered off). If DSRLOGOUT is enabled, then the MODEM CONTROL option must be disabled. An example command using the DSRLOGOUT option follows:</p> <pre>CHANGE PORT 3 DSRLOGOUT ENABLED MODEM DISABLED</pre> <p>The DSRLOGOUT option is intended for use on ports with terminals attached. Note that the port does not deassert DTR to the device as required by data switch and computer ports.</p> <p>Always enable MODEM CONTROLS on a port if the attached device is a data switch or computer port. The MODEM CONTROLS option will deassert DTR to the device if the server DSR signal is lost.</p>
<b>DTRWAIT</b> <i>(Privileged users only)</i>	<p><b>Default: DISABLED.</b> When disabled, the modem signals DTR and RTS are asserted as soon as the server initializes. They remain asserted except for a five-second period when the port is being logged out (at which time they are deasserted). When DTRWAIT is enabled, DTR and RTS (only DTR for a partial modem port) remain deasserted until either of the following occur:</p> <ol style="list-style-type: none"> <li>1. A connection is made to the port.</li> <li>2. A RING (full modem port) or DSR (partial modem port) signal is detected.</li> </ol> <p>If DTRWAIT is enabled, then the MODEM CONTROL option must also be enabled. For example:</p> <pre>CHANGE PORT 3 DTRWAIT ENABLED MODEM ENABLED</pre> <p>If DTRWAIT is enabled, then port access is remote or dynamic. A connection is made to the port, then the port asserts DTR and RTS (full modem) or only DTR (partial modem).</p>

*(continued on next page)*

Table 5-14. SET/DEFINE/CHANGE PORT Options (continued)

Option	Definition
<b>DTRWAIT</b> <i>(continued)</i>	<p>Enable DTRWAIT in either of the two following cases:</p> <p>(1) When a dialout modem is on a full modem port or a partial modem port, and the port access is set to remote, or  (2) when a dial-in/dialout modem is on a full modem port, and port access is set to LOCAL or DYNAMIC.</p> <p>If DTRWAIT is enabled, then when port access is local or dynamic and the RING signal (full modem) or DSR signal (partial modem) is detected, the port will assert DTR and RTS (full modem).</p> <p>You should disable DTRWAIT for any partial modem ports that have access DYNAMIC or LOCAL and are attached to a modem. With this configuration, it is necessary to connect modem signal DCD to the server port pin for DSR. The modem RING signal (and its function) is not supported on partial modem ports.</p>
<b>ECHO LOCAL</b>	<p><b>Default: DISABLED.</b> This option specifies that the server echo all characters received from the local terminal. Due to the delay in host character echoing across the network, you may choose to enable this option when connecting to a node on a remote network. Because ALL characters received from the terminal are echoed, you may need to set the port type to SOFTCOPY via the SET PORT TYPE command. You should also disable host character echoing.</p> <p>Although they perform the same function, do not confuse this local port echo option with the TELNET echo option. When a virtual connection is established between a terminal and a host application, there should be only ONE point (or no point) where characters are echoed at any given time.</p>
<b>ERRORLOGOFF</b>	<p><b>Default: DISABLED.</b> This option is valid for port 33 only (the parallel printer port). When ERRORLOGOFF is enabled, printer status changes cause sessions to the printer port to terminate. For example:</p> <p>CHANGE PORT 33 ERRORLOGOFF ENABLED</p>

*(continued next page)*

Table 5-14. SET/DEFINE/CHANGE PORT Options (continued)

Option	Definition
<p><b>FLOW [CONTROL]</b></p>	<p><b>Default: XON.</b> This option selects one of four types of flow control: XON, XOFFANY, CTS, DSR, or DISABLED. An example command with flow control set to CTS follows:</p> <pre>CHANGE PORT 3 FLOW CONTROL CTS</pre> <p>Descriptions follow for the four types of flow control that are supported:</p> <p><b>XON:</b> Selects XON/XOFF flow control. This is standard for all DEC VT-series terminals and compatibles.</p> <p><b>XOFFANY:</b> Similar to XON/XOFF flow control, except that any character will restart transmission, not just an XON. It is commonly used on PCs.</p> <p><b>CTS:</b> Selects CTS/RTS flow control (full modem ports only).</p> <p><b>DSR:</b> Selects DSR/DTR flow control.</p> <p><b>DISABLED:</b> Specify DISABLED if you want no flow control on a port. You may specify flow control in one direction only by enabling flow control and then disabling either INPUT FLOW CONTROL or OUTPUT FLOW CONTROL.</p>
<p><b>FORWARD [SWITCH]</b> <i>key</i></p>	<p><b>Default: NONE.</b> Selects a key that allows you to switch forward to other active sessions. It is usually a control key, such as &lt;Ctrl-F&gt;. See BACKWARD SWITCH for further details.</p>
<p><b>INACTIVITY [LOGOUT]</b> <i>(privileged users only)</i></p>	<p><b>Default: DISABLED.</b> When enabled, the server logs out the port if the port has no active sessions (connections), is in local server mode, and is inactive for an interval set by the SET SERVER INACTIVITY TIMER command. An example of this option follows:</p> <pre>CHANGE PORT 3 INACTIVITY LOGOUT ENABLED</pre>

(continued next page)

Table 5-14. SET/DEFINE/CHANGE PORT Options (continued)

Option	Definition
INPUT FLOW [CONTROL]	<p><b>Default: ENABLED.</b> This option enables or disables input flow control. The actual type of flow control is specified by the FLOW CONTROL option. Example:</p> <p>CHANGE PORT 3 INPUT FLOW CONTROL DISABLED</p>
INTERRUPTS (Privileged users only)	<p><b>Default: DISABLED.</b> When enabled, this option allows you to interrupt a remote connection at the TCP port and return to local mode. (Note that the port must be set to ACCESS DYNAMIC for this to work.) For example, if INTERRUPTS has been enabled, you can stop a host from printing to a hardcopy terminal and regain control of the terminal by pressing the terminal's &lt;Break&gt; key. To restart the terminal's print job, enter "RESUME". An example command enabling the INTERRUPTS option follows:</p> <p>CHANGE PORT 3 INTERRUPTS ENABLED</p>
LOCAL [SWITCH] key	<p><b>Default: NONE.</b> Specifies a key that allows you to enter local mode when you are in a session. The RESUME command returns you to the session. The &lt;Break&gt; key is the default local switch key for all ports unless you have specified otherwise with the BREAK option. See BACKWARD SWITCH for a description of other keys that may be selected. A command example with the LOCAL SWITCH option follows:</p> <p>CHANGE PORT 3 LOCAL SWITCH ^L</p>

(continued next page)

Table 5-14. SET/DEFINE/CHANGE PORT Options (continued)

Option	Definition
MESSAGE [CODES]	<p><b>Default: ENABLED.</b> When enabled, message codes accompany all status and error messages. For example:</p> <p>CHANGE PORT 3 MESSAGE CODES DISABLED</p>
MODEM [CONTROL] (Privileged users only)	<p><b>Default: DISABLED.</b> Specifies whether modem controls are active on a port. For example:</p> <p>CHANGE PORT 3 MODEM CONTROL ENABLED</p> <p>If MODEM CONTROL is enabled on a full modem port, the attached device must assert DSR, CTS, and DCD for the port to function. Only DSR is required on a partial modem port.</p>
NAME (Privileged users only)	<p><b>Default: PORT n.</b> Defines the logical name for the server &lt;port (sname). It may be up to 16 characters and must be unique for each port. The server port name is provided for network management purposes. It is not the same as the TCP port name. For example:</p> <p>CHANGE PORT 3 NAME J_SMITH CHANGE PORT 3 NAME LAB1_STA3_T2</p>
OUTPUT FLOW [CONTROL]	<p><b>Default: ENABLED.</b> This option allows you to disable or reenable output flow control, separately from the input flow control. The type of input/output flow control is set by the FLOW CONTROL option. An example of the OUTPUT FLOW CONTROL option follows:</p> <p>CHANGE PORT 3 OUTPUT FLOW CONTROL DISABLED</p>
PARITY	<p><b>Default: NONE.</b> Specifies the parity used by the port. The options are ODD, EVEN, MARK, SPACE, or NONE. This parameter must match the setting of the terminal or other device connected to the port. For example:</p> <p>CHANGE PORT 3 PARITY EVEN</p>

(continued next page)



Table 5-14. SET/DEFINE/CHANGE PORT Options (continued)

Option	Definition
<b>PASSWORD</b> <i>(Privileged users only)</i>	<p><b>Default: DISABLED.</b> If this option is enabled, you are prompted for a password when you log in to the server. If it is disabled, no password is required. The value of the password is specified by the CHANGE SERVER LOGIN PASSWORD command. An example of the PASSWORD option follows:</p> <p>CHANGE PORT 3 PASSWORD ENABLED</p>
<b>PAUSE</b>	<p><b>Default: DISABLED.</b> Each of the SHOW commands described later in this section displays several screens of status information. If you set the PORT PAUSE option to ENABLED, the SHOW command displays will appear one screen at a time, prompting the user to enter a key before displaying the next screen.</p> <p>For example, if you set PAUSE ENABLED then enter the command SHOW PORT 1-6, the server displays information about port 1 and then waits until you press a key before displaying information about port 2. If PAUSE is disabled, information about each port is displayed in a continuous stream. An example of the SET PORT PAUSE option follows:</p> <p>SET PORT 3 PAUSE ENABLED</p> <p>Refer to the SHOW/MONITOR/LIST commands for further details.</p>
<b>PREFERRED</b>	<p><b>Default: NONE.</b> This option defines the node and TCP port that you will connect to by default if you enter a CONNECT command without specifying a destination. If AUTOCONNECT is also enabled, then you will automatically connect to the specified PREFERRED port after logging in, without issuing a CONNECT command. Only nodes on the local network may be specified as PREFERRED. See also the DEDICATED option, which restricts a port to connect only to a particular node and port.</p>

(continued next page)

Table 5-14. SET/DEFINE/CHANGE PORT Options (continued)

Option	Definition
<p>PREFERRED <i>(continued)</i></p>	<p>If no TCP port name or number is specified with the PREFERRED option, then the default port reached by the CONNECT command is TCP port 23, TELNET. The NONE option allows you to deselect the current preferred port. The command syntax for the PREFERRED option follows:</p> <pre>{SET} PORT [spnum] PREFERRED [ NODE ] {ndname} [ PORT tpname ] {CHANGE}                      [ IP   ] {ipadd  } [          tpname ]                                [ NONE ]          [          NONE  ]</pre> <pre>CHANGE PORT 3 PREFERRED KING CHANGE PORT 3 PREFERRED KING PORT 23 CHANGE PORT 3 PREFERRED PAWN PORT CHANGE PORT 3 PREFERRED 201.202.203.010 CHANGE PORT 3 PREFERRED 201.202.203.010 PORT 23 CHANGE PORT 3 PREFERRED 201.202.203.010 PORT NONE</pre>
<p>RING <i>(Privileged users only)</i></p>	<p><b>Default: DISABLED.</b> When enabled on a service port, this option allows a port to ring an external DTE device such as a computer or data switch. DSRS is connected to the device's RING input. DSRS asserts and deasserts (rings) until DSR is received from the external device, at which time DSRS remains deasserted.</p> <p>The RING option is available only on full modem ports and requires that the MODEM CONTROL and DTRWAIT options for that port be set to enabled and port access be set to REMOTE or DYNAMIC. An example command with the RING option follows:</p> <pre>CHANGE PORT 3 RING ENABLED</pre>

(continued next page)

Table 5-14. SET/DEFINE/CHANGE Port Options (continued)

Option	Definition
<b>SECURITY</b> <i>(Privileged users only)</i>	<p><b>Default: DISABLED.</b> When enabled, this option provides the port with secure status. This is one step below nonprivileged status and prevents you from using the SHOW command to look at the status of other users' ports or sessions. It also restricts your access to some configuration commands. An example command follows:</p> <p>CHANGE PORT 3 SECURITY ENABLED</p>
<b>SESSION LIMIT</b> <i>(Privileged users only)</i>	<p><b>Default: 4.</b> Defines the number of simultaneous sessions you may have. The range is from 0 (no sessions allowed) to 8. Entering NONE (no limit) permits up to 8 sessions. An example follows:</p> <p>CHANGE PORT 3 SESSION LIMIT NONE</p>
<b>SPEED</b>	<p><b>Default: 9600.</b> Selects the port speed in bits per second. For example:</p> <p>CHANGE PORT 3 SPEED 9600</p> <p>Permissible values are 75, 110, 134, 150, 300, 600, 1200, 1800, 2000, 2400, 4800, 9600, and 19200 bps. 38400 bps is also available on servers with 16 or fewer serial ports. You may specify split input and output speeds as follows:</p> <p>CHANGE PORT 3 INPUT SPEED 2400 OUTPUT SPEED 9600</p> <p>The number of stop bits per character is set automatically to 1.5 for 75 bps; 2 for 110, 134.5, and 150 bps; and 1 for all other speeds.</p>
<b>TELNET</b>	<p>This option enables several TELNET functions. The TELNET functions are described fully at the end of the SET PORT options table.</p>
<b>TYPE</b>	<p><b>Default: SOFTCOPY.</b> Specifies the type of terminal connected to the port. For example:</p> <p>CHANGE PORT 3 TYPE VT100</p>

*(continued next page)*

Table 5-14. SET/DEFINE/CHANGE Port Options (continued)

Option	Definition
<b>TYPE</b> <i>(continued)</i>	<p>The following types are supported on serial ports:</p> <p><b>ANSI:</b> Same as the VT100 but does not support line drawing.</p> <p><b>HARDCOPY:</b> A hardcopy terminal. Deleted characters are echoed between backslashes.</p> <p><b>SOFTCOPY:</b> Same as a VT100, but does not support line drawing, the clear screen function, or special cursor controls.</p> <p><b>VT100:</b> Specifies a DEC VT-series terminal or compatible.</p> <p>For the parallel port (port 33), this option specifies a printer type:</p> <p><b>CENTRONICS:</b> Configures the port for a Centronics-type printer.</p> <p><b>DATAPRODUCTS:</b> Configures the port for a Dataproducts-type printer.</p>
<b>USERNAME</b>	<p><b>Default: No username.</b> Defines a username for a port. The name may be 1 to 16 characters long. If the name is not enclosed in quotes, it is converted to all uppercase. For example:</p> <pre>CHANGE PORT 3 USERNAME "J_Smith"</pre> <p>This is primarily a convenience feature. If a username is specified with this command, the server does not prompt for a username when you log in. To eliminate a previously set username, enter the command <code>CHANGE PORT USERNAME ""</code>.</p>
<b>VERIFICATION</b>	<p><b>Default: ENABLED.</b> When enabled, the server displays a short message whenever a session connection, disconnection, or switch is made. Error messages are always displayed, regardless of the VERIFICATION option. For example:</p> <pre>CHANGE PORT 3 VERIFICATION DISABLED</pre>

*(continued on next page)*

Table 5-14. SET/DEFINE/CHANGE PORT Options (continued)

Option	Definition
TELNET	<p>The TELNET command enables several TELNET functions, such as setting TELNET options for communications with remote nodes and setting special Command Keys for each TELNET command. Table 5-15 describes several TELNET functions that you can either enable or disable, including enabling TELNET command keys and verbose mode.</p> <p>Table 5-16 describes TELNET options that may be specified, and are then negotiated with the remote node upon establishing a TELNET connection. If the user wishes to see the actual TELNET option negotiation dialogue, Verbose mode should be enabled on the port via the SET PORT TELNET VERBOSE command (described below).</p> <p>Table 5-17 lists and describes several TELNET commands for which you can define Command Keys. The SET PORT TELNET command syntax follows:</p> <pre> SET PORT [number] [TELNET] [ KEYS      ENABLE/DISABLE                                CRLF      ENABLE/DISABLE                                VERBOSE   ENABLE/DISABLE ]                                [ BINARY [TRANS] ] [ WILL/WONT                                ECHO      ] [ DO/DONT ]                                [ AO key                                AYT key                                BRK key                                EC  key                                EL  key                                GA  key                                IP  key                                ST  key ] </pre> <p>Examples of the TELNET command syntax follow:</p> <pre> SET PORT ECHO WONT DONT SET PORT SUPPRESS WILL DO BINARY WONT DONT SET PORT IP ^P AO ^O KEYS ENABLED </pre>

Table 5-15 describes several TELNET functions that you can either enable or disable.

Table 5-15. TELNET Session Options

Command	Definition
KEYS	<p><b>Default: ENABLED.</b> This command sets all the Command Keys that have been defined to ENABLED or DISABLED.</p>
CRLF	<p><b>Default: DISABLED.</b> This option defines how TELNET will interpret a carriage return (&lt;Return&gt;) character received from a device. For example:</p> <p>CHANGE PORT 3 CRLF ENABLED</p> <p>If disabled, TELNET will append a NULL character to a CR character received from a server port. If enabled, TELNET will append an LF (linefeed) character to a carriage return (&lt;Return&gt;) character received from a server port.</p> <p>If the TELNET option TRANSMIT BINARY is enabled on the port, the CRLF option has no effect on received &lt;Return&gt; characters. No characters are appended.</p>
VERBOSE	<p><b>Default: DISABLED.</b> This option, when enabled, causes the TELNET option negotiation dialogue that occurs at connection time to be displayed at the user's terminal.</p> <p>CHANGE PORT 3 VERBOSE ENABLED</p> <p>A typical TELNET dialogue may appear as follows:</p> <pre>[ Sent: DO      ECHO ] [ Sent: WILL   SUPPRESS GA ] [ Sent: DO      SUPPRESS GA ] [ Recd: WILL   ECHO ] [ Recd: WILL   SUPPRESS GA ] [ Recd: DO      SUPPRESS GA ]</pre>

Table 5-16 defines TELNET options supported by the Performance 4000-T terminal server. Upon the establishment of a connection and prior to any option negotiation, all TELNET options are assumed to be in the WONT/DONT state.

Table 5-16. TELNET Options

Option	Definition
BINARY TRANSMIT	<b>Default: WONT DONT.</b> This option is used to transmit binary files. When enabled on the local node (WILL), all characters transmitted are treated by the receiving node as 8-bit binary data. When enabled on the remote node (DO), the opposite is true.
ECHO	<p><b>Default: WONT DO.</b> This option controls character echoing. If enabled at the server (WILL), the server will echo all characters received from the remote node back to the remote node. If enabled on the remote node (DO), all characters sent to the remote node are echoed back to the server. Do not enable TELNET ECHO on both the local and remote node. This would cause characters to be echoed back and forth indefinitely.</p> <p>Local terminal echoing at a node (commonly referred to as TERMINAL HARDWARE ECHO or LOCAL HARDWARE ECHO) is not controlled by the TELNET ECHO option. A node enabled for TELNET ECHO echoes characters back to the sending node, NOT to a sending terminal. However, there is a server command to perform TERMINAL HARDWARE ECHO. See SET PORT ECHO LOCAL.</p> <p>Note that SET PORT ECHO WILL DO will be rejected by the server. The server makes the assumption the the user would never want to have the local and remote nodes both echoing to each other. This would cause excessive and unwanted network traffic.</p>
STATUS	<b>Default: WONT DONT.</b> When this option is enabled (WILL), the node will discuss its current TELNET status (options) with a remote node.
SUPPRESS GO AHEAD	<b>Default: WILL DO.</b> When enabled, this option allows the server and/or the remote node to transmit data without having the need to send the TELNET command Go Ahead (GA). This option should normally be enabled (WILL DO) if the user terminal is a full-duplex (FDX) device and disabled (WONT DONT) if it is a half-duplex (HDX) device. Most current day terminal devices are capable of full-duplex transmission and reception.
TIMING MARK	<b>Default: WONT DONT.</b> This option when enabled, provides the user with a mechanism to verify that previously transmitted data has been completely processed, printed, discarded, or otherwise disposed of.

Table 5-17 describes several TELNET commands supported by the Performance 4000-T, along with statements for mapping each TELNET command to a single Command Key.

Table 5-17. TELNET Commands

Command	Definition
<b>AO key</b> Abort Output	<b>Default: none.</b> This command defines a Command Key for the TELNET command ABORT OUTPUT. This command allows you to suppress data being transmitted to your terminal. Suppressed data is discarded. Transmission is normally resumed upon the start of the next record.
<b>AYT key</b> Are You There	<b>Default: none.</b> This command defines a Command Key for the TELNET command ARE YOU THERE. This command allows you to "poke" the remote host running your application in the event the application appears to be taking more than a normal amount of time to complete. If the host is still present, a response message will appear on your terminal.
<b>BRK key</b> BREAK	<b>Default: none.</b> This command defines a Command Key for the TELNET command BREAK. This command generates a TELNET break character.
<b>EC key</b> ERASE CHARACTER	<b>Default: none.</b> This command defines a Command Key for the TELNET command ERASE CHARACTER. This command deletes the last undeleted character entered in the current line.
<b>EL key</b> ERASE LINE	<b>Default: none.</b> This command defines a Command Key for the TELNET command ERASE LINE. This command deletes the current line.
<b>GA key</b> GO AHEAD	<b>Default: none.</b> This command defines a Command Key for the TELNET command GO AHEAD. Although the user may choose to issue this command, it is normally only used by a host when transmitting data to a half-duplex (HDX) terminal device. In a HDX environment data can be transmitted and received in only one direction at a time. The host, upon completing data transmission to a HDX device, may require input from the device. To notify the device that the host has completed transmission and is waiting for input from the device, the host transmits the command GO AHEAD.

(continued on next page)



Table 5-17. TELNET Commands (continued)

Option	Definition
<b>GA key</b> <i>(continued)</i>	<p>Upon receiving the GO AHEAD command, the terminal can transmit data to the host. When entering data on a terminal keyboard, the line termination character (normally a line feed or carriage return) notifies the host that that the terminal has completed transmission (a single line). It is therefore not normally necessary for the user to generate a GO AHEAD command. However, some applications may require the user to do so.</p> <p>Most current day computer host and terminal devices are capable of full-duplex transmission and reception. If the user terminal is full-duplex (FDX), the TELNET option SUPPRESS GO AHEAD is normally enabled (WILL DO) because in a FDX environment there is normally no need for the TELNET GO AHEAD COMMAND.</p>
<b>IP key</b> <b>INTERRUPT</b> <b>PROCESS</b>	<p><b>Default: none.</b> This command defines a Command Key for the TELNET command INTERRUPT PROCESS. This command allows the user to suspend, interrupt, abort or terminate the current process.</p>
<b>SY key</b> <b>SYNC</b>	<p>This command defines a Command Key for the TELNET SYNC command.</p>

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## 5.27 SET PRIVILEGED/NOPRIVILEGED

---

The SET PRIVILEGED command is used to place a port in privileged mode. The SET NOPRIVILEGED command is used to place a privileged port back in nonprivileged mode.

**Syntax** SET PRIVILEGED/NOPRIVILEGED [ OVERRIDE ]

**Privilege** Available to all users.

**Examples**

```
Server> SET PRIVILEGED
Password> (enter the privileged password)
Server>>
SET PRIVILEGED OVERRIDE
SET NOPRIVILEGED
```

**Comments** You must enter the privileged password in order to enter privileged mode. The factory default password is SYSTEM. The password is changed by the SET SERVER PRIVILEGED PASSWORD command.

If you forget the privileged password, you must reinitialize the server so that all the factory default settings return. This procedure also resets all port, service, and server options, so it should be considered a last resort.

In privileged mode, the server prompt changes from Server > to Server > >. If the SERVER SECURITY option is enabled, the time of the last entry into privileged mode is displayed. All server commands can be executed in privileged mode, so be sure to return your port to normal mode as soon as you are finished executing privileged commands.

Table 5-18. SET PRIVILEGED/NOPRIVILEGED Options

Option	Definition
OVERRIDE	Only one port at a time is allowed to have privileged status. If another port is already in privileged mode, use the OVERRIDE option to transfer privileged status to your port.

---

## 5.28 SET/DEFINE/CHANGE SERVER

---

The SET, DEFINE, and CHANGE SERVER commands are used to change options that affect the entire server. The three commands work as follows:

- **SET:** Server options are changed temporarily. The old values return when the server is reinitialized.
- **DEFINE:** Server options are not changed until the server is reinitialized, but are then changed permanently.

Some server options cannot be changed while sessions are active. It is convenient to set these options with the DEFINE command and then use a delayed INITIALIZE command to reinitialize the server at a later time when no sessions are active.

- **CHANGE:** Server options are changed immediately and permanently.

When server options are changed permanently, they are stored internally in nonvolatile RAM. When they are changed temporarily, they are stored in dynamic RAM and thus are lost when the server is reinitialized.

**Syntax**     { SET        } SERVER [ options and modifiers ]  
              { DEFINE }  
              { CHANGE }

**Privilege**   Available to privileged users only.

**Examples**    CHANGE SERVER BROADCAST DISABLED  
              DEFINE SERVER RETRANSMIT LIMIT 12

Table 5-19. SET/DEFINE/CHANGE SERVER Options

Option	Definition
<b>ALIAS</b> <b>alias_name</b>	<p><b>Default: None.</b> This option sets an alias name for the server that is 1-16 characters long. An example for this option follows:</p> <pre>SET SERVER ALIAS KING</pre>
<b>ANNOUNCEMENTS</b>	<p><b>Default: ENABLED.</b> When enabled, the server broadcasts uptime information for node tables to other nodes on the network every 2 minutes. If this option is disabled, other Performance 4000-T servers on the network will not be able to configure this server's node name and IP address automatically in their node table. For example:</p> <pre>CHANGE SERVER ANNOUNCEMENTS DISABLED</pre>
<b>AUTOREINIT</b>	<p><b>Default: ENABLED.</b> When enabled, the server automatically reinitializes (including software download) if it detects an unresolvable internal software problem. When AUTOREINIT is disabled and an unresolvable software problem occurs, the server halts, and requires that you power the server off and then on again. An example command follows:</p> <pre>CHANGE SERVER AUTOREINIT DISABLED</pre>
<b>BROADCAST</b>	<p><b>Default: ENABLED.</b> This option allows users to send messages to other ports on the server. Note that target ports must have the PORT BROADCAST option enabled in order to receive broadcast messages. An example command follows:</p> <pre>CHANGE SERVER BROADCAST DISABLED</pre>
<b>BROADCAST NODE [ENTRY]</b>	<p><b>Default: ENABLED.</b> Allows the Performance 4000-T server to create a new node table entry upon receiving an uptime broadcast from a node on the local network that is not currently in the node table. If the local network contains more nodes than the server node table can support, then the network manager may choose to disable this option. If you disable this option, then you must have a downline-loadable node table option. For example:</p> <pre>CHANGE SERVER BROADCAST NODE DISABLED</pre>

(continued on next page)

Table 5-19. SET/DEFINE/CHANGE SERVER Options (continued)

Option	Definition
CIRCUIT [TIMER]	<p><b>Default: 80 milliseconds.</b> The interval between Ethernet packets sent from the server to other nodes on the network. A higher value makes more efficient use of the Ethernet but delays character echoing; a low value improves character echoing but increases the number of Ethernet packets sent. The range is 30 to 200 milliseconds. For example:</p> <pre>DEFINE SERVER CIRCUIT TIMER 120</pre> <p>If any sessions are active, the CIRCUIT TIMER option is valid only with the DEFINE command, not SET or CHANGE.</p>
CONSOLE [PORT]	<p><b>Default: Lowest numbered port.</b> Designates a port as the console port. The console port receives all error and status messages. To designate port 3 as the console port, for example, enter the following:</p> <pre>CHANGE SERVER CONSOLE PORT 3</pre> <p>To disable the console port, specify CONSOLE NONE.</p>
DATE	<p><b>Default: Downloaded date.</b> This option specifies the date displayed by the server on its front panel and in status displays. Use the format dd-mmm-yy, as in the following example (the example specifies December 31, 1988):</p> <pre>SET SERVER DATE 31-DEC-1988</pre>
DOMAIN [NAME]	<p><b>Default: none.</b> This option specifies the domain name of the server. It may be up to 47 characters long. If a domain name is not configured, then the server assumes that all connection requests specifying a node name reside on the local network. The domain name must be configured properly to communicate with a Name Server. An example command with the DOMAIN option follows:</p> <pre>SET DOMAIN ABCINC.COM.</pre>

*(continued next page)*

Table 5-19. SET/DEFINE/CHANGE SERVER Options (continued)

Option	Definition
<p><b>DOMAIN [NAME]</b> <i>(continued)</i></p> <p><b>[EMULEX options]</b> <b>[ENABLE/DISABLE]</b></p>	<p>If the server's domain name is NOT configured (none), and other nodes on the local network have been configured with a domain name, when a user attempts to connect to a local node specifying the node's name, the server will not be able to resolve the node name using the server's internal node table.</p> <p><b>Default: DISABLED.</b> Use Enabled or Disabled (optional) to add or remove options from the existing options list. If neither keyword is specified, the existing options list is replaced by the new options list. Any previously enabled options are deleted. The option list and command examples follow:</p> <p>0: Enable unknown frame reception, and bypass the TCP/IP protocol frame checker, which tests the validity of each frame before it is acted upon.</p> <p>1-4: Options 1, 2, 3, and 4 are Reserved.</p> <p>5: Print Information-only messages on the console port. This option enables these messages.</p> <p>6: Print Nonfatal error messages on the console port. This option enables these messages as well.</p> <p>ALL: 0-6, that is, all options.</p> <p>CHANGE SERVER EMULEX 5,6 ENABLED CHANGE SERVER EMULEX 0 DISABLED</p>
<p><b>FRONTPANEL</b></p>	<p><b>Default: ENABLED "Performance 4000".</b> This option specifies (1) the operation of the front panel buttons and (2) the default message that appears in the Performance 4000-T's LCD display. The ENABLED/DISABLED options enable/disable the front panel buttons. For example:</p> <p>CHANGE FRONTPANEL DISABLED</p>

*(continued next page)*

Table 5-19. SET/DEFINE/CHANGE SERVER Options (continued)

