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Agilent E2050 LAN/GPIB Gateway Installation and Configuration Guide



Agilent Technologies

Manual Part Number: E2050-90003
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Edition 4

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Safety Considerations

Product and Documentation Labels

A WARNING denotes a hazard that can cause injury or death. A CAUTION denotes a hazard that can damage equipment or cause data loss. Do not proceed beyond a WARNING or CAUTION notice until you understand the hazardous conditions and have taken appropriate steps.

Grounding

The power module (Agilent 0950-2546 AC/DC Adapter) is a safety class I product and has a protective earthing terminal. There must be an uninterruptible safety earth ground from the main power source to the product's input wiring terminals, power cord, or power cord set. Whenever it is likely that the protection has been impaired, disconnect the power cord until the ground has been restored.

Servicing

There are no user-serviceable parts inside the E2050 LAN/GPIB Gateway or its power module (AC/DC Adapter). Any servicing, adjustment, maintenance, or repair must be performed by service-trained personnel only. The power module does not have a power switch. The power cord is intended to serve as the disconnect device. Make sure the power module is installed near a wall outlet and is easily accessible.

Radio and Television Interference

This device has been verified to comply with FCC Rules Part 15. Operation is subject to these two conditions: (1) this device may not cause radio interference, and (2) this device must accept any interference received (including interference that may cause undesired operation).

This equipment generates and uses radio frequency energy. If not installed and used in accordance with this manual, it can cause interference to radio and television communications. The rules with which it must comply afford reasonable protection against such interference when it is used in most locations.

However, there can be no guarantee that such interference will not occur in a particular installation. If you think your device is causing interference, turn off the system. If the radio or television reception does not improve, your device is probably not causing the interference.

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If your device does cause interference to radio and television reception, you are encouraged to try to correct the interference by one or more of the following measures:

- Relocate the radio or TV antenna.
- Move the device away from the radio or television.
- Plug the device into a different electrical outlet, so that the device and the radio or television are on separate electrical circuits.
- Make sure you use only shielded cables to connect peripherals to your device.
- Consult your dealer, Agilent Technologies, or an experienced radio/ television technician for other suggestions.
- Order the FCC booklet *How to Identify and Resolve Radio-TV Interference Problems* from the U.S. Government Printing Office, Washington, D.C. 20402. The stock number of this booklet is 004-000-00345-4.

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Manufacturer's Name: Agilent Technologies, Incorporated
Manufacturer's Address: 815 - 14th St. SW
Loveland, Colorado 80537
USA

Declares, that the product

Product Name: LAN/GPIB Gateway
Model Number: E2050B
Product Options: *This declaration covers all options of the above product(s).*

Conforms with the following European Directives:

The product herewith complies with the requirements of the Low Voltage Directive 73/23/EEC and the EMC Directive 89/336/EEC (including 93/68/EEC) and carries the CE Marking accordingly.

Conforms with the following product standards:

EMC	**Standard**	**Limit**
	IEC 61326-1:1997+A1:1998 / EN 61326-1:1997+A1:1998	
	CISPR 11:1990 / EN 55011:1991	*Group 1 Class A*
	IEC 61000-4-2:1995+A1:1998 / EN 61000-4-2:1995	*4kV CD, 8kV AD*
	IEC 61000-4-3:1995 / EN 61000-4-3:1995	*3 V/m, 80-1000 MHz*
	IEC 61000-4-4:1995 / EN 61000-4-4:1995	*0.5kV signal lines, 1kV power lines*
	IEC 61000-4-5:1995 / EN 61000-4-5:1995	*0.5 kV line-line, 1 kV line-ground*
	IEC 61000-4-6:1996 / EN 61000-4-6:1996	*3V, 0.15-80 MHz*
	IEC 61000-4-11:1994 / EN 61000-4-11:1994	*Dips: 30% 10ms; 60% 100ms* *Interrupt > 95%@5000ms*
	Canada: ICES-001:1998 *Australia/New Zealand: AS/NZS 2064.1*	
	The product was tested in a typical configuration with Agilent Technologies test systems	
Safety	*IEC 61010-1:1990+A1:1992+A2:1995 / EN 61010-1:1993+A2:1995* *Canada: CSA C22.2 No. 1010.1:1992* *UL 3111-1: 1994*	

21 June 2001
Date

Ray Corson
Product Regulations Program Manager

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1

Introduction

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Introduction

This *Agilent E2050 LAN/GPIB Gateway Installation and Configuration Guide* gives guidelines to install and configure the E2050 LAN/GPIB Gateway (Gateway) for use with supported, network-equipped computer systems. You can also use this guide to administer the Gateway on your network and to troubleshoot installation or configuration problems. This chapter includes:

- How to Use This Guide
- E2050 Hardware Description
- E2050 Software/Firmware Architecture

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How to Use This Guide

The information in this guide assumes you are a Network Administrator who installs, configures, and maintains a local area network (LAN), including network-related hardware like the E2050 LAN/GPIB Gateway.

If you use a Series 700 HP-UX workstation with the Gateway, you must also have super-user (`root`) privileges on the HP-UX system. If you use a Windows NT PC with the Gateway, you must also have system administrator privileges on the Windows NT PC.

Guide Contents

Chapter	Description
Chapter 1 - Overview	Provides an overview of the E2050 LAN/GPIB Gateway.
Chapter 2 - Installation	Shows how to install the Gateway on LAN and GPIB.
Chapter 3 - Configuration	Shows how to configure the Gateway on your network.
Chapter 4 - Administration	Shows how to maintain the Gateway on the network.
Chapter 5 - Troubleshooting	Provides ways to fix problems with the Gateway.
Appendix A - Specifications	Provides specifications for the Gateway.
Glossary	Technical terms used in this guide.

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Related Software Documentation

Suggested software manuals you can use for E2050 LAN/GPIB Gateway operation with the listed I/O application software products follow. The E2050 Gateway supports all I/O application operations by these software products except for parallel polling, SICL commander sessions, and asynchronous aborting.

Product	Related Documentation
VISA	To use the LAN/GPIB Gateway, you must configure the LAN Client software provided with VISA. See the *Agilent I/O Libraries Installation and Configuration Guide* for configuration procedures. To develop and use VISA I/O applications for the Gateway, see *Agilent VISA User's Guide*.
SICL	To use the LAN/GPIB Gateway, you must configure the LAN Client software provided with SICL. See the *Agilent I/O Libraries Installation and Configuration Guide* for configuration procedures. To develop and use SICL I/O applications for the Gateway in Windows, see the *Agilent SICL User's Guide for Windows*. To develop and use SICL I/O applications for the Gateway in HP-UX, see the *Agilent SICL User's Guide for HP-UX*.
VEE	To use the LAN/GPIB Gateway, see the *VEE User's Manual* for configuration procedures. To develop and use VEE I/O applications for the Gateway, see the *VEE User's Manual*.
BASIC/ UX 700	**Version 8.x** To use the LAN/GPIB Gateway, you must configure the SICL LAN Client software provided with BASIC/UX 700 Version 8.x. See the *Installing and Using BASIC/UX 8.x* manual for configuration procedures. To develop and use BASIC/UX 700 Version 8.x I/O applications for the Gateway, see the *BASIC Interface Reference* manual. **Version 7.1** To use the LAN/GPIB Gateway, you must configure the SICL LAN Client software provided with BASIC/UX 700 Version 7.1. See the *Installing and Maintaining HP BASIC/UX* manual for configuration procedures. To develop and use BASIC/UX 700 Version 7.1 I/O applications for the Gateway, see the *BASIC Interface Reference* manual.

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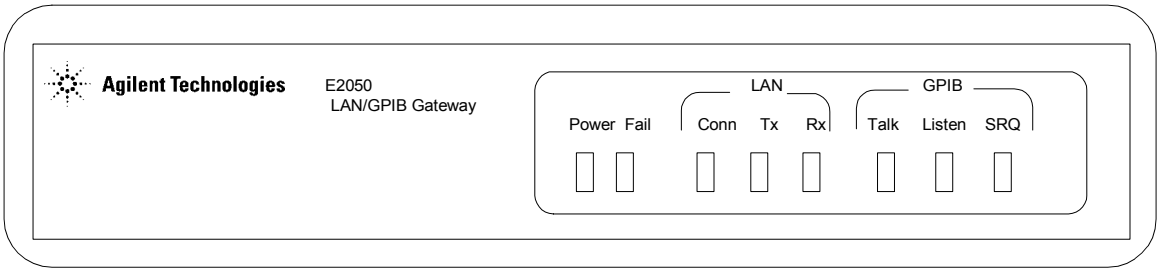
E2050 Hardware Description

In addition to this guide, the E2050 product package consists of:

- E2050 LAN/GPIB Gateway Front Panel
- E2050 LAN/GPIB Gateway Rear Panel
- AC/DC Adapter and Standard AC Power Cord
- Rack Mount Kit (Optional)

E2050 LAN/GPIB Gateway Front Panel

As shown in the following figure, the front panel of the Gateway contains 8 light-emitting diodes (LEDs) that indicate the status of the Gateway.



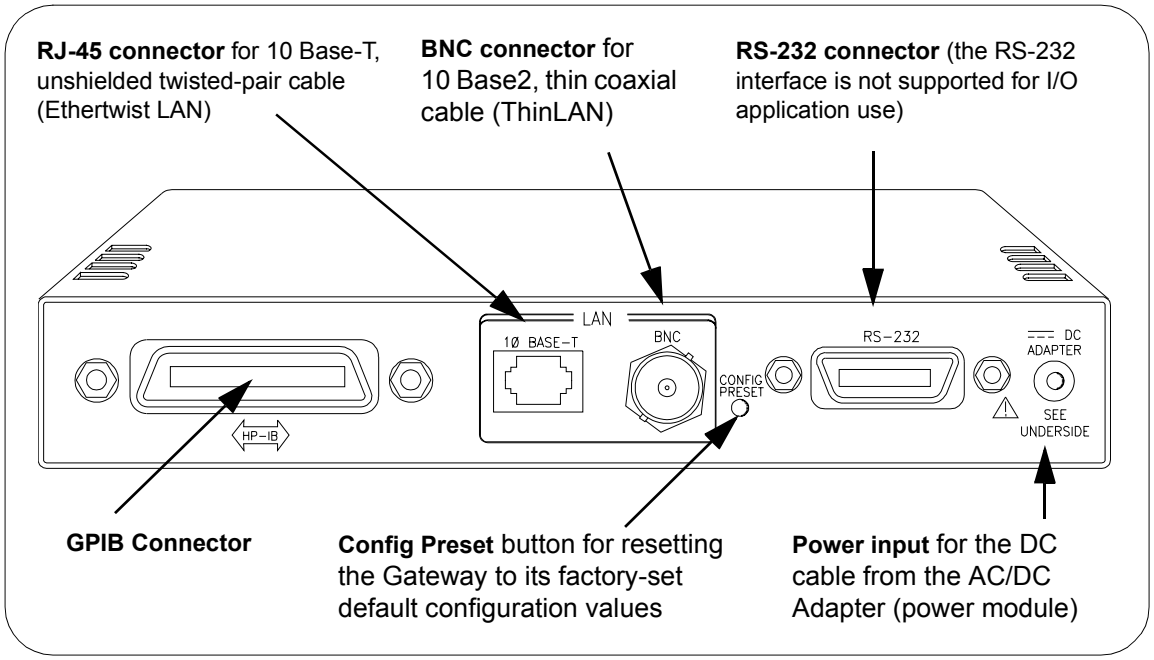
E2050 LAN/GPIB Gateway Front Panel

LED	Color	Meaning When Illuminated
Power	Green	Power is applied to the Gateway.
Fault	Red	Diagnostic failure of the hardware. This LED will normally be off.
LAN Conn	Yellow	A TCP/IP port is open (Telnet or a LAN connection). Flashes at a fast rate for BOOTP or a BOOTP with TFTP configuration. Flashes at a slow rate when the default IP address (`192.0.0.192`) is used (after the **Config Preset** button is pressed).
LAN Tx	Yellow	Flashes at 10 Hz rate when transmitting packets on the LAN.
LAN Rx	Yellow	Flashes at 10 Hz rate when receiving packets from the LAN.
GPIB Talk	Yellow	The Gateway is configured to TALK on the GPIB bus.
GPIB Listen	Yellow	The Gateway is configured to LISTEN on the GPIB bus.
GPIB SRQ	Yellow	The GPIB SRQ line is asserted.

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E2050 LAN/GPIB Gateway Rear Panel

This figure shows the back panel features of the Gateway. Note that the RS-232 interface is NOT supported for I/O application use..



E2050 LAN/GPIB Gateway Rear Panel

NOTE

Converters are available that provide an Attachment Unit Interface (AUI) connection (10 Base-T to DB15 AUI port) for ThickLAN or fiber optic networks (for Ethernet/IEEE 802.3 protocol).

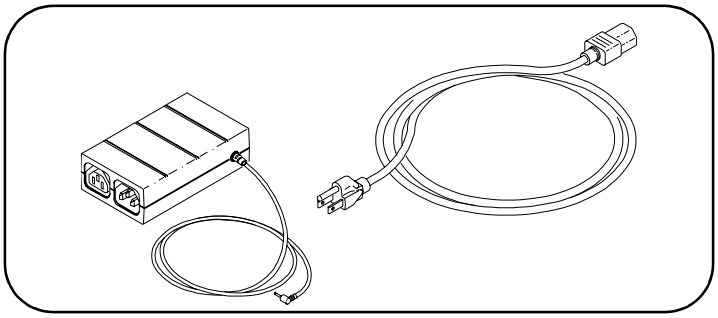
You will need to purchase both a converter and a Medium Attachment Unit (MAU) to use the E2050 LAN/GPIB Gateway with ThickLAN or a fiber optic network. Contact Agilent Technologies for information on these and other networking products.

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AC/DC Adapter and AC Power Cord

As shown in the following figure, the power module (AC/DC Adapter) (Agilent part number 0950-2546) provides 5 Vdc power to the Gateway. The 4-foot, DC cable attached to the power module connects to the power input on the back panel of the Gateway. The universal AC outlets on the power module can automatically accept and adapt to 100-240 Vac power.

