

LRS Installation Guide

For LRS1 and LRS2 Remote Access Servers

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Rev. B**

WARNING

This product has been designed to comply with the limits for a Class A digital device pursuant to Part 15 of FCC Rules. These limits are designed to provide reasonable protection against such interference when operating in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy, and if not installed and used in accordance with this guide, may cause harmful interference to radio communications.

Operation of this equipment in a residential area is likely to cause interference in which case the user, at his or her own expense, will be required to take whatever measures may be required to correct the interference.

Changes or modifications to this device not explicitly approved by Lantronix will void the user's authority to operate this device.

Cet appareil doit se soumettre avec la section 15 des statuts et règlements de FCC. Le fonctionnement est subjecté aux conditions suivantes:

(1) Cet appareil ne doit pas causer une interférence malfaisante.

(2) Cet appareil doit accepter n'importe quelle interférence reçue qui peut causer une opération indésirable.

The plug on the power cord is the disconnect device. The socket-outlet shall be installed near the equipment and shall be easily accessible.

Das Gerät wird durch Austecken des Stromkabels abgeschaltet. Die Anschluss-Steckdose sollte nah am Gerät und leicht zugänglich sein.

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1: Introduction

1.1 Overview

The Lantronix Remote Access Servers (LRS models) allow packet traffic between your network and remote networks or computers. The servers use modems to offer attached devices as services to the network, and conversely, can provide connections to other devices on the network.

The LRS1 provides one DB25 serial port, an AUI connector, and a UTP (10/100BASE-T) port or BNC (10BASE2) port for Ethernet connections.

The LRS2 provides two DB25 serial ports, a console port, an AUI connector, a UTP (10/100BASE-T) port, and a BNC (10BASE2) port for Ethernet connections.

All models support the AppleTalk, IP, and IPX network protocols, and can support baud rates between 300 and 230400 bits per second.

Note: *Throughout the remainder of this manual, all LRS models will be referred to as the LRS unless a distinction needs to be made between the models.*

1.2 Configuration

The EZWebCon configuration software (shipped with the distribution CD-ROM) is the easiest way to configure the LRS. EZWebCon guides you through configuration via a point and click interface.

Note: *Instructions for using EZWebCon are included with the CD-ROM. EZWebCon is also available from the Lantronix FTP and BBS servers and from the Lantronix web site at <http://www.lantronix.com>. See the LRS Reference Manual for instructions on how to download the software.*

Although EZWebCon is the recommended way to configure the server, the unit may also be configured using any of the following methods:

- ◆ Via Telnet/Rlogin connections to the LRS
- ◆ Via BOOTP replies from a TCP/IP network host (IP address, loadhost, and download filename only)
- ◆ Via RARP replies from a TCP/IP host (IP address only)
- ◆ Via a terminal attached to a serial port (LRS1 and LRS2), or the serial console port (RJ45 port 1 on the LRS16 and LRS32).
- ◆ Via a configuration file downloaded from a TCP/IP or NetWare host at boot time

1.3 Software

The LRS stores its executable code in Flash (rewritable) ROM. It is only necessary to download host software to the LRS if you need to update the code in the Flash ROMs with a new version of the software.

Note: *For instructions on downloading new software into the LRS, see the Updating Software appendix of the LRS Reference Manual.*

1.4 About the Documentation

This manual explains how to install, initially configure, and start using the LRS. The appendices discuss technical support, troubleshooting, pinouts, and environmental and cabling restrictions.

The LRS Reference Manual explains detailed, conceptual LRS networking concepts. PostScript and browsable HTML versions of the LRS Reference Manual are available on the distribution CD-ROM. In addition, they are available at the Lantronix WWW site, <http://www.lantronix.com>. To obtain a printed copy of the LRS Reference Manual (part number 900-039), contact Lantronix or your Lantronix distributor.

2: Installation

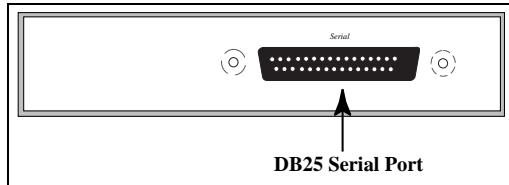
2.1 Overview

This chapter contains information that the system manager needs to install the LR hardware. The use of industry standard connectors on the serial lines make wiring and connection simple. See Appendix C for more information on the serial cables necessary to connect devices to the LRS.

2.2 LRS1 Product Description

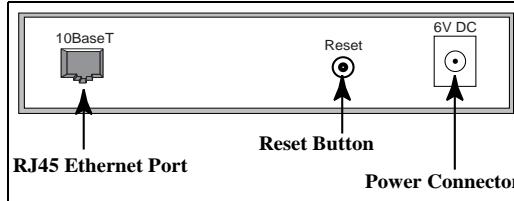
The LRS front panel has a male DB25 serial connector.

Figure 2-1: LRS1 Front Panel



The rear panel has an RJ45 Ethernet connector, a reset button, and a power connector. Use of the network and power connectors are discussed in the following section.

Figure 2-2: LRS1 Rear Panel



Note: When pressed and held during the power up and boot procedures, the Reset button forces the LRS to return to its factory default configuration.

Four LEDs are located on the top of the unit.

Figure 2-3: LRS1 Top Panel showing LEDs



The first LED is a power indicator, and should remain green while the LRS is plugged in. The second is a network link indicator, and should remain green when the LRS is properly connected to the network. Throughout the manual, these LEDs will be referred to as the Power and Link LEDs.

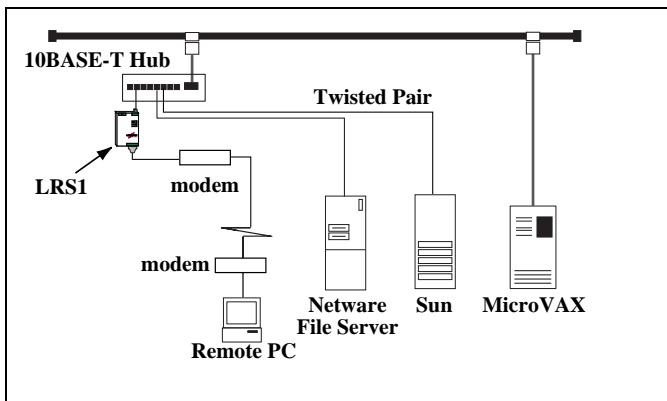
The remaining two LEDs indicate network and serial port activity. They will blink off, yellow, green, or red depending on the current activity. In this manual, these LEDs are referred to as the OK and Serial LEDs.

Note: *Although a red LED during boot mode usually signals an error, red LED patterns are part of the normal operation of the LRS and are not necessarily indicative of errors or dangerous operation.*

2.3 LRS1 Installation

Figure 2-4 displays one example of the LRS installed in a network.

Figure 2-4: Sample Layout



1 Select a location for the LRS

The LRS should be positioned close to the device it will be servicing but out of the way of everyday activity. (See Appendix C, *Pinouts*, for specific cabling limits.) Since powering down the unit will terminate any active sessions, it may be desirable to place the server in a location secure from unauthorized access. Also, be aware of the environmental operating limits described in Appendix E, *Specifications*.

2 Connect the LRS to the Ethernet

Connect the 10BASE-T cable to the RJ45 connector on the back of the LRS.

3 Connect the LRS to a serial device

The LRS is designed to connect to an RS232-based serial device. Connect one end of a serial cable to the DB25 connector on the front of the LRS. Connect the other end to your serial device's DB25 port.

Initially, you may want to connect a terminal to the serial port. The terminal will display any error messages and will allow you to view commands as you configure the LRS.

The serial port is initially set for 9600 baud, 8 data bits, one stop bit, and no parity.

4 Supply Power

Attach the power cord to the LRS. A secure power connection is necessary for the LRS to function properly. Power will come on automatically when the unit is plugged in, so be sure to use appropriate care when handling the unit.