Option	Definition
<b>FRONTPANEL</b> <i>(continued)</i>	<p>The DISPLAY option selects the contents of the LCD display:</p> <p><b>DISPLAY NAME:</b> Selects the server's name (as set by the SET SERVER NAME command).</p> <p><b>DISPLAY IP:</b> Selects the server's IP address (as set by the SET SERVER IP command).</p> <p><b>DISPLAY NUMBER:</b> Selects the server's ID number (as set by the SET SERVER NUMBER command).</p> <p><b>DISPLAY TIME:</b> Selects the date and time of day.</p> <p><b>DISPLAY "message":</b> Selects a user-defined message up to 16 characters long. Both the front panel buttons and the LCD display can be set with one command. For example:</p> <p>CHANGE FRONTPANEL DISABLED DISPLAY "ENGR_LAB"</p>
<b>HEARTBEAT</b>	<p><b>Default: DISABLED.</b> When enabled, the server monitors the Ethernet collision detect circuitry. This option must be compatible with the type of transceiver you are using. For example:</p> <p>CHANGE SERVER HEARTBEAT ENABLED</p> <p>Note that some devices, such as repeaters and multiport transceivers, require that heartbeat be disabled. These include the Emulex P4902, P4904, and P4905. The P4901 transceiver can be used with or without heartbeat.</p>
<b>IDENTIFICATION</b>	<p><b>Default: None.</b> Specifies a phrase that describes the server. The phrase can be up to 40 characters long and must be enclosed in quotation marks. If any sessions are active, this option is valid with the DEFINE command only, not the SET or CHANGE command. Example:</p> <p>DEFINE SERVER IDENTIFICATION "P4000-T No. 6"</p>

*(continued next page)*

Table 5-19. SET/DEFINE/CHANGE SERVER Options (continued)

Option	Definition
<p><b>INACTIVITY</b> [ <b>TIMER</b> ]</p> <p><b>IP ipadd</b></p>	<p><b>Default: 30 minutes.</b> The length of time before an inactive port is logged out. Affects only ports with the port option <b>INACTIVITY LOGOUT</b> enabled. The range is 1 to 120 minutes. For example:</p> <pre>CHANGE SERVER INACTIVITY TIMER 45</pre> <p><b>Default: none.</b> The internet address (IP address) for the server. In order for the server to communicate with other nodes on the network, the server's IP address must be set by the network manager. The IP address must be specified in the format d.d.d.d where "d" is a decimal number within the range of 0-255.</p> <p>If any sessions are active, this option is valid only with the <b>DEFINE</b> command, not <b>SET</b> or <b>CHANGE</b>. The server will not communicate with other nodes on the network if its IP address is not defined. Setting the server's IP address to <b>NONE</b> effectively removes the server from the network.</p> <p>In the event the server's IP address is configured with an address already in use and the correct address is unknown, the network manager can issue a <b>SET SERVER IP NONE</b> command to take the server off line until the correct IP address is determined.</p> <p>Syntax:</p> <pre>SET SERVER IP [ ipadd ]                 [ NONE ]</pre> <p>Example:</p> <pre>DEFINE SERVER IP 201.202.203.001 DEFINE SERVER IP NONE</pre>

*(continued on next page)*



Table 5-19. SET/DEFINE/CHANGE SERVER Options (continued)

Option	Definition
KEEPALIVE [TIMER]	<p><b>Default: 50 seconds.</b> This option specifies how often the server will transmit an ID on a virtual circuit in the absence of any other activity (the purpose is to keep other nodes aware that the server is still active). It also specifies how often the server will retry a connection if AUTOCONNECT is enabled for a port. The range is 10 to 180 seconds. If any sessions are active, this option is valid only with the DEFINE command, not SET or CHANGE. Example:</p> <pre>DEFINE SERVER KEEPALIVE TIMER 10</pre>
[LOCAL] PROMPT	<p><b>Default: "Server".</b> The prompt normally displayed by the server. It must be 1-8 characters and enclosed in quotes. The server always adds a "&gt;" character after the prompt ("&gt;&gt;" if you are in privileged mode). Example:</p> <pre>CHANGE SERVER LOCAL PROMPT "Local"</pre>
LOCK	<p><b>Default: ENABLED.</b> Allows users to use the LOCK command. The LOCK command allows users to lock their terminals without logging out. See the description of the port LOCK command for further details. Example:</p> <pre>CHANGE SERVER LOCK DISABLED</pre>
LOGIN PASSWORD	<p><b>Default: ACCESS.</b> This option sets the password that users must enter to log in to the server. It must be 1 to 16 characters starting with an alphabetic character and must be enclosed in quotation marks. For example:</p> <pre>CHANGE SERVER LOGIN PASSWORD "ORANGE"</pre> <p>You may also type the command without a password and the server will prompt you for one.</p> <pre>Server&gt;&gt; CHANGE SERVER LOGIN PASSWORD Login password&gt; (enter the password here--it is not echoed) Verification&gt; (enter the password again)</pre>

(continued next page)

Table 5-19. SET/DEFINE/CHANGE SERVER Options (continued)

Option	Definition
LOGIN PASSWORD <i>(continued)</i>	Note that this option specifies only the value of the login password. If you want to require the use of login passwords, you must enable passwords on a port by port basis via the CHANGE PORT PASSWORD command.
LOGIN PROMPT	<p><b>Default:</b> #. The prompt displayed by the server when it is waiting for a user to enter the login password. The prompt must be 1-8 characters and must be enclosed in quotation marks. Example:</p> <pre>CHANGE SERVER LOGIN PROMPT "Password"</pre> <p>The login prompt is always preceded by a beep when the user logs in.</p>
NAME	<p><b>Default:</b> P4K_ "ethernet-address".</p> <p>A name for the server that is also the server's node name. It may be up to 16 characters long and should be different from all other nodes on the local network.</p> <p>Emulex recommends that this name match the node name in the host node name table. If any sessions are active, this option is valid only with the DEFINE command, not SET or CHANGE. For example:</p> <pre>DEFINE SERVER NAME P4K03</pre>
NODE [LIMIT]	<p><b>Default:</b> 125. The maximum number of nodes the server stores information about in its internal node table. The range is 1-125. NONE sets the limit to its maximum.</p> <pre>CHANGE SERVER NODE LIMIT NONE</pre>
NODENAME RESOLUTION LOCAL/REMOTE	<p>This option specifies whether node name resolution resolution will take place from the local Nodetable or from a remote Nameserver.</p>

*(continued next page)*

Table 5-19. SET/DEFINE/CHANGE SERVER Options (continued)

Option	Definition
NUMBER	<p><b>Default: 0.</b> An ID number for the server. The range is 0 to 32767. If any sessions are active, this option is valid only with the DEFINE command, not SET or CHANGE. For example:</p> <pre>DEFINE SERVER NUMBER 97</pre>
PASSWORD LIMIT	<p><b>Default: 3.</b> The number of times you may enter an incorrect password when the server prompts you for one. If you exceed the limit, your port is disconnected and you must wait one minute before trying again. (If the SERVER SECURITY option is enabled, the port is disconnected until a privileged user logs it out). The range is 0 to 250. If you specify NONE, you are logged out after 250 unsuccessful attempts. For example:</p> <pre>CHANGE SERVER PASSWORD LIMIT 4</pre>
PREFERRED	<p><b>Default: NONE.</b> Specifies the preferred node for software downline load, crash dump upline load, and node table downline load. None indicates that no downline load or crash dump will be executed. The "ndname" can be up to 16 characters long and is restricted to nodes on the local network. Each load function may have a different preferred node. If a preferred node is not present on the local network, the load will be executed on any available node on the local network that supports the function.</p> <p>The command syntax for the PREFERRED option follows:</p> <pre>SET SERVER [ PREFERRED ] { DUMP      } [ NODE  ndname ]                         { LOAD      } [      NONE   ]                         { NODETABLE } [ IP     ipadd  ]                                       [      NONE   ]                                       [ FILE  fname  ]                                       [      NONE   ]                                       [ NONE     ]</pre> <p>Examples:</p> <pre>SET SERVER PREFERRED DUMP NONE SET SERVER PREFERRED DUMP NODE KING SET SERVER DUMP NODE KING IP 201.202.203.001 SET SERVER DUMP IP 201.202.203.001 FILE P03DUMP</pre>

(continued next page)

Table 5-19. SET/DEFINE/CHANGE SERVER Options (continued)

Option	Definition
<b>PRIVILEGED PASSWORD</b>	<p><b>Default: SYSTEM.</b> The password that must be entered when you enter the SET PRIVILEGED command. It must be 1-16 characters and must be enclosed in quotation marks. For example:</p> <pre>CHANGE SERVER PRIVILEGED PASSWORD "LEXINGTON"</pre> <p>You may also type the command without a password and the server will prompt you for one:</p> <pre>Server&gt;&gt; CHANGE SERVER PRIVILEGED PASSWORD</pre> <p>Login password&gt; <i>(enter the password here--it is not echoed)</i> Verification&gt; <i>(enter the password again)</i></p> <p>The privileged password can be changed only by a privileged user. If you forget the password, you may reset it to SYSTEM by resetting the server to its factory defaults (see subsection 3.2.5).</p>
<b>RETRANSMIT [LIMIT]</b>	<p><b>Default: 32.</b> The number of times a message is retransmitted to a remote node when no acknowledgement is received. The range is 4 to 120. If any sessions are active, this option is valid only with the DEFINE command, not SET or CHANGE. For example:</p> <pre>DEFINE SERVER RETRANSMIT LIMIT 12</pre>
<b>SECURITY</b>	<p><b>Default: DISABLED.</b> When enabled, this option has the following effects: First, users who exceed the password limit when logging in are disconnected permanently (rather than for one minute). The port is said to be in a "sealed" state, and this state is logged to the console port.</p> <p>Second, whenever you enter privileged mode, the server prints a message telling you the identity (port number) and date and time of the last user to enter privileged mode. For example:</p> <pre>CHANGE SERVER SECURITY ENABLED</pre>

*(continued next page)*

Table 5-19. SET/DEFINE/CHANGE SERVER Options (continued)

Option	Definition
SERVICE [LIMIT]	<p><b>Default: 20.</b> This option allows you to reduce the total number of services that the server can support at one time. Lowering the service limit may raise the node limit at the next initialization.</p>
SESSION [LIMIT]	<p><b>Default: 64.</b> This option allows you to reduce the total number of sessions the server can support at one time. For example:</p> <pre>CHANGE SERVER SESSION LIMIT 40</pre> <p>Note that there is no advantage to reducing the SESSION LIMIT; it is only included as an option for compatibility with other protocols.</p>
SOFTWARE	<p><b>Default: P4KT00E.</b> This parameter should only be used if the Performance 4000-T software is loaded from a DECserver. A 1 to 9 character name for the software the server will load from its load host the next time it is initialized. This option is valid with the DEFINE command only. For example:</p> <pre>DEFINE SERVER SOFTWARE P4KT00E</pre>
TIME	<p><b>Default:</b> This option specifies the time displayed by the server on its front panel and in status displays. The time is normally downloaded from the load host when the server is initialized, but you can change it with this option if you wish. Use the following format:</p> <pre>SET SERVER TIME 18:30:00</pre>
WELCOME	<p><b>Default: "Welcome to Performance 4000-TCP/IP".</b> This option defines a message that the server displays when a user logs in. It can be up to 80 characters long and must be enclosed in quotes. It may include any ASCII characters (including special control characters). For example: <code>CHANGE SERVER WELCOME "Call x3333 for help"</code>.</p>

## 5.29 SET/DEFINE/CHANGE SERVICE

The SET, DEFINE, or CHANGE SERVICE command creates or modifies TCP ports (also referred to as services) that include specified server ports. The command keyword "SERVICE" is used for compatibility with other versions of the Performance 4000 terminal server.

Any single server port or group of server ports (pool) may be defined to appear to the network as a (single) TCP port. Once a TCP port has been set up, users on the network can connect to it by specifying the TCP port number or name that has been assigned.

If you want to connect to a remote TCP port using the TCP port name, then you must have a means of resolving the TCP port name (determining its TCP port number). If you do not have that capability, then you must use the TCP port number when connecting to the TCP port.

When TCP ports are changed permanently, the TCP port options are stored internally in nonvolatile RAM. When they are changed temporarily the options are stored in RAM and thus are lost when the server is reinitialized.

The three commands work as follows:

- SET: TCP ports are created (or modified) temporarily. The old values return the next time the server is reinitialized. If a TCP port is created with the SET command, it is deleted when the server is reinitialized.
- DEFINE: TCP ports are not created or changed until the server is reinitialized, but are then changed permanently.
- CHANGE: TCP ports are created or changed immediately and permanently.

Syntax	<pre>{ SET      } SERVICE tpname { DEFINE  } { CHANGE  }</pre>	<pre>[ tpname   PORT  spnum      [ ENAB/DISAB ]   CONNECTIONS     [ ENAB/DISAB ]   IDENTIFICATION  "string"   PASSWORD        "password"   TELNET          [ ENAB/DISAB ]</pre>
--------	--	---

**Privilege** Available to privileged users only.

**Examples**

```
CHANGE SERVICE MODEM 3000 PORT 3
CHANGE SERVICE MODEM_POOL 3001 PORT 1-4
CHANGE SERVICE MOD12_POOL 3002 PORT 1-4 ID "mod12"
CHANGE SERVICE LAZER 3010 PORT 5 TELNET DISABLED
```

**Comments** A maximum of 16 different local TCP ports may be defined on the server. A single local TCP port may be defined as multiple server ports. Note also that port parameters must be set correctly for all server ports that make up a local TCP port.

Table 5-20. SET/DEFINE/CHANGE SERVICE Options

Option	Definition
<b>tpname</b>	TCP port name. The name of the local TCP port you wish to create or modify.
<b>tpnum</b>	<b>Default: None.</b> TCP port number. The number identifying the local TCP port. The range is from 1 to 4999. TCP port numbers should be assigned values from 3000 to 4999 so that they will not be confused with physical server port numbers (1-34).
<b>PORT spnum</b>	<p><b>Default: ENABLED.</b> Specifies one or more server ports to be included in the TCP port that you are creating. If you have dialout modems connected to the first three serial ports, you might use the following command to create the TCP port MODEM_POOL that includes server ports numbered 1-3:</p> <pre>CHANGE SERVICE MODEM_POOL PORT 1-3 3010</pre> <p>You may add ports to an existing TCP port via the ENABLED modifier. You may subtract ports from an existing service by using the DISABLED modifier. For example, the following command adds port 4 to the existing port list for the TCP port MODEM_POOL:</p> <pre>CHANGE SERVICE MODEM_POOL PORT 4 ENABLE</pre>

(continued next page)

Table 5-20. SET/DEFINE/CHANGE SERVICE Options (continued)

Option	Definition
CONNECTIONS	<b>Default: ENABLED.</b> Allows new connections to be made to the service.
IDENTIFICATION "string"	<b>Default: None.</b> A phrase that describes the TCP port. The identification string may be up to 40 characters long and must be enclosed in quotation marks.
PASSWORD "string"	<b>Default: None.</b> Defines a password that is required to connect to the service. The password must be 1-16 characters long starting with an alphabetic character. For example:  CHANGE SERVICE MODEM PORTS 1-3 PASSWORD "JACK"  To remove password protection from a service that already has it, enter PASSWORD "".
TELNET	<b>Default: ENABLED.</b> Defines whether the TCP port (service) provides TELNET service to the network.



---

## 5.30 SET SERVICE REMOTE

---

The SET SERVICE REMOTE command is used to create and change the server's remote TCP port records (not the remote TCP port). The term "SERVICE" and "TCP port" have the same meaning. The Performance 4000-T TCP/IP server has retained the command keyword SERVICE for compatibility with other versions of the Performance 4000.

In general, the network manager maintains remote TCP port records so that the server can resolve the remote TCP port names (that is, determine the associated TCP port numbers). The command does not change or modify any remote TCP port parameters. If there is no record for a remote TCP port, then the user will be required to specify the TCP port number in order to connect to the remote TCP port.

The SET command places the remote TCP port record information in dynamic RAM, so that it is deleted whenever the server reinitializes. The CHANGE and DEFINE commands place the remote TCP port records in nonvolatile RAM, where they will remain after a server reinitialization.

### NOTE

Nonvolatile memory allows storage for a maximum of only 16 TCP ports (including both local and remote). Therefore, local TCP ports that are to be retained after server reinitialization should be configured prior to defining remote TCP port records. To remedy this situation, additional remote TCP port records can be downline loaded via the host downline-loadable node table option, as described in Appendix C.7.

The three commands work as follows:

- SET: The SET command makes changes only to the information stored in dynamic RAM. Upon next server initialization, only the records stored in nonvolatile RAM will remain. If a remote TCP port record is created with the SET command, it is deleted when the server reinitializes.
- DEFINE: Remote TCP port records are not created or changed until the server is reinitialized, but are then changed permanently.
- CHANGE: Remote TCP port records are created or changed immediately and permanently.





## 5.32 SHOW/MONITOR/LIST NODE

The SHOW, MONITOR, and LIST NODE commands are used to display information about the Ethernet nodes accessible to users from the Performance 4000-T. The two commands work as follows:

**SHOW:** Displays current information stored in volatile RAM about available nodes on the network.

**MONITOR:** Similar to SHOW, except that the display is updated every second for privileged users and every 10 seconds for nonprivileged users. MONITOR displays are terminated by pressing any key.

**LIST:** Displays current information stored in nonvolatile RAM about available nodes on the network.

<b>Syntax</b>	<pre>{ SHOW   } NODE [ [ NAME ] ndname ] [ STATUS ] { MONITOR }      [ IP   ] ipadd   [ SUMMARY ] { LIST   }      NAMESERVER [ COUNTERS ]                   GATEWAY                   ALL</pre>
---------------	---

**Privilege** Available to all users.

**Examples**

```
SHOW NODE
SHOW NODE NAME KNIGHT.MRKTG.ABCINC.COM.
SHOW NODE ALL
```

**Comments** If the SET PORT PAUSE option is enabled, the server stops after each screen and displays a prompt until you press the specified key (shown at the bottom of the screen). Press any other key to terminate the displays.

Three different displays about each node are available, as follows:

1. STATUS display (default if one node is specified)
2. SUMMARY display (default if multiple nodes or no nodes are specified)
3. COUNTERS display

The information provided by the three displays is described in three subsections following the SHOW/MONITOR/LIST NODE Options table.

Table 5-22. SHOW/MONITOR/LIST NODE Options

Option	Definition
<b>NAME ndname</b>	The name of the node you want information about. If no node name is specified, a summary is displayed for each node.
<b>IP ipadd</b>	The address of the Internet node you want information about. If no node address is specified, a summary is displayed for each node.
<b>NAMESERVER</b>	Specifies that you want a summary displayed for all Nameservers.
<b>GATEWAYS</b>	Specifies that you want a summary line displayed for all Gateway nodes.
<b>ALL</b>	Specifies that you want a summary displayed for all nodes.
<b>STATUS</b>	One node per screen. Displays the STATUS screen for each node you specify. This screen contains the node's IP address, ports offered, and so on. This is the default if one node is specified.
<b>SUMMARY</b>	One screen. Displays an abbreviated description for each node you specify. This is the default if multiple nodes are specified.
<b>COUNTERS</b>	<p>One node per screen. Displays the COUNTERS screen for each node you specify. This screen contains information about the number of connections the server has made to the node, the number of messages sent, the number of errors detected, etc.</p> <p><b>Note:</b> If the SET PORT PAUSE option is enabled, use the specified keys (displayed at the bottom of the screen) to move forwards and backwards from node to node.</p>

```
Current Node Status
Name: P4K03.MRKTG.ABCINC.COM.
  Alias: none
  Creator: Broadcast
Identification: Emulex P4000 #3 in marketing department
Network:
  IP Address:      201.202.203.004      Frame Size:      576
  Ethernet Addr:  00-00-C9-00-20-05    IP Version:      4
  Status: Up (ddd hh:mm) 005 13:32
  Node Type:      TCP/IP
TCP Port Name      Sess  Identification
Modem12           0     1200 baud dialout modem
Modem24           1     2400 baud dialout modem
MORE 24-JUN-1989 12:11:45
```

Figure 5-1. The SHOW NODE STATUS Display

### 5.32.1 The SHOW NODE STATUS DISPLAY

Figure 5-1 shows an example of the SHOW NODE STATUS Display. The STATUS display is the default display when one node is specified by the SHOW NODE command (for example, SHOW NODE ACTG1.EMX.COM.). It contains the following groups of information about the node that has been specified:

- **Name** is the full name of the node including the domain name.
- **Creator** identifies who created the node table entry.
- **Alias** is a character string that is equated to the full node name.
- **Identification** is the identification string that identifies the node.
- **IP Address** is a 32-bit address consisting of a network address and a host address.
- **Ethernet Address** is the node's physical Ethernet address. This field may be blank if no connections have been made since the server was last initialized.

- **Status** is valid only for nodes on the local network.
  - \* **Up** status identifies the node as being online or up. The amount of uptime since the node was last initialized is displayed. Uptime is displayed for all nodes on the local network that are broadcasting. Uptime is displayed in the format (days, hours, and minutes).
  - \* **Dn** status identifies the node as being offline or down. The amount of downtime since the node was last heard from after the server determined that it was no longer broadcasting is displayed. Downtime is displayed in the format (days, hours, and minutes).
  - \* "Node not broadcasting" status is displayed for nodes that are not currently broadcasting and for which the server has never received a broadcast, or for nodes that are not on the local network. This does not mean the node is down as it is possible for a node to be online (up) and not broadcasting. It simply means the server cannot determine whether the node is up or down.
- **Frame Size** is the maximum size of the Ethernet packets that the node transmits/receives over the network.
- **IP Version** is the version level of the TCP/IP protocol that the node is using.
- **TCP Port Name** is the name of any TCP ports offered to the network by the node. These ports may be attached to such devices as printers and dial out modems.
- **Sess** is the number of sessions currently on the TCP port. A single TCP port as seen by the network can be made up of multiple server ports and therefore have multiple sessions.
- **Identification** is a phrase that describes the TCP port.

```
Current Node Summary

*Name: KING
  Alias:                S3MRK      Creator: Broadcast
  IP Addr: 201.202.204.012      Status: Up (ddd hh:mm) 5 13:30
  Node Type:            TCP/IP
  ID: P4000 #3 main building

*Name: QUEEN
  Alias:                S4MRK      Creator: Name Server
  IP Addr: 201.202.204.013      Status: Node not broadcasting
  Node Type:            TCP/IP
  ID: P4000 #4 main building

Name: PAWN.MRKTG.ABCINC.COM
  Alias:                S5PROD      Creator: Broadcast
  IP Addr: 201.202.205.022      Status: Dn (ddd hh:mm) 0 00:20
  Node Type:            TCP/IP
  ID: P4000 #5 Production

Name: KNIGHT.MRKTG.ABCINC.COM
  Alias:                V85PROD      Creator: Down Load
  IP Addr: 201.202.205.020      Status: Up (ddd hh:mm) 15 03:50
  Node Type:            TCP/IP
  ID: Vax785 Production

MORE *-local node _____ 24-FEB-1989 16:04:36
```

Figure 5-2. The SHOW NODE SUMMARY Display

### 5.32.2 The SHOW/MONITOR/LIST NODE SUMMARY Display

Figure 5-2 shows an example of the SHOW NODE SUMMARY Display with multiple nodes specified. The SUMMARY display is the default display when multiple nodes are specified by the SHOW NODE command (for example, SHOW NODE ALL).

Explanations follow for the fields of information included for each entry of the display:

- **Name** is the name assigned to the node.
- **Alias** is a character string that is equated to the full node name.
- **IP address** is the Internet address of the node.
- **Node Type** is the type of network node, such as TCP/IP.



- **ID** is the node's identification phrase (if any), as defined by the SET/DEFINE/CHANGE NODE command.
- **Creator** identifies how the node table entry was created.
- **Status** is the status of the node along with its up time or down time. There are three possible status.
  - \* **Up** - node is up
  - \* **Dn** - node is down
  - \* **Node not broadcasting** - it is not known whether the node is up or down because the server has never received a broadcast packet from the node.

```
Current Node Counters
Name: P4K03.MRKTG.ABCINC.COM
Alias: P3MRK                      Creator: Broadcast

Seconds since zeroed: 343579 (3 23:26:19)

TCP Packets:      Transmit   Receive   TCP Errors:
Sync:             240        350      Bad Seq Nos:      0
Fin:              210        220      Invalid Acks:     0
Reset:            5          10       IP Rx Errors:     0
Retransmits:     0          0        IP Tx Errors:     0

MORE                                07-JUN-1989 14:20:10
```

Figure 5-3. The SHOW NODE COUNTERS Display

### 5.32.3 The SHOW/MONITOR NODE COUNTERS Display

Figure 5-3 shows an example of the SHOW NODE COUNTERS Display. The COUNTERS display contains a variety of statistics about data exchanges between the Performance 4000-T and the node you specify. It can be useful for estimating how heavily certain nodes are being used. Use the SHOW SERVER COUNTERS command if you wish to view statistics for the server as a whole.

The COUNTERS display contains the following groups of information:

**Name Information:**

**Name** is the name assigned to the node.

**Alias** is a character string that is equated to the full node name.

**Creator** identifies how the node table entry was created.

**Seconds since zeroed:**

The number of seconds since either (1) the server was reinitialized, or (2) the ZERO COUNTERS command was issued for the node. The value in parentheses indicates the same period in a different format (days, hours, minutes, and seconds).

**TCP Packets:**

**Sync** is the number of sync packets transmitted and received to and from the node.

**Fin** is the number of fin packets transmitted and received to and from the node.

**Reset** is the number of reset packets transmitted and received to and from the node.

**Retransmits** is the number of times a packet required retransmission. Only the transmit field is valid for retransmits.

**TCP Errors:**

**Bad Seq Nos** is the number of packets received with bad sequence numbers.

**Invalid Acks** is the number of invalid acknowledgement sequence numbers received from remote sites.

**IP Rx Errors** is the number of bad receive packets.

**IP Tx Errors** is the number of bad transmit packets.

---

## 5.33 SHOW/MONITOR/NODE TABLE STATUS

---

The SHOW and MONITOR NODE TABLE STATUS commands display information about the server's node table. The two commands work as follows:

**SHOW:** Displays current information about the server's node table.

**MONITOR:** Similar to SHOW, except that the display is updated every second for privileged users, and every 10 seconds for nonprivileged users. MONITOR displays are terminated by pressing any key.

**Syntax**     { SHOW     } NODE TABLE [ STATUS ]  
              { MONITOR }

**Privilege**   Available to all users.

**Examples**    SHOW NODE TABLE

Current Node Table Status			
<b>Node Table Statistics:</b>		<b>Node Entry Creator:</b>	
Node Limit:	125	Down Load:	20
Current Nodes:	55	Local Node:	1
High Node Count:	11	Name Server:	8
Available Entries:	70	Rec'd Broadcast:	20
Local Network Nodes:	55	Set Node Command:	1
Remote Network Nodes:	0	Define Node Command:	4
		Connect (IP Addr only):	1
<b>Node Name Resolution Order:</b>		<b>Node Entry Creation:</b>	
Node Table, Name Server		Rec'd Broadcast:	enabled
05-JUN-1989 16:40:20			

Figure 5-4. The SHOW NODE TABLE STATUS Display

### 5.33.1 The SHOW NODE TABLE STATUS Display

Figure 5-4 shows an example of the SHOW NODE TABLE STATUS Display. Explanations for the fields of information included in the display follow:

#### Node Table Statistics:

- **Max Nodes** is the maximum number of nodes that the node table can hold.
- **Current Nodes** is the number of nodes currently in the node table.
- **High Node Count** is the maximum number of nodes in the node table since the most recent server initialization.
- **Available** is the number of node table records currently available for new nodes.
- **Local Network Nodes** is the number of nodes in the node table that have a domain name equal to that of the server.
- **Remote Network Nodes** is the number of nodes in the node table that have a domain name not equal to that of the server.

### Node Entry Creator:

The Node Entry Creator identifies the method in which a node was originally entered into the node table.

- **Down Load** is the number of node table entries created as a result of the downline loading of the node table from a load host.
- **Local Node** is the server's own node entry in the node table. It is always present, and the count is always 1.
- **Name Server** is the number of node table entries created as a result of a user requesting a connection to a node, specifying the node's name, and thereby causing a Name Server to resolve the name.
- **Rec'd Broadcast** determines whether the server's receive broadcast logic may create a new entry in the node table for the broadcasting node. Entries are created only for nodes not currently in the node table. The SET/DEFINE/CHANGE BROADCAST NODE ENTRY command enables/disables this server option.
- **Set Node Command** is the number of node table entries created by the SET NODE command.
- **Define Node Command** is the number of node table entries created by the DEFINE NODE command. This occurs when the server is initialized. At that time, if any nodes are defined in nonvolatile memory, they are copied into the node table. A maximum of four entries can be defined in nonvolatile memory.
- **Connect Command, IP Only** is the number of node table entries created as a result of a user requesting a connection to a node specifying the node's IP address.

**Node Name Resolution Order:**

This display lists the order in which the two methods of resolving a node name will be used. One method is via the Name Server (remote resolution), and the other method is via the node table (local resolution). The SET/DEFINE/CHANGE SERVER NODENAME RESOLUTION LOCAL or REMOTE command selects which method will be used first. If the first method fails to resolve the node name, then the server will always try the second method.

**Node Entry Creation:**

This field indicates how the node table was created. Possible entries for this field are (1) Node Table, or (2) SET/DEFINE/CHANGE NODE command.

**Rec'd Broadcast** is the number of node table entries originally created by an uptime broadcast being received from a node.

## 5.34 SHOW/MONITOR/LIST PORT

The SHOW, MONITOR, and LIST PORT commands are used to display information about server ports. The three commands work as follows:

- **SHOW:** Displays current information stored in volatile RAM about server ports, such as port options that have been changed temporarily by the SET command.
- **MONITOR:** Similar to SHOW, except that the display is updated every second for privileged users and every 10 seconds for nonprivileged users. MONITOR displays are terminated by pressing any key.
- **LIST:** Displays (permanent) information stored in nonvolatile RAM about server ports, such as port options that have been determined by the DEFINE or CHANGE commands. These are the parameters that will take effect (if they haven't already) the next time the port is logged in or out.

```
Syntax   SHOW PORT [-spnum] [CHARACTERISTICS] [ LOCAL
                                             HARDWARE
                                             NETWORK ] [ 1
                                                         2 ]
                                             [ SUMMARY
                                             STATUS
                                             COUNTERS ]
                                             [ SESSIONS ] [ SUMMARY
                                                         STATUS ]
                                             [ ACCESS ] [ LOCAL
                                                         REMOTE
                                                         DYNAMIC
                                                         NONE ]
                                             [ ALL ]
```

**Privilege** Available to all users. Nonprivileged users may MONITOR more than one port with the SUMMARY option only. Secure users may display information about their own port only.



**Examples**    SHOW PORT  
                  SHOW PORT 1-4 CHARACTERISTICS HARDWARE  
                  SHOW PORT ACCESS REMOTE

**Comments**    The only option that is valid with the LIST PORT command is the CHARACTERISTICS option.

If the PORT PAUSE option is enabled, the server pauses after displaying each screen that results from the SHOW/MONITOR/LIST command. Pressing specified keys shown at the bottom of the screen displays the next screen resulting from the command. Press any other key to terminate a display immediately. Five different displays are available about each port.