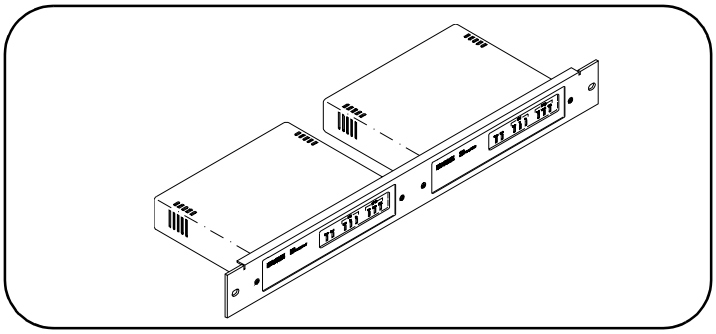
The separate AC power cord connects to the AC IN outlet on the power module and to a power outlet (wall outlet), thus providing power to the power module and Gateway. You should have received the appropriate AC power cord for your country.



AC/DC Adapter and Standard AC Power Cord

Rack Mount Kit (Optional)

As shown in the following figure, this optionally purchased E2051 Rack Mount Kit allows you to mount up to two LAN/GPIB Gateways in a rack frame. A light-duty, fixed shelf is also required. It is recommended you use an Agilent E3666 Plain Shelf with this rack mount kit.



Rack Mount Kit (Optional)

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E2050 Software/Firmware Architecture

This section describes E2050 software/firmware architecture, including:

- I/O Application Software Supported
- Typical LAN Connections
- Software/Firmware Overview
- Using Applications Software

I/O Application Software Supported

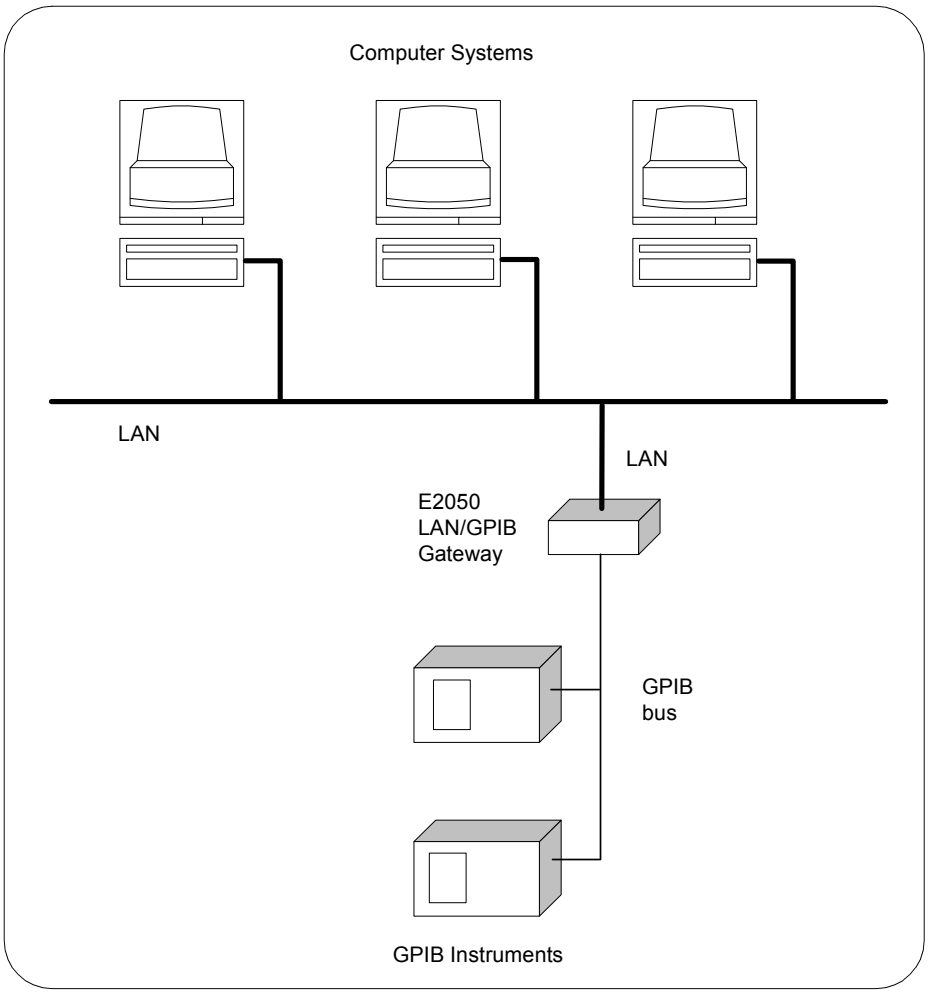
The E2050 LAN/GPIB Gateway supports these I/O application software products. The Gateway supports all I/O application operations provided by these software products except for parallel polling, SICL commander sessions, and asynchronous aborting.

- *Agilent Virtual Instrument Software Architecture* (VISA) on HP-UX or on Microsoft Windows 95, Windows 98, Windows 2000, Windows Me, or Windows NT (for WIN32 applications only), as applicable.
- *Agilent Standard Instrument Control Library* (SICL) on HP-UX or on Microsoft Windows 95, Windows 98, Windows 2000, Windows Me, or Windows NT (for WIN32 applications only).
- Agilent Visual Engineering Environment (VEE) on HP-UX or on Microsoft Windows 95, Windows 98, Windows 2000, Windows Me, or Windows NT (for WIN32 applications only).
- HP BASIC/UX 700 Version 7.1 or Version 8.x on HP-UX.

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Typical LAN Connections

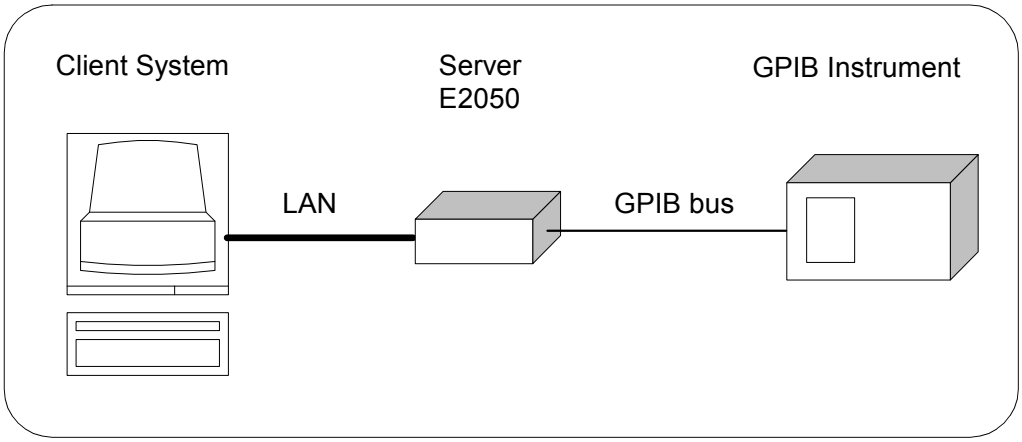
The E2050 LAN/GPIB Gateway combines hardware and firmware in a single box that provides a network gateway between network-equipped computer systems and GPIB based instruments. The Gateway enables users of I/O applications to obtain measurement data either locally or remotely from GPIB instrumentation. The following figure shows typical LAN connections for an E2050 Gateway.



Typical LAN Connections

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The Gateway connects the local area network (LAN) from the computer system to the GPIB bus. Network-equipped computer systems that are supported for use with the Gateway include Series 700 workstations and 32-bit PCs. Following the client/server model of computing, the computer system is the **client**, and the E2050 LAN/GPIB Gateway acts as the **server**.



Client - Server Configuration

Thus, I/O applications running on the computer system can transparently interface to GPIB-based instruments over the LAN. Since several computer systems can access the LAN/GPIB Gateway, groups of users can share access to the same GPIB instruments via the Gateway. In addition, existing I/O applications that are supported with the LAN/GPIB Gateway and are designed for GPIB can use the Gateway without modification beyond an address change.

The Gateway and its attached GPIB instruments can be placed anywhere on the network (rather than with a particular controller or server computer system). This includes networks which span different geographic locations, such as when networked computer systems are located at several different sites. Hence, GPIB instruments can be located where they are most convenient for I/O application users.

In addition, you can have more than one LAN/GPIB Gateway on a network, providing “clusters” of GPIB instrumentation at different locations. This further aids users in accessing the instrumentation they need for their specific I/O applications.

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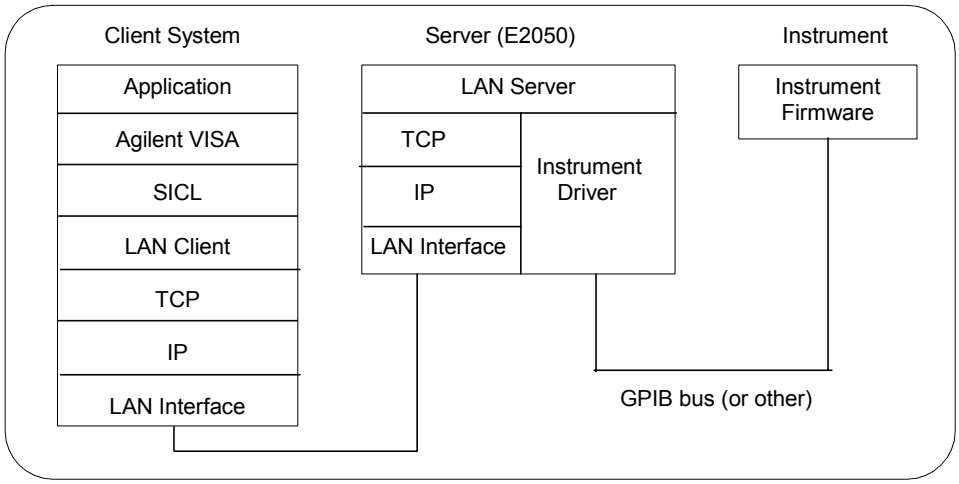
Software/Firmware Architecture Overview

Agilent SICL contains the LAN client software needed to access the LAN/GPIB Gateway. Thus, SICL is also provided with the VISA, VEE, and HP BASIC/UX 700 I/O application software products. To use any of these software products with the LAN/GPIB Gateway, you must also install and configure SICL on the client computer system.

Several of these software products support two different LAN networking protocols: the SICL LAN Protocol and the TCP/IP Instrument Protocol. Version A.01.00 or later of the LAN/GPIB Gateway supports the SICL LAN Protocol and VXI-11 (TCP/IP Instrument Protocol). To check your version of the Gateway (and the protocol(s) you can use with the Gateway depending on the software product you have), see C*hapter 4*.

As shown in the following figure, the client system contains the LAN client software provided with SICL as well as the TCP/IP LAN software needed to access the Gateway. The Gateway contains LAN server and TCP/IP LAN firmware so that it acts as the LAN server.

The LAN client software provided with SICL uses the TCP/IP LAN protocol suite to pass messages between the client system and the server (the E2050 LAN/GPIB Gateway). Therefore, the client sends I/O requests over the network to the server. The server then executes those I/O requests on the appropriate GPIB based instrument(s) connected to the server.



Software/Firmware Architecture

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Using Application Software

This section summarizes how the software on a client computer system works with the E2050 LAN/GPIB Gateway to complete I/O application operations on attached GPIB instruments. For more information on how to use your software with the Gateway, see the applicable software documentation as listed in “Related Software Documentation”.

Establishing a Network Connection

Before trying to perform an I/O application operation on the Gateway’s GPIB interface and the GPIB bus, the LAN client software in the client computer system establishes a network connection to the LAN server (the Gateway). Once the client establishes a connection, the client can begin to send I/O requests to the Gateway.

Maximum Client Connections

The Gateway (LAN server) can have multiple clients connected and being serviced at any given time. The maximum number of concurrent client connections depends on memory usage in the Gateway, including the number of clients and the number of current sessions running on those clients. However, at least 8, but not more than 15, client connections can be running concurrently. Thus, if the maximum number of client connections to the Gateway has not been exceeded, the connection is allowed to occur.

I/O Application Operation

Although several instruments can be connected to the Gateway’s GPIB bus, only one I/O application operation can occur on the GPIB bus at any given time. Therefore, once a client’s request begins to execute on the GPIB, all other client requests for operations on the GPIB must wait until the current client request completes. Client requests are serviced in a first come, first served manner, unless they are prohibited by interface or device locks.

Using Locks

If a client has a sequence of I/O application operations to perform that should not be preempted, the client should obtain a lock on the Gateway’s GPIB interface or device. Once the client’s sequence has completed, it should release its lock, allowing other clients access.

Closing a Network Connection

When a client closes a connection, the Gateway frees up the resources allocated to that client, including any locks, pending I/O requests, memory usage, etc. Abnormal termination (for example, the network and/or client goes down) is discussed in *Chapter 5*.

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2

Installation

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Installation

This chapter shows how to install the E2050 LAN/GPIB Gateway on the LAN and the GPIB bus for use with network-equipped computer systems, including:

- Hardware Requirements
- Software Requirements
- Hardware Installation

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Hardware Requirements

To install the Gateway, you must have the following hardware:

- One or more of these network-equipped computer systems to act as the LAN client system(s):
  - ❑ HP 9000 Series 700 workstation
  - ❑ 32-bit personal computer (PC)
- A local area network (LAN) to which the client system(s) and the E2050 LAN/GPIB Gateway can connect via the appropriate LAN cables.
- The E2050 LAN/GPIB Gateway.
- The power module and standard power cord to provide power to the Gateway.
- Optionally, a separately purchased rack mount kit in which you can mount the Gateway.
- GPIB instrument(s), including the GPIB cable(s) needed to connect the Gateway to the instrument(s).

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Software Requirements

Each client computer system that will access the Gateway must be running one of the following operating systems.

- HP-UX Version 9 or Version 10.01 or later (for Series 700 workstations)
- Microsoft Windows 95, Windows 98, Windows 2000, Windows Me, or Windows NT (for 32-bit PCs)

You must also have one or more of the following I/O application products installed and configured on each client computer system that you want to use with the Gateway.

- Agilent I/O Libraries, including one or more of the following:
  - Agilent VISA on HP-UX or on Microsoft Windows 95, Windows 98, Windows 2000, Windows Me, or Windows NT (for WIN32 applications only) as applicable.
  - Agilent SICL on HP-UX or on Microsoft Windows 95, Windows 98, Windows 2000, Windows Me, or Windows NT (for WIN32 applications only).
  - Agilent VEE on HP-UX or on Microsoft Windows 95, Windows 98, Windows 2000, Windows Me, or Windows NT (for WIN32 applications only)
  - HP BASIC/UX 700 Version 7.1 or Version 8.x on HP-UX.