Ensure that you are using the LRS 6 volt power supply. Many power cubes look similar; however, using a cube with the wrong voltage will damage the unit. Verify that the output voltage on your cube is 6 Volts DC.

Check to see if the Power and Link LEDs on the front of the server light. If not, unplug the server and check the power supply, then check the Ethernet connection and plug the server in again.

The LRS boot-up procedure consists of three steps. During normal operation, the boot process requires approximately 30 seconds to complete.

- A** The LRS will run through a set of power-up diagnostics for approximately 5 seconds. The Power and Link LEDs should remain solid green; the OK and Serial LEDs will show varying patterns corresponding to the test being run.

The Power and Link LEDs will be solid green if the unit is plugged in and there is a valid network connection.

- B** The LRS will try to obtain TCP/IP configuration information via BOOTP and RARP. This will take approximately 20 seconds if no hosts answer the request. During this step, the OK LED will blink green approximately three times per second, and occasionally yellow as packets are sent and received.

For more information on BOOTP and RARP, refer to your operating system's documentation.

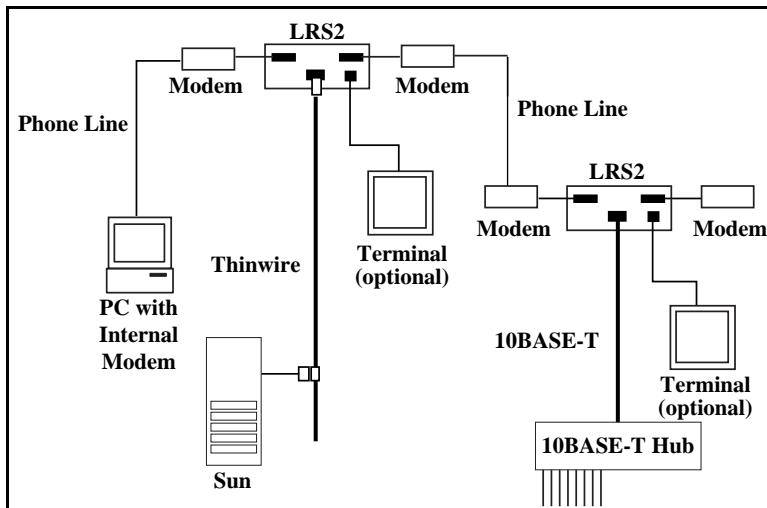
- C** The LRS will determine if the code in the Flash ROMs is valid. If so, it will load that code and begin normal execution. This takes approximately 5 seconds.

When the unit is running normally, the green OK LED will blink once every two seconds. If data is being transmitted on the Ethernet port, the OK LED will blink yellow. The Serial LED will blink red when characters are transmitted through the serial port, green when characters are received, and yellow when characters are both transmitted and received.

2.4 LRS2 Installation

The following diagram shows a properly-installed LRS.

Figure 2-5: Sample LRS2 Network Layout



To install the LRS, complete the following steps in order. Refer to the numbers in the previous figure.

- 1 Connect one or more serial devices to the LRS. See Appendix C, *Pinouts*, for information on what kinds of device attachments the LRS supports.
- 2 Connect an Ethernet cable to the Ethernet port.
- 3 If desired, connect a terminal to the LRS console port (port 1). This will enable you to receive diagnostic and initial configuration messages.

Note: *The default serial port settings are 9600 baud, 8 bit characters, and no parity. Refer to Appendix C for more information.*

- 4 Attach one end of the power cable to the LRS and plug the other end into an electrical outlet.
- 5 Flip the power switch to the ON position. The LRS will go through two steps to begin normal operation:
 - A It runs through a set of power-up diagnostics for approximately 12 seconds. The LEDs show varying patterns corresponding to the tests being run.
 - B It tries to obtain TCP/IP configuration information via DHCP, BOOTP, and RARP.

- 6 Install EZWebCon on your 32-bit Windows PC. The EZWebCon software is located on the distribution CD-ROM.

2.5 Is it Working?

If the LRS appears to be working (the Power and Link LEDs are lit, and the OK LED is blinking slowly) and the unit is connected to the network, there are three ways to confirm that it is working correctly:

- 1 If you have a terminal attached, try logging in. If the LRS passes power-up diagnostics and you are able to log in, the server is running normally.
- 2 The EZWebCon installation and configuration software (provided on the distribution CD-ROM) will show any working LRS on the network.
- 3 If an IP address has been configured for the LRS, ping the LRS from a TCP/IP host.

Figure 2-6: Pinging the LRS

```
unix% ping xxx.xxx.xxx.xxx
```

Note: To configure the LRS when a problem has occurred (for example, the Boot> prompt appears), refer to the Troubleshooting appendix.

3: Configuration

3.1 Overview

The LRS may be configured using the EZWebCon configuration software or commands issued at the command line (Local>) prompt.

To configure the LRS when a problem has occurred (for example, the Boot> prompt appears), refer to Appendix B.

3.1.1 EZWebCon Configuration

The EZWebCon software, shipped with the LRS, is the easiest way to configure the server. EZWebCon's point-and-click interface can assist you with both general configuration and configuration for specific tasks.

UNIX, Macintosh, Windows/Windows NT, and Novell NetWare versions of EZWebCon are shipped on the distribution CD-ROM. To use the CD-ROM, refer to the instructions on the CD-ROM case. To install EZWebCon, refer to the appropriate EZWebCon README file.

Note: *To use EZWebCon, NetWare users must run the NetWare VLM Client software.*

Note: *If you are using a TCP/IP network, the LRS must have an IP address and subnet mask assigned before EZWebCon can be used.*

All instructions for using EZWebCon are listed in each README file. Once EZWebCon is running, refer to the EZWebCon on-line help for assistance.

3.1.2 Command Line Configuration

If you choose to configure the LRS using the command line interface (accessible from a Telnet/Rlogin session, via EZWebCon, or by connecting a terminal to the serial console port) rather than EZWebCon, see the Command Reference chapter of the LRS Reference Manual for a detailed list of commands.

Note: *SET commands make temporary changes on the server; they are lost once the server is rebooted. DEFINE commands permanently configure the server, but they only take place once the server is rebooted.*

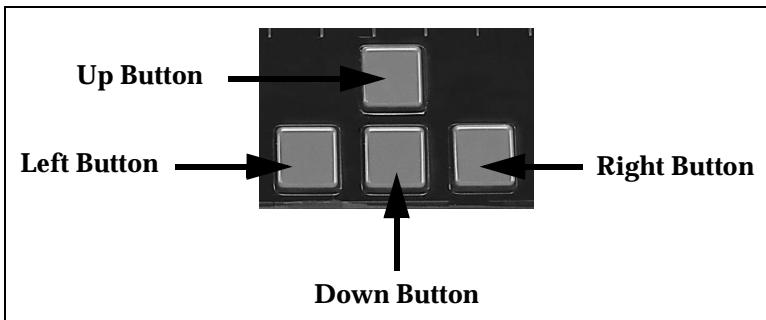
3.1.3 Front Panel Menu Configuration

After the LRS2 has booted, the LCD will display a date and time.

Note: *The initial date and time may not be correct; see Setting the Date and Time on page 3-7 for configuration instructions.*

To display the configuration options, press any of the buttons.

Figure 3-1: Front Panel Buttons



The following options are available:

Table 3-1: Front Panel Configuration Options

Option	Description
IP Address	Set the IP address.
Loadhost IP Address	Sets the IP address of the loadhost. When the LRS2 is booting, it will download its operational code from this host.
Second IP Host	Sets the IP address of a backup loadhost. If the first loadhost cannot be reached during the LRS2 boot process, the operational software will be downloaded from this host.
IP Subnet Mask	Sets the IP subnet mask.
Scan Settings	Displays the current software version, LRS2 ethernet (hardware) address, IP address, loadhost IP address, filename of the operation software, secondary loadhost IP address, subnet mask, NetWare server address, and whether BOOTP and RARP are enabled or disabled.
Reboot	Reboots the LRS2.