Each of the following displays is shown and explained in the subsections following the options table:

- CHARACTERISTICS display (default if one port is specified)
- SUMMARY display (default if multiple ports are specified)
- STATUS display
- COUNTERS display
- SESSIONS display, either SUMMARY or STATUS may be specified

If the SET PORT PAUSE option is enabled, then all the display screens that result from a SHOW PORT command are shown one at a time. You may scroll between the display screens by pressing the key according to the prompt at the bottom of the display screen. If SET PORT PAUSE is DISABLED, then you will automatically scroll through all of the display screens without a pause between screens.

Table 5-23. SHOW/MONITOR/LIST PORT Options

Option	Definition
<p><b>spnum</b></p> <p><b>CHARACTERISTICS</b></p>	<p>Abbreviation for server port number. Identifies the port about which you wish to display information. It may be one port, several ports, or PORT ALL. If no port number is given, information is displayed about your own port.</p> <p><b>Four screens per port.</b> Displays the Characteristics screens for each port you specify. The Characteristics screens display the parameters that are currently set for server ports via the SET PORT command. You may specify four suboptions along with the CHARACTERISTICS option, as follows:</p> <ol style="list-style-type: none"> <li>(1) LOCAL port options. LOCAL is the default if one server port number is specified. The local options are the parameters set for a server port (via the SET PORT command) that affect local port operation, such as the username, session limit, and terminal type.</li> <li>(2) HARDWARE port options. HARDWARE port options are those options set via the SET PORT command that affect the server port hardware functioning, such as the serial device configuration (including baud rate, parity, and character size) and the operation of modem signals.</li> <li>(3) NETWORK usage information, group 1. The network characteristics are those parameters set via the SET PORT command that affect communication of the specified port with remote ports. Group 1 includes the settings for dedicated or preferred remote nodes for communication, and several Telnet control flags.</li> <li>(4) NETWORK usage information, group 2. The network characteristics for group 2 include the settings for communication with remote ports, including Telnet options, Command Keys and control flags, as set by the SET PORT command.</li> </ol>

(continued next page)

Table 5-23. SHOW/MONITOR/LIST PORT Options (continued)

Option	Definition
<b>SUMMARY</b>	<b>One screen.</b> Displays a brief summary for each port that you specify. The summary display includes only the port numbers and the port status for each port that is specified, rather than the port parameter options defined by the SET PORT command. The port status can be either connected, idle, logging in, or not installed.
<b>STATUS</b>	<b>One screen per port.</b> Displays the STATUS screen for each port that you specify. This screen contains the port's username, access setting, whether the port is full or partial modem, and so on. See subsection 5.34.3 for further details.
<b>COUNTERS</b>	<p><b>One screen per port.</b> Displays the COUNTERS screen for each port that you specify. This screen contains statistics on activities at the specified port, including any inactivity or password logoffs, port errors such as Framing errors, parity errors, and Overrun errors. See subsection 5.34.4 for further details.</p> <p><b>Note:</b> If the SET PORT PAUSE option is enabled, use the right-arrow key to move forward from port to port. Use the left-arrow key to move backward through the ports. If a display has more than one screen, use the up and down-arrow keys to change screens.</p>
<b>SESSIONS</b>	<b>One screen per port.</b> Displays the active sessions for the specified port. A SUMMARY or a STATUS display may be specified. This display is identical to the SHOW SESSIONS PORT command.
<b>ACCESS</b>	Displays ACCESS information about the specified server port(s), as specified by the SET PORT ACCESS command.

---

### 5.34.1

---

## The SHOW PORT CHARACTERISTICS Display

The CHARACTERISTICS display is a detailed listing of all port options. It is the default if a single port is specified by the SHOW PORT command (for example, SHOW PORT). Four screens of information are available:

- Local Group screen
- Hardware Group screen
- Network Group screen 1
- Network Group screen 2

If the PORT PAUSE option is enabled, you need only enter the command SHOW PORT x; the Local Group screen appears and you may press the up and down-arrow keys to move between the four screens. If PAUSE is disabled, only one screen is shown and you must specify which one you want (for example, SHOW PORT 3 HARDWARE, SHOW PORT 3 NETWORK 1). The Local Group screen is the default. The four screens are shown on the following pages, together with descriptions of the information that is shown.

Figure 5-5 shows the Local Group and Hardware Group screen information that is displayed by the SHOW PORT CHARACTERISTICS command. Figure 5-6 shows the Network Group 1 and Network Group 2 screens.

```
Current Characteristics for Port 1 — Network Group
Current Characteristics for Port 1 — Hardware Group
Current Characteristics for Port 1 — Local Group

Characteristics:
Access:                local
Break:                 local
Broadcast:             enabled
Inactivity Logout:    disabled
Interrupts:           disabled
Message Codes:        enabled
Password:              enabled
Pause:                disabled
Security:              disabled
Session Limit:        4
Type:                  vt100
Verification:         enabled

Identification:
Username:             J_Smith
Portname:             Port_1

Switch Characters:
Forward:              ^F
Backward:             ^K
Local:                none

07-JUN-1989 15:10:20
```

```
Current Characteristics for Port 1 — Local Group
Current Characteristics for Port 1 — Network Group
Current Characteristics for Port 1 — Hardware Group

Serial Configuration:
Input speed:          9600
Output speed:         9600
Parity:               none
Character Size:       8
Autobaud:             disabled

Modem Control:
Modem Control:       disabled
DCDlogout Delay:    enabled
DSRlogout:           disabled
DTRwait:             disabled
Ring:                disabled

Flow Control:
Flow Control:        xon
Input Flow Ctrl:    enabled
Output Flow Ctrl:   enabled

07-JUN-1989 15:10:20
```

Figure 5-5. The SHOW PORT CHARACTERISTICS Display  
for the Local Group and Hardware Group

```
Current Characteristics for Port 1 — Hardware Group
Current Characteristics for Port 1 — Local Group
Current Characteristics for Port 1 — Network Group 1 of 2
Dedicated/Preferred Node:
Node Name: KING
IP Address: 201.202.203.001
Port Name: TELNET
Port Number: 23
Characteristics:
CR/LF: disabled
Verbose: disabled
Echo Local: disabled
Autoconnect: disabled
Telnet keys: disabled
07-JUN-1989 15:10:20
```

```
Current Characteristics for Port 1 — Hardware Group
Current Characteristics for Port 1 — Local Group
Current Characteristics for Port 1 — Network Group 2 of 2
Characteristics:
CR/LF: disabled
Verbose: disabled
Echo Local: disabled
Autoconnect: disabled
Telnet Keys: disabled
Telnet Command Keys:
AO Abort Output: none
AYT Are you there: none
BRK Break: none
EC Erase Char: none
EL Erase Line: none
GA Go Ahead: none
IP Interrupt Process: none
SYN Clear Data Path: none
Telnet Options:
Loc Rem
Echo: wont do
Status: wont dont
Suppress GA: will do
Timing Mark: wont dont
Binary Transmit: wont dont
07-JUN-1989 15:10:20
```

Figure 5-6. The SHOW PORT CHARACTERISTICS Display for Network Group 1 and Group 2

---

Descriptions follow for the fields in the SHOW PORT CHARACTERISTICS display:

**Local  
Group**

**Characteristics:**

A list of the configurations for several port options that affect local port operation are provided, including the session limit and terminal type. The settings for these port options are determined by the SET PORT command, as described in subsection 5.26. The port options are listed in alphabetical order in the options table for the SET PORT command.

**Identification:**

- **Username** is the port's username, set either at login or by the SET PORT USERNAME command.
- **Portname** is the server's logical name for the port, as set by the SET PORT NAME command. Do not confuse the server port name with the TCP port name.

**Switch Characters:**

**Forwards** and **Backwards** are the characters (if any) defined by the SET PORT FORWARD SWITCH and the SET PORT BACKWARD SWITCH commands. **Local** is the character (if any) set by the SET PORT LOCAL SWITCH command.

**Hardware  
Group**

**Serial Configuration, Modem Control, and Flow Control:**

All the options in the Hardware Group screen are set by the SET PORT command. These include settings for baud rate, parity, and character size, and various modem control signals. These options are listed in alphabetical order and described in the options table for the SET PORT command, subsection 5.26.

**Network  
Group  
1 of 2**

**Dedicated/Preferred Node:**

- **Node Name** is the name of the node (excluding domain name) that the user is to be connected to.
- **IP address** is the internet address of the node that the user is to be connected to.

- **Port Name** is the TCP port name that the user is to be connected to. This field will be blank if the TCP port has no name. If no port name and/or no port number is specified, the default is port 23, TELNET.
- **Port Number** is the TCP port number that the user is to be connected to. If no port name and no port number is specified, the default is port 23, TELNET.

**Characteristics:**

All characteristics in the Network Group Screen 1 are set by the SET PORT command (subsection 5.26).

**Network  
Group  
2 of 2**

**Characteristics, Telnet Options, Telnet Command Keys**

All Telnet options and commands in the Network Group Screen 2 are set by the SET PORT command. The Telnet options are described in Table 5-16. The Telnet commands are described in Table 5-17. The Characteristics are the same as in Network Group screen 1.



Current Status Summary for Specified Ports					
Port	Status	Port	Status	Port	Status
1	connected	2	idle	3	connected
4	idle	5	connected	6	idle
7	idle	8	idle	9	idle
10	logging in	11	idle	12	idle
13	idle	14	idle	15	idle
16	idle	17	not installed	18	not installed
19	not installed	20	not installed	21	not installed
22	not installed	23	not installed	24	not installed
25	not installed	26	not installed	27	not installed
28	not installed	29	not installed	30	not installed
31	not installed				

**PRINTER (port 33): idle**  
**Remote Console TCP Port 2048 (port 34): idle**

07-JUN-1989 15:10:20

Figure 5-7. The SHOW PORT SUMMARY Display

### 5.34.2 The SHOW PORT SUMMARY Display

The SUMMARY display is the default when multiple ports are specified by the SHOW PORT command (for example, SHOW PORT ALL). Each server port is listed along with its current connect status. The connect status can have the following values:

- IDLE - The port exists but is not active.
- WAKING UP - The port is responding to modem handshaking.
- LOGGING IN - A user is logging in to the port.
- LOGGING OFF - A user is logging off the port.
- LOCAL - The port is logged in but has no active sessions.
- CONNECTING - The port is connecting to a service.
- CONNECTED - The port is connected to a service.
- LOCKED - LOCK has been entered at the port.
- RESUME PENDING - The port is trying to resume a session.
- DIAGNOSTIC - TEST PORT has been executed for the port.
- AUTOBAUD - The port is in the process of autobauding.
- MONITORING - MONITOR has been executed at the port.
- SEALED - The user has exceeded the allowable password attempts.
- TRANSITION - The port is changing from one state to another.

```
Current Status for Port 1
-----
Local Status:
Username:      J_Smith      Inactivity:      0
Priv Status:   normal      Input XOFFed:    no
Access Mode:   local       Output XOFFed:   no
State:         local

Hardware Status:
Hardware Port Type: partial modem
Selftest Result:      passed
Active Modem Controls: DSR DTR

07-JUN-1989 15:30:20
```

Figure 5-8. The SHOW PORT STATUS Display

---

### 5.34.3 The SHOW PORT STATUS Display

---

The STATUS display is a single screen of information about the requested port. It contains the following groups of information:

**Local Status:**

- **Username** is the port's username, set either at login or by the SET PORT USERNAME command.
- **Priv Status** is the privilege level of the port. It is either privileged, normal (nonprivileged), or secure.
- **Access Mode** is set by the SET PORT ACCESS command. It can be local, remote, dynamic, or none.
- **State** is the port's current status. The possible states are listed by the SHOW PORT SUMMARY command, shown on the previous page.
- **Inactivity** is the number of minutes the port has been inactive. If the PORT INACTIVITY LOGOUT option is enabled for the port, the port is logged out when this number reaches the value set by the SERVER INACTIVITY TIMER option.
- **Input XOFFed** displays whether the port's input logic has send an XOFF to the attached device requesting it to cease transmitting to the server port.

- **Output XOFFed** displays whether the port's output logic has received an XOFF from the attached device requesting the server port to cease transmitting to the device.

**Hardware Status:**

- **Hardware Port Type** is either full modem (25-pin D connectors), partial modem (RJ12 connectors), or parallel printer.
- **Self-test Result** indicates the result of the server's power-up self-test. It can be either passed or failed.
- **Active Modem Controls** lists the modem controls (both incoming and outgoing) currently asserted on the port.

```
Current Counters for Port 1
Seconds since zeroed: 7055 (0 01:57:35)

Port Statistics:                Port Errors:
Local Accesses:                Framing:                0
Remote Accesses:              Parity:                0
Inactivity Logoff:            Overrun:               0
Password Logoff:              0

07-JUN-1989 15:30:20
```

Figure 5-9. The SHOW PORT COUNTERS Display

### 5.34.4 The SHOW PORT COUNTERS Display

The COUNTERS display, shown in Figure 5-9, lists statistics about port activity. It contains the following groups of information:

#### Seconds since zeroed:

The number of seconds since either (1) the server was initialized, or (2) the ZERO COUNTERS command was issued for the port. The value in parentheses indicates the same period in a different format (days, hours, minutes, and seconds).

#### Port Statistics:

- **Local Accesses** is the number of times a user has logged into the port.
- **Remote Accesses** is the number of times a remote node has connected to the port.
- **Inactivity Logoff** is the number of times the port has been automatically logged out due to inactivity (enabled by the SET PORT INACTIVITY LOGOUT command).
- **Password Logoff** is the number of times the port has been logged out because the user failed to enter the login password within the allowed number of attempts (as specified by the SET SERVER PASSWORD LIMIT command).

### **Port Errors:**

The number of errors the server has detected on incoming characters at the port. The following error types are listed:

- **Framing** indicates the number of characters received with a missing stop bit. If this number is not zero, it indicates either (1) a problem with the port or the device attached to the port, or (2) a mismatch between the serial parameters of the port (baud rate, parity, and character size) and the serial parameters of the device attached to the port.
- **Parity** indicates the number of characters received with a bad parity bit. If this number is not zero, it indicates either (1) a problem with the port or the device attached to the port, or (2) a mismatch between the serial parameters of the port (baud rate, parity, and character size) and the serial parameters of the device attached to the port.
- **Overrun** indicates that characters were lost because the server's internal buffer was full. This count should be zero. If this number is not zero, the most likely cause is a mismatch between the type of flow control set for the port and the type of flow control used by the device attached to the port.

---

### **5.34.5**

---

### **The SHOW PORT SESSIONS Display**

This display is identical to the SHOW SESSIONS display, as described in subsection 5.37.

## 5.35 SHOW/MONITOR/LIST SERVER

The SHOW, MONITOR, and LIST SERVER commands are used to display information about the Performance 4000-T itself. The three commands work as follows:

- SHOW - Displays current information stored in volatile RAM about the server, including server options that have been changed temporarily by the SET command.
- MONITOR - Similar to SHOW, but the display is updated every second for privileged users and every 10 seconds for nonprivileged users. MONITOR displays are terminated by pressing any key.
- LIST - Displays permanent information about the server that is located in nonvolatile memory. These are the parameters that will take effect (if they haven't already) the next time the server is initialized.

**Syntax**    { SHOW        } SERVER [ CHARACTERISTICS type ]  
               { MONITOR }            [ STATUS  
               { LIST        }            [ COUNTERS            type ]

**Privilege**    Available to nonprivileged and privileged users. Not available to secure users.

**Examples**    SHOW SERVER  
                   SHOW SERVER COUNTERS

**Comments**    Only the CHARACTERISTICS option is valid with the LIST SERVER command.

Three different displays about the server are available:

- CHARACTERISTICS display (default)
- STATUS display
- COUNTERS display

Each of these displays is described briefly in the options table, and then in full detail in the subsections following the table.

Table 5-24. SHOW/MONITOR/LIST SERVER Options

Option	Definition
<b>CHARACTERISTICS type</b>	<p><b>Three screens.</b> Displays the CHARACTERISTICS screens for the server (this is the default). These screens display the following: (1) Server options that are strictly LOCAL; (2) Options that affect NETWORK operation; and (3) a description of the server HARDWARE (installed memory, type of PerformancePak, and so on). See subsection 5.35.1 for further.</p> <p>If the SET PORT PAUSE option is enabled, all three screens are shown in rotation (see note below); otherwise you may specify a particular screen (LOCAL is the default).</p>
<b>STATUS</b>	<p><b>One screen.</b> Displays the STATUS screen for the server. This screen contains information about the number of users on the server, an error summary, and so forth. See subsection 5.35.2 for further details.</p>
<b>COUNTER type</b>	<p><b>Two screens.</b> Displays the COUNTERS screens for the server. These screens display (1) server counters that relate to ETHERNET activity, and (2) counters that relate to TCP/IP activity (i.e., user and system data packets transmitted and received by the server). If the SET PORT PAUSE option is enabled, both screens are shown in rotation (see note below); otherwise you may specify a particular screen (ETHERNET is the default). See subsection 5.35.3 for further details.</p> <p><b>Note:</b> If the SET PORT PAUSE option is enabled and you specify a multi-screen display, use the up and down-arrow keys to change screens or follow the instructions at the bottom of the screen.</p>

```
Current Server Characteristics — Network Group
Current Server Characteristics — Hardware Group
Current Server Characteristics — Local Group

Performance 4000                Hardware: A.1 Software: 1.0

Announcements      enabled      Load:                netload
Autoreinit:        enabled      Prompt:              Server
Broadcast:         enabled      Software:            P4KT00E
Dump:              disabled     Dump File:           none
Lock:              enabled      Node File:           none
Security:          disabled     Console Port:        1
Heartbeat:         disabled     Password Limit:      3
Emulex options:    none        Inactivity Timer:    30

07-JUN-1989 15:10:20
```

```
Current Server Characteristics — Local Group
Current Server Characteristics — Network Group
Current Server Characteristics — Hardware Group

Hardware:                    Front Panel:
Hardware Revision:          A.1      Status:              enabled
PerformancePak:            (NL) 1.0  Display:            message
Installed Memory:          512K      Message:            Performance 4000
Installed Ports:           16

Selftest Result:
System: ++++++ (ok)
Ports: ++++++ (ok)

07-JUN-1989 15:10:20
```

Figure 5-10. SHOW SERVER CHARACTERISTICS Display, Local and Group and Hardware Group



```

Current Server Characteristics — Hardware Group
Current Server Characteristics — Local Group
Current Server Characteristics — Network Group 1 of 2

Identification:
Name:                p4ktcp0102
Alias:                P3MRK
Number:               0
IP Address:           201.202.204.012
Subnet Mask:          255.255.255.0
Ethernet:             00-00-C9-00-20-05
Domain:               MRKTG.ABCINC.COM.
Id:                   P4000 #3 in marketing

Internal Software:
Revision:             1.0
IP Version:           4
Frame Size:           576

07-JUN-1989 15:20:45
  
```

```

Current Server Characteristics — Hardware Group
Current Server Characteristics — Local Group
Current Server Characteristics — Network Group 2 of 2

Preferred Nodes:
Load:                 none
Dump:                 none
Node Table:           none

IP Addresses:
Load:                 255.255.255.255
Dump:                 none
Node Table:           none

Configured Limits:
Sessions:              60
Node Table:            60
Service Table:         32
Retransmissions:       64

Configured Timers:
Circuit (ms):         80
Keepalive (sec):      20

07-JUN-1989 15:10:20
  
```

Figure 5-11. The SHOW SERVER CHARACTERISTICS Display,  
Network Groups 1 and 2

---

## 5.35.1 The SHOW SERVER CHARACTERISTICS Displays

---

The CHARACTERISTICS display is the default for the SHOW SERVER command. It contains information about server options, settings, and hardware configurations. Three screens of information are available:

- Local Group screen
- Network Group screen
- Hardware Group screen

If the SET PORT PAUSE option is enabled, you need only enter the command SHOW SERVER CHARACTERISTICS; the Local Group screen appears and you may press the up and down-arrow keys to move between the three screens. If PAUSE is disabled, only one screen is shown and you must specify which one you want (for example, SHOW SERVER CHARACTERISTICS HARDWARE). The Local Group screen is the default. All three screens are shown on the previous 2 pages. They contain the following groups of information:

### Local Group

#### Performance 4000:

Most of options shown in two columns in this display are set by the SET/DEFINE/CHANGE SERVER command. Refer to subsection 5.28 if you require detailed descriptions of these options.

"Software" is the name of the download software that the server is currently running. Issuing a LIST SERVER CHARACTERISTICS command will display the download software to be loaded the next time the server is initialized. They are normally the same.

#### Hardware:

The revision level of the Performance 4000-T hardware.

#### Software:

The revision level of the Performance 4000-T operational software.

### Hardware Group

#### Hardware:

**Hardware Revision** is the revision level of the server's hardware.

**PerformancePak** is the revision level of the PROMs on the server's PerformancePak. NL indicates a network load PerformancePak; SL indicates a self load PerformancePak.

**Installed Memory** is the amount of internal memory in the server.

**Installed Ports** is the number of ports the server contains. It varies depending on the model of the server.

**Selftest Result:**

**System** shows the results of the server's power-up self-test. Each plus sign represents one internal subtest that passed successfully; if one of the plus signs is replaced by a number, the server detected that number of errors in the subtest. Refer to the description of error message number 922 in Appendix E, "Error and Status Messages", for further details.

**Ports** displays one plus sign for each serial port on the server. If a plus sign is replaced by a minus sign, that port is bad. Refer to Section 6, Troubleshooting, for further details.

**Front Panel:**

**Status** indicates whether the front panel buttons are enabled or disabled (as specified by the SET SERVER FRONTPANEL command).

**Display** indicates the contents of the LCD front panel display (time of day, Ethernet address, user message, and so on). This is set by the SET SERVER FRONTPANEL command.

**Message** is the message that is displayed in the LCD front panel. It is normally, "Performance 4000 TCP/IP" unless it has been changed by the SET SERVER FRONTPANEL command.

**Network  
Group 1**

**Identification:**

**Name**, **Subnet Mask**, **Domain**, and **ID** are options that are set by the SET SERVER command. **Alias** is set by the SET NODE command or by the downloading of the node table. **Ethernet** is the Ethernet address of the server. These values are used by other network nodes to specify particular servers. Refer to subsection 5.28 if you require detailed descriptions of these options.

**Internal Software:**

**Revision** is the revision level of the Performance 4000-T operational software.

**IP Version** is the revision level of the IP protocol used by the Performance 4000-T.

**Frame Size** is the maximum size of the Ethernet packets that the server transmits over the network.

**Network  
Group 2**

**Preferred & Default Nodes:**

Node names for the preferred **dump** node and **load** node, and a preferred **Node Table** file name for the server, are set via the SET SERVER PREFERRED command (as described in Table 5-19). **Gateway** and **Name Server** nodes are selected via the SET NODE command (subsection 5.25).

**IP Addresses:**

These parameters are also determined by the SET SERVER command (as described in subsection 5.28). They are the same as the Preferred and Default nodes defined above, except that their IP addresses are shown instead of their node names.

**Configured Limits:**

These limits are determined via the SET SERVER command, for example, SET SERVER NODE, SET SERVER SERVICE, and so on. Refer to Table 5-19 for descriptions of these options.

**Configured Timers:**

These are internal server timers that are configured by the SET SERVER command. Refer to Table 5-19 for descriptions of these options.

```

Current Server Status
-----
Minutes to Shutdown: none           Uptime: 7087 (0 01:58:07)

Resource Usage:      Cur High/Max   Diagnostic Summary:
Ports:              2    2/33      TCP/IP Errors:      0
Users:              2    2/32      Port Errors:        0
Circuits:           0    2/64      Resource Errors:    0
Sessions:           0    0/64      Selftest:           ++++++
Local TCP Ports:    0    0/16
Remote TCP Ports:   10   0/44
CPU Busy (%):       10   25/100
Fixed Buff (%):     27   28/100
Variable Size (%):  0    0/100

Node Summary:
Load Node:          KING
Dump Node:          KING
Node Table:         none

IP Addresses:
Load Node:          255.255.255.255
Dump Node:          201.202.203.001
Node Table:         none
-----
07-JUN-1989 15:30:20

```

Figure 5-12. The SHOW SERVER STATUS Display

### 5.35.2 The SHOW SERVER STATUS Display

The SERVER STATUS display, shown in Figure 5-12, provides statistical information about the server and the server's current activity level. It contains the following groups of information:

#### Minutes to Shutdown:

The number of minutes remaining before the server is reinitialized. There is a value here only if an INITIALIZE command has been issued with the DELAY option.

#### Uptime:

The number of seconds since the most recent server initialization. The value in parentheses indicates the same period in a different format (days, hours, minutes, and seconds).

#### Resource Usage:

For each option in this group, the current activity is shown, the highest usage since the last initialization is shown, and the maximum available usage is shown. Descriptions follow for each of the options shown:

- **Ports** is the number of ports that are logged in. The maximum number possible is 33.
- **Users** is the number of ports with active sessions. The maximum number possible is 32.
- **Circuits** is the number of virtual circuits the server has established. One virtual circuit is established for each connection to a node. The maximum number of circuits is 64.
- **Sessions** is the total number of sessions that the server is supporting. The maximum limit is determined via the SET SERVER SESSION command.
- **Local TCP Port** is the number of TCP ports offered on the server.
- **Remote TCP Port** is the number of remote TCP ports configured in the server.
- **CPU Busy (%)** is the percentage of the server's internal microprocessor that is being used.
- **Memory Used (%)** is the percentage of the server's internal buffers that are in use.

**Diagnostic Summary:**

- **TCP/IP Errors** is the sum of all the various types of TCP/IP errors. Refer to the SHOW NODE COUNTERS display for detailed information about TCP/IP errors.
- **Port Errors** is the sum of all data errors on all ports. Use the SHOW PORT COUNTERS command to identify the number of the bad port and the type of error.
- **Resource Errors** is the number of times a user request was denied due to lack of internal memory (for example, if the maximum allowed number of simultaneous sessions was exceeded).
- **Selftest** shows the results of the server's power-up self-test. It should be six plus signs; if one of the plus signs is replaced by a number, the self-test detected an error.

**Node Summary:**

This group shows the node name and IP Address of the server's most recent Load Host, Dump Host, and Node Table Host.

---

### 5.35.3 The SHOW SERVER COUNTERS Display

---

The COUNTERS display contains statistics about server activity. Two screens of information are available:

- Ethernet Group screen
- TCP/IP Group screen

If the SET PORT PAUSE option is enabled, you need only enter the command SHOW SERVER COUNTERS; the Ethernet Group screen appears by default, and you may press the up and down-arrow keys to move between the two screens.

If PAUSE is disabled, only one screen is shown and you must specify which screen you want (for example, SHOW SERVER COUNTERS TCP).

Both screens are shown on the following pages. They contain the following groups of information:

#### Ethernet Group

##### Seconds since zeroed:

The number of seconds since either (1) the server was reinitialized or (2) the ZERO COUNTERS ALL command was issued.

##### Directly Addressed:

These are statistics about data sent directly to and from the server:

- **Bytes Received** and **Bytes Transmitted** are the number of bytes exchanged between the server and all nodes.
- **Frames Received** and **Frames Transmitted** are the number of Ethernet frames exchanged between the server and all nodes.
- **Frames Sent, def** is the number of times the server deferred a transmission because the Ethernet link was busy. It should be less than 20 percent of all frames transmitted.
- **Frames Sent, 1 col** is the number of Ethernet frames transmitted after one collision. **Frames Sent, 2+ col** is the number of frames transmitted after two or more collisions. These two categories should total less than five percent of all frames transmitted. A higher percentage indicates either (1) your network exceeds Ethernet specifications, or (2) it is very heavily loaded.

```
Current Server Counters — TCP/IP Group
Current Server Counters — Ethernet Group

Seconds since zeroed: 7062 (0 01:57:42)

Directly Addressed:
Bytes Received:      795440
Bytes Transmitted:   241396
Frames Received:     4782
Frames Transmitted:  2446
Frames Sent, def:    6
Frames Sent, 1 col:  1
Frames Sent, 2+ col: 0

Ethernet Failures:
Send Failures:      0
Send Failure Cause: 0
Receive Failures:   0
Rec Failure Cause:  0
Data Overrun:       0
No Rx Buffer:        0
No Tx Buffer:        0

Broadcast Addressed:
Bytes Received:      477590
Bytes Transmitted:   1548
Frames Received:     5565
Frames Transmitted:  712

07-JUN-1989 10:20:17
```

```
Current Server Counters — Ethernet Group
Current Server Counters — TCP/IP Group

Seconds since zeroed: 343579 (3 23:26:19)

IP Datagrams:
Received:      3465
Fragmented Rx: 0
Transmitted:   3190

IP Errors:
Datagrams Discarded: 0
Reassembly Errors:   0
Routing Failures:    0
Lifetime Expired:    0
Source Quench Tx:    0

TCP Packets:   Transmit   Receive
Sync:          350         110
Fin:           220         50
Reset:         10          4
Retransmits:   0

TCP Errors:
Bad Seq Nos:    0
Invalid Acks:  0
IP Rx Errors:  0
IP Tx Errors:  0

07-JUN-1989 15:30:20
```

Server>

Figure 5-13. The SHOW SERVER COUNTERS Display



**Ethernet Failures:**

- **Send Failures** is the number of times the server cancelled a transmission. It should be zero. If this number is greater than zero, **Send Failure Cause** gives the reason for the cancellations.
- **Send Failure Cause** is the reason transmissions were cancelled (if **Send Failures** is greater than zero). This value is a binary bit map and more than one bit may be set. For example, the value 100001 indicates that bits 0 (rightmost) and 5 are set. Each bit has the following meaning:

Bit	Meaning
0	The transmission failed after 16 attempts. Indicates that either your network is too busy or you have a hardware problem somewhere on the network.
1	Carrier was lost on the Ethernet during transmission. Indicates a transceiver, cable, or other hardware failure.
4	The frame exceeded the maximum allowed length. Indicates faulty host software.
5	A late collision. Indicates the Ethernet cable is too long.
8	Heartbeat error. This can occur only if the SERVER HEARTBEAT option is enabled and can then be expected up to 200 times per day. It does not indicate a problem.
9	Data underflow. The server tried to transmit something but could not retrieve information from internal memory fast enough. Indicates a server hardware problem.

Once these bits are set, they stay set until the server is reinitialized or the ZERO COUNTERS ALL command is issued.