For information on configuring these software products for use with the Gateway, see “Related Software Documentation” in *Chapter 1*.

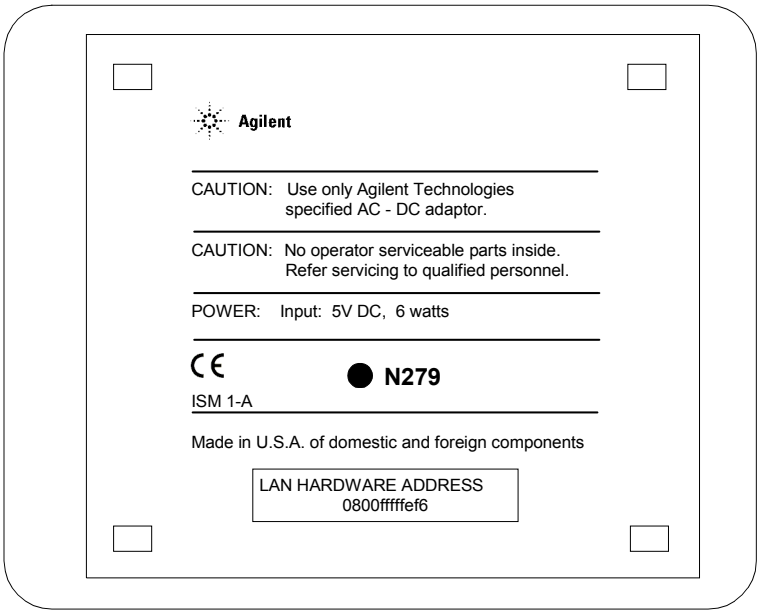
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Installing the Hardware

This section shows how to install the LAN/GPIB Gateway hardware by connecting it to the LAN, GPIB bus, and power module.

Step 1: Record LAN Hardware Address

First, find the hardware address of the LAN interface in the E2050 LAN/GPIB Gateway. Turn the Gateway over and look for the label on the underside of the Gateway. The hardware address on the label will be similar to **0800*xxxxxx***. Write down this address, as you may need it later to configure the Gateway on the network.



Finding the LAN Hardware Address (MAC)

Step 2: Configure the Network

- If you purchased the optional rack mount kit, follow that kit's documentation to assemble the rack and to install the Gateway in the rack's frame.
- Make sure the GPIB instrumentation you will connect to the Gateway is working properly and is connected to the GPIB bus.

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Step 3: Connect the Gateway to the Network

CAUTION

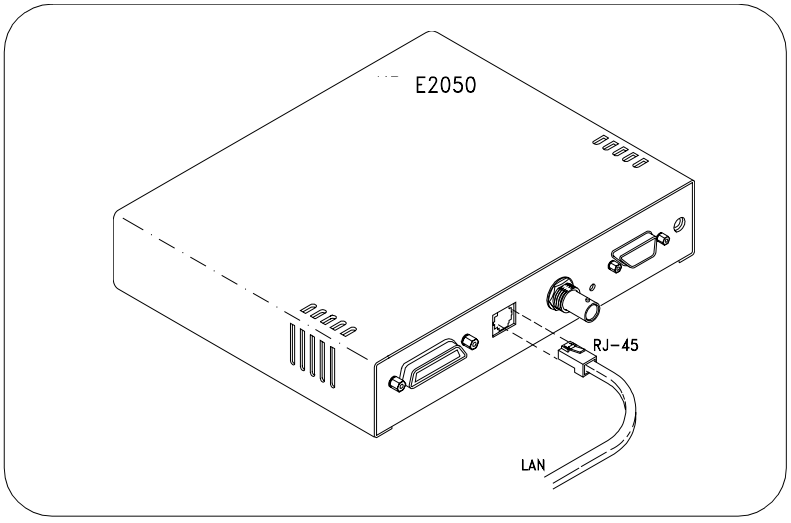
Do not connect to both the RJ-45 and the BNC connectors on the Gateway. Only one connection to the LAN interface in the Gateway can be made at a time. Data loss may occur if you try to use both connectors simultaneously. The Gateway will automatically select the active port.

NOTE

To connect the Gateway to a ThickLAN or fiber optic network, see the hardware documentation for with your ThickLAN or fiber optic network to connect the LAN cable to the RJ-45 connector on the Gateway.

To connect the Gateway directly to a client computer system, you will need a special twisted-pair cable. Contact Agilent Technologies for more information.

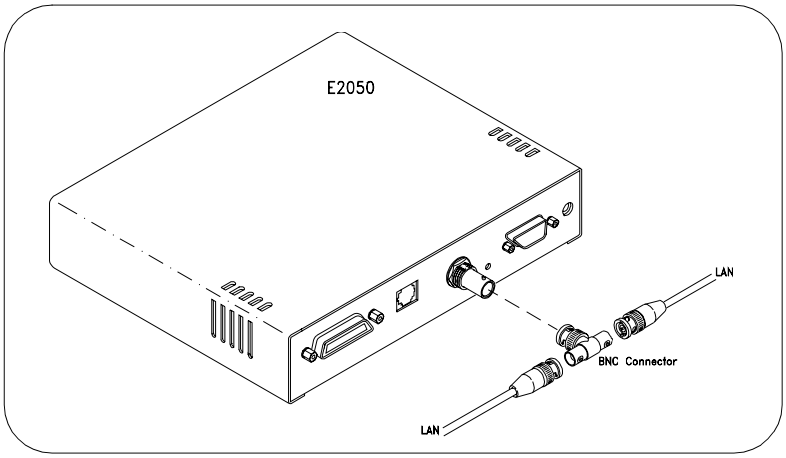
- **Ethertwist Connection.** For Ethertwist, connect the LAN cable to the RJ-45 connector on the back panel of the Gateway.



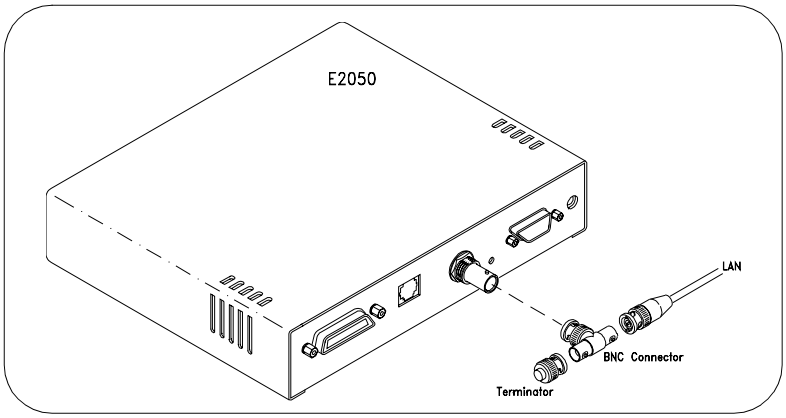
Connecting to an Ethertwist LAN Using an RJ-45 Connector

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- **ThinLAN Connections.** For ThinLAN, connect the LAN cable to the BNC connector on the back panel of the Gateway using a BNC “T” connector. Make sure the ThinLAN segment is properly terminated. If the Gateway is the end node on the LAN, a 50-ohm BNC terminator must be attached to the “T” connector.



Connecting to a ThinLAN Using a BNC “T” Connector



Connecting to a ThinLAN Using a BNC “T” Connector and 50-Ohm Terminator

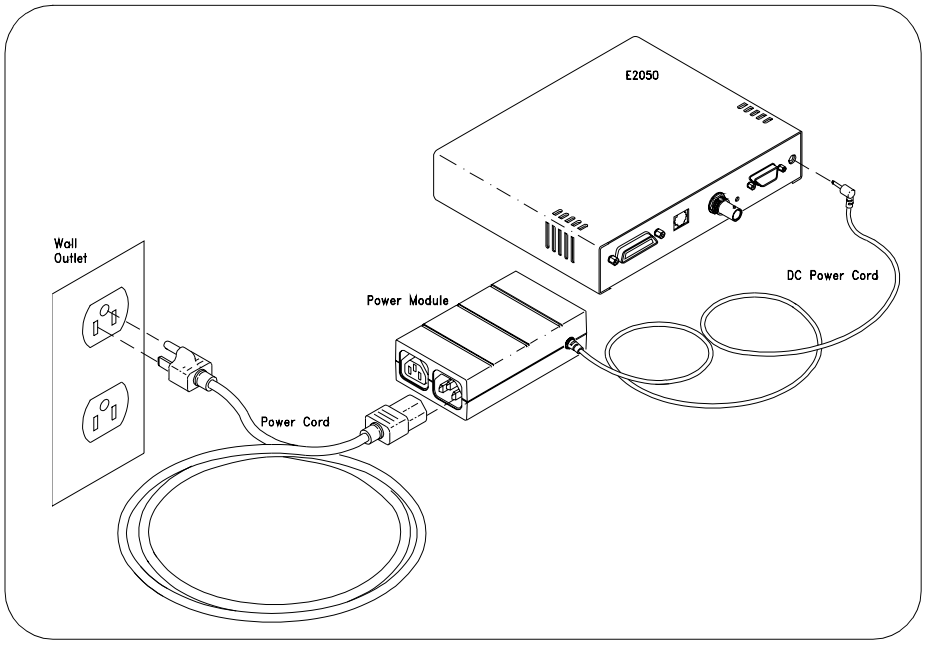
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Step 4: Connect GPIB Cable and Power Cords

NOTE

The power module and Gateway do not have power switches. Connecting the standard AC power cord to the power source (wall outlet) activates both units. The power module automatically adapts to the correct AC voltage range for your power source.

- Connect the GPIB cable from the GPIB instrument(s) to the GPIB connector on the back panel of the Gateway.
- Connect the DC power cord attached to the power module (AC/DC Adapter) to the power input on the back panel of the Gateway, as shown.
- Connect the standard AC power cord to AC IN on the power module and to a power outlet (wall outlet), as shown.



Connecting the Power Module

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Step 5: Observe the Power-On Sequence

- The Gateway now goes through its power-on, hardware self-test. Verify that the hardware is working properly by looking at the LEDs on the front panel of the Gateway.
- The green **Power** LED should now be illuminated and the red **Fault** LED should be off. One or more of the yellow **LAN** LEDs may also be flashing. Ignore the LAN LEDs at this time.
- The red **Fault** LED is illuminated *briefly* at power-on to verify its operation. If the **Fault** LED *remains* illuminated, a hardware fault was found during the power-on, hardware self-test of the Gateway. Please contact Agilent Technologies for instructions. Service is required *only* if the **Fault** LED remains illuminated.
- Once you have verified that the hardware is working properly (the Gateway's green **Power** LED is illuminated), disconnect the standard AC power cord from the power outlet (wall outlet).

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Notes:

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Configuration

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Configuration

This chapter gives guidelines to configure the E2050 LAN/GPIB Gateway on your network. You can use this chapter if you are configuring the Gateway for the first time on your network or if you need to change the Gateway's configuration.

NOTE

If the E2050 LAN/GPIB Gateway is already configured and you want to change the configuration, see "Configuring the Gateway" in *Chapter 4* first. Then, use this chapter to reconfigure the Gateway.

This chapter includes:

- Setting Configuration Values
- Using Configuration Methods

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Setting Configuration Values

This section gives guidelines to set E2050 configuration values, including:

- Steps to Set Configuration Values
- Configuration Values Descriptions
- Default Configuration Settings
- How Configuration Values are Used

Steps to Set Configuration Values

To configure an E2050 LAN/GPIB Gateway on a network, you will need to:

- Know the configuration values that can be used for the Gateway, including the defaults (if any) that are preset for each configuration value.
- Decide which configuration values you will need to change or set for the Gateway.
- Use one of three configuration methods on HP-UX or use the Telnet configuration method on Windows 95, Windows 98, Windows 2000, Windows Me or Windows NT to change or set desired configuration values for the Gateway.

Configuration Values Descriptions

This section provides a brief description of the configuration values that are used to configure the E2050 LAN/GPIB Gateway on a network.

The most important configuration value is the Internet Protocol (IP) address of the LAN/GPIB Gateway. Without a proper IP address, the Gateway may not respond or may operate unexpectedly.

At a minimum, you *must* set the IP address for the LAN/GPIB Gateway on your network. In fact, the IP address may be the only configuration value you will need to set. To determine what configuration values other than the IP address (if any) you will need for the Gateway, see this section and the “Default Configuration Settings” section.

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NOTE

IP addresses for network devices are assigned by a designated Network Administrator in your workplace. If you are not the Network Administrator, you will need to contact the designated Network Administrator who can assign the Gateway's IP address for you.

The following table describes the configuration values for the E2050 and the applicable default (factory-set) values. The E2050 LAN/GPIB Gateway is shipped from the factory with default settings for the configuration values listed in the table. You can use the methods described in "Using Configuration Methods" to change or set any of the configuration values as needed.

The E2050 LAN/GPIB Gateway uses these default configuration values until you explicitly change any value of these values and set any other configuration values. The Gateway also uses these values when you press the Gateway's **Config Preset** button (on the back panel of the Gateway).

Value	Default Value	Description
BOOTP ON/OFF	`ON`	This value is used to enable (ON) or disable (OFF) a BOOTP or a BOOTP with TFTP configuration of the LAN/GPIB Gateway. This value is only used with the Telnet configuration method.
Default Subnet Gateway Address	`0.0.0.0`	This value is the IP address of the default subnet gateway that allows the E2050 LAN/GPIB Gateway to communicate with systems that are not on the local subnet. Thus, this is the default subnet gateway where packets are sent which are destined for a device not on the local subnet, as determined by the subnet mask setting. Only one default subnet gateway can be configured. A value of `0.0.0.0` indicates that no subnetting is to be done.
Hardware Address (MAC)	N/A	This value is the unique address of the LAN interface in the LAN/GPIB Gateway. (The LAN hardware address is also often called the link-level address, the Ethernet station address, or the LANIC ID.) The LAN hardware address is printed on a label on the underside of the LAN/GPIB Gateway box.