To navigate between the options, press the left and right buttons.

Pressing the down button will invoke the current menu option (for example, reboot) or will enable you to set an address. The up button acts as an “escape key”; it cancels a command or address edit and displays the top level of options.

3.2 Additional Configuration

This section describes how to configure the IP address, subnet mask, system passwords, incoming logins, and server clock and timezone.

3.2.1 Setting the LRS's IP Address

The following methods can be used to set the IP address: the LRS2 front panel buttons, an ARP entry and the Ping command, a BOOTP or an RARP reply, or commands entered from a terminal connected to the DB25 portserial console port.

All methods of setting the address are discussed in the following sections; choose the method that is most convenient for you.

3.2.1.1 Using the Front-Panel Buttons

To set the IP address using the LRS2 buttons, press the right button until the IP Address option is displayed.

Press the down button. The current IP address will be displayed on the LCD. The first time you configure the LRS2, a row of zeros will be displayed. This indicates that the LRS2 does not have an IP address.

Figure 3-2: LRS2 Without IP Address

000.000.000.000

To set the address, press the left and right buttons to navigate to the desired digit. Press the up button to increment the digit, and the down button to decrement the digit. When you've set all digits, press the left button until the leftmost digit is underlined, then press the left button again.

You will be prompted to confirm the address.

Figure 3-3: Prompt to Confirm IP Address

Are you sure?

To set this address, press the down button. To cancel (leaving the IP address unchanged), press the up button.

3.2.1.2 Using an ARP Entry and the Ping Command

If the LRS has no IP address, it will set its address from the first directed IP ICMP (ping) packet it receives. To generate such a packet, create an entry in a UNIX host's ARP table. The entry should specify the intended LRS IP address and its current Ethernet address, located on the bottom of the unit.

Note: Adding an ARP entry requires superuser privileges on the UNIX host and on Windows NT from DOS mode.

Figure 3-4: Adding an Entry to the ARP Table

```
# arp -s 192.0.1.220 00:80:a3:xx:xx:xx
```

Note: Command parameters may vary from host to host. Refer to the host documentation for more information.

Then ping the server using the following command:

Figure 3-5: The Ping Command

```
unix% ping 192.0.1.220
```

When the LRS receives the ping packet, it will notice that its IP address is not currently set and will send out broadcasts to see if any other host is using the specified address. If no duplicates are found, the server will use this IP address and will respond to the ping packet. The LRS will not save this learned IP address permanently; it is intended as a temporary measure to enable EZWebCon to communicate with the server or to allow an administrator to Telnet to the remote console port.

Figure 3-6 shows a Telnet connection to the remote console port, designated as port 7000. The LRS will display the remote console port prompt (#). In order to successfully log into the port, the login password must be entered at this prompt. The default login password is access.

Note: To change the login password, see Login Password on page 3-7.

Once logged in, the command **Define Server Ipaddress n.n.n.n** can be entered to make the address permanent.

Figure 3-6: Telnetting to the Remote Console Port

```
% telnet xxx.xxx.xxx.xxx Trying
xxx.xxx.xxx.xxxConnected to
xxx.xxx.xxx.xxxEscape character is '^]'#
access (not echoed)Lantronix LRS
Version n.n/n (yyymmdd)Type Help at the
'Local>' prompt for assistance.Enter User-
name> jimLocal> SET PRIVILEGEDPassword>
system (not echoed)Local>> DEFINE SERVER
IPADDRESS 192.0.1.220
```

3.2.1.3 Using a BOOTP or an RARP Reply

At boot time a host-based BOOTP or RARP server can respond to an LRS request for an available IP address. For information about configuring the BOOTP or RARP servers, see the host documentation. Keep in mind that many BOOTP daemons will not reply to a BOOTP request if the download filename in the configuration file does not exist. If this is the case, create a file with the same pathname specified in the configuration file.

By default, the LRS will attempt BOOTP and RARP queries. You can disable these queries by doing either of the following:

- ◆ Within EZWebCon, use the **Maintenance:Server Boot Parameters** menu.
- ◆ At the Local> prompt (accessible via EZWebCon, a Telnet/Rlogin, or by connecting a terminal to the serial console port), enter the Define Server BOOTP Disabled and Define Server RARP Disabled commands.

3.2.1.4 Using Commands Entered from the Serial Console PortDB25 Port

To define the IP address from the serial console portDB25 port (typically port 1), connect a terminal to the console port and press the Return key.

Note: *The default port parameters for the serial console portDB25 port are 9600 baud, 8 bits, no parity, and 1 stop bit. To edit these parameters, see the Ports chapter of the LRS Reference Manual. See Appendix C for pinout information.*

If the LRS Boot> prompt appears, the LRS does not have enough information to boot. See Appendix B for a list of Boot Configuration commands which can be used at the Boot> prompt.

If the LRS has already completed booting when you press the Return key, a Username> prompt will be displayed. Once you enter your username, a Local> prompt will be displayed. Become the privileged user (see *Privileged Password* on page 3-7) and use the **Define Server Ipaddress** command to set the IP address:

Figure 3-7: Set/Define Server Ipaddress

```
Local>> DEFINE SERVER IPADDRESS  
192.0.1.221
```

3.2.2 Setting a Subnet Mask

When the IP address is configured, a default subnet mask is chosen. If your network is divided into subnetworks, the default subnet mask will not be correct for your network; you must enter a custom subnet mask. A custom subnet mask can be chosen using the front panel buttons or using a command issued at the Local> prompt.

3.2.2.1 Using the Front-Panel Buttons

To set the subnet mask using the front panel buttons, press the right button [Figure 3-1 on page 3-2]. A configuration option will be displayed on the LCD. Continue to press the right button until the *IP Subnet Mask* option is displayed.

Press the down button. The current subnet mask will be displayed on the LCD.

Figure 3-8: Default Subnet Mask

255.255.255.0
00

To set the subnet mask, press the right and left buttons to navigate to the desired digit. Press the up button to increment the digit, and the down button to decrement the digit. When you've set all digits, press the left button until the leftmost digit is underlined, press the left button again.

You will be prompted to confirm the subnet mask. To set this mask, press the down button. To cancel (leaving the subnet mask unchanged), press the up button.

3.2.2.2 Using Commands at the Local> Prompt

The Local> prompt is accessible from a Telnet/Rlogin session, via EZWebCon, or by connecting a terminal to the serial console port. Use the Define IP Subnet command to set the subnet mask.

Figure 3-9: Setting Subnet Mask

Local>> DEFINE IP SUBNET 255.255.192.0

3.2.2.3 System Passwords

There are two important passwords on the LRS: the privileged password and the login password.

Note: *Passwords can be no more than 7 alphanumeric characters. For security purposes, you should use a mix of letters and numbers in each password.*

3.2.3 Privileged Password

Changing any server, site, or port setting requires privileged user status. EZWebCon will prompt you for the privileged password when it is needed. If you are not using EZWebCon, you will need to enter the Set Privileged command at the Local> prompt to become the privileged user. The default privileged password on the LRS is system.

Figure 3-10: Set Privileged Command

```
Local> SET PRIVILEGED  
Password> system (not echoed)  
Local>>
```

The prompt will change to reflect privileged user status. Only one user can be the privileged user at a time. If another user is currently logged into the LRS as the privileged user, use the Set Privileged Override command to forcibly become the privileged user.

To change the privileged password, use the Set/Define Server Privileged Password command. Figure 3-11 displays an example of this command.

Figure 3-11: Changing Privileged Password

```
Local> SET PRIVILEGED  
Password> system (not echoed)  
Local>> DEFINE SERVER PRIVILEGED PASSWORD  
"pie4me"
```

3.2.4 Login Password

The login password is required for remote console logins and for password-protected serial ports. The default login password is access. To change the login password, use the Set/ Define Server Login Password command at the Local> prompt. Figure 3-12 displays an example.