Note that some receive errors are expected due to the nature of the Ethernet protocol. These errors are recovered and no data is lost. You should check the error counters periodically, however, so you can see if the number of errors is increasing. This could indicate that you have violated a network configuration rule or that you have a hardware failure somewhere on the network.

- **Receive Failures** is the number of Ethernet frames that were received with errors. It should be zero. If this number is greater than zero, Receive Failure Cause indicates the nature of the error.
- **Receive Failure Cause** indicates the nature of received data errors (if Receive Failures is greater than zero). This value is a binary bit map and more than one bit may be set. Each bit has the following meaning (bit 0 is the rightmost bit):

Bit	Meaning
0	CRC error.
1	Framing error.
2	Frame length error. The frame exceeded 576 bytes or is less than 64 bytes.

Once these bits are set, they stay set until the server is reinitialized or the ZERO COUNTERS ALL command is issued.

- **Data Overrun** is the number of times the server lost data because of inadequate memory. It indicates a server hardware problem.
- **No Rx Buffer** and **No Tx Buffer** are the number of times the server rejected messages from other nodes due to inadequate internal memory.

#### Broadcast Addressed:

This group is the same as the Directly Addressed group except that it refers to bytes and frames transmitted to the broadcast address. The count of broadcast frames and bytes transmitted and received by the server are displayed.

#### TCP/IP Protocol Group

#### Seconds since zeroed:

This is the number of seconds since either (1) the server was reinitialized, or (2) the ZERO COUNTERS command was issued for the node. The value in parentheses indicates the same period in a different format (days, hours, minutes, and seconds).

#### IP Datagrams:

- **Received** is the total number of datagrams the server has received from all nodes.

- **Fragmented Rx** is the number of fragmented datagrams the server has received from all nodes.
- **Transmitted** is the total number of datagrams the server has transmitted to all nodes.

**IP Errors:**

- **Datagram Discarded** is the number of times a received datagram was discarded due to a bad checksum.
- **Reassembly Errors** is the number of errors encountered when reassembling receive packets.
- **Routing Failures** is the number of times a datagram was undeliverable due to reasons such as a network being down, thereby preventing it from delivery to its destination.
- **Lifetime Expired** is the number of packets that were transmitted by the server, but expired before reaching their destination.
- **Source Quench Tx** is the number of times a remote node requested a local node to stop data transmission (flow controlled), due to a lack of buffer area for incoming data on the remote node.

**TCP Packets:**

- **Sync** is the number of sync packets transmitted/received to/from the node.
- **Fin** is the number of fin packets transmitted/received to/from the node.
- **Reset** is the number of reset packets transmitted/received to/from the node.
- **Retransmits** is the number of times a packet required retransmission. Only the transmit field is valid for retransmits.

**TCP Errors:**

- **Bad Seq Nos** is the number of packets received with invalid sequence numbers.
- **Invalid Acks** is the number of packets.
- **IP Rx Errors** is the number of bad receive packets.
- **IP Tx Errors** is the number of bad transmit packets.

---

## 5.36 SHOW/MONITOR/LIST SERVICE

---

The SHOW, MONITOR, and LIST SERVICE commands are used to display information about the local and remote Ethernet services you are authorized to access. The three commands work as follows:

**SHOW:** Displays current information stored in volatile RAM about services, including services that have been created or changed temporarily by the SET command.

**MONITOR:** Similar to SHOW, except that the display is updated every second for privileged users and every 10 seconds for nonprivileged users. MONITOR displays are terminated by pressing any key.

**LIST:** Displays permanent information stored in nonvolatile RAM about services. These are the parameters that will take effect (if they haven't already) the next time the server is initialized. Only local services can be shown with the LIST command.

<b>Syntax</b>	{ SHOW }	SERVICE	[ name ]	[ SUMMARY ]
	{ MONITOR }		LOCAL	CHARACTERISTICS ]
	{ LIST }		REMOTE	
			ALL	

**Privilege** Available to all users.

**Examples**

```
SHOW SERVICE MODEM
SHOW SERVICE ALL
SHOW SERVICE LOCAL
```

**Comments** Only the CHARACTERISTICS option is valid with the LIST SERVICE command.

Two displays are available about each service:

- SUMMARY display (default if multiple services are specified)
- CHARACTERISTICS display

The options table describes each command option in the command syntax. The following subsections show and explain each of these displays in detail.

Table 5-25. SHOW/MONITOR/LIST SERVICE Options

Option	Definition
<b>name</b>	Specifies the name of a single local or remote TCP port (service) about which you want information.
<b>ALL</b>	Specifies that you want information about all local and remote TCP ports (services). This is the default screen if no name is specified.
<b>SUMMARY</b>	One screen. Displays the SUMMARY screen for the local and remote TCP ports (services) that you specify. This is the default screen.
<b>CHARACTERISTICS</b>	One screen. Displays several lines of CHARACTERISTICS for each local or remote TCP port (service) that you specify.
<b>LOCAL</b>	Specifies that you want information about all local TCP ports (services).

```
Current Services (TCP ports) Summary
*Name: modem12      TCP Port: 3002      Sessions: 0
*Name: modem24      TCP Port: 3003      Sessions: 1
*Name: hsprntr      TCP Port: 3008      Sessions: 1
*Name: lzprntr      TCP Port: 3009      Sessions: 0
*-local _____ 07-JUN-1989 14:21:17
```

Figure 5-14. The SHOW SERVICE SUMMARY Display

---

### 5.36.1 The SHOW SERVICE SUMMARY Display

---

The SUMMARY display shown above is the default if more than one service is specified by the SHOW SERVICE command (for example, SHOW SERVICE ALL).

For each local or remote service (TCP port) specified, the name of the service is given, the TCP port number, the number of sessions currently connected to the service, and the identification phrase associated with the service (if any).

```
Current Services (TCP Ports) Characteristics

*Name: PRINTER_COLOR      TCP Port: 3013      Telnet: disabled
Connections: disabled    Password: disabled
ID: Color Printer
Server Port(s): 13

*Name: PRINTER_HS        TCP Port: 3014      Telnet: disabled
Connections: disabled    Password: disabled
ID: High Speed Printer
Server Port(s): 14

Name: PRINTER_LZ         TCP Port: 3015      Telnet: disabled
Connections: disabled    Password: disabled
ID: Lazer Printer
Server Port(s): 15

*-local node 07-JUN-1989 14:21:17
```

Figure 5-15. The SHOW SERVICE CHARACTERISTICS Display

### 5.36.2 The SHOW SERVICE CHARACTERISTICS Display

The CHARACTERISTICS display is similar to the STATUS display.

The service name is given along with the service options set by the SET SERVICE command.

## 5.37 SHOW/MONITOR SESSIONS

The SHOW and MONITOR SESSIONS commands are used to display the current sessions on a port. The two commands work as follows:

SHOW: Displays the current sessions on a port.

MONITOR: Similar to SHOW, but the display is updated every second for privileged users and every 10 seconds for nonprivileged users. MONITOR displays are terminated by pressing any key.

**Syntax** {SHOW } SESSIONS [PORT spnum] [SESS number] [SUMMARY]  
{MONITOR } [STATUS ]

**Privilege** Available to all users. Secure users may only display information about sessions on their own ports.

**Examples** SHOW SESSIONS  
SHOW SESSIONS PORTS 3-8

**Comments** There is a single SHOW SESSIONS display. It is described in detail in subsection 5.37.1.

Table 5-26. SHOW/MONITOR SESSIONS Options

Option	Definition
PORT spnum	The number of the port (or ports) for which you want a session display. If no port number is specified, then sessions are displayed for your port. SHOW SESSIONS PORT ALL displays all sessions for all ports.

**Note:** If the SET PORT PAUSE option is enabled, you may use the right-arrow key to switch screens forward from port to port. The left-arrow key moves you backward through the ports.



```
Current Session Summary for Port 1

Session: 1
Node: KING.CORP.ABCINC.COM
Alias: KING
Port Name: TELNET
Status: connected
IP Address: 192.9.200.217
Port Number: 23
Telnet: enabled

*Session: 2
Node: KNIGHT.MRKTG.ABCINC.COM
Alias: KNIGHT
Port Name: TELNET
Status: connected
IP Address: 192.9.200.3
Port Number: 23
Telnet: enabled

!Session: 3
Node: CASTLE.MRKTG.ABCINC.COM
Alias: CAS
Port Name: none
Status: connected
IP Address: 192.9.200.4
Port Number: 23
Telnet: enabled

*=current session — !=output waiting — 07-JUN-198 15:30:20
```

Figure 5-16. The SHOW SESSIONS Display

### 5.37.1 The SHOW SESSIONS Display

The SHOW SESSIONS display contains the following information about each session on the specified port:

- # is the number of the session. This number stays the same until the port is logged out (i.e., it does not change when other sessions are disconnected). Session numbers are reused when sessions are disconnected.

The current session is indicated by an asterisk (\*) next to the session number. If a node has generated output for a session that is not the currently active session an exclamation point (!) is placed next to the session number indicating output waiting. The output will be sent to the port upon resuming that session.

- **Node** is the name of the node to which the session is connected.
- **Alias** is the alias for the name of the node to which the session is connected.
- **Port Name** is the name of the TCP port. This field may be blank if the TCP port name is not known by the server or not specified in the CONNECT command.
- **Type** is the type of session, such as a TELNET session. This field may be blank.
- **Port Number** is the number number of the TCP port to which the session is connected, such as 23 for TELNET. This field may be blank if the TCP port number is not known by the server or not specified in the CONNECT command.
- **Status** is the connect status of the session. It can have the following values:

Connected	The session is active.
Connecting	The session is is the process of connecting.
Disconnected	The session is inactive.
Disconnecting	The session is disconnecting.
Waiting	The session is waiting to autoconnect to a service.
Transition	The session is changing states.

## 5.38 SHOW/MONITOR USERS

The SHOW USERS and MONITOR USERS commands are used to display status information about each port user. The two commands work as follows:

- **SHOW:** Displays information stored in volatile RAM about each user on the server.
- **MONITOR:** Similar to SHOW, but the display is updated every second for privileged users and every 10 seconds for nonprivileged users. MONITOR displays are terminated by pressing any key.

**Syntax** SHOW/MONITOR USERS

**Privilege** Available to nonprivileged and privileged users. Not available to secure users.

**Example** SHOW USERS

**Comments** There is a single SHOW USERS display, shown below. For every port on the Performance 4000-T, the current username is shown (if any) and an asterisk is placed next to the port number if the port is currently logged in.

```

Current User Summary
-----
Port  Username      Port  Username      Port  Username
*  1   J_Smith          *  2   M_Jones       *  3   L_MARTIN
*  4   SYSTEM         *  5           *  6   B_Richardson
   7   J_Doe          8   Port_8       9
  10                                     12
  13                                     15
  16                                     18
  19                                     21
  22                                     24
  25                                     27
  28                                     30
  31                                     32

Printer (Port 33): Laserprinter
Remote Console TCP Port 2048 (Port 34):

*=logged in _____ 07-JUN-1989 15:30:20

```

Figure 5-17. The SHOW USERS Display

## 5.39 TEST PORT

The TEST PORT command causes the server to transmit a repeating pattern of ASCII characters to the specified port. If a terminal is connected to the port, the data pattern may be observed and checked for errors.

**Syntax**     **TEST PORT** [ **spnum** ] [ **COUNT number**  
  **WIDTH number**  
  **LOOPBACK type** ]

**Privilege**    Nonprivileged users may test only their own port. Secure users may not issue this command at all.

**Examples**     **TEST PORT COUNT 100**  
                  **TEST PORT 4 COUNT 50 WIDTH 132**

Table 5-27. TEST PORT Options

Option	Definition
<b>spnum</b>	Number for the server port you wish to test. It must be a single port. If no port is specified, then your own port is tested.
<b>COUNT number</b>	The number of times the test pattern is sent to the port. NONE specifies a continuous test. The default is 23. Press the break (<Break>) key at any time to terminate the test.
<b>WIDTH number</b>	The number of characters transmitted in each line. The range is 1 to 132; the default is 72.
<b>LOOPBACK type</b>	<p>This option may be used only to test someone else's port. If it is selected, then the data pattern is looped back from the port and checked for errors. At the end of the test, a message is displayed telling how many errors were detected.</p> <p>You may specify either LOOPBACK INTERNAL or LOOPBACK EXTERNAL. External loopback requires that a physical loopback connector be placed on the port. LOOPBACK may not be specified for port 33 (parallel printer port).</p>

## 5.40 ZERO COUNTERS

This command resets to zero some or all of the internal counters used by the server.

**Syntax**      ZERO COUNTERS    [ [ NODE ] ndname ]  
    IP            ipadd  
    PORT        spnum  
    ALL

**Privilege**     Available to privileged users only.

**Examples**     ZERO COUNTERS PORT 3-7  
                          ZERO COUNTERS NODE HOST  
                          ZERO COUNTERS ALL

**Comments**     Server counters keep track of such things as data exchanges between nodes, transmission errors, number of port logins, and so on. These counters can be viewed by the following commands:

```
SHOW NODE COUNTERS
SHOW SERVER COUNTERS
SHOW PORT COUNTERS
```

Table 5-28. ZERO COUNTERS Options

Option	Definition
<b>NODE ndname</b>	Zeroes counters maintained by the server that relate to the specified node.
<b>IP ipadd</b>	Zeroes counters maintained by the server that relate to the node specified by the IP address.
<b>PORT spnum</b>	Zeroes error and status counters for the specified port. You may specify a single port, several ports, or PORT ALL.
<b>ALL</b>	Zeroes all internal counters maintained by the server.



---

## **6.1 Overview**

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This section explains how to isolate any problems you may have with the Performance 4000-T. Most common problems are discussed and resolutions are suggested.

---

### **6.1.1 Emulex Service**

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If, after following the instructions in this section, you are unable to solve your problem, call Emulex Technical Support at the number below. They can suggest further troubleshooting procedures and can also authorize return of your Performance 4000-T to the factory for repair, if that is necessary.

**Do not return a component to Emulex without authorization.** Before returning a component to Emulex, whether it is under warranty or not, you must contact the factory or the factory's representative for instructions and a Return Materials Authorization (RMA) number. A component returned for service without an authorization will be returned to you at your expense.

In the continental United States, Alaska, and Hawaii contact:

Emulex Technical Support  
3545 Harbor Boulevard  
Costa Mesa, CA 92626  
Outside California: (800) 854-7112  
Inside California: (714) 662-5600  
TWX 910-595-2521

Outside of the United States, contact the distributor from whom the server was initially purchased.

After you have contacted Emulex and received an RMA, package the component (preferably using the original packing material) and send it *postage paid* to the address given you by the Emulex representative. You must also insure the package.

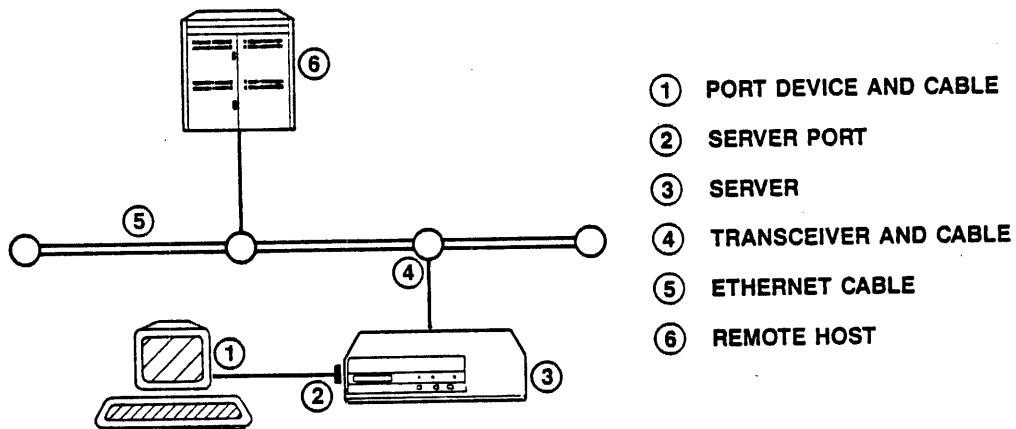
## 6.2 Isolating Problems

The most important step in troubleshooting a problem with the server is isolating the component that has either failed or has been configured incorrectly. Figure 6-1 illustrates a typical Performance 4000-T installation and shows the possible trouble areas.

There is one common rule for isolating problem areas: *Figure out which component is causing problems by swapping components one at a time.* For example, if a terminal cannot connect to a service:

- Try a different terminal on the same port (maybe the terminal is bad or is configured incorrectly).
- Try the same terminal on a different port (maybe the server port is bad or is configured incorrectly).
- Using the same terminal and port, try connecting to a different service (maybe the problem is with the service).
- Try connecting to the same service from a different server (maybe the entire server is bad).

Potential problems and solutions are discussed in the next few sections. Table 6-1, on the opposite page, lists the most common problem areas and directs you to the specific section that discusses the problem.



ER2003-1532

Figure 6-1. Components in a Terminal Server Network



## 6.2.1 The Console Port

When a problem occurs, always check the server's console port for error messages. All fatal error messages and server-wide status messages are directed to the console port. Error and status messages that affect only a single port are normally directed to the affected port.

If you have disabled the console port (via the SET SERVER CONSOLE command), you should reenable it and then try to recreate your problem. The error message generated may lead you directly to the problem's cause. Section 4.4 explains how the console port operates; Appendix D describes all Performance 4000-T status and error messages.

Table 6-1. Performance 4000-T Troubleshooting Guide

Problem Area	Section
<b>Initialization and Downloading</b>	<b>Section 6.3.</b> This section discusses problems that occur when the server is powering up. This includes self-test errors, software downloading problems, and hardware problems.
<b>Logging In</b>	<b>Section 6.4.</b> This section discusses problems logging in to the server. This includes terminal related problems, server limitations, and cabling problems.
<b>Connecting to TCP Ports</b>	<b>Section 6.5.</b> This section discusses problems connecting to local and remote services. Note, however, that if the connection failure generates an error message, you can refer directly to Appendix E for an explanation of the message.
<b>Error Messages</b>	<b>Appendix E.</b> This section explains all server status and error messages. In many cases, problems with the server are accompanied by error messages either on the port that generated the problem, or on the console port. In these cases the error message is often all you need to isolate the failure.

---

## 6.3 Initialization and Downloading Problems

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This section describes in detail the entire procedure the Performance 4000-T goes through when it is powered up. At every stage, potential errors are discussed and resolutions suggested.

---

### 6.3.1 Step 1 - Power-Up

---

When you plug in the server, the green Power LED lights and the fan starts.

- **If the fan does not start**, try plugging the server into another outlet.
- **If the fan starts but the Power LED does not light**, check to make sure the PerformancePak is installed.

If your AC power outlet is OK and the PerformancePak is installed, but the server still refuses to power up, it has a hardware failure. Call Emulex Technical Support and return the unit for repair.

---

### 6.3.2 Step 2 - Self-Test

---

After the server is powered up, it begins its self-test immediately. The names of the internal subtests it is running are shown in the front panel LCD display; they should flash by quickly.

In order for the network portion of the self-test to pass, the server must be connected to a transceiver or have the ethernet loopback connector installed. See Appendix A--Ethernet Loopback Connector.

- **If the self-test detects an error, it will display a "LAN XLP Error" message**, which means that there is a problem with either your transceiver or your transceiver cable. Check the transceiver connection and reinitialize the server.
- **Any other message displayed is the name of a failed test.** This indicates a fatal hardware error. Call Emulex Technical support and return the unit for repair.

At the end of a successful self-test, the LCD display looks like this:

```
++++++ nn
```

This display lasts only a couple of seconds. The value "nn" is the number of the port configured as the console port. Make sure that you have a terminal plugged into this port.

- **If one of the plus signs is replaced by a number**, the self-test detected a nonfatal error. It is accompanied by message 922 on the console port, which indicates the nature of the problem.
- **If the server's TDR test detects a cable break**, message 910 is displayed indicating the approximate position of the break. The position is listed for both thickwire and thinwire cable.

---

### 6.3.3 Step 3 - Downloading

---

If you are using a network load PerformancePak, the server begins downloading its internal software when the self-test is complete. Messages that indicate the status of the download are displayed on both the LCD display and the console port.

- **If there is no activity on the console port**, check the following:

The terminal you are using must be connected to the correct port. The number of the console port is displayed on the server's front panel at the end of the power-up self-test (it is usually port 1, the factory default. If you have a 12-port server, it will display as port 5).

The terminal must be set for 9600 baud, 8-bit characters, no parity, and XON/XOFF flow control. Note, however, that if this is not the first time the server has been used, these parameters may have been changed.

Make sure the terminal and the terminal cable are working properly. If the cables are bad, refer to Appendix A to make sure you are using the right cable type.

If the console device sends an OFF and does not shortly thereafter send an XON, the download will continue, but at a reduced rate.

If the console port is working normally, the following messages should appear:

LCD Display	Console Port
Network Load x.x	-901- Performance 4000-T Network Load
NL: Seeking Host	-902- Seeking load host for <i>filename</i>
NL: Found Host	-903- Loading from host: <i>address</i>
NL: Loading...	.....
NL: Load Complt	-904- Load complete at <i>time</i> on <i>date</i>

If there are any problems with the download, error messages appear on the console port.

If you receive an error message, follow the suggestions in Appendix E and see if they resolve the problem. If they don't, or if you have a server hardware failure, call Emulex Technical Support for further help.

---

## 6.4 Login Problems

---

To log in from an interactive terminal, you must press the **<Return>** key to get a response from the server.

- **If you get no prompt from the server at all**, press **<Return>** a second or third time. This is required if the port is configured for autobaud operation.
- **If you still get absolutely no response**, check the following:

Make sure the server is powered up by checking the green Power LED on the front panel.

Make sure your terminal is working by plugging it into another port and trying to log in.

Verify the correct cable type shown in Appendix A.

From another port, check to make sure the access for the suspect port is set to LOCAL or DYNAMIC (via the SET PORT ACCESS command).

---

From another port, check to see if MODEM CONTROL is enabled for the suspect port. If so, the port will not respond unless it detects DSR, CTS, and DCD (DSR only for partial modem ports) from the terminal. If your terminal cannot supply the necessary modem signals, you must disable the MODEM CONTROL via SET PORT *x* MODEM DISABLE.

Finally, from another port or from the front panel, check the port status via the SHOW PORT STTAUS command. It should be "idle." If it is not, issue a LOGOUT PORT command for the port and then try logging in again.

If none of these suggestions solves the problem, get on another port and execute the TEST PORT command for the bad port, as described in subsection 5.39. If the port fails call Emulex Technical Support for further help.

- **If you get garbled characters on the screen but no prompt,** check the terminal's serial parameters (baud rate, character size, and parity). They must match the settings of the port. If autobaud is enabled for the port, the terminal must be configured for 7-bit characters with even parity or 8-bit characters with no parity. You can check the settings of the port via the SHOW PORT command or the server's front panel display (see section 4.7 for details).

The next thing you see depends on how the port is configured. If server passwords are enabled, you see a pound sign prompt (#) and you must enter a password (the default password is ACCESS, but may have been changed).

- **If you tried to log in before,** but exceeded the maximum allowed number of password attempts, the port stays dead for one minute. Try again when the minute is up. (If the SERVER SECURITY feature is enabled, the port stays logged out permanently until a privileged user logs it out from another port.)

If no username has been assigned, you are asked for a username. You then receive the local mode prompt:

```
Server>
```

When you receive the local mode prompt, the server is ready for use.

- If you occasionally get garbled characters on the screen after logging in, check to see if the port is configured for the correct terminal type. If you have a VT series terminal or compatible, it should be set to VT100. Other options are SOFTCOPY (the default), ANSI, and HARDCOPY (for hardcopy style terminals). Refer to the SET PORT TYPE command for further details.

Also check to make sure the port and the terminal are configured for the same type of flow control (VT terminals and compatibles normally use XON/XOFF flow control).

If you log in successfully but have problems executing server commands or connecting to services, refer to the next section.

---

## **6.5 Service (TCP Port) Connection Problems**

---

Once you have logged in successfully, you are assured of the following:

- Your terminal is working.
- Your server port is working.
- The server itself is working.

The following error conditions may be encountered when attempting to connect to a TCP port:

### **CONNECTION REQUEST REFUSED**

- A non-existent TCP port was specified.
- There is a problem with the TCP port on the target node; this can be caused by one of the following:
  1. Incorrect access mode specified on the port; access should be dynamic or remote.
  2. Connections are disabled on the service where the TCP port is defined.

#### TIME LIMIT EXPIRED

- The node requested is not responding. This can occur for a number of reasons, including the following:
  1. The IP address specified in the CONNECT command is not correct.
  2. The network on which the target node is located has a problem.
  3. The node requested is unavailable to the network.

#### NODE name NOT KNOWN

- The server was unable to obtain an IP address for node name specified:
  1. If there is no Name Server in use on the network: the node was not in the server's node table and the IP address was not specified for that node.
  2. The node is in the server's node table, but the IP address is not specified for that node.
  3. A Name Server was not available to provide the IP address of the node specified. This can occur because: 1) a Name Server does not exist; 2) a Name Server does exist, but it is not configured into the server's node table.
  
- Appendix C section C.7.1 contains detailed information on node name and IP address resolution. Refer to that section for further information.





## A.1 Overview

Tables A-1 and A-2 list pin/signal assignments for the Performance 4000-T serial ports. Two types of serial ports are listed: full modem control (25-pin connectors) and partial modem control (RJ12 connectors). Full modem ports are available only on certain models of the Performance 4000-T (see Section 1 for model number and ordering information).

All signals on the serial ports are electrically RS-232 compatible. The data leads are RS-232/RS-423 compatible. Pin/signal assignments on the full modem ports are standard RS-232.

Table A-3 lists the pin/signal assignments for the Performance 4000-T parallel port. It is compatible with standard PC printer cables.

The figures that follow the tables are cabling schematics for some of the cables commonly used with the Performance 4000-T.

Table A-1. Full Modem Serial Port (25-Pin) Pin/Signal Assignments

Pin	Signal Name	CCITT Number	Mnemonic
1	Chassis Ground	101	Ground
2	Transmit Data	104	Tx
3	Receive Data	103	Rx
4	Request to Send	105	RTS
5	Clear to Send	106	CTS
6	Data Set Ready	107	DSR
7	Signal Ground	102	SG
8	Carrier Detect	109	CD
12	Speed Mode Indicator	112	SMI
16	Receive Common	--	RxC
20	Data Terminal Ready	108.2	DTR
22	Ring	125	RI
23	Data Signal Rate Select	111	DSRS

Table A-2. Partial Modem Serial Port (RJ12) Pin/Signal Assignments

Pin	Signal Name	CCITT Number	Mnemonic
1	Data Terminal Ready	108.2	DTR
2	Transmit Data	104	Tx
3	Signal Ground	102	SG
4	Receive Common	--	RxC
5	Receive Data	103	Rx
6	Data Set Ready	107	DSR

Table A-3. Parallel Port Pin/Signal Assignments

Pin	Signal Name	Mnemonic
1	Data Strobe	Strobe
2	Data 0	D0
3	Data 1	D1
4	Data 2	D2
5	Data 3	D3
6	Data 4	D4
7	Data 5	D5
8	Data 6	D6
9	Data 7	D7
10	Printer Acknowledge	ACK
11	Printer Busy	Busy
12	Paper End	P End
13	Printer Select Status	Select
14	Auto Line Feed	Auto Feed
15	Printer Error	Error
16	Printer Initialize	Init Printer
17	Inhibit Decode of Select/Deselect	Sel Inh
18-25	Ground	Gnd

---

## A.2 Making Serial Cables

---

The cabling diagrams on the following pages show how to connect a variety of devices to the serial ports on the Performance 4000. Each cable shown has a different purpose, uses a specific type of cable, and may or may not require an adapter to make it work. It is important that you understand the following points:

- **DB25 vs. RJ12.** Although all serial ports on the Performance 4000-T are configured as DTE, some use DB25 connectors and some use RJ12 modular connectors. Most terminals, printers, and modems use DB25 connectors. Thus, most of the cabling diagrams show two cable types: DB25-to-DB25 and DB25-to-RJ12. Be sure to use the right one.
- **Modular cable vs. standard cable.** RJ12 connectors can be attached only to modular cable. This cable is typically flat, silver colored, and nonshielded. To attach an RJ12 connector to modular cable, you must use a special crimping tool (available at most electronics stores). Modular cable has six conductors.

Standard cable is usually round and comes with as many conductors as you wish. You cannot attach an RJ12 connector to standard cable. Use standard cable if you are making up your own cable with DB25 connectors on both ends.

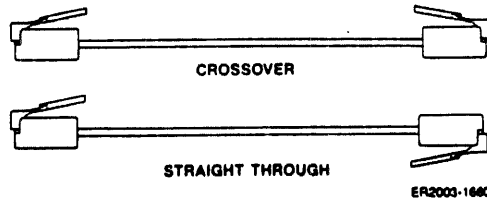
- **Crossover vs. straight through.** To connect a terminal (a DTE device) to a server port (also a DTE device), you must use a cable that crosses the input and output signals. This is required so that the terminal's transmit pin is connected to the server's receive pin.

The simplest way to determine if your cable is twisted is to hold the RJ12 connectors side by side, tabs up. If the wiring's color order is the same from left to right in both connectors, the wire is straight. If not, the cable is twisted.

When connecting a server port (DTE) to a modem (DCE) it is not necessary to cross signals. Use a straight pin to pin cable.

Be sure to use the correct cable for each device.

- **Crossing a modular cable.** There is a simple way to add a crossover to a modular cable: simply crimp the connector in the same direction on both ends (see illustration). This crosses all the wires in the cable.



- **The Emulex adapter.** Whenever you require a DB25-to-RJ12 cable, you must use an adapter that converts the DB25 to an RJ12. This gives you DB25 on both ends so that you can use ordinary modular cable to connect them.

Emulex makes an adapter (model number P0005x--for terminals only) that converts DB25 to RJ12. It is shown below, and pin assignments are shown in some of the cabling diagrams (for example, Figure A-2). If you wish, you may buy your own adapter kits instead. Be sure to wire them correctly.

One more note: the cables shown in this appendix are designed to be compatible with most applications, regardless of what options are used or what devices are connected. In many cases, simpler cables are possible depending on the requirements of your device. The simplest terminals, for example, require only three-wire cable (Tx, Rx, and Signal Ground).

It is impossible to cover every possible type of cable here. If you think you can get by with a simpler cable for some of your applications, refer to the instruction manuals for your serial devices for information about their requirements.