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Value	Default Value	Description
Hardware Address (MAC) (cont'd)	N/A	The hardware address value cannot be set or changed with Telnet configuration of the LAN/GPIB Gateway. However, the hardware address value must be specified and set when using the BOOTP or the BOOTP with TFTP configuration method.
Hostname	**E2050**	This value configures the Internet domain name for the LAN/GPIB Gateway. This name is used in some error and status messages, but is not a required configuration setting. The maximum length of the **hostname** value is 35 characters.
HP-IB Address	**21**	This value configures the GPIB bus address. This address is used when transfers are made on the GPIB bus. A SICL client application can change this value by using the SICL function **IGPIBBUSADDR**. The GPIB address value can be any number **0** through **30**.
HP-IB Interface Name	**hpib**	This value is the symbolic name of the GPIB interface in the LAN/GPIB Gateway. It is used in a SICL client application's **iopen** operation to symbolically reference the GPIB interface in the Gateway. The maximum length of the GPIB interface name is 15 characters. If VXI-11 (TCP/IP Instrument Protocol) is used, the name must be changed to **gpib0**. Also, for VISA LAN client, this name must match the name set in the *IO Config* utility.
HP-IB Logical Unit	**7**	This value is the interface logical unit number of the GPIB interface in the LAN/GPIB Gateway. It may be used in a SICL client application's **iopen** statement to uniquely identify the GPIB interface in the Gateway. The GPIB logical unit value can be any number **1** through **255**.
I/O Timeout	**120 sec**	This value sets the server I/O timeout in seconds. It configures the Gateway to use an I/O timeout of the specified amount of seconds if the client requests a timeout of infinity. If **0** is specified for this value and the client requests infinity, the Gateway will use a timeout of infinity as requested. This timeout value may be used to ensure that the Gateway does not wait indefinitely for an I/O operation. It also allows the Gateway to detect certain network events (such as when a client connection is dropped) that may otherwise go undetected. If the Gateway detects such a condition, it will release any resources, such as locks, associated with the client.

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Value	Default Value	Description
IP Address	`192.0.0.192`	This value is the Internet Protocol (IP) address of the LAN/GPIB Gateway. The IP address is a required value and is used for all IP and TCP/IP communications with the LAN/GPIB Gateway. The IP address is represented in dotted decimal notation (for example, `154.140.222.201`). This number is not assigned by Agilent. Rather, it is assigned by your designated Network Administrator. The LAN/GPIB Gateway uses the default IP address of `192.0.0.192` as a temporary IP address until you configure a true IP address.

IP Allow List	* (all allowed)	The IP allow list defines a list of computer systems that are allowed to communicate with the LAN/GPIB Gateway. When a computer system attempts to connect to the LAN/GPIB Gateway, the Gateway checks the IP address of the computer system requesting the connection against the list of IP addresses that are allowed access to the LAN/GPIB Gateway.
		
		The IP address(es) of the computer system(s) are represented in dotted decimal notation, with each IP address separated by a blank space. The maximum length of the allow list is 125 characters. Not specifying an allow list or specifying an allow list value of * (the asterisk wild card character) allows connections from all computer systems on the network.
		
		An example IP allow list entry follows that lists the specific IP addresses of two computer systems that are allowed to communicate with the LAN/GPIB Gateway:
		
		`allow: 156.140.34.2  192.54.24.5`
		
		You can also use the asterisk wild card character (*) to signify all IP addresses. For example, either of the following entries allow all computer systems with IP addresses starting with `156.`140:
		
		`allow: 156.140.*.*` or `allow: 156.140.*`
		
		In addition, you can use a dash character (-) between numbers to signify a range of IP addresses. For example:
		
		`allow: 156.140.34-48.2  192.54.24-37.*`

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Value	Default Value	Description
LAN Timeout	`0 sec`	This value sets the LAN connect timeout in seconds. The Gateway may use the TCP keepalive timer of the TCP/IP protocol stack to determine if a client is still reachable. By specifying this configuration value, the Gateway turns on the keepalive timer when connecting to the client. If after the specified amount of time there has been no activity on the connection, the Gateway will send keepalive probes to the client to determine if it is still alive. After a system specified amount of time, the connection will be marked as down ("dropped"), and the Gateway will release any resources which were allocated to the associated client. A value of `0` means no timeout is set. Thus, the Gateway will wait forever and no keepalive probes are sent. If this value is set, it is recommended that the largest value be used which still meets the application's need for unreachable client detection. Smaller LAN timeout values will generate keepalive probes (network traffic) more often than larger values in an otherwise idle but healthy system, using more of the available network bandwidth.
Subnet Mask	`0.0.0.0`	This value is used to enable the LAN/GPIB Gateway to determine if an IP address is on the same local subnet as the LAN/GPIB Gateway itself. When an address is on a different subnet, all packets must be sent to a subnet gateway. The subnet mask is sometimes not needed with subnet gateways, which automatically know when to forward packets between subnets. A value of `0.0.0.0` or `255.255.255.255` indicates no subnetting is to be done.
Syslog Server Address	`0.0.0.0`	This value, which is only available on HP-UX (not on Windows 95/98/2000/Me/NT), is the IP address of the syslog server to which you want the LAN/GPIB Gateway to send syslog messages. Syslog messages identify changes in the LAN/GPIB Gateway's status or error conditions that have occurred. A `syslogd` daemon on the syslog server reads and forwards messages to a log file.

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Value	Default Value	Description
Syslog Server Address (cont'd)	`0.0.0.0`	Typically, **`syslogd`** obtains its routing information from the **`/etc/syslog.conf`** configuration file, which you can edit to specify the log file to which you want syslog messages from the LAN/GPIB Gateway routed. See **`syslogd(1M)`** for more information on the **`syslogd`** daemon and the **`syslog.conf`** file. The syslog server's IP address is represented in dotted decimal notation. This is not a required configuration setting. However, setting up a syslog server and log file is recommended, as syslog messages are helpful in administering the LAN/GPIB Gateway and troubleshooting problems with the Gateway.
TFTP File	N/A	This value is the path to an optional, TFTP configuration file. This value is only used with the BOOTP with TFTP configuration of the LAN/GPIB Gateway. The TFTP file contains additional configuration values, including LAN timeout, I/O timeout, IP allow list, GPIB address, GPIB interface name, and/or GPIB logical unit. The maximum length of the path to the TFTP file is 33 characters. The TFTP file name is usually designated with a **`.cfg`** extension. There are two modes for running TFTP: one which uses the TFTP home directory (the default mode) and one where a path is specified on the TFTP command line (the command line is normally set in the **`/etc/inetd.conf file`** on both HP-UX Versions 9 and 10.01). If no path is specified on the command line (the default mode), a *relative* path from the home directory must be used. In this case, the path to the TFTP configuration file is relative either from the **`/usr/tftpdir`** directory on HP-UX Version 9 or from the **`/home/tftpdir`** directory on HP-UX Version 10.01. However, if a path is specified on the command line, the full path to the TFTP configuration file must be used.

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How Configuration Values are Used

The E2050 LAN/GPIB Gateway uses the default configuration values and/or the configuration values that you changed or set depending on certain situations, such as when the power is cycled on the Gateway or when the **Config Preset** button on the back panel of the Gateway is pressed.

This section summarizes how configuration values are used in various situations. This information can help you better maintain the Gateway and more easily troubleshoot problems you may encounter with the Gateway.

This section also describes how the Gateway uses the configuration values during the Gateway's power-on initialization sequence (after power is cycled on the Gateway) and when the Gateway's **Config Preset** button is pressed.

During the Power-on Initialization Sequence

When power is applied to the Gateway and the hardware self-test has completed, the networking subsystem is initialized. What happens during this initialization sequence depends on what configuration method, if any, has been used to configure the Gateway.

After Telnet Configuration

If you have used the Telnet configuration method to set the IP address, the Gateway will not send BOOTP requests at power-on to configure itself. Instead, the Gateway will simply use the IP address and any other configuration values that were set through Telnet.

Prior to Successful Configuration with BOOTP or BOOTP with TFTP

If you are applying power to the Gateway before it has been successfully configured with an actual IP address via BOOTP or BOOTP with TFTP, the Gateway will send BOOTP requests to the BOOTP server for up to five minutes. When the BOOTP server's **`bootpd`** daemon receives the request, it will search the **`/etc/bootptab`** configuration file for an entry that matches the Gateway's LAN hardware address.

When a match is found, **`bootpd`** retrieves the configuration data associated with the entry and sends it to the Gateway as a BOOTP response. The Gateway then completes its initialization using the configuration data provided in the BOOTP response.

After BOOTP or BOOTP with TFTP Configuration

If you have applied power to the Gateway one or more times since configuration, the Gateway will have successfully completed BOOTP requests in the past. Thus, the Gateway will send BOOTP requests for only one minute before it stops and then uses the previous BOOTP response stored in the Gateway's non-volatile memory.

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When the Config Preset Button is Pressed

The recessed **Config Preset** button on the back panel of the Gateway is used to reset the LAN/GPIB Gateway to its default configuration values (preset at the factory). The **Config Preset** button has two modes of operation.

- If you press the **Config Preset** button *at the same time as you apply power to the Gateway*, all previous configuration information is erased and all default configuration values are used.

  This is helpful if you want to completely reconfigure the Gateway, but you first need to set the Gateway to a known state (to a state where the Gateway is using all of its default configuration values).

- If you press the **Config Preset** button *after power is applied*, previous configuration information is not erased, but the Gateway *temporarily* uses its default IP address. That is, only the IP address is reset to its default value temporarily. Once you reboot or cycle the power again, the Gateway will return to its actual IP address that was previously set.

  This is helpful if you want to interrogate the Gateway at a known address in preparation for setting a new IP address for the Gateway. However, all network connections to the Gateway, if any, are also terminated without any cleanups.

NOTE

If you use the default IP address, you may need to explicitly tell your networking software how to talk to the Gateway. This is because the default IP address may appear to be on a different subnet. Use the **`route`** command, as follows.

• On HP-UX client systems, as root:

`route add host 192.0.0.192` *your_system_name* **Return**

• On Windows 95/98/2000/Me/NT client systems:

`route add 192.0.0.192` *your_system_name* **Enter**

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Configuration Methods

This section describes configuration methods you can use to set the configuration values for the E2050 LAN/GPIB Gateway, including:

- Configuration Methods Overview
- Using Telnet Configuration Method (Windows)
- Using Telnet Configuration Method (HP-UX)
- Using BOOTP Configuration (HP-UX)
- Using BOOTP with TFTP Configuration Method (HP-UX)

Configuration Methods Overview

Summary descriptions of the three methods to configure an E2050 LAN/GPIB Gateway on a network follow.

NOTE

If you configure the Gateway on your network from a **Windows 95/98/2000/Me/NT Client System,** you *must* use the Telnet configuration method. Neither the BOOTP nor the BOOTP with TFTP configuration methods are available on Windows 95/98/2000/Me/NT.

If you configure the Gateway on your network from an **HP-UX Client System,** you can use any one of the three configuration methods.

Telnet

Telnet is a networking protocol that connects to the Gateway and then provides a command line interface to assist you in configuring the Gateway on the network. If you prefer to use a command line interface (rather than having to edit files, as you would in the BOOTP and the BOOTP with TFTP methods), you may want to choose this method to configure the Gateway on the network. You can use Telnet from either an HP-UX or a Windows 95/98/2000/Me/NT client system to set or change *any* of the configuration values for the Gateway.

The Telnet utility used to configure the LAN/GPIB Gateway is also used to administer the Gateway after it has been configured on the network. For example, you can use the Telnet utility to monitor the status of client connections, etc. Thus, you may want to use the Telnet configuration method because you will be using the same Telnet utility in the future for administration tasks.

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BOOTP

BOOTP is a bootstrap protocol that allows critical configuration values such as the IP address and subnet mask to be set easily. With the BOOTP configuration method, you set the values for the Gateway in the **`/etc/bootptab`** file. This file is then used by the bootpd daemon running on the BOOTP server to configure the Gateway on the network. You can use BOOTP from an HP-UX client system if you do not need to change the default values for the following configuration values:

- LAN timeout
- I/O timeout
- IP allow list
- GPIB address
- GPIB interface name
- GPIB logical unit

NOTE

If you use the BOOTP method, the BOOTP server system must be configured to run the **`bootpd`** daemon. See the *Administering ARPA Services* manual for more information.

BOOTP with TFTP

Trivial File Transfer Protocol (TFTP) is a protocol that can be used with BOOTP, where more configuration values for the Gateway are set in a separate TFTP configuration file. The path to this TFTP configuration file, which usually has a `.cfg` extension, is set in the **`T144:`** BOOTP tag in the **`/etc/bootptab`** file.

Both the **`/etc/bootptab`** file and the TFTP configuration file contents are used by the **`bootpd`** daemon running on the BOOTP server to configure the Gateway on the network. You can use BOOTP with TFTP from an HP-UX client system to set or change *any* of the configuration values for the Gateway.

NOTE

If you use the BOOTP with TFTP method, the BOOTP and TFTP server system must be configured to run the **`bootpd`** and **`tftpd`** daemons. See the *Administering ARPA Services* manual for more information.

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Using Telnet Configuration Method (Windows)

To configure the LAN/GPIB Gateway on your network using the Telnet configuration method from a Windows 95/98/2000/Me/NT client system:

1 Power-on the Gateway by plugging the AC power cord from the power module into a power outlet (wall outlet).

2 Once the Gateway is powered on, press the **Config Preset** button on the back panel of the Gateway. This causes the Gateway to temporarily use its default IP address, **`192.0.0.192`**. The **LAN Conn** (LAN Connect) LED on the front panel of the Gateway will flash slowly, showing that the default IP address is now in use.

3 If not already running, start Windows 95/98/Me or Windows 2000/NT on the client computer system (the Windows PC).

4 From the Windows 95/98/Me task bar at the bottom of the screen, select **`Start`** | **`Programs`** | **`MS-DOS Prompt`**. The MS-DOS window opens. Or, from the Windows 2000/NT Program Manager, select **`Main`**. Then select **`MS-DOS Prompt`**. The MS-DOS window opens.

5 At the **>** prompt in the MS-DOS window, type:

`route add 192.0.0.192` *your_system_name* **Enter**

This sets up a route table entry on your client system for the Gateway at its default IP address.

6 At the **>** prompt in the MS-DOS window, type:

`telnet 192.0.0.192` **Enter**

This connects you to the Gateway at its temporary (default) IP address and the Telnet window opens.

NOTE

If you are unable to make a Telnet connection using the default IP address (**`192.0.0.192`**), try pressing the **Config Preset** button again and then try the **`telnet`** command (Step 6). If you are still unsuccessful, see *Chapter 5*.

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When you are connected to the Gateway, you will see general information about the Telnet utility commands, as well as a listing of the current configuration settings for this Gateway.