Figure 3-12: Changing Login Password

```
Local> SET PRIVILEGED  
Password> system (not echoed)  
Local>> DEFINE SERVER LOGIN PASSWORD  
"82much"
```

3.2.5 Setting the Date and Time

The LRS can save the local time, coordinated Universal Time (UTC) (also known as Greenwich Mean Time), standard and Daylight Savings timezones, and the corresponding number of hours difference between UTC and the set timezone.

3.2.6 Setting the Clock

Use EZWebCon's Maintenance feature to set the local date and time, or use the Set/Define Server Clock command at the Local> prompt. The following example shows how to use the Define Server Clock command.

Figure 3-13: Setting the Clock

```
Local>> DEFINE SERVER CLOCK 14:15:00 12/31/  
1995
```

3.2.7 Setting the Timezone

The LRS is configured to recognize a number of timezones. To display these timezones, use the Show Timezone command at the Local> prompt. If your timezone is not displayed, see the LRS Reference Manual for instructions on how to set it manually.

Set the timezone by using EZWebCon's Maintenance feature, or using the Set/Define Server Timezone command at the Local> prompt:

Figure 3-14: Setting the Timezone

```
Local>> DEFINE SERVER TIMEZONE US/  
PACIFIC
```

3.2.8 Configuring a Timeserver

The LRS regularly verifies and updates its time setting with the designated timeserver. A timeserver is a host which provides time of day information for nodes on a network. To specify a timeserver or backup timeserver, either use the Set/Define IP Timeserver or Set/Define IPX Timeserver command.

Figure 3-15: Set IP Timeserver Command

```
Local>> DEFINE IP TIMESERVER 193.0.1.50  
Local>> DEFINE IP SECONDARY TIMESERVER  
193.0.1.51
```

3.2.9 Rebooting the LRS

Rebooting is necessary for three reasons: to make parameters entered with the Define command take effect immediately, to return the unit to factory defaults, and to reprogram the Flash ROM.

There are three ways to reboot the LRS:

- 1 Within EZWebCon, click the Reset button. EZWebCon will prompt you to confirm the reboot; click **OK**.
- 2 Using the front panel buttons, select the Reboot option.
- 3 At the Local> prompt, use the Initialize Server command.

3.2.10 Restoring Factory Default Settings

To restore the LRS to its factory default configuration, enter the **Initialize Server Factory** command at the Local> prompt.

3.2.11 Reloading Flash ROM

Reloading the Flash ROM is necessary if a new version of software is released and you wish to upgrade your unit to this version. To reload the Flash ROM, see the *Updating Software* appendix of the LRS Reference Manual.



A: Contact Information

If you are experiencing an error that is not listed in Appendix B; or if you are unable to fix the error, contact your dealer or Lantronix Technical Support at 800-422-7044 (US) or 949-453-3990. Technical Support is also available via Internet email at support@lantronix.com.

A.1 Problem Report Procedure

When you report a problem, please provide the following information:

- ◆ Your name, and your company name, address, and phone number
- ◆ Lantronix LRS model number
- ◆ Lantronix LRS serial number
- ◆ Software version (use the **Show Server** command to display)
- ◆ Network configuration, including the information from a **Netstat** command
- ◆ Description of the problem
- ◆ Debug report (stack dump), if applicable
- ◆ Status of the unit when the problem occurred (please try to include information on user and network activity at the time of the problem)

A.2 Full Contact Information

Address: 15353 Barranca Parkway, Irvine, CA 92618 USA

Phone: 949/453-3990

Fax: 949/453-3995

World Wide Web: <http://www.lantronix.com>

North American Direct Sales: 800/422-7055

North American Reseller Sales: 800/422-7015

North American Sales Fax: 949/450-7232

Internet: sales@lantronix.com

International Sales: 949/450-7227

International Sales Fax: 949/450-7231

Internet: intsales@lantronix.com

Technical Support: 800/422-7044 or 949/453-3990

Technical Support Fax: 949/450-7226

Internet: support@lantronix.com



B: Troubleshooting

This Appendix discusses how to diagnose and fix errors quickly yourself without having to contact a dealer or Lantronix. It will help to connect a terminal to the serial port while diagnosing an error to view any summary messages that are displayed.

When troubleshooting, always ensure that the physical connections (power cable, network cable, and serial cable) are secure. If you have trouble with wireless networking, it may help to connect the LRS to a wired Ethernet network to verify that it is working properly and to check the wireless settings.

Note: *Some unexplained errors may be caused by duplicate IP addresses on the network. Make sure that your LRS IP address is unique.*

B.1 Diagnosing the Error

To properly diagnose an error, connect a terminal to the console port. Take note of any error message displayed on the LCD or on a terminal. Table B-1 lists each error message, and problems that don't necessarily display a message. If the LCD or terminal displays an error message that isn't listed in the following table, try to match the message with one discussed in the table. If none match, contact your dealer or Lantronix Technical Support.

Table B-1: Error Messages

Problem	Error	Remedy
Terminal doesn't display information. Doesn't display a prompt.	The terminal's setup is incorrect or there is a connection error.	Check the terminal setup and physical connections. Try another terminal or cable, or try cycling power on the LRS.
Terminal displays a Boot> prompt rather than a Local> prompt	No network is present. Init Noboot was issued at the Local> prompt.	Check the cabling. If you are using the UTP port, check the hub. Configure and reboot the LRS, ensure that the button is not depressed.
	The Ethernet address is invalid.	Use the Set Server Hardware nn-nn-nn command to set the correct address. Reboot the LRS.
Request BOOTP: no valid reply received	The BOOTP request has failed.	The unit will still boot. Check the BOOTP server's configuration.
Request RARP: no valid reply received	The RARP request has failed.	The unit will still boot. See your host man pages for RARPD information.

Table B-1: Error Messages , cont.

Problem	Error	Remedy
Attempting NetWare boot: failed	The NetWare boot has failed.	Make sure that the LRS is using the proper fileserver name, and that the fileserver is running properly. Both devices must be on the same network. Make sure that the LRS is using the complete and correct loadfile pathname, including the drive name. Verify that the loadfile is in the login directory and is world-readable.
	The flash needs to be replaced.	Contact your dealer or Lantronix Technical Support for assistance.
File server xxxxxx not found	The NetWare boot has failed.	Make sure that the LRS is using the proper fileserver name, and that the fileserver is running properly. Both devices must be on the same network.
File not found	NetWare or TFTP could not locate the appropriate boot file.	Make sure that the LRS is using the complete and correct loadfile pathname, including the drive name. Verify that the loadfile is in the login directory and is world-readable.
Attempting TFTP boot: failed	The TFTP request has failed. The flash needs to be replaced.	See the LRS Reference Manual for TFTP troubleshooting information. Contact your dealer or Lantronix Technical Support for assistance.

Note: *If your LRS will not save software in its Flash ROMs, contact your dealer or Lantronix technical support.*

B.2 Power-up Troubleshooting

Problem situations and error messages are listed in Table B-2. If you cannot find an explanation for your problem, try to match it to one of the other errors. If you cannot remedy the problem, contact your dealer or Lantronix Technical Support.

Table B-2: Power-up Problems and Error Messages

Problem/Message	Error	Remedy
The LRS is connected to a power source, but there is no LED activity.	The unit or its power supply is damaged.	Contact your dealer or Lantronix Technical Support for a replacement.
The LRS is unable to complete power-up diagnostics.	This generally indicates a hardware fault. One of the LEDs will be solid red for three seconds, followed by one second of another color.	Note the blinking LED and its color, then contact your dealer or Lantronix Technical Support. The LRS will not be operational until the fault is fixed.
The LRS completes its power-up and boot procedures, but there's no noticeable serial activity.	There is a problem with the serial connection or the set-up of the serial device. A rapidly-blinking OK LED may signal boot failure.	Check the terminal setup and the physical connections, including the cable pinouts (see Appendix C). Try another serial device or cable, or cycle power on the LRS. Reboot the unit. When the LRS is running normally, the OK LED blinks every two seconds.

Table B-2: Power-up Problems and Error Messages, cont.