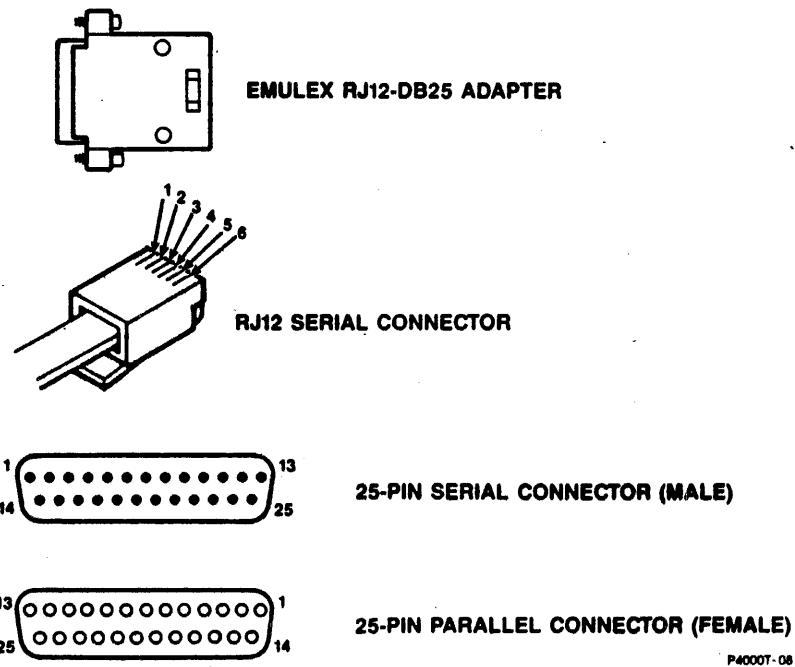


Figure A-1. Pin Locations on Performance 4000-T I/O Ports

### Terminal Cable (full modem/modular cable)

**Function:** Connects full modem server port to terminal or serial printer  
**Connectors:** RJ12 to RJ12  
**Cable Type:** 6 wire modular, crossover, with Emulex adapters

This diagram shows how to cable a terminal, data switch, or printer to a full modem port using Emulex adapters on each end to convert the DB25 connectors to RJ12. The cable itself is a modular cable with RJ12 connectors on each end.

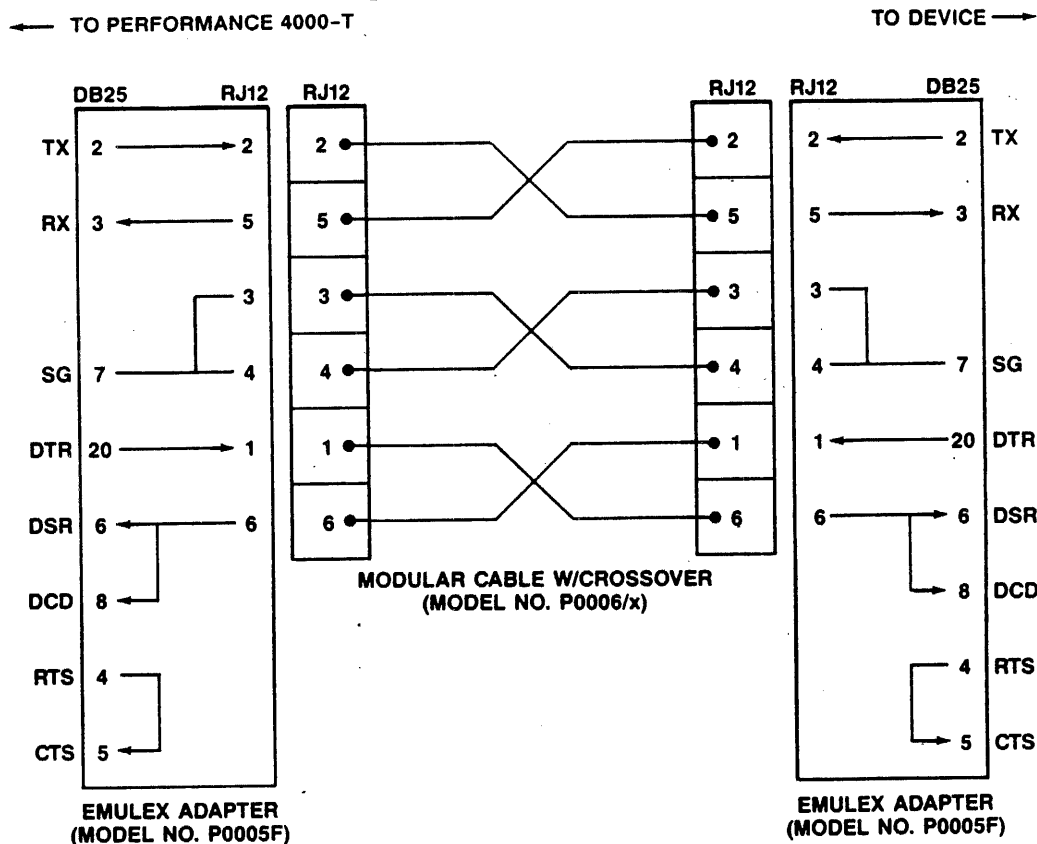


Figure A-2. RS-232 Terminal or Serial Printer Cable (Full Modem/Modular Cable)

## Terminal Cable (full modem/standard cable)

**Function:** Connects full modem server port to terminal or serial printer  
**Connectors:** DB25S to DB25S  
**Cable Type:** 6 wire standard with crossover

This diagram shows how to cable a terminal, data switch, or printer to a full-modem port. No adapters are necessary.

Note that although this cable can be used with most terminals, printers, and data switches, you may be able to get by with a simpler cable. Refer to the instruction manual for your device to see if you can use a cable with fewer connections.

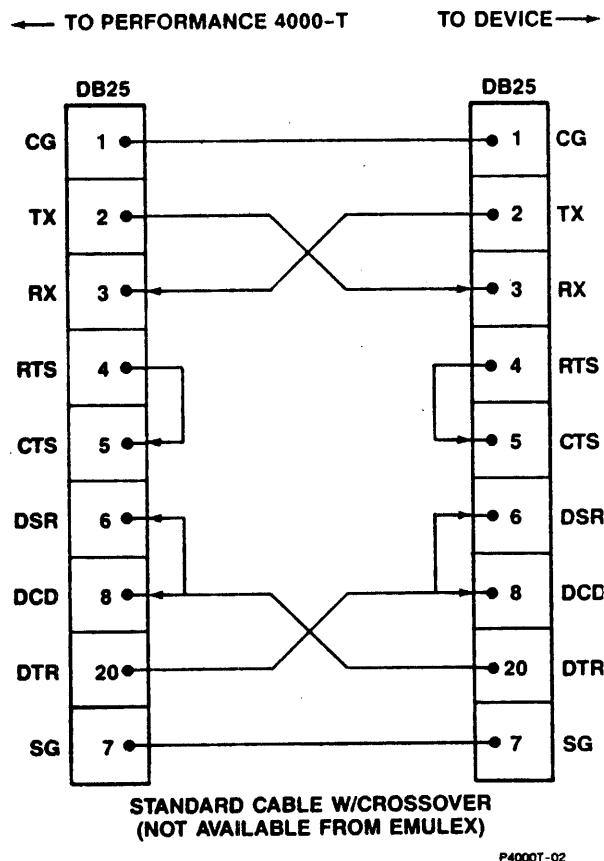


Figure A-3. RS-232 Terminal or Serial Printer Cable (Full Modem/Standard Cable)

### Terminal Cable (partial modem/modular cable)

**Function:** Connects partial modem server port to terminal or serial printer  
**Connectors:** RJ12 to RJ12  
**Cable Type:** 6 wire modular, crossover, with Emulex adapter on terminal end

This diagram shows how to cable a terminal, data switch, or printer to a partial modem port using an Emulex adapter on the terminal end that converts the DB25 connector to RJ12. The cable itself is a modular cable with RJ12 connectors on each end.

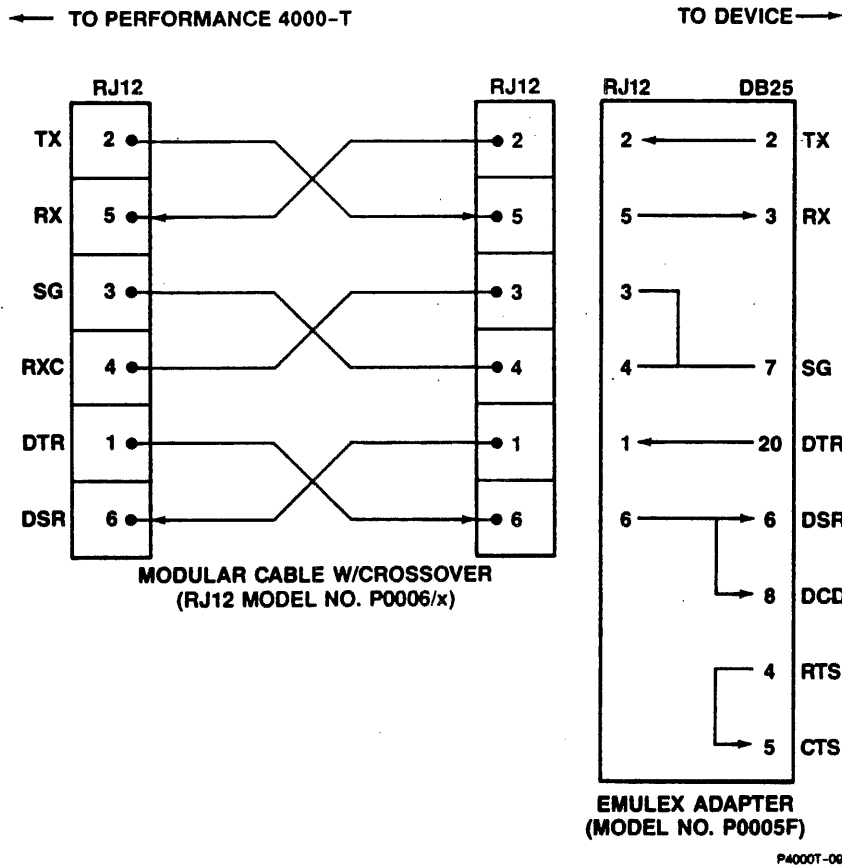


Figure A-4. RS-232 Terminal or Serial Printer Cable (Partial Modem/Modular Cable)



## RS-423 Cable (full modem/standard cable)

**Function:** Connects full modem server port to RS-423 terminal or printer  
**Connectors:** DB25S to DB25S  
**Cable Type:** 7 wire standard cable with crossover

This diagram shows how to cable an RS-423 terminal or printer to a full modem server port. RS-423 allows longer cable runs than RS-232, but note that the terminal must support RS-423 as well as the server.

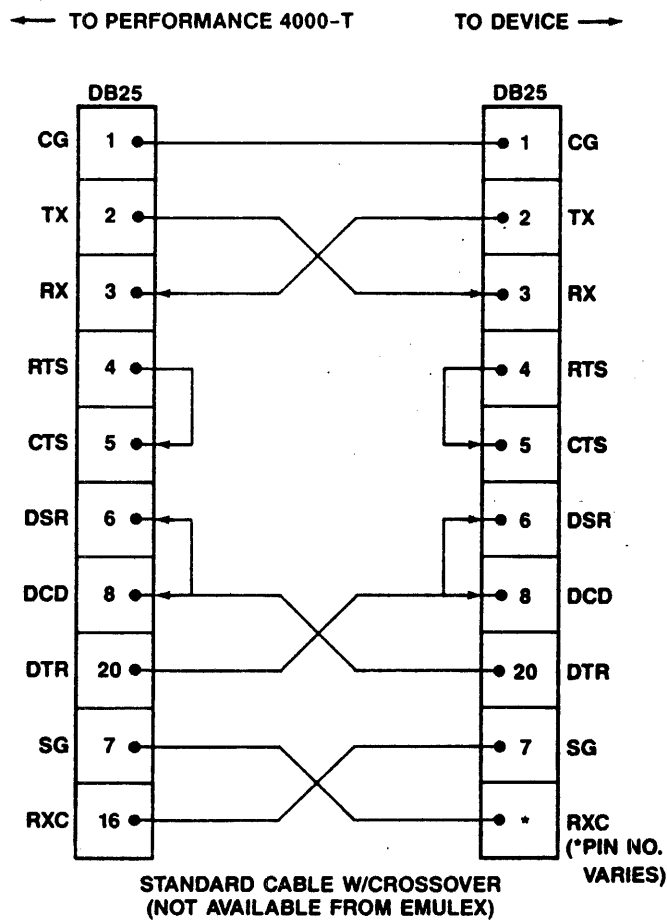


Figure A-5. RS-423 Terminal or Serial Printer Cable (Full Modem/Standard Cable)

## RS-423 Cable (partial modem/modular cable)

**Function:** Connects partial modem server port to RS-423 terminal or printer  
**Connectors:** RJ12 to RJ12  
**Cable Type:** 6 wire modular, crossover, with user supplied adapter on terminal end

This diagram shows how to cable an RS-423 terminal or printer to a partial modem server port. Both the cable and the adapter must be made up; RS-423 is not supported with the Emulex DB25-to-RJ12 adapter.

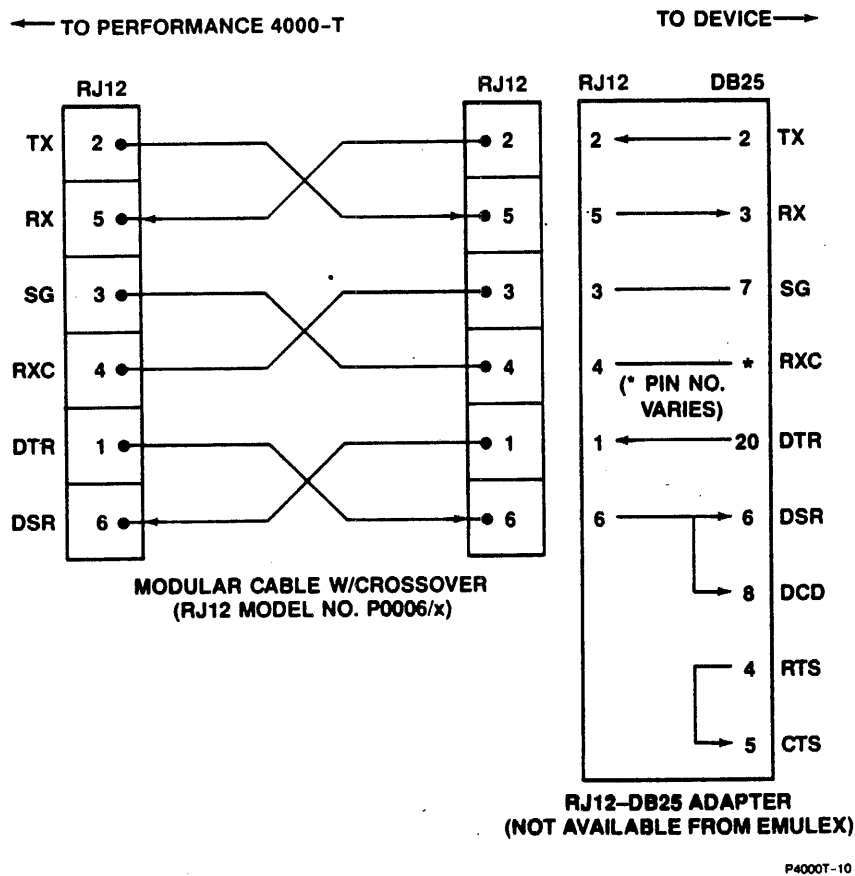


Figure A-6. RS-423 Terminal or Serial Printer Cable (Partial Modem/Modular Cable)

## Modem Cable (full modem/standard cable)

**Function:** Connects full modem server port to modem.  
**Connectors:** DB25S to DB25P  
**Cable Type:** 12 wire standard cable

**Note:** For Hayes Smartmodems, the drawing below is correct except that the connection on pin 23 *must be eliminated*.

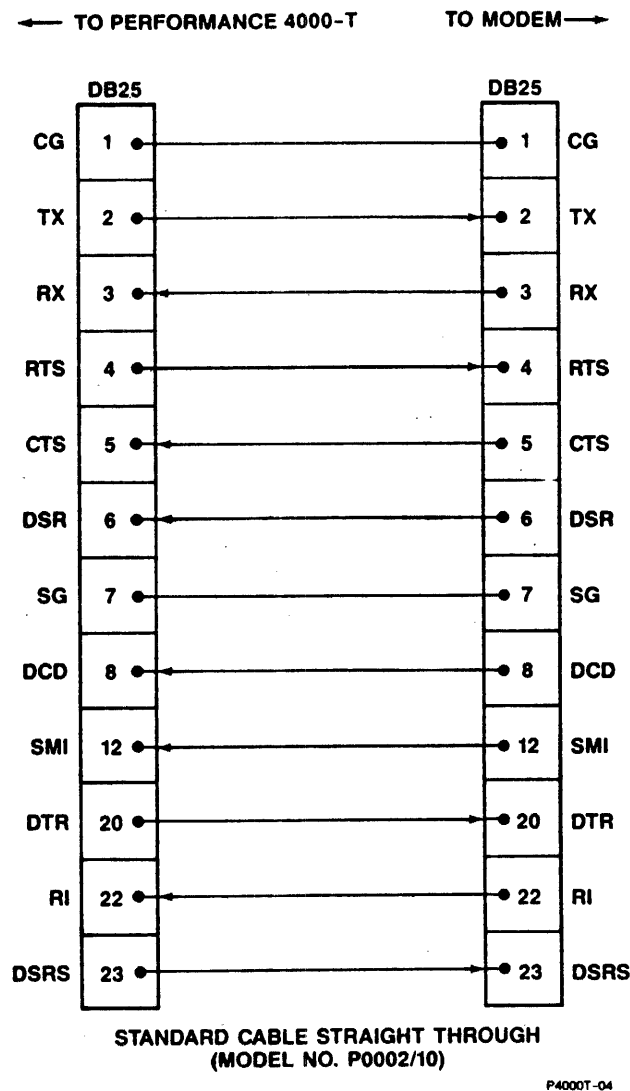


Figure A-7. Modem Cable (Full Modem/Standard Cable)

## Modem Cable (partial modem/modular cable)

**Function:** Connects partial modem server port to modem.  
**Connectors:** RJ12 to RJ12  
**Cable Type:** 6 wire modular with user supplied adapter on modem end

Partial modem ports support full-duplex modems only. Multispeed modem operation is not supported. See Appendix C for full details about how the modem signals work.

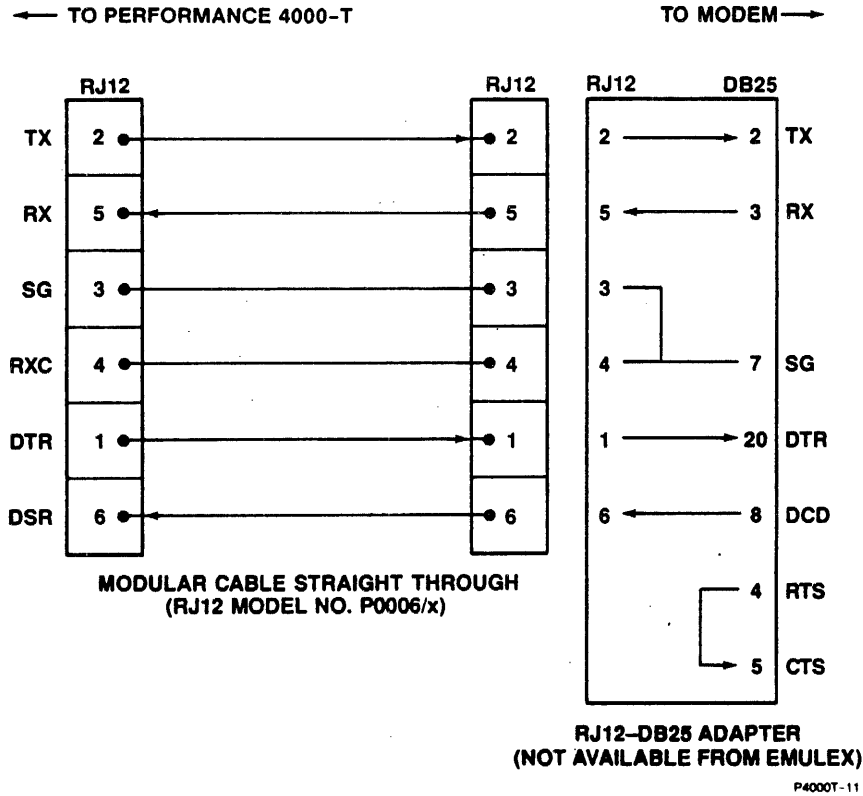


Figure A-8. Modem Cable (Partial Modem/Modular Cable)

### Serial Printer Cable with CTS/RTS Flow Control (full modem/standard cable)

- Function:** Connects full modem server port to serial printer using CTS/RTS flow control
- Connectors:** DB25S to DB25S
- Cable Type:** 6 wire standard cable with crossover

Printers that use XON/XOFF or DSR/DTR flow control can use the standard terminal cables on the previous pages. Only printers that use CTS/RTS flow control need to use the cable shown below.

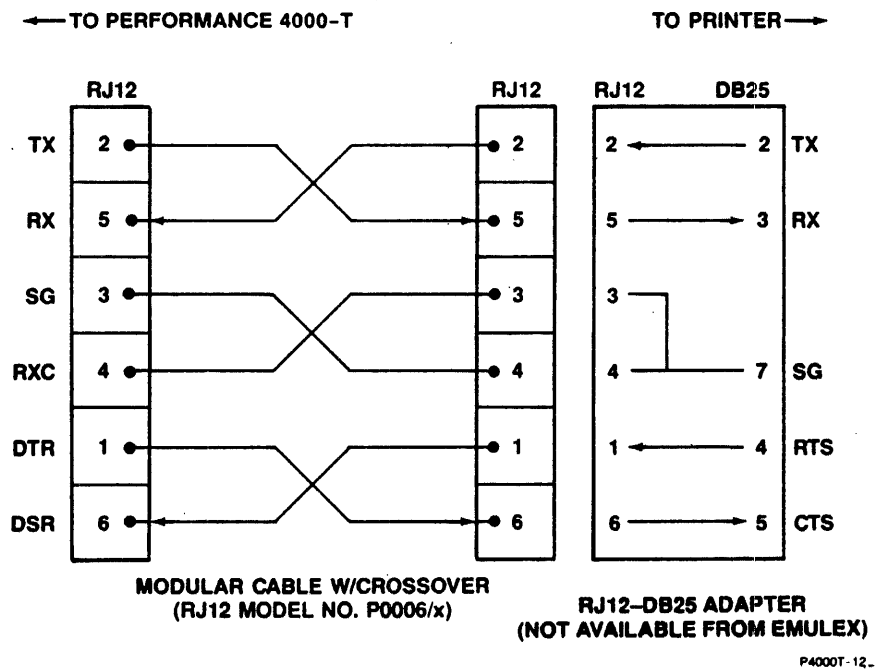


Figure A-9. Serial Printer Cable with CTS/RTS Flow Control (Full Modem/Standard Cable)

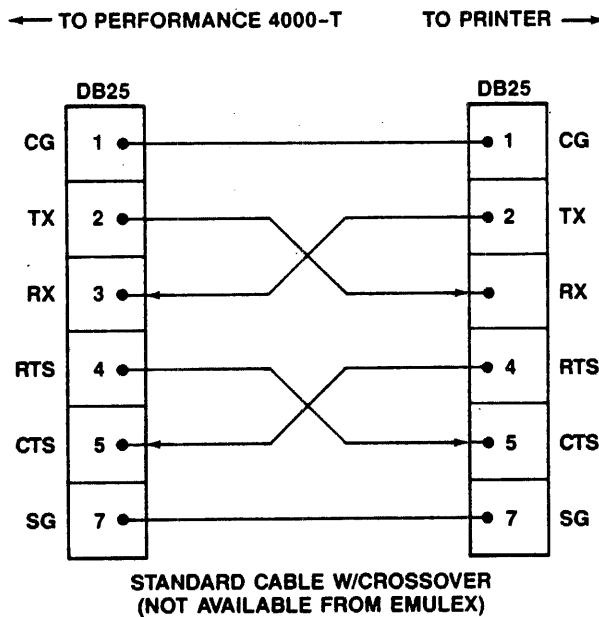
## Serial Printer Cable with CTS/RTS Flow Control (partial modem/modular cable)

**Function:** Connects partial modem server port to serial printer using CTS/RTS flow control

**Connectors:** RJ12 to DB25S

**Cable Type:** 6 wire modular, crossover, with user supplied adapter

Printers that use XON/XOFF or DSR/DTR flow control can use the standard terminal cables on the previous pages. Only printers that use CTS/RTS flow control need to use the cable shown below. Note that although partial modem ports support CTS/RTS printers using this cable, the port itself must be configured for DSR/DTR flow control.



P4000T-05

Figure A-10. Serial Printer Cable with CTS/RTS Flow Control (Partial Modem/Modular Cable)

## Serial Loopback Connectors

**Function:** Loopback connector for diagnostic testing  
**Connectors:** Full modem ports: DB25S  
 Partial modem ports: RJ12  
**Cable Type:** None

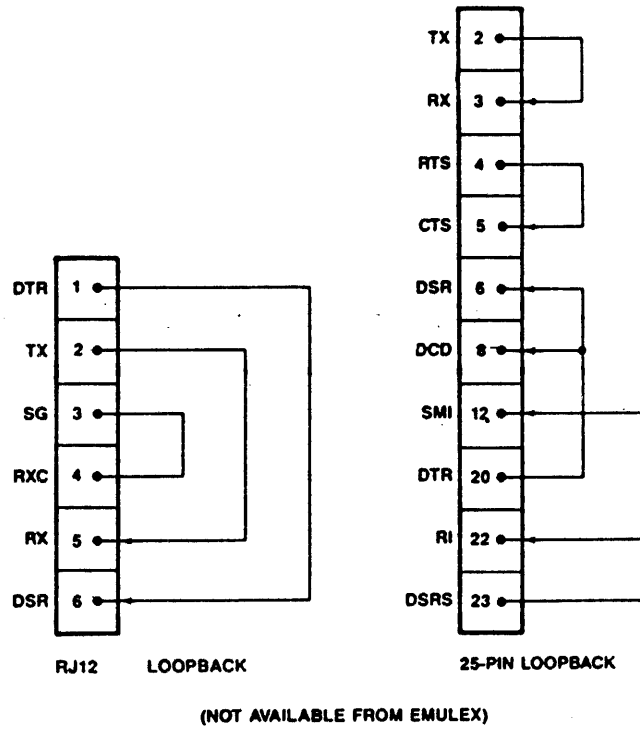


Figure A-11. Serial Port Loopback Connectors





Parallel Printer Cable (Dataproducts style)

**Function:** Connects parallel port to Dataproducts style printer  
**Connectors:** DB25P to 50-pin Dataproducts  
**Cable Type:** 25 wire  
**NOTE:** Buffer Clear is active high true on the Performance 4000-T. It is active low true on some printers. You must match the polarity of this signal to the printer (set printer for Buffer Clear, high active true) or do not include this line in your cable.

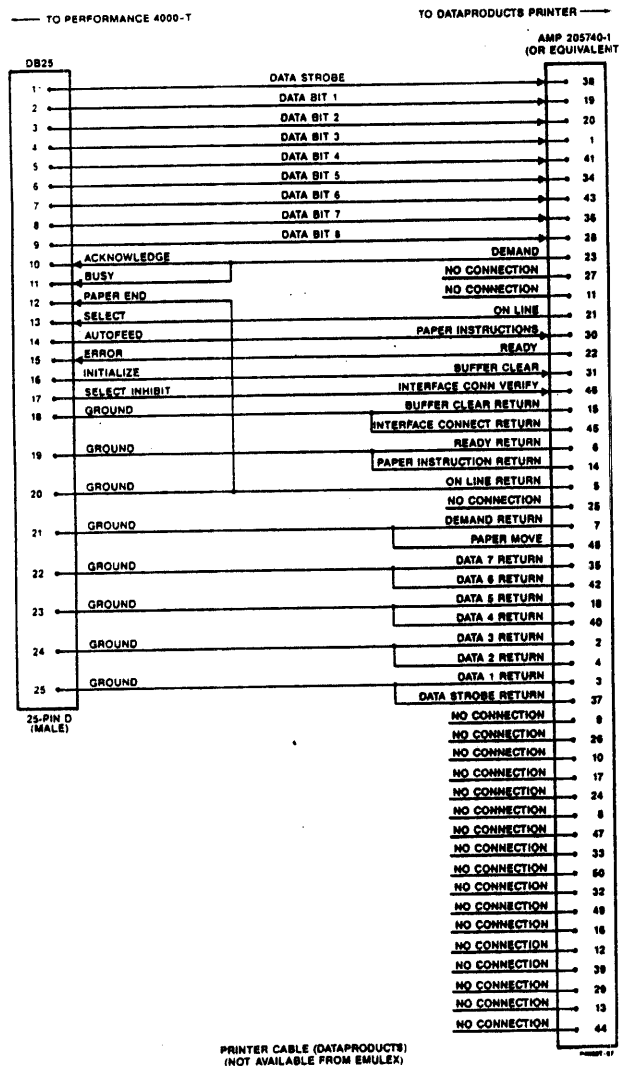


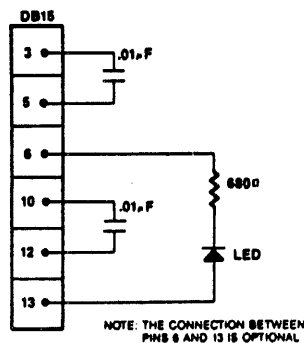
Figure A-13. Parallel Port Printer Cable (Dataproducts Style)

## Ethernet Loopback Connector

**Function:** AUI loopback connector for Ethernet diagnostic testing  
**Connectors:** DB15S  
**Cable Type:** None

Table A-4. Ethernet Port Pin/Signal Assignments

Pin	Signal Name
1	Ground
2	Collision +
3	Transmit +
4	Ground
5	Receive +
6	Power -
7	Not Used
8	Ground
9	Collision -
10	Transmit -
11	Ground
12	Receive -
13	Power +
14	Ground
15	Not Used



ETHERNET LOOPBACK CONNECTOR  
(NOT AVAILABLE FROM EMULEX)

ER2003-1659

Figure A-14. Ethernet Port Loopback Connector

## **B.1 Overview**

This appendix contains specifications for the Performance 4000. The specifications are contained in Table B-1.