For example, if you have not changed any of the configuration settings previously, you will see the default configuration settings for the Gateway as shown. In this display, the **`hardware-addr:`** value is an example. Your **`hardware-addr:`** value will be correct for your Gateway.

```
Welcome to the E2050 LAN/GPIB Gateway configuration utility.

Commands

    ?              Show additional commands
    exit, quit     Exit WITHOUT saving configuration changes
    reboot         Save configuration changes and restart
    status         Show the LAN/GPIB Gateway connection status

Configuration Parameters

hostname:       E2050          # Internet domain name
hardware-addr:  0800091A0E02   # Ethernet station address
ip:             0.0.0.0        # Internet Protocol address
default-gw:     0.0.0.0        # Default subnet gateway IP address
subnet-mask:    0.0.0.0        # Network subnet mask
syslog-svr:     0.0.0.0        # Syslog server IP address
bootp:          ON             # Obtain config via BOOTP/TFTP
lan-timeout:    0              # LAN connect timeout in seconds
io-timeout:     120            # Server I/O timeout in seconds
allow:          *              # IP allow list

hpib-address:   21             # GPIB Address
hpib-name:      hpib           # GPIB interface symbolic name
hpib-unit:      7              # GPIB logical unit number
```

7 Now you must turn on **Local Echo** in the **Terminal Preferences** dialog box so the Telnet utility will display your typed input. From the menu at the top of the Telnet window, select **Terminal | Preferences**. The **Terminal Preferences** dialog box is displayed.

8 Click the checkbox next to **Local Echo** to turn it on. A checkmark is displayed in the checkbox. **Local Echo** is now set on.

9 Click **OK** to close the **Terminal Preferences** dialog box.

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10 At the Telnet prompt (**>**), enter the configuration values you want to change or set. (You only need to specify the non-default values that you want.) The following information will help you set the values correctly.

The following table lists the configuration values you can set using Telnet. The following information shows the syntax you should use and provides tips to help you to change or set the configuration values correctly.

NOTE

By using the Telnet configuration method, the LAN hardware address (**`hardware-addr:`**) value is automatically set to the correct hardware address for this LAN/GPIB Gateway. Do not change the hardware address value via Telnet. Its value in the Telnet configuration table is for information purposes only.

Configuration Value	Telnet Command	Default Value
Hostname	hostname:	**`E2050`**
IP Address	ip:	**`192.0.0.192`**
Default Subnet Gateway Address	gateway:	**`0.0.0.0`**
Subnet Mask	subnet-mask:	**`0.0.0.0`**
Syslog Server Address	syslog-svr:	**`0.0.0.0`**
BOOTP	bootp:	**`ON`**
LAN Timeout	lan-timeout:	**`0`**
I/O Timeout	io-timeout:	**`120`**
IP Allow List	allow:	**`* (All allowed)`**
GPIB Address	hpib-address:	**`21`**
GPIB Interface Name	hpib-name:	**`hpib`**[1]
GPIB Logical Unit	hpib-unit:	**`7`**

[1] Change name to **`gpib0`** for VXI-11 compatibility

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For each configuration value to change or set, use the syntax: *Telnet_command: value* **Enter**. For example, to set the IP address value of **`156.140.222.201`** for the Gateway, enter: **`ip: 156.140.222.201`** **Enter**

If you make a mistake, re-enter the correct configuration value you want. To do this, use the same syntax as before to re-enter the value (*Telnet_command: value* **Enter**).

If you want to exit *without* saving any of the configuration values you have changed or set, enter either **`exit`** **Enter** or **`quit`** **Enter**. You can then re-enter the Telnet configuration utility starting with Step 6.

Any time during the Telnet session, you can enter **`config`** **Enter** to view the current configuration settings. Any time during the Telnet session, you can enter **`?`** **Enter** for a list of available commands you can use in the Telnet utility.

11 When you have changed or set all the configuration values you want for the Gateway, type **`reboot`** **Enter**. Then, type **`y`** **Enter** to confirm your changes. Rebooting activates the configuration values you have set for the Gateway.

CAUTION

If you are reconfiguring the Gateway, any client operations in progress and client connections will be terminated by the **`reboot`** *command.*

12 After you have rebooted the Gateway, test that the Gateway has been successfully configured by using the **`ping`** command. This command allows you to test general network connectivity between your client computer system and the LAN/GPIB Gateway. At the client system, type: **`ping`** *hostname* (or) *IP_address* **Enter**

For example, using a Gateway's hostname:

`ping E2050.agilent.com` **Enter**

Or, using a Gateway's IP address:

`ping 156.140.4.249` **Enter**

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You should get a response from the **ping** command that is similar to the following, where each line after the **PING** line is an example of a packet successfully reaching the Gateway from the client system. If the **ping** response is similar to the following, the Gateway has been configured successfully.

```
Pinging E2050.agilent.com[128.10.0.3] with 32 bytes
of data:
Reply from 128.10.0.3:bytes=32 time=10ms TTL=255
Reply from 128.10.0.3:bytes=32 time=10ms TTL=255
Reply from 128.10.0.3:bytes=32 time=10ms TTL=255
    .
    .
    .
```

However, if **ping** is unable to reach the host, you will see a message similar to the following. This indicates the client was unable to contact the Gateway and there may be some problem with the Gateway's configuration or with the network itself. If you have trouble configuring the Gateway or want to verify that the configuration is correct, see *Chapter 5*.

```
Pinging E2050.agilent.com[128.10.0.3] with 32 bytes
of data:
Request timed out.
Request timed out.
Request timed out.
```


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Using Telnet Configuration Method (HP-UX)

To configure the LAN/GPIB Gateway on your network using Telnet from an HP-UX client system, do the following:

1. Power-on the Gateway by plugging the AC power cord from the power module into a power outlet (wall outlet).

2. After the Gateway is powered on, press the recessed **Config Preset** button on the back panel of the Gateway. This causes the Gateway to temporarily use its default IP address, **`192.0.0.192`**. The **LAN Conn** (LAN Connect) LED on the front panel of the Gateway will flash slowly, showing that the default IP address is now in use.

3. Log into a client computer system (the Series 700 HP-UX workstation) as **`root`**.

4. At the system prompt, type:

   `route add host 192.0.0.192` *your_system_name* **Return**

   This sets up a route table entry on your client system for the Gateway at its default IP address.

5. At the system prompt, type:

   `telnet 192.0.0.192` **Return**

   This connects you to the Gateway at its temporary, default IP address.

> **NOTE**
>
> If you are unable to make a Telnet connection using the default IP address (**`192.0.0.192`**), try pressing the **Config Preset** button again and then try the **`telnet`** command (Step 5). If you are still unsuccessful, see *Chapter 5*.

When you are connected to the Gateway, you will see the message: **`Connected to 192.0.0.192`**. This is followed by general information about the Telnet utility commands and a listing of the current configuration settings for this Gateway.

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For example, if you have not changed any of the configuration settings previously, you will see the default configuration settings for the Gateway, as follows. In this display, the **`hardware-addr:`** value is an example. Your **`hardware-addr:`** value will be correct for your Gateway.

NOTE

On HP-UX 10.01, you may see the string **`Local flow control off`** at the bottom of the screen. This will not affect the use of the Telnet utility to configure the E2050.

```
Welcome to the E2050 LAN/GPIB Gateway configuration utility.

Commands

    ?             Show additional commands
    exit, quit    Exit WITHOUT saving configuration changes
    reboot        Save configuration changes and restart
    status        Show the LAN/GPIB Gateway connection status

Configuration Parameters

hostname:       E2050           # Internet domain name
hardware-addr:  0800091A0E02    # Ethernet station address
ip:             0.0.0.0         # Internet Protocol address
default-gw:     0.0.0.0         # Default subnet gateway IP address
subnet-mask:    0.0.0.0         # Network subnet mask
syslog-svr:     0.0.0.0         # Syslog server IP address
bootp:          ON              # Obtain config via BOOTP/TFTP
lan-timeout:    0               # LAN connect timeout in seconds
io-timeout:     120             # Server I/O timeout in seconds
allow:          *               # IP allow list

hpib-address:   21              # GPIB Address
hpib-name:      hpib            # GPIB interface symbolic name
hpib-unit:      7               # GPIB logical unit number
```

6 At the Telnet prompt (**>**), enter the configuration values you want to change or set. You *only* need to specify the non-default values that you want. The following information will help you set the values correctly.

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The following table lists the configuration values you can set using Telnet. The information following the table explains the syntax you should use and provides reminders to help you to change or set the configuration values correctly.

NOTE

By using the Telnet configuration method, the LAN hardware address (**`hardware-addr:`**) value is automatically set to the correct hardware address for this LAN/GPIB Gateway. Do not change the hardware address value via Telnet. Its value in the Telnet configuration table is for information purposes only.

Configuration Value	Telnet Command	Default Value
Hostname	hostname:	`E2050`
IP Address	ip:	`192.0.0.192`
Default Subnet Gateway Address	gateway:	`0.0.0.0`
Subnet Mask	subnet-mask:	`0.0.0.0`
Syslog Server Address	syslog-svr:	`0.0.0.0`
BOOTP	bootp:	`ON`
LAN Timeout	lan-timeout:	`0`
I/O Timeout	io-timeout:	`120`
IP Allow List	allow:	`* (All allowed)`
GPIB Address	hpib-address:	`21`
GPIB Interface Name	hpib-name:	`hpib`
GPIB Logical Unit	hpib-unit:	`7`

For each configuration value to change or set, use the syntax:

Telnet_command: value **Return**

For example, to set the IP address value of `156.140.222.201` for the Gateway, enter: **`ip: 156.140.222.201`** **Return**

If you make a mistake, re-enter the correct configuration value you want. To do this, use the same syntax as before to re-enter the value (*Telnet_command: value* **Return**).

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If you want to exit *without* saving any of the configuration values you have changed or set, enter either **`exit` Return** or **`quit` Return**. You can then re-enter the Telnet configuration utility starting with Step 5.

Any time during the Telnet session, you can enter **`config` Return** to view the current configuration settings. Any time during the Telnet session, you can enter **`?` Return** for a list of available commands you can use in the Telnet utility.

7 When you have changed or set all the configuration values you want for the Gateway, type **`reboot` Return**. Then, type **`y` Return** to confirm your changes. Rebooting activates the configuration values you have set for the Gateway.

CAUTION

If you are reconfiguring the Gateway, any client operations in progress and client connections will be terminated by the ***`reboot`*** *command.*

8 After you have rebooted the Gateway, test that the Gateway has been successfully configured by using the **`ping`** command. This command allows you to test general network connectivity between your client computer system and the LAN/GPIB Gateway. At the client system, type: **`ping`** *hostname* (or) *IP_address* **Return**

For example, using a Gateway's hostname:

`ping E2050.agilent.com` Return

Or, using a Gateway's IP address:

`ping 156.140.4.249` Return

You should get a response from the **ping** command that is similar to the following, where each line after the **PING** line is an example of a packet successfully reaching the Gateway from the client system.

If the **ping** response is similar to the following, the Gateway has been configured successfully. If, after several seconds, **ping** does not print any lines, use **Ctrl+C** to kill **ping**. The **ping** will then report on what it found.

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```
PING E2050.agilent.com: 64 byte packets
64 bytes from 128.10.0.3: icmp_seq=0. time=3. ms
64 bytes from 128.10.0.3: icmp_seq=1. time=3. ms
64 bytes from 128.10.0.3: icmp_seq=2. time=2. ms
   .
   .
   .
```

A response similar to the following indicates the client was unable to contact the Gateway. There may be some problem with the Gateway's configuration or with the network itself. If you have trouble configuring the Gateway or want to verify that the configuration is correct, see *Chapter 5*.

```
----E2050.agilent.com PING Statistics----
4 packets transmitted, 0 packets received, 100%
packet loss
```


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Using BOOTP Configuration Method (HP-UX)

To configure a LAN/GPIB Gateway on your network using BOOTP from an HP-UX client system:

1 Make sure that the Gateway is powered-off. The AC power cord from the power module must be disconnected from the power outlet (wall outlet).

2 Determine which computer system is the BOOTP server on your network. Then, log into the BOOTP server system as **`root`**.

Edit the **`/etc/bootptab`** configuration file. Add an entry to the file for each LAN/GPIB Gateway on your network. (You *only* need to specify the non-default values that you want.) The following information will help you complete the entry correctly.

The following table lists the values you can configure. In the table, BOOTP Tag is the tag that the BOOTP daemon (**`bootpd`**) searches for in the **`/etc/bootptab`** file to service BOOTP requests. See the next example BOOTP entry and tips to help you complete your BOOTP entry correctly.

For more information on the BOOTP tags, use the system **man** command on **bootpd**. Also, see “Configuration Values” for more information about each of the configuration values.

Configuration Value	BOOTP Tag	Default Value
Hostname	hn	`E2050`
Hardware Address	ha	`None`
IP Address	ip	`192.0.0.192`
Default Subnet Gateway Address	gw	`0.0.0.0`
Subnet Mask	sm	`0.0.0.0`
Syslog Server Address	lg	`0.0.0.0`

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This example BOOTP entry configures a hostname (**hn**), a hardware address (**ha**), and an IP address (**ip**) for the LAN/GPIB Gateway. All other configuration values are "set" to (will default to) the factory defaults.

E2050:\	*Hostname for this Gateway*
hn:\	
ht=ether:\	*Hardware type, which should be* **`ether`**
vm=rfc1048:\	*Vendor magic cookie selector, which should be* **`rfc1048`**
ha=0800091A0E00:\	*Hardware address for the Gateway's LAN interface*
ip=156.140.4.249	*IP address for the Gateway*

For each entry you make to the file, include a colon ("**`:`**") and a backslash ("**`\`**") after each field to continue the entry on the next line. (Do not put the **`:\`** at the end of the last field in your entry.)

Begin the hostname with a letter. Do *not* start a hostname with any other character, such as a number, underscore, etc. Use only letters, numbers, periods, or hyphens within a hostname. The underscore character ("_") is not allowed.

The LAN hardware address (**`ha`**) value is the address you recorded while installing the Gateway hardware in *Chapter 2*. The Gateway's LAN hardware address is printed on a label on the underside of the Gateway box.

The IP address (**`ip`**) value is the address that your designated Network Administrator assigned for the Gateway. The address must be in dotted decimal notation.

3 Once you have added the configuration values for each of your Gateways, save and close the **`/etc/bootptab`** file. Then, power on the Gateway by plugging-in the power cord to the power outlet (wall outlet).

As soon as it completes its hardware self-test, the Gateway will begin sending BOOTP requests to the BOOTP server. While the Gateway is sending BOOTP requests, the **LAN Conn** (LAN Connect) LED on the front panel of the Gateway will flash rapidly. The BOOTP server should respond with the BOOTP response to configure the Gateway. When the Gateway receives a valid response from the BOOTP server, the **LAN Conn** LED will stop flashing.

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4 Test that the Gateway has received the BOOTP response and has configured itself by using the **`ping`** command. This command allows you to test general network connectivity between your client computer system and the LAN/GPIB Gateway. At the client system, type: **`ping`** *hostname* **`(or)`** *IP_address* **Enter.**

For example, using a Gateway's hostname:

`ping E2050.agilent.com` **Enter**

Or, using a Gateway's IP address:

`ping 156.140.4.249` **Enter**

You should get a response from the **ping** command that is similar to the following, where each line after the **PING** line is an example of a packet successfully reaching the Gateway from the client system. If your **ping** response is similar to the following, the Gateway has been configured successfully.