Problem/Message	Error	Remedy
The terminal shows a Boot> prompt rather than a Local> prompt.	<p>The LRS is not connected properly to the Ethernet.</p> <p>The LRS Ethernet address is invalid.</p> <p>Init Noboot command was entered.</p>	<p>Ensure that the LRS is firmly connected to a functional and properly-terminated network node.</p> <p>The LRS Ethernet address is located on the bottom of the unit. Use the Change Hardware command to set the correct address, then reboot.</p> <p>See <i>Entering Commands at the Boot Prompt</i> on page B-6.</p>
The LRS passes power-up diagnostics, but attempts to download new Flash ROM code from a network host.	<p>If the OK LED blinks rapidly, the Flash ROM code may be corrupt.</p> <p>If you did not request a TFTP boot, the flash ROM code is corrupt. The unit will remain in boot mode.</p>	Reboot the unit. If you get the same message, you will need to reload Flash ROM. See <i>Reloading Software</i> on page D-2.

B.3 DHCP Troubleshooting

Table B-3: DHCP Troubleshooting

Area to Check	Explanation
DHCP is enabled on the LRS	Use the Set/Define Server DHCP Enabled command. If you manually enter an IP address, DHCP is automatically disabled.
Make sure the DHCP server is operational.	Check to see that the DHCP server is on and is functioning correctly.
The LRS gets its IP address from the DHCP server	Refer to the DHCP Manager on your DHCP server for information about addresses in use. If the DHCP server doesn't list your LRS IP address, there may be a problem.

B.4 BOOTP Troubleshooting

If the BOOTP request is failing and you have configured your host to respond to the request, check these areas:

Table B-4: BOOTP Troubleshooting

Area to Check	Explanation
BOOTP is in your system's /etc/services file	BOOTP must be an uncommented line in /etc/services .
The LRS is in the loadhost's /etc/hosts file	The LRS must be in this file for the host to answer a BOOTP or TFTP request.
The download file is in the correct directory and is world-readable	The download file must be in the correct directory and world-readable. Specify the complete pathname for the download file in the BOOTP configuration file, or add a default pathname to the download filename.
The LRS and host are in the same IP network	Some hosts will not allow BOOTP replies across IP networks. Either use a host running a different operating system or put the LRS in the same IP network as the host.

B.5 RARP Troubleshooting

Table B-5: RARP Troubleshooting

Area to Check	Explanation
The LRS name and hardware address in the host's /etc/ethers file	The LRS name and hardware address must be in this file for the host to answer a RARP request.
The LRS name and IP address in the /etc/hosts file	The LRS name and IP address must be in this file for the host to answer a RARP request.
The operating system	Many operating systems do not start a RARP server at boot time. Check the host's RARPD documentation for details, or use the ps command to see if there is a RARPD process running.

B.6 Modem Configuration Checklist

Most modem problems are caused by cabling mistakes or incorrect modem configuration. However, the following items should be verified after any modem configuration, and re-checked when there is modem trouble.

- ◆ The modem must disconnect immediately when DTR is de-asserted.
- ◆ The modem must assert CD (or DSR, if connected) when connected to another modem. It must not assert CD when disconnected. The modem may optionally assert CD during outbound dialing.
- ◆ The modem and LRS must agree on the flow control method and baud rate scheme.
- ◆ The modem must not send result codes or messages to the LRS except optionally during outgoing calls.
- ◆ The modem should be set to restore its configuration from non-volatile memory when DTR is dropped.
- ◆ The modem should be configured to answer the phone if incoming connections are to be supported. Generally this is done with the **ats0=1** command.
- ◆ The modem should not be configured to answer the phone unless the LRS asserts DTR.
- ◆ LRS Modem control must be enabled. Using modems on ports without modem control enabled will lead to security problems.
- ◆ The LRS Autobaud feature should be enabled only when required.

B.7 Entering Commands at the Boot Prompt

If the Boot> prompt appears on the serial console instead of the Local> prompt, one of two things may be wrong. Either the LRS does not have enough information to boot, or the network or flash boot has failed. If pressing the **Return** key does not display a prompt, press any other key. The Boot> prompt should appear.

If the LRS does not have enough information to boot, or the network or flash boot has failed, it will print a message to the console and wait ten seconds for serial port activity. If it detects serial port activity, it will continue booting provided the flash is good. However, if the user presses a key during that time period, the LRS will display the Boot> prompt.

Note: *If you see the message “Will attempt another download in x minutes,” press any key for the Boot> prompt.*

A series of commands called Boot Configuration Program (BCP) commands can be entered at the Boot> prompt to configure the LRS. These commands are a subset of the entire LRS command set. For example, a typical TCP/IP configuration might use the following commands:

Figure B-1: BCP Command Examples

```
Boot> Set/Define IPADDRESS 192.0.1.229
Boot> Set/Define SOFTWARE /tftpboot/LRS.SYS
Boot> Set/Define LOADHOST 192.0.1.188
Boot> Set/Define SECONDARY 192.0.1.22
Boot> FLASH
% Initialization begins in 5 seconds.....
```

These commands set the Server's address, the software loadfile, and the loadhost's IP address (as well as that of a backup loadhost). The server then reboots using the **Flash** command and will attempt to load the file LRS.SYS from the host at 192.0.1.188.

Flush NVR

This command is used to restore the LRS's non-volatile RAM to its factory default settings. It will reset everything that is configurable on the server, including the unit's IP address.

Flash

This command will force the LRS to download new operational code and reload it into Flash ROM. This is necessary when a new version of software is released and you wish to upgrade your unit. If the server cannot download the file, the code in Flash ROM will still be usable.

Help

Displays a one-page summary of available commands and what they do.

Init 451

Reboots the LRS after it has been configured. If the LRS can find and load the specified software loadfile, it will restart itself with full functionality. If the loadfile is not found, the server will attempt to reload continuously. If there is an error, or if the console's **Return** key is pressed, the LRS will re-enter the Boot Configuration Program.

Set BOOTP {Enabled, Disabled}

Enables or disables the sending of BOOTP queries during the boot sequence. It is enabled by default.

Set DHCP {Enabled, Disabled}

Enables or disables the sending of DHCP queries during the boot sequence. It is enabled by default.

Set/Define Hardware xx-xx-xx	Specifies the last three numbers of the server's Ethernet address. The first three numbers will be supplied automatically.
	The Ethernet address should have been set at the factory. Setting an incorrect address could cause serious network problems.
Set/Define IPAddress ip_address	Specifies this server's IP address. Uses the standard numeric format.
Set/Define Loadhost ip_address	Specifies the host to attempt to load the file from. The IP address should be in standard numeric format (no text names are allowed).
Set/Define RARP {Enabled, Disabled}	Enables or disables the sending of RARP queries during the boot sequence. It is enabled by default.
Set/Define Secondary ip_address	Specifies a backup loadhost. The IP address should be in standard numeric format (no text names are allowed). The backup loadhost will be queried if the primary host cannot load the server.
Set/Define Software filename	Specifies the name of the file to load. The LRS will automatically add .SYS to the filename you specify. Note that all protocols must have a filename specified (either the default or set by the user). For more information, see <i>Appendix D</i> .
	TCP/IP users must use the Software option to specify the loadhost, the loadfile, and their own network address.
	TFTP users can specify a complete path name (up to 31 characters) if the file is located in a directory other than the default. The case of the filename must match that of the filename loaded onto the host computer.
Show Server	Use this command when issuing other commands to view the current LRS setup.