Table B-1. Performance 4000-T Specifications

Parameter	Description
<b>Functionality</b>	Allows asynchronous terminals to be connected to an Ethernet network.
Ethernet Compatibility	Ethernet Version 2 IEEE 802.3
Supported Protocol(s)	TCP/IP
<b>Serial Ports</b>	
Number	12, 16, 28, 32
Configuration	Asynchronous DTE
Interface	RS-232 V.24/V.28/V.10/X.26
Modem Signals	
Full modem ports	RTS, CTS, DSR, DCD, SMI, DTR, RI, DSRS
Partial modem ports	DSR, DTR
Connectors	
Full modem ports	DB25P (25-pin male)
Partial modem ports	RJ12 (6 pin)

*continued on next page*

Table B-1. Performance 4000-T Specifications (continued)

Parameter	Description
<b>Serial Ports (continued)</b>	
Transmission Speeds	50, 75, 110, 134.5, 150, 200, 300, 600, 1200, 1800, 2400, 4800, 9600, 19200, 38400 bps (38400 supported only on servers with 16 or fewer ports)
Character Lengths	5, 6, 7, or 8 bits
Stop Bits	1, 1.5, or 2
Parity	ODD, EVEN, MARK, SPACE, or none
Split Speed	All channels
<b>Parallel Port</b>	
Interface	Centronics or Dataproducts
Connector	DB25S (25-socket female)
<b>Server Maximums</b>	
Simultaneous Sessions	64
Known Services	20
Known Nodes	125
Local Services	16
Virtual Circuits	80

(continued on next page)

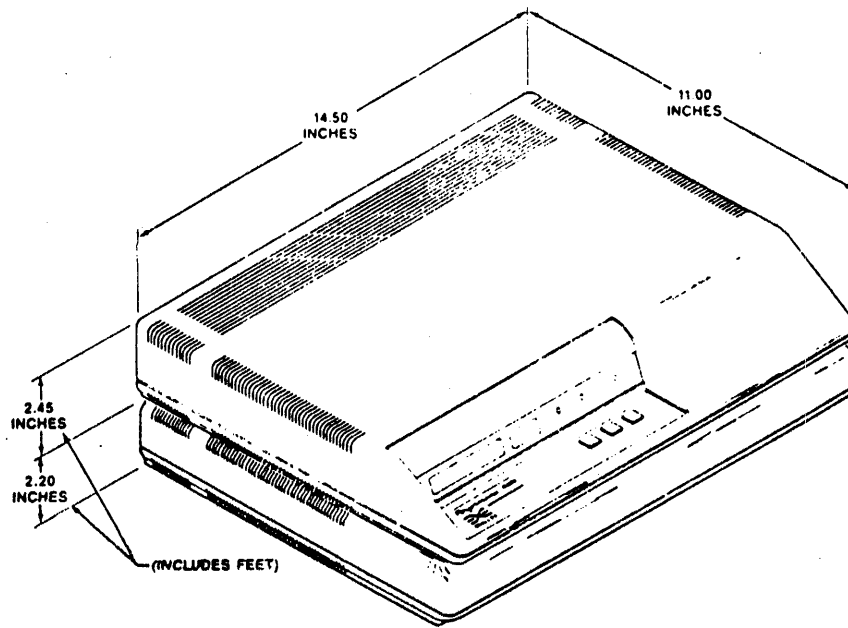


Figure B-1. Performance 4000-T Dimensions

Table B-1. Performance 4000-T Specifications (continued)

Parameter	Description
<b>Physical</b>	
Base Unit	11.00 inches x 14.50 inches x 2.45 inches
Expansion Unit	11.00 inches x 14.50 inches x 2.20 inches
Shipping Weight	7 lbs (12 lbs with expansion unit)
<b>Electrical</b>	
Voltage	90-135 VAC or 180-270 VAC 50 or 60 Hz
Power	37.5 watts (with expansion unit)

(continued on next page)

Table B-1. Performance 4000-T Specifications (continued)

Parameter	Description
<b>Environmental</b>  Operating Temperature Storage Temperature    Relative Humidity	5°C to 43°C (41°F to 109°F) -40°C to 66°C (-68°F to 151°F)  Maximum temperature is reduced 1.8°C per 1000 meters (1°F per 1000 feet) altitude  10% to 95% noncondensing

---

## **C.1 Overview**

---

This appendix provides more detailed explanations of how the Performance 4000-T server supports the requirements of the TCP/IP protocol than are found in the main body of this manual. The following topics are discussed:

- Several parts of the TCP/IP protocol are listed, including a more detailed description of the TELNET protocol.
- Network support and compatibility of the Performance 4000-T with TCP/IP protocol standards are described for several different network configurations and functions.
- The Performance 4000-T's implementation of the internal node table is described, including the following subjects: 1) the node table architecture, 2) node and port name resolution, and 3) the Emulex host-resident node table specification.

---

## **C.2 TCP/IP Protocol Support**

---

This section discusses the overall compatibility of the Performance 4000-T TCP/IP protocol.

Table C-1 lists the protocols in the TCP/IP protocol suite that are supported by the Performance 4000-T, as defined by the U.S. Department of Defense. A more in-depth description of the TELNET protocol follows Table C-1.

Table C-1. TCP/IP Protocols Supported by the Performance 4000-T

Protocol	Definition
<b>IP/ICMP</b>	<b>Internet Protocol/Internet Control Message Protocol.</b> These protocols are supported as defined by U.S.A. Department of Defense (D.O.D.) RFC 791.
<b>TCP</b>	<b>Transmission Control Protocol.</b> This protocol is supported as defined by D.O.D. RFC 793. TCP is a layer above IP.
<b>ARP</b>	<b>Address Resolution Protocol.</b> This protocol is supported as defined by D.O.D. RFC 826.
<b>UDP</b>	<p><b>User Datagram Protocol.</b> This protocol is supported as defined by D.O.D. RFC 768. The UDP protocol sits above the internet protocol (IP). The following functions use the UDP protocol:</p> <ul style="list-style-type: none"> <li>■ <b>Broadcast packets.</b> The server generates a broadcast packet every 2 minutes, using the UDP protocol. The packet is transmitted to other nodes on the local network providing them with the server's uptime status. UDP receives broadcast packets from other nodes on the network and maintains uptime information on each node.</li> <li>■ <b>Interface with Name Server.</b> The server generates request packets and receives response packets via UDP to and from a Name Server node.</li> </ul>
<b>BOOTP</b>	<b>BOOTP Protocol.</b> The BOOTP protocol is supported by the Performance 4000-T software.
<b>TFTP</b>	<b>TFTP Protocol.</b> The TCP/IP File Transfer Protocol (TFTP) is supported by the Performance 4000-T software.
<b>TELNET</b>	<b>TELNET Protocol.</b> This protocol is supported as defined by D.O.D. RFC 854. The following subsection describes the TELNET protocol in detail.



---

## C.3 TELNET Protocol Overview

---

TELNET is discussed here in more detail than other TCP/IP protocols because the user has greater control over TELNET, whereas the other protocols listed in Table C-1 are more transparent to the user.

The following discussion of TELNET assumes that the server port has TELNET enabled. Subsection 5.26 describes the command syntax to accomplish this, the SET PORT TELNET ENABLE command. When TELNET is enabled on a port, a user or TCP port can negotiate TELNET options with, or issue and receive TELNET commands to and from a remote node.

If the device attached to the server port is intelligent and supports the TELNET protocol, then TELNET support can be disabled on the server port, allowing the attached device's TELNET protocol to interact directly with the remote node or device. This is sometimes referred to as a RAW TCP connection.

Throughout this section, references to local TELNET and remote TELNET are made in order to be compatible with the Department of Defense (D.O.D.) TELNET documentation. They are defined as follows:

**Local TELNET:** Local TELNET is a TELNET protocol implementation residing in the node that initiates a connection request. If a Performance 4000-T user connects to a host, then the TELNET protocol implementation in the server is referred to as local TELNET because the server initiated the connection.

**Remote TELNET:** Remote TELNET is a TELNET protocol implementation residing in the node that accepts a connection. If a Performance 4000-T user connects to a host, then the TELNET protocol implementation in the host is referred to as Remote TELNET, because the host is accepting a connection request. If a host computer initiates connection to a Performance 4000-T server to gain access to a printer, then the TELNET implementation in the server is referred to as Remote TELNET because the server accepted the connection request initiated by the host.

A TELNET connection can be described as a TCP connection with interspersed TELNET control information. The CONNECT command establishes a TELNET session by default unless NOTELNET is specified (refer to subsection 5.8 for the CONNECT command). The TELNET protocol allows all terminal devices to appear as Network Virtual Terminals (NVT) to the network.

Several TELNET options are available to local and remote TELNET ports, as described in the following subsection. When a Performance 4000-T user connects to the TELNET TCP port of a host computer, the server port (local TELNET) and the host port (remote TELNET) will attempt to negotiate TELNET options. They will settle for the highest obtainable options that they can both agree on.

The user can control what TELNET options the server port will negotiate with the remote node (normally a host computer) by using the SET PORT TELNET option command (subsection 5.26). Once TELNET options are negotiated and the user is interacting with the host, TELNET commands can be issued via the SET SESSION command (subsection 5.31).

---

## **C.4 TELNET Options**

---

The following subsections describe each TELNET option supported by the Performance 4000-T terminal server. These options are described briefly in the descriptions of the SET PORT TELNET command (subsection 5.26) and SET SESSION command (subsection 5.31), but a more detailed presentation is given here.

---

### **C.4.1 The Binary Transmit Option**

---

If the TELNET BINARY TRANSMIT option is enabled, e.g. via a SET SESSION BINARY command or a SET PORT TELNET BINARY command, this informs the receiver that all characters should be interpreted as 8-bit binary data characters (as opposed to 7-bit ASCII Network Virtual Terminal characters). In this mode, TELNET commands are still interpreted and executed.

A TELNET command is defined as an IAC character followed by a valid TELNET command. The character IAC (hex FF) indicates the start of a TELNET command sequence. If this character is in the actual data stream, an extra IAC will be inserted. A double IAC character signifies to the receiver that the second IAC is actual data.

## C.4.2 The ECHO Option

The TELNET ECHO option determines at what point in the virtual connection character echoing will be done. Character echoing allows a user to see the characters that he is entering on a terminal. There are five points in the connection where echoing can be done. Two of the points are controlled by the TELNET ECHO option.

Figure C-1 is a diagram that shows the available points for character echoing for a local server-requested connection to a host application. Note where Local and Remote TELNET are indicated in the diagram. There should be only one point of echo at a given time. At host password entry time, no point is enabled for echo. The logical point of echo could be any point except that of Local TELNET. If Remote TELNET echo or application echo is enabled, then the Suppress Go Ahead option should also be enabled.

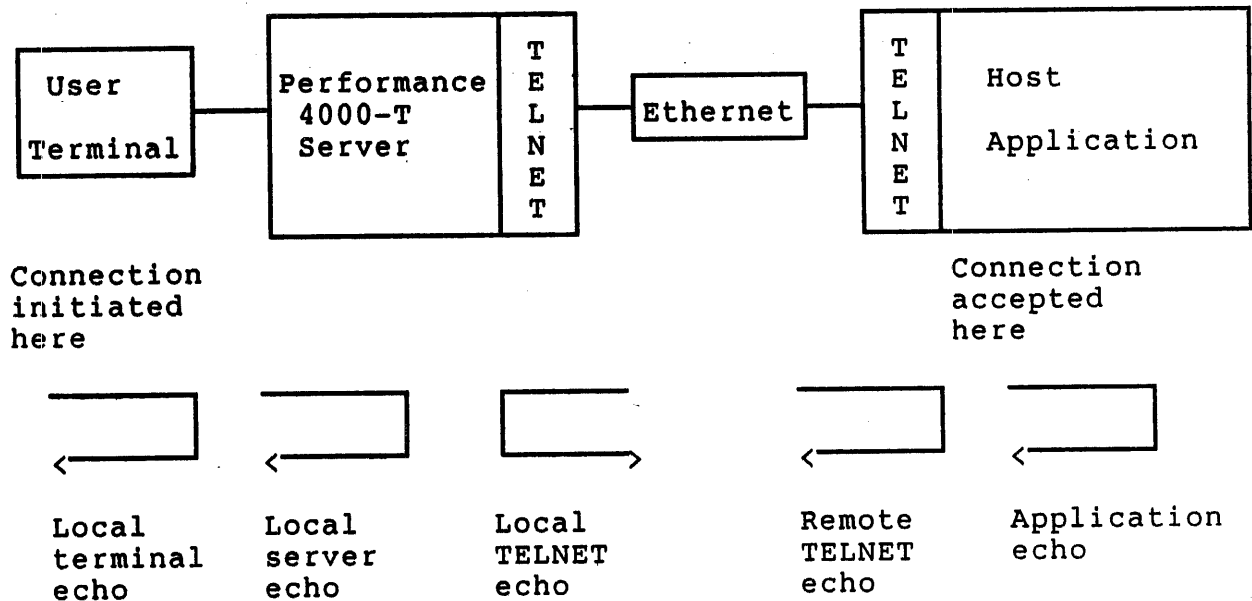


Figure C-1. Character Echoing for a User-requested Connection to a Host Application

Figure C-2 is a diagram that shows the available points for character echoing with a computer-requested connection to another computer (one that does not support Ethernet and/or TCP/IP). The connection is made through an RS-232 port on the Performance 4000-T server. Note where Local and Remote TELNET are shown in the diagram. Because the connection is computer-to-computer, there would probably be no echo point enabled.

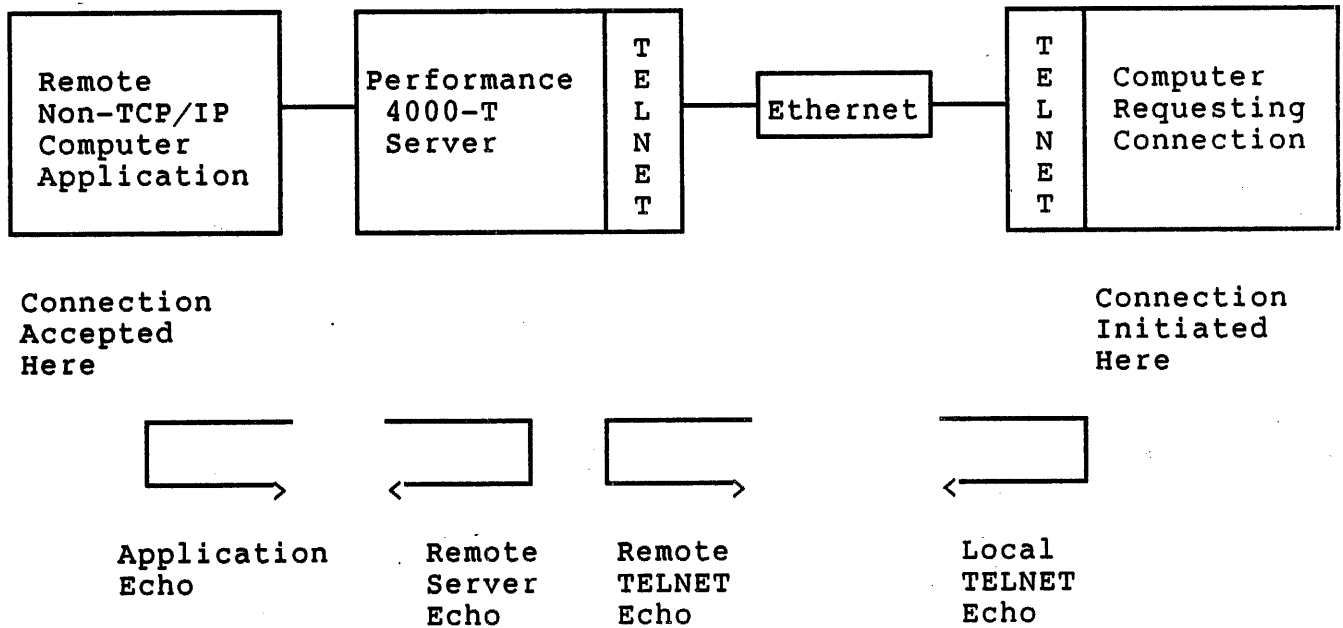


Figure C-2. Character Echoing for a Computer-to-Computer Connection

Table C-2 summarizes the five possible points of character echoing, and how they are controlled.

Table C-2. Character Echoing Overview

Point of Echo	Controlled By
<b>Local Terminal Echo</b>	User terminal or jumper in terminal cable.
<b>Local Server Echo</b>	Server via Change/Define/Set PORT ECHO LOCAL enable/disable command.
<b>Local TELNET</b>	<p>Local TELNET refers to the TELNET implementation that resides in the node initiating the connection request (typically the Performance 4000-T). When TELNET ECHO is enabled, characters received from the remote node are echoed back to the remote node. Note that TELNET ECHO does not echo received characters from the attached terminal device back to the device. In order for TELNET to echo characters back to a terminal, TELNET ECHO must be enabled on the remote node.</p> <p>The user can somewhat control this point of echo (enable/disable) using the SET PORT TELNET ECHO WILL/WONT command. The user cannot enable echoing at this point without consent of the remote node (SERVER TELNET).</p>
<b>Remote TELNET</b>	<p>Remote TELNET refers to the TELNET implementation that resides in the node accepting the connection request (typically a host computer). When TELNET ECHO is enabled, characters received from the remote node (typically the Performance 4000-T) are echoed back to the remote node (and on to the user terminal).</p> <p>The user can somewhat control this point of echo (enable/disable) using the SET PORT TELNET ECHO DO/DONT command. The user cannot enable echoing at this point without consent of the remote node (Remote TELNET).</p>
<b>Application Echo</b>	The application program residing in the Host computer echoes received characters. This point of echo is typically used when the user is running an application such as a word processor. The application requires control of character echoing because not all characters (such as line editing characters) are echoed to the terminal exactly as they were received from the terminal.

---

### **C.4.3 The Status Option**

---

When enabled, the server agrees to send current TELNET status information to the remote node upon request or spontaneously.

---

### **C.4.4 The Suppress Go Ahead Option**

---

When enabled, the Suppress Go Ahead option will suppress the need for the host process to send a Go Ahead command to the user terminal device. The Go Ahead command is intended for use with true half-duplex terminal devices. Such a device cannot transmit and receive at the same time, and therefore needs to be signaled by the host process (Go Ahead), notifying it that the host has relinquished control of the line and that it can transmit data to the host if it so desires.

The typical user will want to enable this option (Suppress Go Ahead) and communicate with the host application in full-duplex mode, particularly if the application is doing character echoing. Most terminals are full-duplex.

---

### **C.4.5 The TELNET Timing Mark Option**

---

When enabled, the Timing Mark option provides a mechanism for a user or process to verify that previous transmitted data has been completely processed by the remote node.

---

## **C.5 TELNET Commands**

---

TELNET commands can only be issued for an active session. TELNET commands can be issued in either of two methods. Only one of the following methods may be used in a particular session.

1. Enter local server mode and issue a SET SESSION command followed by a RESUME to return you to the active session.
2. Enter the Command Key assigned to the desired TELNET command via the SET PORT TELNET command. Command Keys function only in connected mode (in a session). Command Keys are enabled via the SET PORT TELNET KEYS ENABLED/DISABLED command.

Disabling the COMMAND KEYS may improve the server's performance in some applications since the server's port logic does not have to scan received characters for commands. If the Command Keys are disabled, then the SET SESSION command must be used to issue TELNET commands.

Descriptions follow for each TELNET command supported for the Performance 4000-T. Table 5-17 in subsection 5.26 provides brief descriptions of the commands. The following descriptions provide descriptions that supplement what is provided in that subsection.

---

### **C.5.1 The TELNET Abort Output Command**

---

This command, when issued by a user, allows the process generating terminal output to run to completion without sending the output to the terminal.

---

### **C.5.2 The TELNET Are You There Command**

---

This command allows the user to poke a host or remote node to determine if it is still up and running. A user may want to issue this command when the host or remote node appears silent for a longer than normal period. If the remote host or node is present, it will send a response to the user's terminal. The nature of the response depends on the host. Typical response will be a bell.

---

### **C.5.3 The TELNET Break Command**

---

The Break command allows the user or application to send a Break signal to the remote node or host. How that break signal is interpreted by the remote host is defined by the host software application.

---

### **C.5.4 The TELNET Erase Character Command**

---

This command deletes the last undeleted character entered in the current line.

---

### **C.5.5 The TELNET Erase Line Command**

---

This command deletes the current line.

---

### **C.5.6 The TELNET GO Ahead Command**

---

This command is normally used by a host only when the host is transmitting data to a half-duplex (HDX) terminal device. In an HDX environment, data can be transmitted and received in only one direction at a time. The host, upon completing data transmission to a HDX device, may require input from the device.

To notify the device that the host has completed transmission and is waiting for input from the device, the host transmits the command GO AHEAD. Upon receiving the GO AHEAD command, the terminal can transmit data to the host if it so desires.

When entering data on a terminal keyboard, the line termination character (normally a line feed or carriage return) notifies the host that that the terminal has completed transmission (a single line). Therefore, it is normally not necessary for the user to generate a GO AHEAD command. However, some applications may require the user to do so. Most current day computer host and terminal devices are capable of full-duplex transmission and reception. If the user terminal is full-duplex (FDX), the TELNET option SUPPRESS GO AHEAD is normally enabled (WILL DO). This is because in an FDX environment there is normally no need for the TELNET GO AHEAD COMMAND.

---

### **C.5.7 The TELNET Interrupt Process Command**

---

This command allows the user to suspend, interrupt, abort, or terminate the current process.

---

### **C.5.8 The TELNET Status Command**

---

The Status command displays the server settings for various TELNET options.



---

### **C.5.9 The TELNET Sync Command**

---

This command allows a user to gain control of a runaway process. The Sync command is sent as an urgent message followed by a Data Mark. Upon the remote node receiving the SYNC, the receiver discards all data until it receives the Data Mark. At that time the remote node's receiver returns to normal character processing.

---

## **C.6 Performance 4000-T Network Support**

---

This section discusses the overall compatibility of the Performance 4000-T with TCP/IP standards relating to the network.

---

### **C.6.1 Local Area Network Support**

---

The initial release of the Performance 4000-T TCP/IP Terminal Server (software version 1.00) is capable of supporting any TCP/IP node that is on the same local area network and that is compatible with the TCP/IP protocol standards set forth by the D.O.D., with the restrictions stated in this section.

---

### **C.6.2 Remote Area Network and Gateway Support**

---

The Performance 4000-T TCP/IP terminal server supports gateways and remote networks, provided that the IP address of the gateway is configured in the server. To configure the IP address for the Gateway, use the CHANGE/SET/DEFINE GATEWAY command, as described in subsection 5.27.

---

### **C.6.3 Name Server Support**

---

The Performance 4000-T will make name resolution request to a name server in an effort to obtain a node's IP address. However, the Performance 4000-T TCP/IP terminal server does NOT offer the functionality of a name server to other nodes on the network.

In order for the Performance 4000-T to communicate with a Name Server, the IP address of the name server must be configured using the SET/DEFINE/CHANGE NODE NAMESERVER command (subsection 5.25).

---

## C.6.4 Identification of the Load Host and Downline Loading of the Software

A load host is defined as any computer on the network whose database contains the Performance 4000-T operational software files supplied by EMULEX with the purchase of a Performance 4000-T terminal server. The load host must support the Trivial File Transfer Protocol (TFTP) and the BOOTP protocol.

The host's BOOTP protocol application program may require configuration information about the node to be installed (Performance 4000-T). This information would include the node's name, IP address, ethernet address, name of the file to be downline loaded, and so on.

Emulex software supplied with the server includes a BOOTP program for supported load hosts.

Upon the initial installation of a Performance 4000-T terminal server at a customer site, the server will not have the necessary information identifying its own IP address or that of the load host. Therefore, upon powering up and successful completion of the server's internal self-test, the server will attempt to locate a load host using the BOOTP protocol. If successful, the server will downline load its operational software using the TFTP protocol. Success being defined as the server obtaining the load host's IP address, the load host's ethernet address, the server's own IP address, and the file name of the downline load file.

If the BOOTP protocol is **NOT** successful, the server will prompt the network manager on the console port in an effort to obtain the necessary information to allow the server to contact a load host and downline load its operational software using TFTP (prompts are shown below). This alternate method is intended to bypass the load host's BOOTP protocol in the event that it is unavailable or not configured properly.

If the server's BOOTP protocol could not identify a load host the following prompts will appear on the console port:

```
----- after selftest completion -----  
Attempting to locate a load host .....  
A load host did not respond  
Please answer the following questions:  
  
IP address of load host (d.d.d.d):  
Node name (server name) of this server:  
IP address of this server (d.d.d.d):  
Filename to be downline loaded (including extension):  
  
Seeking load host for "filename"  
----- end of query -----
```

*Figure C-3. BOOTP Error Messages*

Once the server comes online, the network manager should login into the server and use the SHOW SERVER NETWORK and CHANGE/DEFINE/SET SERVER commands to verify and/or CHANGE/DEFINE/SET the following:

- The server's name, IP address, and subnet mask.
- The server's preferred node name and IP address for downline loading operational software.
- The server's preferred node name and IP address for downline loading the node table (created by network manager) and the filename of the node table. Note that configuring a preferred node for downline loading the node table is optional.
- The server's preferred dump node name and IP address. Note that configuring a preferred dump node is optional.

In some cases it may be desired to force the server to prompt the network manager for the load host parameters stated above, even though the BOOTP protocol was able to identify a load host. Such a case would be where the server was powered on, located a load host via the BOOTP protocol, and proceeded to downline load a corrupted file. Depending on the type of corruption, this may cause the server to restart the downline load sequence.

In the situation described above, the server would be in an endless loop. It would not give the network manager a chance to correct or change the load host parameters (filename), because the BOOTP protocol was successful in finding a load host. A way out of this situation has been provided. If power is removed from the server and restored, while at the same time the select button on the server's front panel is held depressed, the server will bypass attempting to locate a load host and will display the load host configuration prompts on the console terminal. This will allow the network manager to change the name of the file being downline loaded or make other changes as determined necessary.

---

## **C.7 Performance 4000-T Node Table Architecture**

---

Each node the server is aware of has a record in the server's internal node table. This record contains the node's name and IP address, node identification, node uptime or downtime, information about Ethernet traffic between the server and the node, and other statistics. The Performance 4000-T node table can maintain information on up to 125 nodes.

The node table is located in RAM. Upon server initialization, any node entries defined in nonvolatile memory (EAROM) are copied into RAM. After the completion of server initialization, other nodes can be entered into the node table in any one of the following methods.

- The server receives a broadcast from a node on the local network. If the node sending the broadcast is not already in the node table, it will be entered if the CHANGE/DEFINE/SET SERVER BROADCAST NODE ENTRY option is enabled.
- A user issues a CONNECT command specifying a node's IP address. If the IP address does not already exist in the node table, it will be entered at this time. The entry will not have a node name.
- A user issues a CONNECT command specifying a node's name. If the node name does not already exist in the node table, a request to a name server node will be issued by the server to obtain the node's IP address. If the name server can provide the IP address of the node, and the IP address does not already exist in the node table, the node will be entered. If the IP address is found in the node table (the node existed but had no node name), then the existing node entry will be updated to reflect the node's name.

A downline load of the node table from a local network host is executed as a result of the server being initialized, or the LOAD NODETABLE command being issued by a privileged user.

Note that the host-resident node table must reside on a host on the local network.

---

### **C.7.1 Node Name and TCP Port Name Resolution**

---

In order for a user to connect to a TCP/IP node and TCP port, the user must specify the node's name or IP address and (optionally) the TCP port's name or number.

If the user chooses to specify the node's IP address and TCP port number when issuing the CONNECT command, the server is provided with the necessary information to make the connection. However, if the user does not know (or cannot remember) the node's IP address or TCP port number, he has the option of using the node's name and the TCP port name when issuing a CONNECT command. In such cases, the server must resolve the IP address and TCP port number associated with the node name and TCP port name.

The server uses two methods to obtain a node's IP address. If one method fails, the server will attempt to use the alternate method. The server uses a single method to obtain a TCP port's number. These methods are discussed below.

---

### **C.7.2 Local Node Name Resolution**

---

The server command SET SERVER NODENAME RESOLUTION local/remote will determine which method will be attempted first. If node name resolution is set for local, upon receiving a CONNECT command specifying a node name, the server will search its internal node table for the node name. If it is found, the server will retrieve the node's IP address and proceed with the connection process. If it is not found the server will contact a Name Server and request it to provide the node's IP address. If the Name Server cannot resolve the node name, the connection to the node cannot be completed. The user will receive a message stating the node name is unknown.

Note that in order for the server to communicate with a Name Server, the Name Server's IP address must be configured via the SET NAME SERVER command.

---

### C.7.3 Remote Node Name Resolution

---

If node name resolution is set to remote, a sequence opposite to that of local resolution (see local resolution) will occur. In this case, the Name Server will be contacted first and if it cannot resolve the node name, the server's internal tables will be searched.

---

### C.7.4 TCP Port Name Resolution

---

#### NOTE

The word "Service", used in Performance 4000-T command keywords and descriptions, is a synonym for TCP port. "Service" has been carried over to the Performance 4000-T TCP/IP Terminal Server for compatibility with other Performance 4000 products.

TCP port name resolution is a function of the Performance 4000-T. There is no remote TCP port name resolution. Name Servers do not resolve TCP port names. If the user does not specify a TCP port name or number in the CONNECT command, the default port is TELNET, TCP port number 23. If the port is not TELNET, then the server searches its internal service records for records containing the node name or IP address supplied in the CONNECT command.

Upon finding a record for the specified node, the server searches the record for the TCP port name. If found, the server retrieves the TCP port number and proceeds with the connection. If the TCP port name is not found, the connection is terminate and the user receives a message stating the TCP port name is unknown.

In order for the server to resolve a TCP port name, the network manager must configure the server with the necessary TCP port information using the SET/DEFINE/CHANGE SERVICE command, or the SET/DEFINE/CHANGE SERVICE REMOTE command. Remote TCP port names can also be configured in the server via the downline loadable node table. The SET SERVICE command creates or modifies service records for local TCP ports that are offered to the network. The SET SERVICE REMOTE command creates or modifies service records for TCP ports offered by other nodes.

Before the SET SERVICE REMOTE command can be used to configure a remote TCP port into the service table, the node that offers the TCP port must be configured in the server's node table. The only purpose of the SET SERVICE REMOTE command is to create/modify a service record for a remote TCP port so that the server can do TCP port name resolution. If the network manager chooses not to create any remote TCP port entries, the user will simply have to provide the TCP port number when connecting to a TCP port if that port is not a WELL KNOWN TCP PORT. See descriptions of the SET SERVICE command (subsection 5.29) and the SET SERVICE REMOTE command (subsection 5.30) in this manual.