```
PING E2050.agilent.com: 64 byte packets
64 bytes from 128.10.0.3: icmp_seq=0. time=3. ms
64 bytes from 128.10.0.3: icmp_seq=1. time=3. ms
64 bytes from 128.10.0.3: icmp_seq=2. time=2. ms
   .
   .
   .
```

If, after several seconds, **`ping`** does not print any lines, use **Ctrl+C** to kill **`ping`**. The **`ping`** will then report on what it found. A response similar to the following indicates the client was unable to contact the Gateway and there may be some problem with the Gateway's configuration or with the network itself. If you have trouble configuring the Gateway or want to verify that the configuration is correct, see *Chapter 5*.

```
----E2050.agilent.com PING Statistics----
4 packets transmitted, 0 packets received, 100%
packet loss
```


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Using BOOTP with TFTP Configuration Method (HP-UX)

To configure a LAN/GPIB Gateway on your network using BOOTP with TFTP from an HP-UX client system:

1. Make sure that the Gateway is powered OFF. The AC power cord from the power module must be disconnected from the power outlet (wall outlet).

2. Determine which computer system is the BOOTP server on your network. Then, log into the BOOTP server system as **`root`**.

3. Edit the **`/etc/bootptab`** configuration file. Add an entry to the file for each LAN/GPIB Gateway on your network. (You *only* need to specify the non-default values that you want.) The following information will help you complete the entry correctly.

   The following table lists the values you can configure. In the table, BOOTP Tag is the tag that the BOOTP daemon (**`bootpd`**) searches for in the **`/etc/bootptab`** file to service BOOTP requests. An example BOOTP entry and tips are provided to help you complete your BOOTP entry correctly.

   For more information on the BOOTP tags, use the system **`man`** command on **`bootpd`**. Also, see “Configuration Values” for more information about each of the configuration values.

Configuration Value	BOOTP Tag	Default Value
Hostname	hn	**`E2050`**
Hardware Address	ha	**`None`**
IP Address	ip	**`192.0.0.192`**
Default Subnet Gateway Address	gw	**`0.0.0.0`**
Subnet Mask	sm	**`0.0.0.0`**
Syslog Server Address	lg	**`0.0.0.0`**
TFTP File	T144	**`None`**

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This example BOOTP entry configures a hostname (**hn**), a hardware address (**ha**), an IP address (**ip**), and the path to the TFTP configuration file (**T144**). In this example, the path to the TFTP configuration file is *relative*, with the assumption that the default TFTP mode is being used. All other configuration values are "set" to (will default to) the factory defaults.

`E2050:\`	*Hostname for this Gateway*
`hn:\`	
`ht=ether:\`	*Hardware type, which should be* **ether**
`vm=rfc1048:\`	*Vendor magic cookie selector, which should be* **rfc1048**
`ha=0800091A0E00:\`	*Hardware address for the Gateway's LAN interface*
`ip=156.140.4.249:\`	*IP address for the Gateway*
`T144="E2050/gw1.cfg"`	*Path to the TFTP configuration file*

For each entry you make to the file, include a colon (":") and a backslash ("\") after each field to continue the entry on the next line. Do not put the **:** at the end of the last field in your entry.

Begin the hostname with a letter. Do *not* start a hostname with any other character, such as a number, underscore, etc. Use only letters, numbers, periods, or hyphens within a hostname. The underscore character ("_") is not allowed.

The LAN hardware address (**ha**) value is the address you recorded while installing the Gateway hardware in *Chapter 2*. The Gateway's LAN hardware address is printed on a label on the underside of the Gateway box.

The IP address (**ip**) value is the address that your designated Network Administrator assigned for the Gateway. The address must be in dotted decimal notation.

The TFTP configuration file (**T144**) value is the path to the TFTP file you will use. (You will create the TFTP file in the following steps.) The path must be enclosed in double quotation marks.

4 Once you have added the configuration values for each of your Gateways, save and close the **/etc/bootptab** file.

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5 Create the appropriate directory structure and TFTP configuration file for each LAN/GPIB Gateway, as noted in the **T144** configuration value you set in the **/etc/bootptab** file. Be sure you set permissions on these directories and on the TFTP configuration file to allow access by the **bootpd** daemon.

For example, the **T144** value in the previous example **/etc/bootptab** file was set to "**E2050/gw1.cfg**". We will also assume the default TFTP mode is being used and that the client system is running HP-UX Version 9. Thus, in this example, you would:

- **cd** to the **/usr/tftpdir** directory.
- Create an **E2050** subdirectory under **/usr/tftpdir**.
- **cd** to the **E2050** subdirectory
- Create the TFTP configuration file, **gw1.cfg**, with your editor.

6 Edit the TFTP configuration file, adding the configuration values you desire to set for the Gateway. (You *only* need to specify the non-default values that you want.) The following information will help you complete this file correctly.

This table lists the configuration values you can set in the TFTP file. Also, see the example TFTP file that follows this table..

Configuration Value	Telnet Command	Default Value
Hostname	**hostname:**	**E2050**
LAN Timeout	**lan-timeout:**	**0**
I/O Timeout	**io-timeout:**	**120**
IP Allow List	**allow:**	*** (All allowed)**
GPIB Address	**hpib-address:**	**21**
GPIB Interface Name	**hpib-name:**	**hpib**
GPIB Logical Unit	**hpib-unit:**	**7**

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An example TFTP file follows. Consult your system documentation for any other steps required to complete the TFTP configuration file.

```
# The E2050 gw1 Configuration File

  hostname: E2050

# Timeouts
  lan-timeout: 7200
  io-timeout: 240

# IP allow list
  allow: 156.140.34.2  15.2.*

# GPIB configuration
  hpib-addr: 17
  hpib-name: hpib1
  hpib-unit: 8
```

7 Once you have added the configuration values you want, save and close the TFTP configuration file(s).

8 Power on the Gateway by plugging-in the power cord to the power outlet (wall outlet).

As soon as it completes its hardware self-test, the Gateway will begin sending BOOTP requests to the BOOTP server. While the Gateway is sending BOOTP requests, the **LAN Conn** (LAN Connect) LED on the front panel of the Gateway will flash rapidly.

The BOOTP server should respond with the BOOTP response to configure the Gateway. When the Gateway receives a valid response from the BOOTP server, the **LAN Conn** LED will stop flashing.

9 Test that the Gateway has received the BOOTP response and has configured itself by using the **ping** command. This command allows you to test general network connectivity between your client computer system and the LAN/GPIB Gateway.

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At the client system, type: **`ping`** *hostname* **`(or)`** *IP_address* **Return**

For example, using a Gateway's hostname:

`ping E2050.agilent.com` **Return**

Or, using a Gateway's IP address:

`ping 156.140.4.249` **Return**

You should get a response from the **`ping`** command that is similar to the following, where each line after the **`PING`** line is an example of a packet successfully reaching the Gateway from the client system.If your **`ping`** response is similar to the following, the Gateway has been configured successfully.

```
PING E2050.agilent.com: 64 byte packets
64 bytes from 128.10.0.3: icmp_seq=0. time=3. ms
64 bytes from 128.10.0.3: icmp_seq=1. time=3. ms
64 bytes from 128.10.0.3: icmp_seq=2. time=2. ms
   .
   .
   .
```

If, after several seconds, **`ping`** does not print any lines, use **Ctrl+C** to kill **`ping`**. The **`ping`** will then report on what it found. A response similar to the following indicates the client was unable to contact the Gateway and there may be some problem with the Gateway's configuration or the network itself. If you have trouble configuring the Gateway or want to verify that the configuration is correct, see *Chapter 5*.

```
----E2050.agilent.com PING Statistics----
4 packets transmitted, 0 packets received, 100%
packet loss
```


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4

Administration

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Administration

This chapter gives guidelines to administer the E2050 LAN/GPIB Gateway on your network, using the Telnet utility provided with the LAN/GPIB Gateway. The Telnet utility provides a command line interface for accomplishing administration tasks, including Telnet configuration of the Gateway, querying the status of the Gateway and its client connections, etc. The chapter contents are:

- Using the Telnet Utility
- Querying the Gateway
- Configuring the Gateway

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Using the Telnet Utility

This section explains how to access and exit the Telnet utility. It also summarizes various Telnet commands you can use to administer the E2050 LAN/GPIB Gateway. The section contents are:

- Accessing the Telnet Utility
- Exiting the Telnet Utility
- Summary of Telnet Comands

Accessing the Telnet Utility

If you need to use Telnet commands, first use this procedure to access the Telnet utility:

1 If you are on an HP-UX or Windows 2000/NT client computer system, **`login`**. Also, if you are using a Windows 95/98/Me or a Windows 2000/NT client computer system, do the following:

- From the Windows 95/98/Me task bar at the bottom of the screen, select **`Start`** | **`Programs`** | **`MS-DOS Prompt`**. The MS-DOS window opens.
- From the Windows 2000/NT Program Manager, select **`Main`**. Then select **`MS-DOS Prompt`**. The MS-DOS window opens.

2 If you know the IP address and hostname of the Gateway, do the following, where *IP_address* is the IP address of the E2050 LAN/GPIB Gateway. *hostname* is the hostname (Internet domain name) of the E2050 LAN/GPIB Gateway.

- If you are using an HP-UX client system, at the HP-UX system prompt, type: **`telnet`** *IP_address* (or) *hostname* **Return.**
- If you are using aWindows 95/98/Me/2000/NT client system, at the **>** prompt in the MS-DOS window, type: **`telnet`** *IP_address* (or) *hostname* **Enter**

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3 If you do *not* know the IP address or *hostname* of the Gateway:

- After the Gateway has been powered-on, press the **Config Preset** button on the back panel of the LAN/GPIB Gateway. This forces the Gateway to temporarily use the **`192.0.0.192`** default IP address without modifying any other configuration values.
- If you are using an HP-UX client system, as root, type **`route add host 192.0.0.192`** *your_system_name* **Return**.
- If you are using a Windows 95/98/2000/Me/NT client system, at the **>** prompt in the MS-DOS window, type **`route add 192.0.0.192`** *your_system_name* **Enter**. This sets up a route table entry on your client system for the Gateway at its default IP address.

4 To connect you to the Gateway at its temporary (default) IP address, use the following commands. If you are using an HP-UX client system, type: **`telnet 192.0.0.192`** **Return**. If you are using a Windows 95/98/Me/2000/NT client system, type: **`telnet 192.0.0.192`** **Enter**.

When you are connected to the Gateway's Telnet utility, you will see a listing of the main Telnet commands and a listing of the current configuration values for this Gateway.

The following is an example screen for an E2050 LAN/GPIB Gateway. Many of the configuration values in this example screen are not the default values, which means this example Gateway was previously configured. The configuration values you see for your Gateway may be different from those shown here.

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```
Welcome to the E2050 LAN/GPIB Gateway configuration utility.
Commands
?               Show additional commands
exit, quit      Exit WITHOUT saving configuration changes
reboot          Save configuration changes and restart
status          Show the LAN/GPIB Gateway connection status

Configuration Parameters
hostname:       E2050          # Internet domain name
hardware-addr:  0800091A0E02   # Ethernet station address
ip:             156.140.4.249  # Internet Protocol address
default-gw:     0.0.0.0        # Default subnet gateway IP address
subnet-mask:    0.0.0.0        # Network subnet mask
syslog-svr:     156.140.4.244  # Syslog server IP address
bootp:          OFF            # Obtain config via BOOTP/TFTP
lan-timeout:    7200           # LAN connect timeout in seconds
io-timeout:     120            # Server I/O timeout in seconds
allow:          156.140.4.*    # IP allow list

hpib-address:   21             # GPIB Address
hpib-name:      hpib1          # GPIB interface symbolic name
hpib-unit:      7              # GPIB logical unit number
```

5 If you are using a Windows 95/98/Me/2000/NT client system, you may also need to turn on **Local Echo** in the **Terminal Preferences** dialog box so that the Telnet utility will display your typed input. To do this:

- From the menu at the top of the Telnet window, select **`Terminal`** | **`Preferences`**. The **Terminal Preferences** dialog box is displayed.
- Click the checkbox next to **`Local Echo`** to turn it on. A checkmark is displayed in the checkbox. **Local Echo** is now set on.
- Click **OK** to close the **Terminal Preferences** dialog box.

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Exiting the Telnet Utility

To exit the Telnet utility, use these Telnet commands.

- If you want to exit *without* saving any changes (if any) you have made to the configuration values, at the Telnet prompt (**>**) type **`bye`** (or) **`exit`** (or) **`quit`**.
- If you want to save the changes you have made to the configuration values via the Telnet utility, at the Telnet prompt (**>**) type **`reboot`**.

CAUTION

*Any client operations in progress and client connections will be terminated by the **`reboot`** command.*

- Reset the Gateway to the default configuration values and reboot the Gateway, at the Telnet prompt (**>**), type **`factory-reset`**.

CAUTION

*Any client operations in progress and client connections will be terminated by the **`factory-reset`** command when it reboots the Gateway.*

Telnet Commands

Table 4-1 lists the Telnet commands you can use to administer the E2050 LAN/GPIB Gateway. Many Telnet commands are for configuration purposes only. These commands have a colon (":") and italicized value parameter after them (for example, **`allow:`** *IP_address(es)*).

You should use the Telnet configuration commands *only* if you are using the Telnet configuration method to configure the Gateway. If, instead, you are using the BOOTP or the BOOTP with TFTP configuration methods, follow the procedures in *Chapter 3*.

You can see a summary of all the Telnet commands online by typing **`?`** at any time within the Telnet utility.