B.8 LRS2 Boot Menu

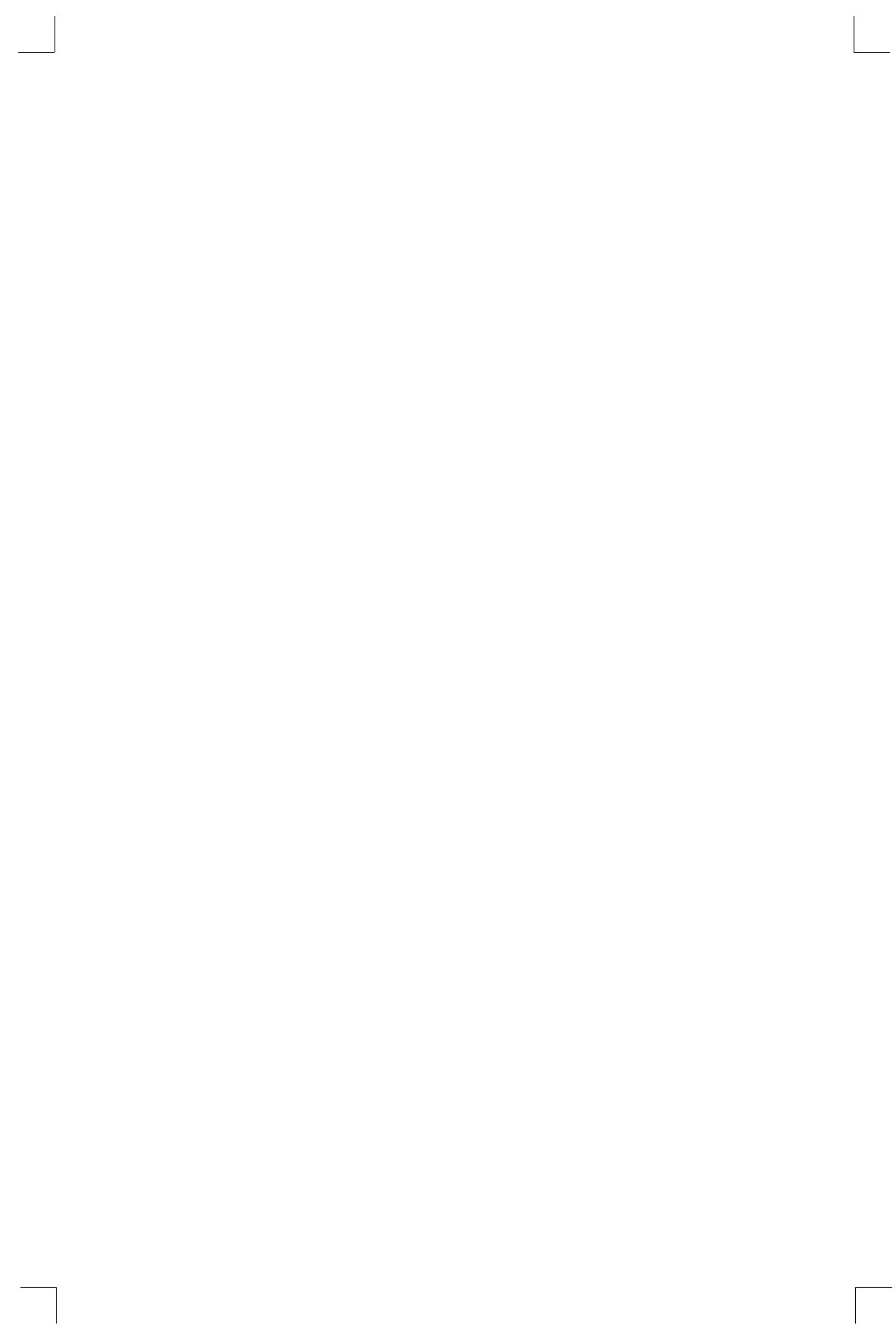
The LRS2 Boot Menu offers a number of options that affect how the LRS2 boots. To display this menu, use the **Initialize Server Noboot** command. The LRS2 will reboot and display the Boot Menu. Alternately, depress one of the front panel buttons and cycle power on the LRS2. Continue to depress the button until the message “Release button” is displayed on the LCD.

The Boot Menu will also display after the LRS2 has been reset to its factory defaults, or its non-volatile memory (NVR) has been flushed.

The Boot Menu contains the following options:

Table B-6: LRS2 Boot Menu

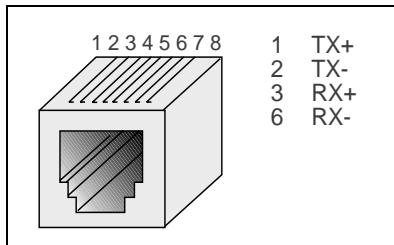
Boot Menu Option	Settings	Default
Scan Settings	[View only. Displays settings including Hardware (Ethernet) Address and ROM version.]	
Reset Options	Reboot Flush NVR Reload Flash	
BOOTP	BOOTP Enabled BOOTP Disabled	Enabled
RARP	RARP Enabled RARP Disabled	Enabled
ENet Interface	Using Auto Using UTP Using AUI Using BNC	Using Auto
IP Address		(undefined)
Loadhost IP Address		(undefined)
Second IP Host		(undefined)
NetWare Server		(undefined)
Software File		(undefined)



C: Pinouts

C.1 Ethernet Connector

Figure C-1: RJ45 Ethernet Connector

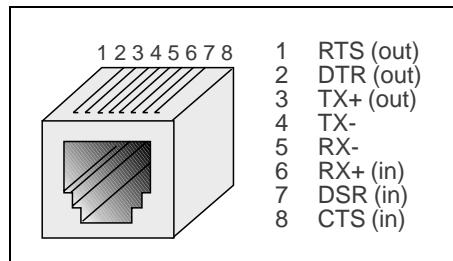


C.2 Serial Connectors

C.2.1 RJ45 Serial Connectors

LRS servers are RS-423 compliant, and are thus limited by the equipment at the remote end of the serial line. If the is connected to an RS-232 device, it is subject to RS-232 limits: 15m (50 ft.) in length at 9600 baud, and to 2m (6 ft.) at 115.2K baud, although longer lengths will generally work.

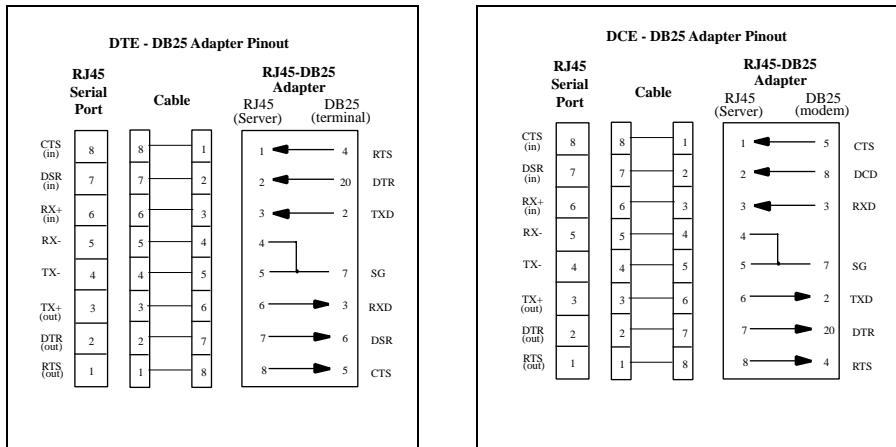
Figure C-2: RJ45 Serial Connector



C.2.1.1 RJ45 to DB25

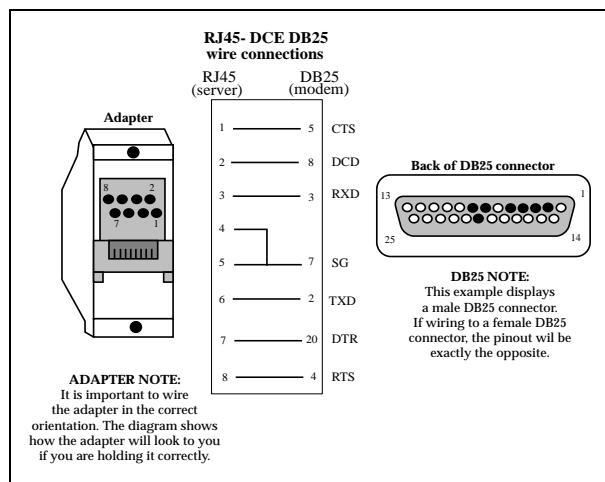
If you are connecting an RJ45 port to a DTE device (such as a terminal) that has a DB25 connector, you will need to use an RJ45-DTE DB25 adapter. To connect an RJ45 port to a DB25 connector on a DCE device, you will need an RJ45-DCE DB25 adapter. The pinout information for both connections is shown in Figure 0-2.