---

## **C.8 Server Operation with an Empty Node Table**

---

A connection to a node can be made even though the server's internal node table is empty. If a user knows the IP address of the node he wishes to connect to, he can make the connection. If the user knows only the node's name (not its IP address) and there is a Name Server on the network (the Name Server's database must contain the node name), he can make the connection. In this case, the Performance 4000-T will request the Name Server to provide the IP address of the node.

Note that in order for the Performance 4000-T to make the name resolution request to a Name Server, the Name Server IP address must be configured in the Performance 4000-T using the SET/DEFINE/CHANGE NODE NAMESERVER command.

---

### **C.8.1 Automatic Entry of Nodes Into the Internal Node Table**

---

The Performance 4000-T can be configured such that it will automatically build its own node table from information obtained from the network. The SET/DEFINE/CHANGE SERVER BROADCAST NODE ENTRY command allows the server to create an entry into the server's internal node table every time it receives a RUPTIME broadcast from a node on the local network.

The ENTRY option should not be enabled if the local network contains more nodes (that are broadcasting) than are supported by the node table. In such a case, the node table would become full, and not allow any new entries. If the node table is full, then the server simply cannot provide the node name's IP address or maintain statistics on the node. If the connection was requested using the node's name, the server will attempt to contact a Name Server to obtain the node's IP address.

However, note that even if the node table becomes full, a user can still successfully connect to a new node (one that is not currently in the node table), if the user provides the node's correct IP address in the CONNECT command.

Anytime a connection is made to a node that is not currently in the server's internal node table, that node will be entered into the node table upon completion of the connection. If when requesting the connection, the user provides the node's IP address, an entry into the node table will be made, but the node's name will be unknown. At a later time, if a connection is made to the same node using the node's name, the old entry will be updated to reflect the node's name, resulting in a single entry for the node.

If the server is initialized, all entries are lost and the process of building the table starts over. If a user requests a connection to a node using the node's name and neither the server's node table nor the Name Server's database contain the node name, then the user will receive a message stating that the node name is unknown.

---

## **C.8.2 Using the SET/DEFINE/CHANGE NODE Command**

---

The network manager can use the SET/DEFINE/CHANGE NODE command (subsection 5.25) to enter node names and their associated IP addresses into the server's internal node table. Up to eight entries can be entered into the server's nonvolatile memory via the DEFINE NODE or CHANGE NODE commands. As many nodes as there is room for in volatile memory may be entered into the node table in volatile memory via the SET NODE command.

Nodes entered into nonvolatile memory will be automatically loaded into the internal node table after server initialization. They will be maintained even after a power loss.



It is recommended that the network manager configure new nodes that are not currently in a Name Server's database in nonvolatile RAM. A user will then be able to connect to the new nodes by their node names.

Nodes entered directly into the node table in volatile RAM (Set NODE) will be lost if the server is reinitialized. Because of this, you may wish to create a host node table that will be downline loaded into the server upon server initialization, as described in the following subsection.

---

### **C.8.3 Downline Loading the Node Table from a Network Host**

---

This unique feature allows the network manager to configure a node table file on a local network host (per Emulex specifications) and have the Performance 4000-T load the node table into the server's internal node table. The node table is loaded every time the server is initialized, or a privileged user issues a LOAD NODETABLE command.

The ability to load the node table allows the server to maintain a large internal node table. This is of particular importance if the network does not have a Name Server node, or if the existing Name Server node is down. Also, if a new node is added to the network and the Name Server's database has not been updated, the local network manager can update the node table on the local host as a work-around until the Name Server's database is updated.

By updating a host resident node table and issuing an INITIALIZE DELAY command to all Performance 4000-T servers, the network manager can cause all Performance 4000-T servers to be updated by downline loading the node table file at a pre-determined time (12:00 midnight), as opposed to using the SET NODE command on each individual server.

See the following subsection for specifications on creating the host-resident node table file.

---

## C.9 Host-Resident Node Table Specification

---

This subsection describes the specifications for the Emulex Host Resident Node Table.

---

### C.9.1 Creating the Host-Resident Node Table

---

Included with the purchase of a Performance 4000-T TCP/IP terminal server, is the source file EMLXNODES.C.

This program compiles a .TXT text file containing node and service information for the Performance 4000-T terminal server to a .SYS system file that can be downloaded to the Performance 4000-T. An intermediate .TMP file is used to accumulate the information as it is checked for validity. The program can optionally decompile a .SYS file back to a .TXT file. The format of the .TXT file is described below.

Each line in the file describes either: a NODE, an ALIAS, a SERVICE on the last NODE specified, a NAME SERVER, or a GATEWAY (NAME SERVERs and GATEWAYs are special types of nodes that do not have services. Each line starts with a keyword specifying what to define: 'NODE', 'SERVICE', 'NAMESERVER', or 'GATEWAY'.

The general format of the lines is as follows:

```
NODE node_name ddd.ddd.ddd.ddd "Node id information"
ALIAS alias_node_name
SERVICE tpname dddd "Port id information"
NAMESERVER nameserver_name
GATEWAY gateway_name
```

Figure C-4. Format for the .Txt File

In the .Txt file format that is shown, **ddd.ddd.ddd.ddd** is a valid ip address, and **dddd** is a decimal TCP port number from 1 to 65535. A node can have up to seven services. For example:

```
NODE HOST1.MRKG.ABCINC.COM 201.202.203.001 "Marketing HOST"
ALIAS V1MRK
SERVICE Printer3 4001 "Upstairs printer"
SERVICE Printer4 4002 "Downstairs printer"
NAMESERVER PHILLY
GATEWAY HOUSTON
```

Figure C-5. .Txt File Format Example

Each definition must appear on a single line. White space (tabs and spaces) is insignificant, and is used to separate the fields of the definition; white space within double quote marks is preserved. A NODE, ALIAS, SERVER, NAME SERVER, or GATEWAY name may contain any printable ascii character except a space, provided the first character in the name is alphanumeric. Case is preserved. NODE, SERVER, NAME SERVER, and GATEWAY names are 1-64 characters while ALIAS names are 1-16 characters.

NODE ip addresses and SERVICE port numbers are expressed in decimal. The NODE or SERVICE ID information is the only field that can contain spaces and tabs. The id must be enclosed in double quotes if it contains white space. The ID cannot contain quote marks.

If the program detects any error in the parsing and checking of the information, an error message will be displayed, and the output file will either not be created, or will only be partially populated.

Upon running CREATE\_NODETAB, the following series of prompts will display:

```

TXT2SYS Node and Service File Compilation Program V1.0
25-May-89
Copyright (C) 1989 by Emulex Corporation, Costa Mesa,
CA.

Do you want instructions <NO> :<CR>
COMPILE (.TXT to .SYS) or DECOMPILE (.SYS to .TXT)
<COMPILE> :<CR>
Filename of .TXT file to compile <NODES> :<CR>
Compiling NODES.TXT to NODES.TMP.
Compiling NODES.TMP to NODES.SYS.
System file 'NODES.SYS' created successfully.
```

*Figure C-6. The CREATE\_NODETAB Display*

Note that by entering carriage returns in response to the three prompts, the program defaults 'NO', 'COMPILE' and 'NODES' were selected. When prompted for a file name, enter the file specification of your .TXT file. Enter the directory information if needed, and the filename. Do not enter the file type (extension) as that is appended by the program. The default file specification is the file 'NODES' in the current directory.

---

The file NODES.SYS will be downline loaded into the Performance 4000-T's node table upon execution of the LOAD NODETABLE command or server initialization provided the server is configured via the SET SERVER PREFERRED NODE command.

# Appendix D

## Performance 4000-T Command Summary

### D.1 Overview

This section provides a quick reference syntax guide to the Performance 4000-T command set. The complete syntax is shown here for the sets of options referred to as "options and modifiers" in Section 5.

KEY words are in upper case. OPTIONAL words are enclosed in brackets. Due to the syntax length of some commands, the following abbreviations are sometimes used:

<b>spnum</b>	server port number
<b>tpnam</b>	TCP port name
<b>tpnum</b>	TCP port number
<b>node_name</b>	Network node name
<b>ip_addr</b>	IP address
<b>df</b>	Indicates that this parameter is a default setting (not part of syntax).

### D.2 Command Summary

An alphabetical list of commands follows.

**BACKWARDS syntax**  
BACKWARDS

**BROADCAST syntax**  
BROADCAST PORT spnum "message"  
ALL

**CLEAR/PURGE/DELETE NODES syntax**  
CLEAR NODES [ NAME ] node name [ GATEWAY ]  
[ IP ] ip\_addr [ NAMESERVER ]  
[ ALL ] [ TCPIP ]

CLEAR/PURGE/DELETE SERVICES syntax

CLEAR SERVICES LOCAL tpname  
ALL

REMOTE [ NODE ] node\_name tpname  
[ IP ] ip\_addr ALL  
[ ALL ]

ALL

CLS syntax

CLS

CONNECT syntax

CONNECT [[ NODE ] node\_name ] [ tpname ] [ NOTELNET ]  
[[ IP ] ip\_addr ] [ tpnum ]  
[ alias\_node\_name ] [ RCF ]

CONNECT PORT syntax

CONNECT PORT spnum [[ NODE ] node\_name ] [ tpname ] [ NOTELNET ]  
[[ IP ] ip\_addr ] [ tpnum ]  
[ RCF ]

CRASH 300 syntax

CRASH 300

DISCONNECT syntax

DISCONNECT [[ SESSION ] number ]  
[ ALL ]  
[ ? ]

DISCONNECT PORT syntax

DISCONNECT PORT spnum

FORWARD syntax

FORWARD

HELP syntax

HELP [ command ]

INITIALIZE SERVER syntax

```
INITIALIZE [[ SERVER ] DELAY minutes ]
           [          DISABLE          ]
           [          CANCEL          ]
```

LOAD NODETABLE syntax

```
LOAD NODETABLE [ NODE node_name ] [ FILE file_name ]
               [ IP ip_addr      ]
```

LOCK syntax

```
LOCK
```

LOGOUT syntax

```
LOGOUT [ PORT snum ]
```

MAN syntax

```
MAN
```

RESUME syntax

```
RESUME [ [ SESSION ] session_number ]
       [ ? ]
```

SET HOST syntax

```
SET HOST [[ NODE ] node_name ] [ tnam ] [ NOTELNET ]
         [[ IP ] ip_addr      ] [ tnum ]
         [ RCF ]
```

SET/DEFINE/CHANGE NODE syntax

```
SET NODE NAME node_name [ GATEWAY [ DEF ] [ NETIP ip_addr ] ]
                       [ IP ip_addr ]
                       ALIAS alias_name [ NAMESERVER [ DEFAULT ] ]
                       [
                       [ TCPIP ]
                       [ ID "string" ]
```

## Command Summary

---

SET/DEFINE/CHANGE PORT syntax

SET PORT [ snum ] ACCESS LOCAL  
REMOTE  
DYNAMIC  
NONE

ALTERNATE [ SPEED ] 75  
110  
134  
150  
300  
600  
1200  
1800  
2000  
2400  
4800  
9600  
19200  
38400  
NONE

AUTOBAUD ENABLE/DISABLE  
AUTOCONNECT enab/disa  
BACKWARDS [ SWITCH ] character  
none

BREAK LOCAL  
REMOTE  
DISABLED

BROADCAST ENABLE/DISABLE  
CHARACTER [ SIZE ] size  
DCDLOGOUT ENABLE/DISABLE

DEDICATED [ NODE ] node\_name [ PORT tnam ]  
[ IP ] ip\_addr [ PORT tnum ]  
NONE [ PORT NONE ]

DSRLOGOUT ENABLE/DISABLE  
DTRWAIT ENABLE/DISABLE  
ERRORLOGOFF ENABLE/DISABLE

FLOW [ CONTROL ] XON  
XOFFANY  
CTS  
DSR  
DISABLE



FORWARD [ SWITCH ] char  
 INACTIVITY [ LOGOUT ] ENABLE/DISABLE  
 INPUT FLOW [ CONTROL ] ENABLE/DISABLE  
 INTERRUPTS ENABLE/DISABLE  
 ECHO LOCAL ENABLE/DISABLE  
 LOCAL [ SWITCH ] char  
 LOGGING ENABLE/DISABLE  
 MESSAGE [ CODES ] ENABLE/DISABLE  
 MODEM [ CONTROL ] ENABLE/DISABLE  
 NAME spnam  
 OUTPUT FLOW [ CONTROL ] ENABLE/DISABLE

PARITY EVEN  
       ODD  
       NONE  
       SPACE  
       MARK

PASSWORD ENABLE/DISABLE  
 PAUSE ENABLE/DISABLE  
 RING ENABLE/DISABLE

PREFERRED [ NODE ] node\_name [ PORT tpname ]  
           [ IP    ] ip\_addr    [ PORT tpname ]  
           NONE                [ PORT NONE    ]

SECURITY ENABLE/DISABLE  
 SESSION LIMIT number

[ INPUT ] SPEED    75  
 [ OUTPUT ]       110  
                  134  
                  150  
                  300  
                  600  
                  1200  
                  1800  
                  2000  
                  2400  
                  4800  
                  9600  
                  19200  
                  38400

[ TELNET ] KEYS ENABLE/DISABLE  
CRLF ENABLE/DISABLE  
VERBOSE ENABLE/DISABLE

[ BINARY [ TRANS ] ] [WILL/WONT ]  
[ ECHO ] [DO/DONT ]  
[ STATUS ]  
[ SUPPRESS [ GA ] ]  
[ TIMING [ MARK ] ]

[ AO key ]  
[ AYT key ]  
[ BRK key ]  
[ EC key ]  
[ EL key ]  
[ GA key ]  
[ IP key ]  
[ ST key ]  
[ SYN key ]

TYPE ANSI  
CENTRONICS  
DATAPRODUCTS  
HARDCOPY  
SOFTCOPY  
VT100  
USERNAME "string"  
VERIFICATION enab/disa

SET PRIVILEGE syntax  
SET PRIVILEGE/NOPRIVILEGE [ OVERRIDE ]

SET/DEFINE/CHANGE SERVER syntax  
SET SERVER ALIAS alias name  
ANNOUNCEMENTS ENABLE/DISABLE  
AUTOREINIT ENABLE/DISABLE  
BROADCAST ENABLE/DISABLE  
BROADCAST NODE [ ENTRY ] ENABLE/DISABLE  
CIRCUIT [ TIMER ] milliseconds  
CONSOLE [ PORT ] spnum  
NONE  
DATE dd-mmm-yyyy  
DOMAIN [ NAME ] domain\_name  
DUMP ENABLE/DISABLE  
EMULEX [ OPTIONS ] 1:6 ENABLE/DISABLE

```
FRONTPANEL [ ENABLE/DISABLE ] [ DISPLAY NAME ]
[ IP ]
[ NUMBER ]
[ TIME ]
[ "message" ]
```

```
HEARTBEAT ENABLE/DISABLE
IDENTIFICATION "string"
INACTIVITY [ TIMER ] minutes
KEEPLIVE [ TIMER ] seconds
[ LOCAL ] PROMPT "string"
LOCK enab/disa
LOGIN PASSWORD "string"
LOGIN PROMPT "string"
IP ip_address
NONE
NAME "string"
NODE [ LIMIT ] number
```

```
[ NODENAME ] RESOLUTION local
remote
```

```
NUMBER number
PASSWORD LIMIT number
```

```
[ PREFERRED ] DUMP [ NODE node_name ]
LOAD [ NONE ]
NODETABLE [ IP ip_address ]
[ NONE ]
[ FILE file_name ]
[ NONE ]
[ NONE ]
```

```
PRIVILEGED PASSWORD "string"
RETRANSMIT [ LIMIT ] number
SECURITY enab/disa
SERVICE [ LIMIT ] number
SESSION [ LIMIT ] number
SOFTWARE "filename"
SUBNET [MASK]
TIME hh:mm:ss
WELCOME "string"
```

SET/DEFINE/CHANGE SERVICE syntax

```
SET SERVICE tpsnam [ PORT spnum [ ENABLE df]]
[ [ DISABLE ] ]
[ ]
[ tpsnum ]
[ IDENTIFICATION "string" ]
[ CONNECTIONS enab/disa ]
[ PASSWORD "password" ]
[ TELNET enab/disa ]
```

SET SERVICE REMOTE syntax

```
SET SERVICE REMOTE tcp_port_name [ IP ip_addr ]
                                   [ NODE node_name ]
                                   [ tpnum ]
                                   [ IDENTIFICATION "string" ]
```

SET SESSION syntax

```
SET SESSION [ TELNET ] [ VERBOSE enab/disa ]
                                   [ KEYS enab/disa ]
                                   [ CRLF enab/disa ]

                                   [ BINARY ] [ WILL/WONT ]
                                   [ ECHO ] [ DO/DONT ]
                                   [ STATUS ]
                                   [ SUPPRESS [ GA ] ]
                                   [ TIMING [ MARK ] ]
```

SHOW/MONITOR/LIST NODE syntax

```
SHOW NODE [ [ NAME ] node_name ] [ STATUS ]
           [ [ IP ] ip_addr ] [ SUMMARY ]
           [ NAMESERVER ] [ COUNTERS ]
           [ GATEWAY ]
           [ ALL ]
```

SHOW/MONITOR NODE TABLE syntax

```
SHOW NODE TABLE [ STATUS ]
```

SHOW/MONITOR/LIST PORT syntax

```
SHOW PORT [ spnum ] [ CHARACTERISTICS ] [ LOCAL ]
                                                [ HARDWARE ]
                                                [ NETWORK ] [ 1 ]
                                                [ 2 ]

           [ SUMMARY ]
           [ STATUS ]
           [ COUNTERS ]

           [ SESSIONS ] [ SUMMARY ]
                                   [ STATUS ]

           [ ACCESS ] [ LOCAL ]
                                   [ REMOTE ]
                                   [ DYNAMIC ]
                                   [ NONE ]
```

SHOW/MONITOR/LIST SERVER syntax

```

SHOW SERVER [ CHARACTERISTICS ] [ LOCAL      ]
                                     [ HARDWARE ]
                                     [ NETWORK ] [ 1 ]
                                     [         ] [ 2 ]
                                     [ STATUS   ]
                                     [ COUNTERS ] [ ETHERNET ]
                                     [         ] [ TCP/IP   ]
    
```

SHOW/MONITOR/LIST SERVICE syntax

```

SHOW SERVICE [ name ] [ SUMMARY      ]
               [ LOCAL ] [ CHARACTERISTICS ]
               [ REMOTE ]
               [ ALL   ]
    
```

SHOW/MONITOR SESSION syntax

```

SHOW SESSIONS [ PORT spnum ] [ SESSION number ] [ SUMMARY ]
                                                         [ STATUS ]
    
```

SHOW/MONITOR USERS syntax

```

SHOW USERS
    
```

TEST PORT syntax

```

TEST PORT [ spnum ] [ COUNT number ]
                  [ WIDTH number   ]
                  [ LOOPBACK INTERNAL ]
                  [         EXTERNAL ]
    
```

ZERO COUNTERS syntax

```

ZERO COUNTERS [ [ NODE ] node_name ]
               [ IP ip_addr   ]
               [ PORT spnum   ]
               [ ALL          ]
    
```



## E.1 Overview

This appendix lists all Performance 4000-T status and error messages. Status messages are printed for a variety of reasons (for example, when a connection is made) and are displayed on whichever port is appropriate. Error messages (900 series) are displayed on the port defined as the console by the SET SERVER CONSOLE PORT command. All Performance 4000-T messages contain an optional error code and a message. For example:

```
Server -701- Command Syntax Error
```

The word "Server" can be changed by the CHANGE SERVER PROMPT command and the error code can be suppressed via the CHANGE PORT MESSAGE CODES command, if you wish. The basic families of error codes are listed below, followed by a detailed list of all error messages and their meanings.

Error Code	Meaning
000-099	Normal responses to user commands
100-199	Warning messages
200-299	Connection error messages
500-599	Server generated informational messages
600-699	Security violation messages
700-799	User error messages
900-999	Server specific error messages

## E.2 000 Series Messages

000 series messages are primarily notifications that a command has been executed.

**010** Session *n* connected to *service-name* on node *name*

This is the normal notification that a connection was successful. The node name is included only if it is different from the service name.

**011 Session *n* disconnected from *service-name***

This is the normal notification that a disconnect request was successful.

**012 *service-name* session *n* resumed**

This is the normal notification that a RESUME command was successful.

**013 Continuing attempts to connect to *service-name***

This indicates that a connection was unsuccessful but the server is retrying the request. It is usually preceded by a 200 series message explaining why the connection was unsuccessful. Refer to the explanation of the 200 series message for specific troubleshooting suggestions.

**014 All sessions disconnected**

This is the normal notification that all sessions have been terminated. It follows a DISCONNECT ALL command. Note that all sessions are also disconnected if the port is logged out, but this message is not displayed.

**016 Attempting fallover to *service-name* on node *name***

This message follows a host failure. It indicates that the server is attempting to reconnect you to the same service on a different node.

**020 Logged out port *n***

This is the normal notification that a LOGOUT command was successful.

**090 Port characteristic(s) update is assumed**

This message follows a SET, DEFINE, or CHANGE command when no object was specified and the object could be either a port or the server (for example, SET BROADCAST). It indicates that the server assumed the command was directed at a port rather than the server.

If this is not what you intended, reissue the command and specify the object (for example, SET SERVER BROADCAST). You may also need to reissue the original command if you inadvertently changed a port characteristic.



---

## **E.3 100 Series Messages**

---

100 series messages are mostly warning messages that follow a command that was either not executed or not executed fully.

**101 *n* other session(s) active**

This is the normal notification given when you connect to a service while other sessions are active.

**102 No other session(s) active**

This message is displayed if you issue a FORWARD or BACKWARD command and you have only one current session. The server then places you back in that session.

**111 Port(s) with broadcast disabled not notified**

This notifies you that some of the ports specified in a BROADCAST command did not receive the broadcast message because they had their PORT BROADCAST option disabled.

**123 Session resume pending -- save buffer not empty**

This message is displayed when you resume a session that was previously halted by the host and is still halted. You should exit the session immediately.

The most likely cause for this message is some problem with the remote host. It might have crashed or it might have enabled flow control and never disabled it.

**199 System shutdown in *n* minutes**

This message is displayed on all logged-in ports when a privileged user executes an INITIALIZE command. The warning is sent every 30 minutes. Five minutes before the shutdown, it is sent every minute.

---

## E.4 200 Series Messages

---

200 series messages are displayed after either (1) a connection request failed, or (2) a connection was forcibly terminated. These messages are always two lines long. The first line of the message is:

Connection to *service name* not established (*or terminated*)

The second line states the reason the remote service refused the connection (or terminated it).

### 201 No response within timeout period

Indicates that the server attempted to connect to the service but the service did not respond. The number of times the server tries to connect to a service before it gives up is defined by the SERVER RETRANSMIT LIMIT option.

The most likely cause of this message is that the host that offers the service is down. Issue the SHOW NODE STATUS command to check the status of remote nodes. Another possibility is that the service was too heavily loaded to respond within the timeout period.

### 202 Communication protocol error

Indicates that the connection failed because the service did not respond to the connect request properly. The most likely cause is faulty host software. Try reloading the Emulex host software and reinitializing the server. If this doesn't work, call Emulex Technical Support for further help.

### 203 Service node retransmission limit exceeded

or  
208

Indicates that the connection failed because the service tried repeatedly to transmit data to the server but failed to get a response. The most likely causes are (1) a noisy Ethernet cable, (2) heavy Ethernet traffic, possibly caused by too many multicast or broadcast messages on the network, or (3) the host is too heavily loaded to process replies from the server.

Another possibility is that the server is not responding to the host transmissions. Issue the SHOW SERVER COUNTERS command and check the No Buffer value to see if the server has been rejecting messages due to inadequate internal memory.

**223 Node user disconnect**

This is a host dependent message. Check your host software documentation for further details.

**224 Circuit timer out of range**

This message indicates that the server's circuit timer value is not acceptable to the remote service. Check the remote host's operating system documentation and then reset the SERVER CIRCUIT TIMER option to an acceptable value.

**226 Invalid message or slot received**

Indicates that the connection failed because of bad data in a received Ethernet packet. This is probably caused by a failure in the host software or hardware. Try reloading the Emulex host software and reinitializing the server. If this doesn't work, call Emulex Technical Support for further help.

**227 Time limit expired**

This is a host dependent message. Check your host software documentation for further details.

**228 No progress being made**

This message indicates that the remote service is too heavily loaded to accept the connection. Try again when the service is less busy.

**229 Service not offered on requested port**

This message is displayed if you request a connection to a specific port on the remote node and the service is not available on that port. You must either (1) issue a CONNECT command that specifies the service without specifying a port, or (2) use the SHOW SERVICE CHARACTERISTICS command on the target server to find out which ports the service is offered on.

**230 Object port name not known**

This message is displayed if you request a connection to a specific port name on a remote node and no such port name exists. You must either (1) issue a CONNECT command that specifies the service without specifying a port, or (2) find out the correct port name.

**231 Invalid password**

Indicates that the password you used when you connected to the service is incorrect. Try again with the correct password.

**232 Service in use**

This message is displayed if the desired service is offered only on certain ports on the remote node and all ports are already in use. Try again later.

**233 No such service**

This message indicates either (1) a host failure, or (2) the service has been deleted recently. If the service has been nonexistent for more than a few minutes, you will get message number 711 instead.

**234 Service disabled**

Indicates that connections have been disabled for the service.

**235 Requested entry not in queue**

Indicates that a remote host tried to delete a nonexistent entry from the server's internal queue.

**236 Immediate access rejected**

Indicates that the port is available but the device attached to the port is not. This could happen if modem controls are enabled on the port but the port device is not responding to them.

**237 Access denied**

This is a generic message issued when the host does not have a more specific reason for denying the connection request.

**238 Corrupted solicit request**

This message is displayed when a host tries to initiate a connection to a service or port on the server. It usually indicates faulty host software. Try reloading the Emulex host software and reinitializing the server. If this doesn't work, call Emulex Technical Support for further help.

**261 Insufficient node resources**

Indicates that the remote service terminated the connection because it became too busy or too heavily loaded. Try reconnecting later.

**262 System shutdown in progress**

Indicates that the system manager is shutting down the network (or some part of it) and has disabled connections to the desired service.

**263 Node user disconnect**

This is a host dependent message. Check your host software documentation for further details.

**264 Circuit timer out of range**

This message indicates that the server's circuit timer value is not acceptable to the remote service. Check the remote host's operating system documentation and then reset the SERVER CIRCUIT TIMER option to an acceptable value.

**265 Invalid service class**

This message indicates that you tried to use the SET SESSION command to change your session characteristic (passall, passthru, etc.) to a value not acceptable to the remote service. Check your host operating system documentation for further details.

**266 Invalid message or slot received**

Indicates that the connection was terminated because of bad data in a received Ethernet packet. This is probably caused by a failure in the host software or hardware. Try reloading the Emulex host software and reinitializing the server. If this doesn't work, call Emulex Technical Support for further help.

**267 Time limit expired**

This is a host dependent message. Check your host software documentation for further details.

**268 No progress being made**

This message indicates that the remote service terminated the connection because it was too heavily loaded. Try reconnecting when the service is less busy.

**269 Service not offered on requested port**

This message is displayed if the service is not available on that port. You must either (1) issue a CONNECT command that specifies the service without specifying a port, or (2) use the SHOW SERVICE CHARACTERISTICS command on the target server to find out which ports the service is offered on.

**270 Object port name not known**

This message is displayed if you request a connection to a specific port name on a remote node and no such port name exists. You must either (1) issue a CONNECT command that specifies the service without specifying a port, or (2) find out the correct port name.

**271 Invalid password**

Indicates that the password you used when you connected to the service is incorrect. Try again with the correct password.

**272 Service in use**

This message is displayed if the desired service is offered only on certain ports on the remote node and all ports are already in use. Try again later.

**273 No such service**

This message indicates either (1) a host failure, or (2) the service has been deleted recently. If the service has been nonexistent for more than a few minutes, you will get message number 711 instead.

**274 Service disabled**

Indicates that connections have been disabled for the service.

**275 Requested entry not in queue**

Indicates that a remote host tried to delete a nonexistent entry from the server's internal queue.

**276 Immediate access rejected**

Indicates that the port is available but the device attached to the port is not. This could happen if modem controls are enabled on the port but the port device is not responding to them.

**277 Access denied**

This is a generic message issued when the host does not have a more specific reason for denying the connection request.

**278 Corrupted solicit request**

This message is displayed when a host tries to initiate a connection to a service or port on the server. It usually indicates faulty host software. Try reloading the Emulex host software and reinitializing the server. If this doesn't work, call Emulex Technical Support for further help.

**279 Invalid/unexpected reason code**

This message indicates that the connection failed for some reason the server does not understand.

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**E.5 500 Series Messages**

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500 series messages are informational messages that the server displays when a command is executed or a test is finished.

**501 From port *n*, *name***

This message is displayed when another port transmits a message to you via the BROADCAST command. The broadcast message follows immediately.

**511 Test complete *n* bytes written, *n* errors detected**

This message is displayed at the completion of a TEST PORT command if you tested a port other than your own. If the number of errors is not zero, it indicates a hardware problem with the port.

**512 Loop test successful**

This message is displayed after the successful completion of a TEST LOOP command.

**513 Loop test failure - *reason***

This message is displayed after a TEST LOOP command has completed with errors. It indicates a problem with the physical connection between the server and the remote node being tested or with the remote node itself. The following reasons are displayed:

**Insufficient buffers**

Indicates that the server did not have enough internal buffer space to execute the command. Try again later when the server is less busy.

**Timeout**

There was no response from the target node.

**Data error**

The data received from the target node was bad. This is the basic cause of most TEST LOOP failures and usually indicates a problem with the remote node.

**Sequence number error**

Indicates a bad packet from the target node. This is essentially the same as having corrupted data.

**515 Target port not installed or out of service, command aborted**

This message is displayed if you issue a command to logged in port that is only allowed to be issued to inactive ports. Log out the port and try again.

**542 Last access to privilege status by port *n* on *time/date***

This message is displayed whenever you enter privileged mode if the SERVER SECURITY option is enabled. It tells you who entered privileged mode last so that you can detect unauthorized privileged accesses.



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## E.6 600 Series Messages

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600 series messages warn of potential security violations. They are displayed only if the SERVER SECURITY feature is enabled.

**641 Illegal access attempt by port *n* on *time/date***

Indicates that a user tried to log in to the server but failed to enter the proper password. This message is displayed only if SERVER LOGIN PASSWORD is enabled.

**642 Illegal SET PRIVILEGE attempt by port *n* on *time/date***

Indicates that a user tried to enter privileged mode but failed to enter the proper password.