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Command	Description
allow: *IP_address(es)*	Set the IP allow list configuration value for the Gateway.
bootp: *ON/OFF*	Turn ON or OFF the use of BOOTP or BOOTP with TFTP configuration of the Gateway.
bye	Quit the Telnet utility without saving configuration changes.
config	Display the current configuration settings for the Gateway.
default-gw: *IP_address*	Set the default subnet gateway address configuration value for the Gateway.
exit	Exit the Telnet utility without saving configuration changes.
factory-reset	Reset the Gateway to its default configuration values and reboot the Gateway.
hardware-addr	Display the Gateway's LAN hardware address.
help	Print help information on the main Telnet commands.
hostname: *string*	Set the Internet domain name configuration value for the Gateway.
hpib-address: *0-30*	Set the GPIB address configuration value for the Gateway.
hpib-name: *string*	Set the GPIB interface symbolic name configuration value for the Gateway.
hpib-unit: *1-255*	Set GPIB logical unit number configuration value for the Gateway.
io-timeout: *seconds*	Set the server I/O timeout configuration value for the Gateway.
ip: *IP_address*	Set the IP address configuration value for the Gateway.
lan-timeout: *seconds*	Set the LAN connect timeout configuration value for the Gateway.
quit	Quit the Telnet utility without saving configuration changes.
reboot	Save configuration changes and restart the Gateway.
status	Display the status of the Gateway and client connections.
subnet-mask: *mask*	Set the network subnet mask configuration value for the Gateway.
syslog-clear	Clear the syslog file.
syslog-display	Display the syslog file's contents.
syslog-svr: *IP_address*	Set the syslog server address configuration value for the Gateway.
version	Display the version of the Gateway's firmware.

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Querying the Gateway

This section gives guidelines to query the E2050 LAN/GPIB gateway, including:

- Querying the Current Configuration
- Querying the Firmware Version
- Querying the Configuration Method
- Querying Gateway/Client Connections

Querying the Current Configuration

As soon as you access the Gateway's Telnet utility, you see a screen of information, including a listing of the Gateway's current configuration settings. However, you can view the current configuration settings at any time while you are using the Telnet utility by typing **`config`** at the Telnet prompt (**>**).

If you want to change any of the configuration values, see "Configuring the Gateway." If you want to exit the Telnet utility with or without saving any configuration value changes, see "Exiting the Telnet Utility".

Querying the Firmware Revision

You may need to determine the version of the Gateway's firmware if you contact Agilent for support information or if you need to update the firmware to a new version in the future.

To determine the current version of the Gateway's firmware, type **`version`** at the Telnet prompt (**>**). You will see the version of the software and Bootrom for the Gateway, which will be similar to the following:

```
Software revision A.01.05
Bootrom revision A.01.03
```


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Querying the Configuration Method

If you do not know the configuration method currently used for the Gateway, you can determine the method via the **`bootp: ON/OFF`** Telnet configuration value. To do this:

1. At the Telnet prompt (>), type **`config`**. This displays the current configuration settings for the Gateway.

2. Check the **`bootp:`** configuration setting. If it is set to **`OFF`**, the current configuration method is the Telnet configuration method. If the configuration setting is set to **`ON`**, the current configuration method is BOOTP or BOOTP with TFTP configuration method.

If you want to change the configuration method, see “Changing the Configuration Method”. If you want to continue using the current configuration method, but need to change one or more of configuration values, see *Chapter 3* to reconfigure the Gateway.

Querying Gateway/Client Connections

This section shows how to query the status of the Gateway and its client connections (the LAN client computer systems that are connected to the Gateway to perform I/O operations via the Gateway).

To query the status of the Gateway and client connections via the Telnet utility, type status at the Telnet prompt (**>**). This displays the Telnet status screen that lists all current clients connected to this Gateway.

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The following is an example status screen of clients connected to an E2050 LAN/GPIB Gateway.

Server ID	Client IP Addr	Client ID	Sess	Operation	Lock	Device/Intf
0x2008f624	156.140.4.247	4139	117 5 66	 WRITE	DEV DEV	hpib,1 hpib,21 hpib
0x2008f40c	190.2.49.138	2759 8	21 3 14 129	LOCK	 DEV DEV	7,21 7,9,1 7,9,2 7,1
0x2008f1f4	156.140.4.249	739	36 8	 READ		hpib,1 hpib,9,2

The meaning of the various fields listed on the Telnet status screen are:

Server ID	A unique process identification (ID) number for the client connection on this server (this E2050 LAN/GPIB Gateway).
Client IP Addr	The IP address of the client computer system that is connected to this server.
Client ID	A unique identification (ID) number for the client computer system's process. (Always `0` for a Windows 95/98/Me/2000/NT client.)
Sess	The unique session number of a client's communication channel with a device, which can be any number `1` through `256`.
Operation	The client's I/O operation currently being performed on the associated device or interface. A blank field indicates that no I/O operation is currently executing.
Lock	Indicates if the client has a lock on the associated device (`DEV`) or interface (`INTF`). A blank field indicates no lock.
Device/Intf	The GPIB device or interface on which the client is currently performing, or will perform, its I/O operation. For SICL I/O operations, this relates to the device or interface specified in the **`iopen`** statement.

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All the sessions for a particular connection are listed together and only the first session has the **`Server ID`**, **`Client IP Addr`**, and **`Client ID`** specified. For a given client, one session at most will have an operation pending or in progress at a given time.

The **`Client IP Addr`** and **`Client ID`** are both needed to uniquely identify a client connection. In the previous example, clients 1 and 3 are separate processes on the same machine (that is, they have the same **`Client IP Addr`**).

If an **`Operation`** is specified for a given session and the session does not have a **`Lock`**, the operation for the session may be waiting for another client to complete an I/O operation or to unlock a device or the interface. In the previous example, client 2 is waiting to get a lock on device 21 after client 1 completes the **`WRITE`** operation and unlocks device 21. Also, client 3 is waiting for client 2 to unlock device 9,2 (primary,secondary) before it can perform the **`READ`** operation.

If an **`Operation`** is specified for a given session and the session does have a **`Lock`**, the operation is likely to be in progress and not waiting on another client to complete an operation. For more information, consult the documentation for your I/O application software on how interface locks and device locks work in your software.

The following is a list of **`Operation`** field values and the SICL functions that correspond to them. If you want to terminate the client connections, see “Terminating Client Connections”.

Operation	SICL Function
ATNCTL	**`igpibantctl`**
BUSADDR	**`igpibbusaddr`**
BUSSTAT	**`igpibbusstatus`**
CLEAR	**`iclear`**
CLOSE	**`iclose`**
GETDEV	**`igetdevaddr`**
GETINTF	**`igetintftype`**
GETLU	**`igetlu`**
GETSESS	**`igetsesstype`**

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Operation	SICL Function
GETT1	`igpibgett1delay`
HINT	`ihint`
LLO	`igpibllo`
LOCAL	`ilocal`
LOCK	`ilock`
ONINTR	`ionintr`
ONSRQ	`ionsrq`
OPEN	`iopen`
PASSCTL	`igpibpassctl`
READ	`iread`
READSTB	`ireadstb`
REMOTE	`iremote`
RENCTL	`igpibrenctl`
SENDCMD	`igpibsendcmd`
SETINTR	`isetintr`
SETT1	`igpibsett1delay`
TRIGGER	`itrigger, ixtrig`
UNLOCK	`iunlock`
VERSION	`iversion`
WRITE	`iwrite`

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Configuring the Gateway

This section gives guidelines to configure the E2050 LAN/GPIB Gateway, including:

- Setting Default Configuration Settings
- Changing the Configuration Method
- Using the Gateway's syslog File
- Terminating Client Connections

Setting Default Configuration Values

To return the Gateway to *all* of its default configuration values, you can either press the **Config Preset** button on the back panel of the LAN/GPIB Gateway *at the same time* that you power-on the Gateway or you can execute the **`factory-reset`** Telnet command. Once the Gateway has been returned to the default configuration values, follow the configuration procedures in *Chapter 3* to reconfigure the Gateway.

CAUTION

Any client operations in progress and client connections will be terminated by ***`factory-reset`*** *when it reboots the Gateway.*

Changing the Configuration Method

Before changing the configuration mode, for Windows 95/98/Me/2000/NT client systems, you must use the Telnet configuration method. Neither the BOOTP or the BOOTP with TFTP configuration methods are available on Windows 95/98/Me/2000/NT.

Before modifying the configuration method used for the Gateway, you may want to determine if the Gateway is currently in use via the **`status`** Telnet command. See "Querying Gateway/Client Connections" for information about the **`status`** command.

If the Gateway is currently in use, you may want to alert users that you will be reconfiguring and rebooting the Gateway. This is because any client operations in progress and client connections will be terminated by the **`reboot`** command. Users will then have to re-open sessions on the Gateway after the reboot occurs.

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To change the configuration method used for the Gateway, you can modify the **`bootp: ON/OFF`** Telnet configuration value or you can press the **Config Preset** button. Once you have changed the configuration method, follow the procedures in *Chapter 3* to configure the Gateway via the new method.

NOTE

The **`bootp: ON/OFF`** configuration value in the Telnet utility is automatically set to **OFF** if the IP address is changed via the Telnet utility.

To modify the **`bootp: ON/OFF`** Telnet configuration value:

1. To change to the Telnet configuration method, at the Telnet prompt (**>**), type: **`bootp: OFF`**
2. To change to BOOTP or BOOTP with TFTP configuration method, at the Telnet prompt (**>**), type **`bootp: ON`**
3. After you have modified the **`bootp: ON/OFF`** value, execute the **`reboot`** Telnet command to save the new configuration setting and reboot the Gateway.

CAUTION

*Any client operations in progress and client connections will be terminated by the **`reboot`** command when it reboots the Gateway.*

4. Execute a Telnet **`factory-reset`** command. This changes the configuration values to the default values and reboots the Gateway. This will set the **`bootp: ON/OFF`** value to the default ON value. You may now use the BOOTP or the BOOTP with TFTP configuration method.

CAUTION

*Any client operations in progress and client connections will be terminated by the **`factory-reset`** command when it reboots the Gateway.*

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To modify the configuration method by pressing the **Config Preset** button, press the **Config Preset** button on the back panel of the LAN/GPIB Gateway *at the same time* as you power-on the Gateway. This changes all configuration values back to the default values, including setting the **`bootp: ON/OFF`** value to the default ON value. You may now use either the BOOTP or the BOOTP with TFTP configuration method.

Using the Gateway's syslog File

This section shows how to view and maintain a **`syslog`** file for the LAN/GPIB Gateway. The Gateway sends status information, configuration error messages, and run-time error messages to a **`syslog`** file. The **`syslog`** file is configured via the syslog server address configuration value. For more information, see "Configuration Values" in *Chapter 3*.

> **NOTE**
>
> Windows 95/98/Me/2000/NT clients do not support a **`syslog`** server. However, you cab use the **`syslog-display`** Telnet command on Windows 95/98/Me/2000/NT clients to view messages stored in the E2050.

Viewing `syslog` Messages

The messages logged to a file can be viewed via the **`syslog-display`** Telnet command. To do this, at the Telnet prompt (**>**), type: **`syslog-display`**.

You can also view messages by looking in the **`syslog`** file itself on the computer system acting as the syslog server. In general, the same messages can be viewed in either or both places. However, a few differences do exist:

- Messages viewed with the **`syslog-display`** Telnet command are shorter versions of the messages that are sent to the actual **`syslog`** file. In particular, **`syslog-display`** messages do not show the date or time when the message was logged.
- All **`syslog-display`** messages are cleared out each time the Gateway powers on or reboots, or the **`syslog-clear`** Telnet command is executed.

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- Because of the limited memory area on the Gateway, only about 50 lines of **`syslog-display`** messages can be logged in the Gateway. After the limit has been reached, any new messages can not be logged. For more information, see “Maintaining the **`syslog`** File”.
- Messages sent to the **`syslog`** file on the syslog server will have the date, time, and **`hostname`** prepended to the message. For example:

  `Feb 16 13:51:06` *hostname*`: ready for use`

  Depending on how your systems are administered, messages sent to the **`syslog`** file will probably have a longer history. Therefore, if you need to look at messages before a power-on or a reboot was performed, you should look at the **`syslog`** file itself.

NOTE

Any invalid BOOTP values are detected when the file **`/etc/bootptab`** is read by the **`bootpd`** daemon. Errors will be sent to the syslog server for the BOOTP server system that is running the **`bootpd`** daemon.

See *Chapter 5* for a list of the common syslog messages that are generated by the E2050 LAN/GPIB Gateway.

Maintaining the `syslog` File

Messages written to the actual **`syslog`** file are constantly appended to the file (the log file is not overwritten with new messages). Therefore, the **`syslog`** file may grow rather large over time and will need to be truncated or removed occasionally to regain disk space.

On the Gateway, the **`syslog-display`** messages are kept in a fixed-size memory area. If the syslog message area fills up, the most recent messages generated will be discarded. The number of messages allowed in the syslog memory buffer will vary depending on the size of the individual messages.

A good rule is to use the **`syslog-clear`** Telnet command to clear out the memory buffer before the buffer has around 50 lines or so in it. To clear the syslog memory buffer on the Gateway, at the Telnet prompt (**>**), type **`syslog-clear`**

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Terminating Client Connections

If after querying the status of the Gateway and client connections, you determine that the Gateway or a client's I/O operation is "hung" or there is a deadlock situation between clients that are connected to the Gateway, you can reboot the Gateway to terminate all client connections.

However, before rebooting the Gateway, you may want to alert users that any I/O operations they have in progress and their client connections to the Gateway will be terminated. The users will then need to re-open new sessions on the Gateway after the reboot has occurred.

To terminate all client connections to the Gateway, at the Telnet prompt (>), type: **`reboot.`** Once the reboot occurs, users who previously had open sessions on the Gateway will likely get an **`I_ERR_TIMEOUT`** or **`I_ERR_NOCONN`** error message. Since the reboot terminates all client connections, those users will need to re-open new sessions on the Gateway after the reboot occurs.

CAUTION

Any client operations in progress and client connections will be terminated by the ***`reboot`*** *command when it reboots the Gateway.*

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Notes:

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5

Troubleshooting

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Troubleshooting

This chapter gives guidelines to troubleshoot problems that may occur with the E2050 LAN/GPIB Gateway, including:

- Gateway Failure Messages
- Troubleshooting Network Configuration
- Troubleshooting Gateway Configuration
- Troubleshooting Client Connections

NOTE

This chapter references Telnet utility commands you can use to troubleshoot problems. See *Chapter 4* for E2050 LAN/GPIB Gateway Telnet utility commands.