Figure C-3: Pinouts of RJ45-DB25 Connections



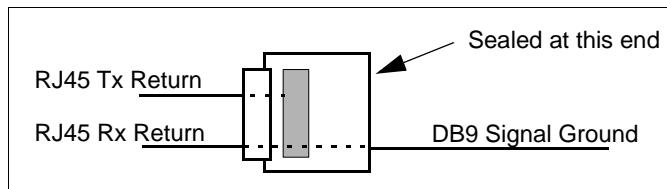
The arrows in Figure 0-2 represent the direction of the signal. The pinouts assume that the 8-conductor cable connecting the LRS and the adapter block is a swapped cable. Both the transmit and receive ground signals on the LRS connector are wired to the signal ground on a DB25 adapter.

Figure C-4: RJ45 to DCE DB25 Adapter



You can use a crimper block to connect both transmit and receive grounds from the RJ45 cable to the single signal ground on the DB25. The connector internally “splices” the two wires together and provides one wire into the DB25 connector as shown below.

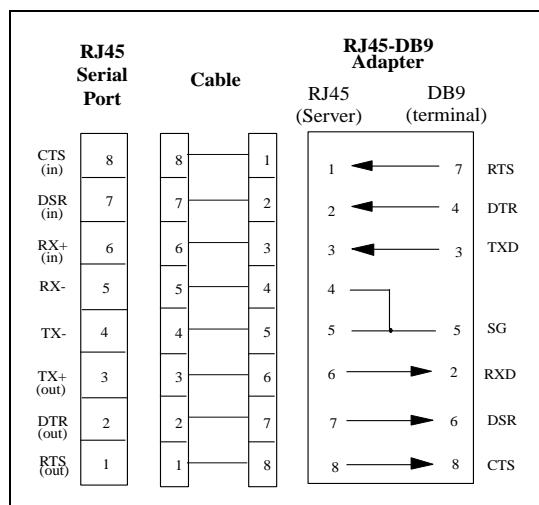
Figure C-5: Wire Splicer



To splice the wires, cut off the end of the wire that **does not** extend through the connector and insert both wires into the connector. Make sure that the wire that **does not** extend through the connector is in as far as possible to ensure a solid connection. Make sure that the wire that **does** extend through the connector extends far enough on the other side to be inserted in to the DB25 connector. Carefully squeeze the connector using a pair of pliers to make sure it is fully latched.

C.2.1.2 RJ45 to DB9

Figure C-6: RJ45-DTE DB9 Adapter



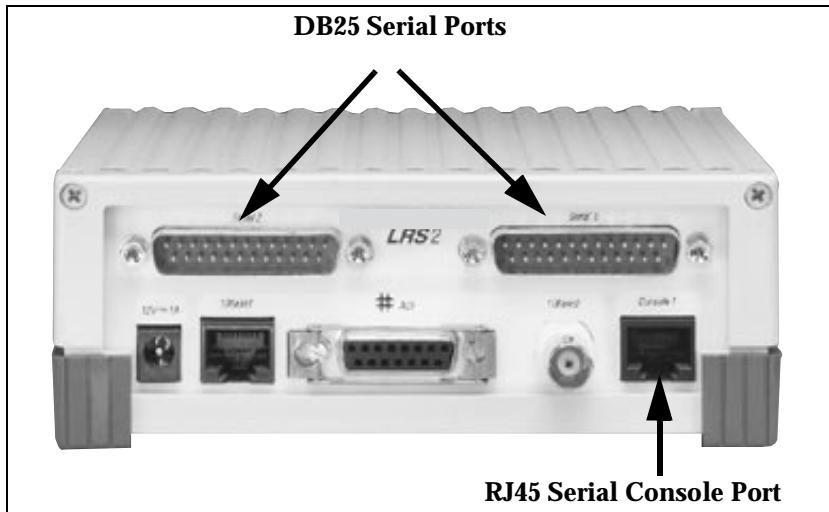
The arrows in Figure 0-5 represent the direction of the signal. The pinouts assume that the 8-conductor cable connecting the LRS and the adapter block is a swapped cable. Both the transmit and receive ground signals on the LRS connector are wired to the signal ground on a DB9 adapter.

The information about crimping the RJ45 ground wires in Section 0.1.1, *RJ45 to DB25* applies to the DB9 connector as well.

C.2.2 LRS2 Serial Connectors

The serial ports on the LRS2 are labeled **Console 1**, **Serial2**, and **Serial3**.

Figure C-7: LRS2 Serial Ports



C.3 Modem Wiring

C.3.1 DSR (Data Signal Ready) versus CD (Carrier Detect)

By default, most modems assert CD only during a valid connection. In this case the modem's CD pin may be wired to the Server's DSR pin. Alternately, many modems can be configured such that DSR acts like CD. In this case, the modem's DSR pin may be wired to the Server's CD pin.

C.3.2 DTR (Data Terminal Ready)

The MSS normally asserts DTR. When modem control is enabled on the MSS, the server will de-assert DTR for three seconds each time the port is logged out and each time a user disconnects from a modem service. The modem must be configured to hang up and recycle when DTR is de-asserted. If the modem is not configured in this way, sessions may not be properly disconnected.

D: Updating Software

D.1 Obtaining Software

Current software files (LRS.SYS) are available on the distribution CD. You can obtain software updates and release notes for the LRS from the Lantronix World Wide Web site (www.lantronix.com), or by using anonymous FTP through the Internet ([ftp.lantronix.com](ftp://ftp.lantronix.com)).

D.1.1 Via the Web

The latest version of LRS.SYS can be downloaded from the Lantronix Web site. At the time of this writing, the exact location of the files on the re-designed site was unknown.

Note: *As a result of Netscape Navigator's configuration, it may try to open the file as an ASCII text file. To avoid this, hold down the shift key when choosing the software file.*

D.1.2 Via FTP

The LRS software resides on the Lantronix FTP server ([ftp.lantronix.com](ftp://ftp.lantronix.com)). Most of these files are binary data, so the binary option must be used to transfer the files. All released files are in the **pub** directory. Always download the README file in the pub directory before downloading anything else; it contains a list of available software files.

To log into the FTP server, enter a username of **anonymous** and enter your full email address as the password. The following text will be displayed:

Figure D-1: Sample FTP Login

```
230-Welcome to the Lantronix FTP Server.  
230-  
230-IMPORTANT: Please get the README file before proceeding.  
230-IMPORTANT: Set BINARY mode before transferring executables.  
220-  
230-Direct questions to support@lantronix.com or 800-422-7044 (US)  
or 949-453-3990  
230-  
230 Guest login ok, access restrictions apply.  
Remote system type is [your type will be displayed here].  
ftp>
```

D.2 Reloading Software

The LRS stores software in Flash ROM to control the initialization process, operation, and command processing. The contents of Flash ROM can be updated by downloading a new version of the operational software via NetWare, TCP/IP, or MOP. Regardless of which protocol is used to update Flash ROM, the following points are important:

- ◆ The Flash ROM software file name, **LRS.SYS**, should not be changed.
- ◆ The download file should be world-readable on the host.
- ◆ There is a sixteen character length limit for the path name.
- ◆ There is a twelve character limit for the filename.
- ◆ Define commands must be used because Set configurations are cleared when the LRS boots. Use the **List Server Boot** command to check settings before rebooting.