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## E.7 700 Series Messages

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700 series messages are displayed when a command cannot be executed for some reason.

**701 Command syntax error**

This message is displayed when a command is entered incorrectly. It is used when none of the more specific error messages is applicable.

**702 Keyword *mmm* not known or ambiguous**

Indicates that a word in the command line is either incorrectly spelled or was abbreviated in a way the server does not recognize.

**703 Value invalid or out of range, *mmm***

Indicates that you specified an illegal value for an option (for example, a baud rate of 700). Refer to the command description in Section 5 for a description of the legal range of values for the option.

**704 Operation requires privileged status**

Indicates that you tried to execute a command that is available only to privileged users. You must enter privileged mode and reissue the command.

**705 Element not in queue**

This message is displayed when you issue the REMOVE QUEUE command for a specific queue entry and the entry does not exist. Use the SHOW QUEUE command to get a current list of all queue entries.

**706 Secure operation requires privilege**

Indicates that you issued a command that is not available to secure users. You must have a privileged user either disable the SECURE option on your port or execute the command for you.

**707 Existing or queued connections prevent operation**

This message is displayed when you enter a CLEAR or PURGE SERVICE command while (1) there are sessions currently connected to the service, or (2) connection requests are pending in the server queue. You may forcibly disconnect sessions via the LOGOUT PORT command; queued requests may be deleted via the REMOVE QUEUE command.

**709 Service *name* not offered by node *name***

This message is displayed if you request a service on a particular node and the node does not offer the service. Use either the SHOW NODE command to find out what services are offered on the desired node or the SHOW SERVICE *name* STATUS command to find out what nodes offer the desired service.

**710 Node *name* not known**

This message is displayed if you try to connect to a service on a particular node and the node name does not exist. Possible causes are (1) the node name was spelled incorrectly, or (2) the node name has been changed. Use the SHOW NODE ALL command to get a list of all nodes known to the server.

**711 Service *name* not known**

This message is similar to message number 710. It is displayed if you try to connect to a service that does not exist. Possible causes are (1) the service name was spelled incorrectly, or (2) the service name has been changed. Use the SHOW SERVICE ALL command to get a list of all services known to the server.

**712 No connection established**

This message is displayed when you issue a RESUME command and you have no active sessions. You must establish a connection with the CONNECT command.

**713 Connection already established**

Indicates that you tried to use the CONNECT PORT command on a port that is already connected to a service.

**714 Preferred service has not been defined**

This message is displayed when you enter a CONNECT command with no service name, but no preferred service has been defined. Use the CHANGE PORT PREFERRED SERVICE command to define a preferred service for your port. You will then be connected to this service whenever you issue a nonspecific CONNECT command.

**715 Service *name* not currently available**

Indicates that the service you tried to connect to is too busy to accept new connections. Use the SHOW SERVICE command to check the service's rating. If it is zero, either all available ports are being used or it has reached its maximum user limit.

**716 Access to service *name* denied**

Indicates that you are not authorized to connect to the desired service. To gain authorization, your port must have at least one group code in common with the service.

To find out the group codes used by the service, issue the SHOW NODE command for the node that offers the service and see which group codes are enabled for the node. Then have a privileged user enable at least one of those group codes for your port via the SET PORT AUTHORIZED GROUPS command and then enable it via the SET PORT GROUPS command.

**717 Session *n* not established**

Indicates that you tried to RESUME a session number that does not exist. Type SHOW SESSIONS or RESUME ? to get a list of all your current sessions.

**718 Port session limit reached**

Indicates that you cannot open another session because you would exceed the maximum number of active sessions allowed for your port (as defined by the PORT SESSION LIMIT option). You must either disconnect one of your old sessions or have a privileged user increase your session limit.

**719 Insufficient resources to complete operation - *keyword***

This message is displayed when the server is unable to execute a command because of internal limitations (for example, the maximum number of sessions has been reached).

Issue the SHOW SERVER STATUS command and check the number of sessions, nodes, and so forth that the server is currently connected to. If any of these number are at their maximum, no further connections are accepted. Try the command again later.

**721 No dedicated service on port *n***

This message is displayed if you issue a CONNECT PORT command for a port that does not have a dedicated service defined.

**722 Connections disabled**

Indicates that connections have been disabled via the INITIALIZE DISABLE command. No connections are allowed until the server is reinitialized without the DISABLE option.

**724 Service node connection limit reached**

Indicates that the server has reached its maximum connection limit. Try again later when the server is less busy.

**725 Access to node *name* denied**

Indicates that you are not authorized to connect to the desired node. To gain authorization, your port must have at least one group code in common with the node.

To find out the group codes used by the node, issue the SHOW NODE command. Then have a privileged user enable at least one of those group codes for your port via the SET PORT AUTHORIZED GROUPS command and then enable it via the SET PORT GROUPS command.

**726 Node *name* not reachable**

Indicates that the node you tried to connect to is unreachable. The most likely cause is a host hardware or software failure. Use the TEST LOOP command to check the physical connection between the server and the node.

**728 Parameter cannot be modified with connections established or pending**

This message is displayed if you try to modify an option that cannot be modified while sessions are active on the server. Refer to the command description in Section 5 for further details.

To get around this, either (1) disconnect all active sessions on the server, or (2) use the DEFINE command and then set the server to reinitialize at a later time.

**729 Parameter cannot be modified by a SET or CHANGE command**

This message is displayed when you try to modify an option with the SET or CHANGE command that can be modified only with the DEFINE command (for example, DEFINE SERVER SOFTWARE). These options are ones that cannot be changed dynamically; they can be set only during server initialization.

Refer to the command description in Section 5 for further details.

**734 Invalid operation from a remote console**

This message is displayed if you try to issue a DEFINE or CHANGE PORT from an RCF connection (only SET is allowed). Note, however, that you may use DEFINE or CHANGE to modify *other* ports from an RCF connection.

**736 Parameter cannot be modified by a DEFINE or CHANGE command**

This message is displayed if you use the DEFINE or CHANGE command on an option that requires the SET command (for example, SET PRIVILEGED). Refer to the command description in Section 5 for further details.

**741 Illegal password**

Indicates that you entered an illegal value when setting a password (for example, after issuing the LOCK command). All passwords must be 1 to 16 ASCII characters.

**742 Password verification failed**

This message applies to the LOCK and SET PRIVILEGED commands. It indicates that when the server asked you to verify your password, you made a mistake. Try again.

**743 Another port already privileged - use OVERRIDE option**

This message is displayed if you enter the SET PRIVILEGED command while another port already has privileged status. Use the SET PRIVILEGED OVERRIDE command if you want to transfer privileged status from the other port to yours. Note that this removes privileged status from the original port without warning.

**750 Another port has this name**

Indicates that the name defined by a SET PORT NAME command is already used by another port. All ports on a single server must be named differently.

**751 Requested command is not enabled for your port**

Indicates that you tried to execute a command that has not been enabled for the server (for example, LOCK or BROADCAST). If you wish to execute the command, you must get a privileged user to enable it.

**771 No current session - please specify a session number**

This message is displayed if you issue a DISCONNECT command without a session number and the server has lost track of which session is the current one. Use the SHOW SESSIONS command to get a list of your active sessions and then reissue the DISCONNECT command with a specific session number.

**772 Parameter cannot be set, port *n* is active**

This message is displayed if you try to modify a port option that cannot be modified while the port is logged in. Refer to the command description in Section 5 for further details.

A privileged user may forcibly log out a port with the LOGOUT PORT command and then re-enter the command if desired.

**774 Server session limit reached - try again later**

Indicates that you cannot open another session because you would exceed the maximum number of active sessions allowed for the server. You must disconnect one of your old sessions (or someone else's) before you can initiate a new connection.

**775 Characteristic can not be updated for multiple ports**

This message is displayed when you specify multiple ports for options that must be different for each port (for example, SET PORT NAME).

**780 Command or parameter inappropriate for specified port**

This message indicates that you tried to set a parameter on a port that does not support it (for example, setting TYPE VT100 on the printer port).

**782 Invalid speed**

Indicates that you specified an unsupported speed with the SET PORT SPEED command. See the SET PORT command in Section 5 for a list of valid speeds.

**789 Syntax error - supply more parameters**

Indicates an incomplete command line. Check the description of the command in Section 5 and try again.

**790 Specified option is not valid with LIST**

Indicates that you specified an option that is not allowed with the LIST command (for example, LIST SESSIONS). Use the SHOW command instead.

**793 Specified option is not valid with DEFINE or CHANGE**

This message is displayed if you use the DEFINE or CHANGE command on an option that requires the SET command (for example, SET PRIVILEGED). Refer to the command description in Section 5 for further details.

**798 There are no items of the requested type to display**

This message is displayed if you try to use the SHOW command for an item that does not exist (for example, SHOW PORT ACCESS REMOTE when no ports are defined as ACCESS REMOTE).

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## **E.8 900 Series Messages**

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900 series messages relate to server-wide status and errors. They are always output on the console port.

**901 Performance 4000-T (NL1.0) hardware address *ethernet\_address***

This message is displayed during server initialization. It indicates that the server is beginning the download process and displays the server's Ethernet address and the revision level of the PerformancePak.

**902 Seeking load host for *filename***

Indicates that the server is multicasting a download request for the specified file to all hosts on the network.

**903 Loading from host *node\_name***

Indicates that the specified node is downloading software to the server. It is followed by a series of dots that shows the progress of the download.

**904 Load complete at *hh:mm:ss* on *dd:mm:yyyy***

Indicates that the download was completed successfully. Message 990 normally follows.

**910 Ethernet cable possibly open at *xx* ns (*yy* ft thin, *zz* ft thick)**

Indicates that the server's TDR test detected a cable break. The distance of the break from the server is listed for both thickwire and thinwire cable.

**911 Port *n* out of service**

Indicates that the power-up self-test detected a bad port. The other ports can still be used, but the server should be returned for service as soon as possible. Call Emulex Technical Support for further help.



**912 Load host timeout**

Indicates that the load host stopped the download for more than 30 seconds. This may indicate a host problem or heavy loading on the host. The server automatically retries the download when this happens.

**915 Download error - transmission limit exceeded**

Indicates that the download transmission failed ten times. The entire download procedure is restarted. The most likely cause of this error is a hardware failure in (1) the host, (2) a transceiver, (3) the Ethernet cable, or (4) the server.

**916 Unexpected data in received software, aborting**

Indicates that the download software is corrupted. This may mean that you have out-of-date download software that is not compatible with your server. Make sure your software installation is correct and make sure that no other host has a copy of old software that the server may be mistakenly trying to download.

**920 Parameter checksum error, default parameters apply to port *n***

Indicates an internal problem that forced the server to reset a port to its factory default settings. The server should be returned for service as soon as possible. Call Emulex Technical Support for further help.

**922 Non-fatal error detected by selftest, code = *nn***

This message is displayed if the server's power-up self-test detects an error that does not prevent the server from beginning operation. The code at the end of the message is a series of plusses and minuses that indicates which test failed (for example, +++-++ indicates test 4). It is followed by the name of the test that failed (listed below). If you receive this message, you should call Emulex Technical Support for further help.

**Front panel LCD error**

Indicates a problem with the front panel display. This does not generally prevent the server from performing normally.

**Internal interrupt hardware error**

Indicates an internal problem with the microprocessor's interrupt hardware.

**Internal DMA controller hardware error**

Indicates an internal problem with the microprocessor's DMA controller.

**Internal I/O processor (AIOP) error**

Indicates an internal problem with the server's serial transmission circuitry.

**Async I/O port error, port code = *nn***

Indicates a problem with one or more of the server's serial ports. The code at the end of the message is a series of 32 pluses, minuses, and periods, which corresponds to the server's serial ports: a plus indicates a port is good, a minus indicates a port is bad, and a period indicates the port does not exist. Note that a bad port does not generally prevent you from bringing the server up and using the remaining ports, if you wish.

**LAN error, check cables and transceiver**

Indicates a possible transceiver or cable problem.

**930 Server parameters checksum error, default parameters applied**

Indicates a hardware problem that forced the server to reset itself to its factory default settings. The server should be returned for service as soon as possible. Call Emulex Technical Support for further help.

**931 Permanent configuration parameters reset to factory defaults due to...**

This message is displayed during initialization and indicates that all server option settings are being reset to their factory defaults. There are two possible reasons for this:

**...operator request**

Indicates that you requested a return to the factory defaults when you initialized the server (by holding down the Next and Last keys on the server front panel). This message is displayed when the reset is started; message 999 is displayed when the reset is finished.

**...Internal configuration checksum error**

Indicates a possible problem with the server's internal nonvolatile memory (EAROM). Try resetting the server to its factory defaults and trying again. If this message appears more than once, call Emulex Technical Support for further help.

**950 Internal error, aborting load, code = *nn***

Indicates a server hardware error found during initialization. The specific problem is specified by the code at the end of the line.

If this message appears, try resetting the server to its factory defaults (by pressing the Next and Last keys on the front panel as you plug in the server) and reinitializing. If this doesn't work, report the error code to Emulex Technical Support and ask for further help.

**951 No response to load request, will try again in *n* minutes**

This message indicates that the server is retrying the download after an initial failure. After three retries, downloads are requested every five minutes and then every 15 minutes. You may restart the load process yourself at any time by pressing any key on the console port or the server's front panel.

The most likely causes of a download failure are (1) a software error, (2) host failure, or (3) transceiver failure.

**980 Fatal software error, code = *nnn***

This code indicates a problem with the server's software. If AUTOREINIT is enabled, the server resets itself and reboots. Write down the code number and call Emulex Technical Support for further help.

**981 Non-fatal software warning, code = *nnn***

This code indicates a problem with the server's software. Write down the code number and call Emulex Technical Support for further help.

**983 Parallel printer status: *status at time/date***

If the PORT LOGGING option is enabled, this message is displayed whenever the status of the parallel port changes. The possible statuses are power off, offline, and paper out.

**984 Parallel printer error: *type at time/date***

This message is displayed only if the PORT LOGGING option is enabled. It indicates a hardware problem with the parallel port. Check to make sure you are using the proper cable and that the port is configured for the correct printer type (Centronics or Dataproducts). If the problem persists, call Emulex Technical Support for help.

**990 Server version x.x initializing - please wait**

This message is displayed after the download is completed and the server is building its internal configuration tables.

**991 Resetting system configuration**

This message is displayed after message 990 if system parameters are being reset (for example, if the server is reset to its factory defaults).

**992 Resetting port configuration**

This message is displayed after message 990 if any port parameters are being reset.

**993 Server ready for logins**

This message is displayed after all internal configuration is finished and the server is ready for use.

**998 Permanent configuration is not compatible with received software. Reset configuration or abort load (R/A)?**

Indicates that your version of the download software is not compatible with the server's nonvolatile memory (EAROM) (i.e., its permanent configuration parameters). You are asked if you wish to reset the server and continue anyway, or abort the load. If you answer "R", all server settings are returned to their factory defaults. If you answer "A", the download is halted.

**999 EAROM factory default request complete**

This message is displayed if the server was reset to its factory defaults by pressing the Next and Last switches while powering up. It indicates the reset has been completed (see also message 931).

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## **F.1 Modem Sequencing**

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This section describes how the Performance 4000-T handles modem signalling sequences used on different types of ports with different types of devices.

For information on Modem Signals, refer to Table 5-16 in Section Five of this manual.

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### **F.1.1 Dual Speed Modems**

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The Performance 4000-T supports a protocol for dual speed modems that uses the modem signals DSRS and SMI. It works like this:

For a dialout modem, the server asserts DSRS to tell the modem to place the call at its highest speed. After the call is placed, the modem asserts SMI to confirm the higher speed or deasserts it to inform the server that the connection was finally established at the fallback speed. If the PORT ALTERNATE SPEED option is enabled, the server adjusts the port speed as required by the SMI signal.

For a dial-in modem, the server simply waits for SMI. If it is asserted, it sets the port to its primary speed; if deasserted it sets the port to its fallback speed.

---

### **F.1.2 Dual Speed Hayes Smartmodem Protocol**

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The Hayes Smartmodem uses a different protocol than the one described above. In Hayes modems, DSRS is tied internally to SMI, which requires that DSRS be opened in the cable, preferably at the modem end (see Appendix A for a cable schematic).

For a dialout modem, the modem sets itself automatically to the port speed by autobauding on the "AT" that precedes the telephone number. For a dial-in modem, SMI is used normally (i.e., it is asserted if the connection is made at the primary speed and deasserted if it is made at the fallback speed).

---

### **F.1.3 Dial-In Modem Sequencing on a Full Modem Port**

---

A dial-in modem on a full modem port uses the following modem signal sequencing:

1. DTRwait is enabled, so the server waits for RING and asserts DTR and RTS in return.
2. The modem asserts DSR and CTS after a minimum two-second delay. (If DSR is present before two seconds, the server assumes it is talking to a null modem device.)
3. When a connection is established and a carrier signal is detected, the modem asserts DCD. If DCD is not asserted within 30 seconds, the server negates DTR and RTS.

In order for the server port to function, DSR, CTS, and DCD must all be asserted. If CTS is lost at any time, no data will be transmitted out the port.

4. If the modem is dual-speed, it asserts SMI if it is using its primary (higher) speed and deasserts it if it is using its fallback (lower) speed. If the PORT ALTERNATE SPEED option is set, the server adjusts the port speed as required by the SMI signal.
5. The server waits two minutes for a login. If it is not received, DTR and RTS are deasserted and the port is logged out.

---

### **F.1.4 Dial-In Modem Sequencing on a Partial Modem Port**

---

A dial-in modem on a partial modem port uses the following modem signal sequencing:

1. DTRwait is disabled, so DTR is asserted continually by the server.
2. The modem establishes communication with the remote modem. When a carrier signal is detected, it asserts DCD (which is connected to DSR on the server).
3. The server waits two minutes for a login. If it is not received, DTR is deasserted and the port is logged out.

---

### **F.1.5 Dialout Modem Sequencing on a Full Modem Port**

---

A dialout modem on a full modem port uses the following modem signal sequencing:

1. DTRwait is enabled, so the server waits for a connection from a user and then asserts DTR and RTS.
2. After a minimum two-second delay, the modem asserts DSR and CTS. (If DSR is present before two seconds, the server assumes it is talking to a null modem device.)
3. If a dual-speed modem is being used, the server asserts DSRS to instruct the modem to use its primary speed.
4. The server reports to the user that the connection has been made and waits for the user to enter a telephone number.
5. When a connection is established and a carrier signal is detected, the modem asserts DCD. If DCD is not asserted within 30 seconds, the server negates DTR and RTS. In order for the server port to function, DSR, CTS, and DCD must all be asserted. If CTS is lost at any time, no data will be transmitted out the port.
6. If the connection ends up being made at the modem's primary speed, it asserts SMI; if it is made at the fallback speed SMI is deasserted. If the PORT ALTERNATE SPEED option is set, the server adjusts the port speed as required by the SMI signal.

---

### **F.1.6 Dialout Modem Sequencing on a Partial Modem Port**

---

A dialout modem on a partial modem port uses the following modem signal sequencing:

1. DTRwait is enabled, so the server waits for a connection from a user and then asserts DTR.
2. The server reports to the user that the connection has been made and waits for the user to enter a telephone number in the appropriate format.
3. When a carrier signal is detected, the modem asserts DCD, which is connected to DSR on the server. If DCD is not asserted within 30 seconds, the server negates DTR.

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### **F.1.7 Computer Port Sequencing on a Full Modem Port**

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A port on the Performance 4000-T may be connected directly to a serial port on a computer, allowing server users access to computers that are not part of the Ethernet network. Connections can be made in either direction.

If the remote computer is trying to log in to the server, the sequence is as follows:

1. If the computer periodically asserts DSRS (or possibly some other signal), which is connected to RING on the server, DTRwait should be enabled. The server responds to the RING by asserting DTR and RTS.
2. If the computer does not provide a RING input, DTRwait is disabled and the server asserts DTR and RTS at all times.
3. The computer port asserts DTR and RTS.

If a server user is trying to log in to the computer, the modem sequence is as follows:

1. A user connects to the local service which contains a port that is connected to the computer.
2. RING is enabled, so the server asserts DSRS periodically. DSRS is connected to RING on the computer port.
3. The computer responds by asserting DTR and RTS, which are connected to DCD, DSR, and CTS on the server.
4. DTRwait is enabled, so the server responds by asserting DTR and RTS, which are connected to DCD, DSR, and CTS on the computer.



---

## **F.1.8 Computer Port Sequencing on a Partial Modem Port**

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A port on the Performance 4000-T may be connected directly to a serial port on a computer, allowing server users access to computers that are not part of the Ethernet network. Connections can be made in either direction.

If the remote computer is trying to log in to the server, the sequence is as follows:

1. DTRwait is disabled, so the server has DTR asserted continually.
2. When the computer connects to the server, it asserts DTR.
3. The connection is complete. Either side may break the connection by dropping DTR.

If a server user is trying to log in to the computer, the modem sequence is as follows:

1. A user connects to the local service which contains a port that is connected to the computer.
2. DTRwait is enabled, so the server responds by asserting DTR, which is connected to DSR on the computer.
3. The computer responds by asserting DTR, which is connected to DSR on the server. Either side may break the connection by dropping DTR.

---

**F.1.9**

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**Data Switch Sequencing on a Full Modem Port**

If the switch is trying to log in to the server:

1. If the switch periodically asserts RING, DTRwait should be enabled and the server responds by asserting DTR and RTS.

If the switch does not provide RING, DTRwait should be disabled and the server asserts DTR and RTS continuously.

2. The switch asserts DTR and RTS.
3. The server waits two minutes for a login. If there is no login, the server drops DTR and RTS.

If a server user is trying to log in to the switch, the modem sequence is as follows:

1. A user connects to the local service which contains a port that is connected to the switch.
2. If a RING input is required by the switch, the RING option is enabled and the server periodically asserts DSRS, which is connected to RING on the switch. DTRwait is enabled.

If no RING input is required, DTRwait should be disabled so the server continuously asserts DTR and RTS.

3. The switch responds by asserting DTR and RTS.
4. The server reports to the user that the connection has been made.

---

**F.1.10 Data Switch Sequencing on a Partial Modem Port**

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If the switch is trying to log in to the server:

1. The switch asserts DTR.
2. DTRwait is disabled, so the server has DTR asserted continually.
3. The server waits two minutes for a login. If there is no login, the server momentarily deasserts DTR.

If a server user is trying to log in to the switch, the modem sequence is as follows:

1. A user connects to the local service which contains a port that is connected to the switch.
2. DTRwait is enabled and the server now asserts DTR.
3. The switch responds by asserting DTR.
4. The server reports to the user that the connection has been made.



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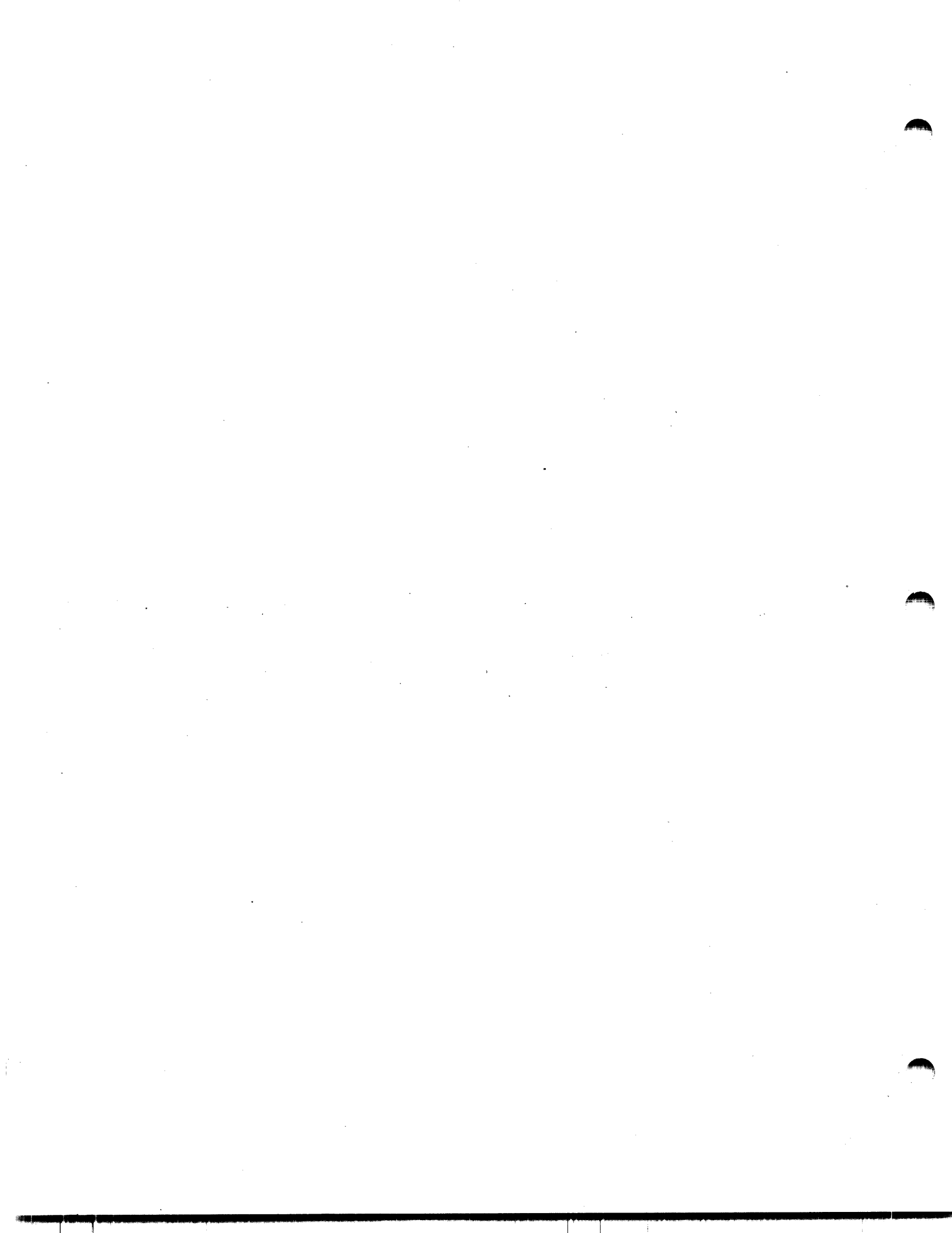
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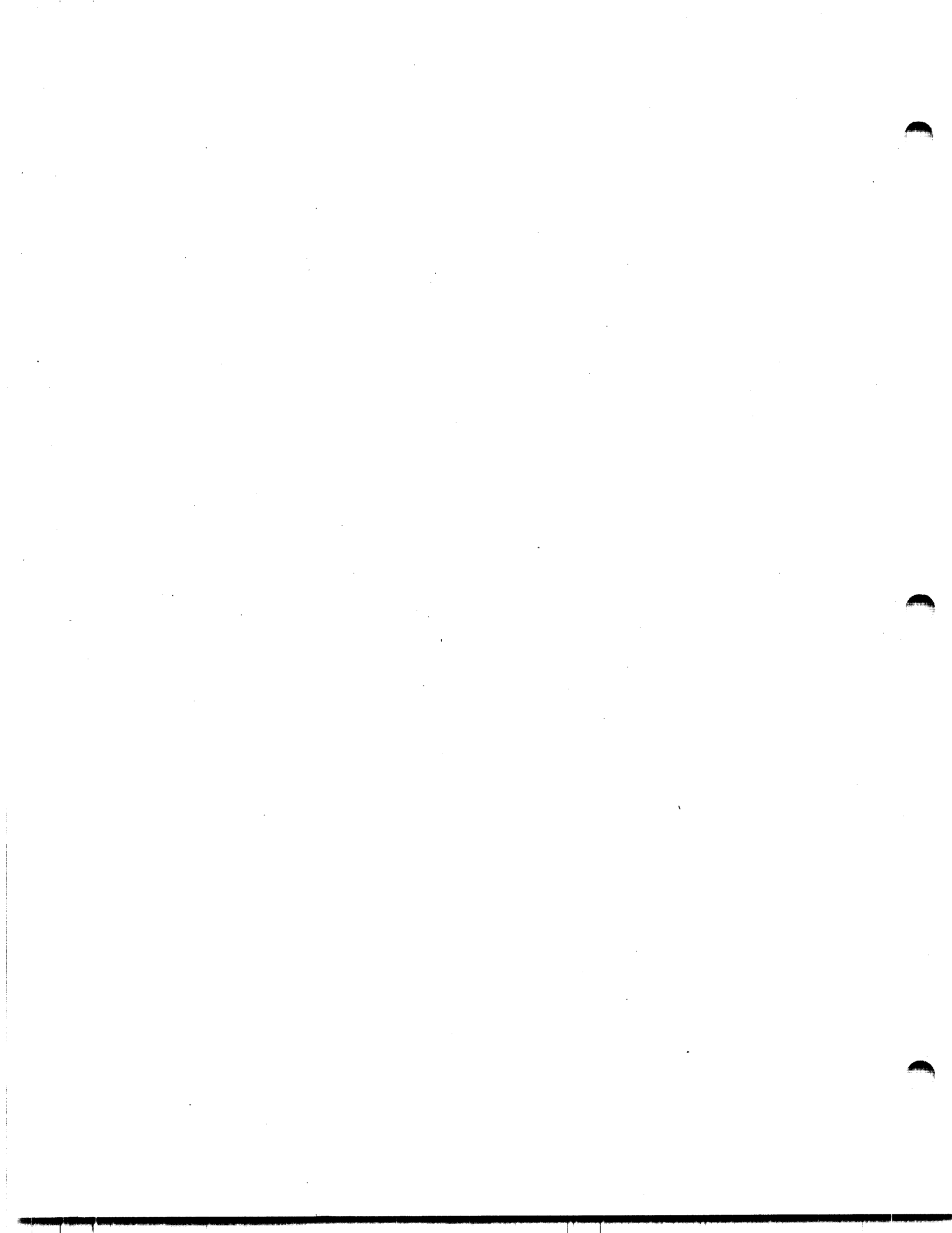
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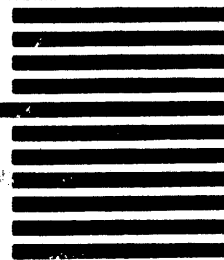
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Do Not Tear—Fold Here



NO POSTAGE  
NECESSARY  
IF MAILED  
IN THE  
UNITED STATES

**BUSINESS REPLY MAIL**

FIRST CLASS PERMIT NO. 202 COSTA MESA, CA

POSTAGE WILL BE PAID BY ADDRESSEE

EMULEX CORPORATION  
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P.O. BOX 6725  
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