Note: *If it is important to check LRS settings before using the Initialize Reload command to ensure that you are reloading the correct software file.*

D.2.1 Reloading Sequence

If DHCP, BOOTP, or RARP is enabled on the LRS, the LRS will request assistance from a DHCP, BOOTP, or RARP server before starting the download attempts. The LRS will then try TFTP, NetWare, and MOP booting (in that order) provided that it has enough information to try each download method.

Downloading and rewriting the Flash ROM will take approximately two minutes from the time the **Initialize** command is issued. If the download file cannot be found or accessed, the LRS can be rebooted with the code still in Flash ROM. The OK/ACT LED will blink quickly while the LRS is booting (and reloading code) and then slowly when it returns to normal operation.

Note: *If you experience problems reloading Flash ROM, refer to Troubleshooting Flash ROM Updates on page D-4.*

D.2.1.1 TCP/IP

Before the LRS downloads the new software, it will send DHCP, BOOTP, and/or RARP queries (all are enabled by default). Next, the LRS will attempt to download the LRS.SYS file using TFTP (Trivial File Transfer Protocol).

Note: *EZWebCon can also be used to reload software.*

If a host provides DHCP, BOOTP, or RARP support, it can be used to set the LRS IP address (all methods) and loadhost information (BOOTP and RARP only).

Some BOOTP and TFTP implementations require a specific directory for the LRS.SYS file. See your host's documentation for instructions.

To manually configure the LRS IP parameters for software reload, use the following commands.

Figure D-2: Configuring TCP/IP Reload

```
Local> SET PRIVILEGED
Password> SYSTEM (not echoed)
Local>> DEFINE SERVER IPADDRESS nnn.nnn.nnn.nnn
Local>> DEFINE SERVER SOFTWARE "/tftpboot/LRS.SYS"
Local>> DEFINE SERVER LOADHOST nnn.nnn.nnn.nnn
Local>> LIST SERVER BOOT
Local>> INITIALIZE RELOAD
```

Note: *For instructions on how to log into the LRS to enter these commands, see the Getting Started chapter.*

The path and filename are case-sensitive and must be enclosed in quotation marks. When attempting to boot across an IP router, you must configure the router to proxy-ARP for the LRS, or use the bootgateway feature. For more information, see **Set/Define Bootgateway** in the *Commands* chapter of the *Remote Access Server Reference Manual* located on the CD-ROM.

D.2.1.2 NetWare

The LRS.SYS file should be placed in the login directory on the NetWare file server. The LRS cannot actually log into the file server (since it knows no username/password); it can only access files in the login directory itself. On the LRS, specify the file server name, filename, and path.

Figure D-3: Configuring NetWare Reload

```
Local> SET PRIVILEGED
Password> SYSTEM (not echoed)
Local>> DEFINE SERVER NETWARE LOADHOST fileserver
Local>> DEFINE SERVER SOFTWARE SYS:\LOGIN\LRS.SYS
Local>> INITIALIZE RELOAD
```

D.2.1.3 MOP

The LRS.SYS filename is the only parameter that the LRS needs to reload via MOP. Make sure the service characteristic is enabled on the host's Ethernet circuit, copy the LRS.SYS file to the MOM\$LOAD directory, and reload the LRS using the **Initialize Reload** command. Be sure to use binary mode for the file transfer.

D.3 Troubleshooting Flash ROM Updates

Many of the problems that occur when updating the Flash ROM can be solved by completing the following steps:

Table D-1: Flash ROM Troubleshooting

Protocol	Area to Check
NetWare	Ensure the file is in the login directory. Since the LRS cannot actually log into the file server, it has very limited access to the server directories.
TFTP	<p>Check the file and directory permissions.</p> <p>Ensure the loadhost name and address are specified correctly and that their case matches that of the filenames on the host system.</p> <p>Ensure the file and pathnames are enclosed in quotes to preserve case.</p> <p>Ensure that TFTP is enabled on the host; several major UNIX vendors ship their systems with TFTP disabled by default.</p>
MOP	<p>The Ethernet circuit must have the service characteristic enabled.</p> <p>Ensure that the MOM\$LOAD search path includes the directory containing the LRS.SYS file.</p>

E: Specifications

E.1 Power Information

E.1.1 Power Requirements

Voltage:	110 V AC US, 220 V AC International
Frequency:	47-63 Hz
Operating Current:	700 mA @ 6 V
Power Consumption:	4.2 Watts maximum
Fuse Rating	1.6A, 250 Volts

E.1.2 Power Supply Cord

Cord type:	3 conductors, 1.0 mm ² minimum conductor size (approximately 18 AWG)
Rated for:	250 Volts AC, 10 Amps
Length:	3.0 meters

E.2 Environmental Limitations

E.2.1 Temperature

Operating range:	5° to 50° C (41° to 122° F)
Storage range:	-40° to 66° C (-40° to 151° F)
Max temp. change/hr:	20° C (36° F)

Rapid temperature changes may affect operation. Therefore, do not operate the LRS near heating or cooling devices, large windows, or doors that open to the outdoors.

E.2.2 Altitude

Operating maximum: 2.4 km (8,000 ft)

Storage maximum: 9.1 km (30,000 ft)

If operating the LRS above 2.4 km (8000 ft.), decrease the operating temperature rating by 1° F for each 1000 ft.

E.2.3 Relative Humidity

Operating range: 10% to 90% noncondensing, 40% to 60% recommended

Storage range: 10% to 90% noncondensing

Warranty Statement

Lantronix warrants for a period of FIVE years from the date of shipment that each LRS1 and LRS2 Remote Access Server supplied shall be free from defects in material and workmanship. During this period, if the customer experiences difficulties with a product and is unable to resolve the problem by phone with Lantronix Technical Support, a Return Material Authorization (RMA) will be issued. Following receipt of a RMA number, the customer is responsible for returning the product to Lantronix, freight prepaid. Lantronix, upon verification of warranty will, at its option, repair or replace the product in question, and return it to the customer freight prepaid. No services are handled at the customer's site under this warranty.

Lantronix warrants software for a period of sixty (60) days from the date of shipment that each software package supplied shall be free from defects and shall operate according to Lantronix specifications. Any software revisions required hereunder cover supply of distribution media only and do not cover, or include, any installation. The customer is responsible for return of media to Lantronix and Lantronix for freight associated with replacement media being returned to the customer.

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Warranty claims must be received by Lantronix within the applicable warranty period. A replaced product, or part thereof, shall become the property of Lantronix and shall be returned to Lantronix at the Purchaser's expense. **All return material must be accompanied by a return material authorization number assigned by Lantronix.**

Declaration of Conformity

(according to ISO/IEC Guide 22 and EN 45014)

Manufacturer's Name & Address: Lantronix
15353 Barranca Parkway, Irvine, CA 92618 USA

Declares that the product:

Product Name: Remote Access Server

Model Name/Number: LRS1
LRS2

Conforms to the following standards or other normative documents:

Safety: EN60950:1988+A1, A2

Electromagnetic Emissions: EN55022: 1998 (CISPR 22, Class A: 1993, A1: 1995, A2: 1996)
IEC 1000-3-2/A14: 2000
IEC 1000-3-3: 1994

Electromagnetic Immunity: EN55024: 1998 Information Technology Equipment-Immunity Characteristics
IEC 6100-4-2: 1995 Electro-Static Discharge Test
IEC 6100-4-3: 1996 Radiated Immunity Field Test
IEC 6100-4-4: 1995 Electrical Fast Transient Test
IEC 6100-4-5: 1995 Power Supply Surge Test
IEC 6100-4-6: 1996 Conducted Immunity Test
IEC 6100-4-8: 1993 Magnetic Field Test
IEC 6100-4-11: 1994 Voltage Dips & Interrupts Test

(L.V.D. Directive 73/23/EEC)

Supplementary Information: *The product complies with the requirements of the Low Voltage Directive 72/23/EEC and the EMC Directive 89/336/EEC.*

Manufacturer's Contact: Director of Quality Assurance, Lantronix
15353 Barranca Parkway, Irvine, CA 92618 USA

General Tel: 949/453-3990
Fax: 949/453-3995

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