This chapter also references various configuration values. See *Chapter 3* for configuration values and methods used to configure the Gateway.

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Gateway Failure Messages

This section provides failure messages and troubleshooting explanations for the E2050 LAN/GPIB Gateway, including:

- SICL Error Codes and Messages
- syslog File Messages

SICL Error Codes and Messages

The following table lists some common SICL error codes and messages a client application may encounter when using the E2050 LAN/GPIB Gateway.

Error Code	Error Message	Troubleshooting Tips
I_ERR_BADADDR	Bad address	The device/interface address passed to **iopen** does not exist. Use the Telnet commands to verify that the **hpib-address:**, **hpib-name:**, and **hpib-unit:** configuration values are correct.
I_ERR_NOCONN	No connection	The communication session with the Gateway was never established or the connection to a remote Gateway was dropped. Use the Telnet **status** command and any error messages logged to a **syslog** file for more information.
I_ERR_NORSRC	Out of resources	No more resources are available. Use the Telnet **status** command and any error messages logged to a **syslog** file for more information.
I_ERR_NOTSUPP	Operation not supported	May occur when using VXI-11 (TCP/IP Instrument Protocol) when the **hpib-name** is set to *hpib*. Use the Telnet configuration utility to change the **hpib-name** to *gpib0*. If this does not solve the problem, use the SICL LAN protocol instead, as this protocol has more features than VXI-11.
I_ERR_SYMNAME	Invalid symbolic name	The symbolic name passed to **iopen** was not recognized. Use the Telnet **hpib-name:** configuration value to verify the configuration.
I_ERR_TIMEOUT	Timeout occurred	A timeout occurred while performing an operation. The device may be busy, in a bad state, or a longer timeout value may be needed for the operation on the device. Verify the correct address was used in **iopen**. Use the Telnet **status** command and any error messages logged to a **syslog** file to get more information.

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`syslog` File Messages

The **`syslog`** file error messages can be viewed via the Telnet **`syslog-display`** command or by looking in the **`syslog`** file specified via the syslog server address configuration value.

Any invalid BOOTP values are detected when the file **`/etc/bootptab`** is read by the **`bootpd`** daemon. Errors will be sent to the syslog server for the BOOTP server system that is running the **`bootpd`** daemon. The following table lists some common **`syslog`** messages generated by the E2050 LAN/GPIB Gateway.

Message	Description
`ready for use`	Gateway has powered on and successfully completed its hardware self-test.
`rebooting`	Gateway is about to do a **`reboot`** or **`factory-reset`** command.
`Access denied for` *`IP_address`*	Client specified by the *IP_address* has been denied access to the Gateway as it is not in the IP allow list. Check current IP allow list configuration setting.
`Max connections exceeded, client` *`IP_address`* **`refused`**	A client specified by the *IP_address* was not allowed to connect to the Gateway because the maximum number of concurrent client connections on the Gateway has been exceeded. No more than 15 client connections can be running concurrently on the Gateway, and fewer may be allowed depending on memory usage for existing clients. Use the Telnet **`status`** command to determine the status of the current client connections on the Gateway.
`Insufficient resources`	An operation could not acquire sufficient resources on the Gateway to execute. This usually means the Gateway has too many sessions open, not allowing another session to be opened or an operation on an open session to be performed. Use the Telnet **`status`** command to determine the status of the current open sessions on the Gateway.
`HP-IB Address` *`n`* **`is not a valid HP-IB address.`**	The **`hpib-addr:`** value in the TFTP configuration file specifies an invalid GPIB address, *n*.
`HP-IB Logical Unit` *`n`* **`is not valid.`**	The **`hpib-unit:`** value in the TFTP configuration file specifies an invalid GPIB logical unit, *n*.
`io-timeout must be >= 0`	The **`io-timeout:`** value in the TFTP configuration file specifies an invalid, negative I/O timeout for the server.
`lan-timeout must be >= 0`	The **`lan-timeout:`** value in the TFTP configuration file specifies an invalid, negative “keepalive” LAN timeout for the server.
`Address is not a valid IP address.`	An invalid IP address for a configuration value was specified in the TFTP configuration file.

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Troubleshooting Network Configuration

This section provides guidelines to troubleshoot network configuration problems, including:

- Verifying Network Connections
- Troubleshooting Network Configurations

Verifying Network Connections

Before attempting to communicate with the E2050 LAN/GPIB Gateway, you may want to verify that the network connection and cabling are correct. Do the following:

1. Verify proper connections and network terminations visually (see *Chapter 2*).
2. Power on the LAN/GPIB Gateway and check for hardware failure (red **Fault** LED *remains* ON). The red **Fault** LED is illuminated *briefly* at power-on to verify its operation.

NOTE

If a hardware fault occurs during the power-on, hardware self-test, the **Fault** LED is illuminated and remains illuminated. In this case, contact Agilent. Service is required *only* if the Fault LED remains illuminated.

3. Make sure network packets are being transmitted on the same local subnet that is connected to the Gateway. The packets do not need to be addressed to go to the Gateway. You could use the **`ping`** command to generate network traffic.
4. If the **LAN Rx** LED is flashing, the Gateway is reading packets being sent over the local subnet. This means that you have a network connection. The **LAN Conn** LED and **LAN Tx** LED may be flashing even if you do not have a connection to the network.

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Troubleshooting Network Configurations

If some network configuration values for the E2050 LAN/GPIB Gateway are improperly configured, one or more client systems may not be able to make a connection to the Gateway. The problem may be:

- Improper configuration value(s) for the default subnet gateway and/or the subnet mask. If this is the case, the Gateway may be receiving requests from the client, but routing the replies to the wrong place.
- Improper or incomplete configuration value(s) for the IP allow list. If the client IP address does not match the ones allowed in the configured IP allow list, the connection will be refused. To verify this:
  - Check for a response from the Gateway with the **`ping`** command. If a response occurs, the connection is being refused because of the IP allow list configuration values.
  - If you are using a **`syslog`** server, look for **`access denied`** messages in the syslog file. See "**`syslog`** File Messages" for more information.

Telnet Configuration

To correct network configuration values when using the Telnet configuration method, take one of the following actions:

- If a client can successfully Telnet to the Gateway, use the Telnet configuration commands to fix the values. Then, reboot using the Telnet **`reboot`** command.

CAUTION

Any client operations in progress and client connections will be terminated by the ***`reboot`*** *command.*

- Otherwise, reset the Gateway to the default configuration values by pressing the **Config Preset** button on the back panel of the LAN/GPIB Gateway *at the same time as you power-on the Gateway*. Then, see *Chapter 3* to reconfigure the Gateway.

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BOOTP or BOOTP with TFTP Configuration

To correct network configuration values when using the BOOTP or the BOOTP with TFTP configuration method:

1. Fix the improper value in the **`/etc/bootptab`** file or the specified TFTP configuration file.
2. Cycle the power on the Gateway or use the Telnet **`reboot`** command. This will force the Gateway to use the new configuration values.

CAUTION

*Any client operations in progress and client connections will be terminated by the **`reboot`** command.*

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Troubleshooting Gateway Configuration

This section gives guidelines to troubleshoot E2050 LAN/GPIB Gateway configuration problems, including

- Verifying Gateway Configuration
- Setting Default Configuration
- Verifying the Configuration Method
- Changing the Configuration Method
- Troubleshooting Telnet Configuration
- Troubleshooting BOOTP Configuration
- Troubleshooting BOOTP with TFTP Configuration

Verifying Gateway Configuration

To verify that the E2050 LAN/GPIB Gateway is properly configured, you can: do the following:

- Telnet to the LAN/GPIB Gateway and use the Telnet **`config`** command to verify the current configuration settings
- Telnet to the LAN/GPIB Gateway and use the Telnet **`syslog-display`** command to see if any TFTP configuration errors were logged during the last power-on initialization of the Gateway.
- Examine the **`syslog`** file and check for configuration errors generated by the *bootpd* daemon or by the Gateway.

Setting Default Configuration

If you want to set the Gateway to *all* of its default configuration values, you can take either of the following actions. After the Gateway has been set to its default configuration values, see *Chapter 3* to reconfigure the Gateway.

- Press the **Config Preset** button on the back panel of the E2050 LAN/GPIB Gateway at the *same time that you power-on the Gateway*.
- If the Gateway is configured to a known IP address, Telnet to the Gateway and use the Telnet **`factory-reset`** command.

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CAUTION

Any client operations in progress and client connections will be terminated by the ***`factory-reset`*** *command when it reboots the Gateway.*

Verifying the Configuration Method

If you have a problem configuring the LAN/GPIB Gateway (such as configuring the IP address), first verify the method of configuration for the Gateway. After verifying the configuration method, see the applicable section in this chapter to troubleshoot the Gateway's configuration.

1 Check the **LAN Conn** LED illumination when the Gateway is powered on:

LAN Conn LED Operation	Description
Fast Flash	Attempting BOOTP or BOOTP with TFTP configuration.
Slow Flash	Temporarily using the default IP address of `192.0.0.192`.
Off	Has a valid IP address and is configured. Could be from a valid BOOTP server response or has been configured via Telnet.
On	Has a valid IP address and a client is connected to it.

2 When the Gateway is powered on, the **LAN Conn** LED works independently, whether or not the Gateway is physically connected to a network. Temporarily disconnecting the Gateway can be helpful to see if the Gateway is being configured via Telnet or BOOTP. *Consult your Network Administrator before disconnecting the Gateway from an active network.*

3 If the Gateway is powered on, configured, and has a known valid IP address, Telnet to the Gateway and check the setting of the **`bootp: ON/OFF`** configuration value to determine the configuration method used.

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4 If the Gateway is powered on, configured, but you do *not* know the IP address:

- Press the **Config Preset** button on the back panel of the LAN/GPIB Gateway. This forces the Gateway to *temporarily* use the `192.0.0.192` default IP address without modifying any other configuration values.
- Make sure the route table entry for the Gateway at its default IP address is setup via the `route` command on the client system.
- Telnet to `192.0.0.192` and look at the setting of the `bootp: ON/OFF` configuration value to determine the configuration method used.

NOTE

If you are unable to make a Telnet connection using the default IP address (`192.0.0.192`), try pressing the **Config Preset** button again and then Telnet to `192.0.0.192`.

- Execute a Telnet `reboot` command. If no values were changed, the Gateway will use the same configuration method and have the same configuration values (IP address, etc.) as previously set.

CAUTION

Any client operations in progress and client connections will be terminated by the `reboot` command.

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Changing the Configuration Method

If you want to change the configuration method used for the Gateway, you can take one of three following actions. However, for Windows 95/98/Me/2000/NT client systems, you must use the Telnet configuration method. Neither the BOOTP nor the BOOTP with TFTP configuration methods are available on Windows client systems. After you change the configuration method, see *Chapter 3* to configure the Gateway to the new method.

1 Telnet to the Gateway, modify the **`bootp: ON/OFF`** value and then use the Telnet **`reboot`** command.

CAUTION

*Any client operations in progress and client connections will be terminated by the **`reboot`** command.*

2 Telnet to the Gateway and then do a Telnet **`factory-reset`** command. This changes the configuration values the default values and reboots the Gateway. This also sets the **`bootp: ON/OFF`** value to the default **`ON`** value. For HP-UX client systems, you can now use the BOOTP or the BOOTP with TFTP configuration method.

CAUTION

*Any client operations in progress and client connections will be terminated by the **`factory-reset`** command when it reboots the Gateway.*

3 Press the **Config Preset** button on the back panel of the LAN/GPIB Gateway *at the same time as you power-on the Gateway*. This changes all configuration values to the default values. This includes setting the **`bootp: ON/OFF`** value to the default **`ON`** value. For HP-UX client systems, you can now use the BOOTP or the BOOTP with TFTP configuration method.

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Troubleshooting Telnet Configuration

If you have trouble configuring the LAN/GPIB Gateway using Telnet with the default IP address of **`192.0.0.192`**:

1. Verify that the **`route`** command was performed properly. Use **`netstat -r`** to display the network routing tables.

2. Verify that the Gateway is on the same local subnet as the client system from which you are Telneting. If not, consult your Network Administrator to determine if the default IP address will work from a separate subnet or to find a client system on the same local subnet that you can use.

3. After the Gateway is powered on, press the **Config Preset** button on the back panel of the LAN/GPIB Gateway and verify the **LAN Conn** LED is flashing slowly.

4. If the Telnet to the default **`192.0.0.192`** IP address does not work, try pressing the **Config Preset** button again. Depending on how your network is configured, the button may need to be pressed twice before the default IP address will be properly recognized and routed on the network. Or, one of the network values may be improperly configured on the Gateway, blocking a successful connection.

Troubleshooting BOOTP Configuration

If you are have trouble configuring the LAN/GPIB Gateway using the BOOTP configuration method:

1. Verify that the Gateway's configuration values are correct in the **`/etc/bootptab`** file for your BOOTP server.

2. Verify that the BOOTP server system is configured to run the **`bootpd`** daemon. See the *Administering ARPA Services* manual for more information.

3. Look for **`bootpd`** daemon errors in the syslog file on the **`syslog`** server for the BOOTP server.

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4 Verify the BOOTP server is on the same local subnet as the Gateway. If not, consult your Network Administrator to verify that your network configuration supports using a BOOTP server that is not on the same subnet.

5 When the Gateway is powered on, verify there is a fast flash on the **LAN Conn** LED.

NOTE

Your BOOTP server may support the **`bootpquery`** capability to verify your BOOTP configuration. See your BOOTP server documentation for how to use the **`bootpquery`** command.

Troubleshooting BOOTP with TFTP Configuration

If you have trouble configuring the LAN/GPIB Gateway using the BOOTP with TFTP configuration method:

1 Follow the steps in “Troubleshooting BOOTP Configuration”.

2 Verify that the TFTP server system is configured to run the **`tftpd`** daemon. See the *Administering ARPA Services* manual for more information.

3 Consult your BOOTP server documentation to verify you have the correct permissions on the specified TFTP configuration file.

4 Verify that the Gateway’s configuration values are correct in the TFTP file.

5 Look for errors specific to the TFTP values in the syslog file on the configured syslog server or with the Telnet **`syslog-display`** command.

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Troubleshooting Client Connections

This section gives guidelines to troubleshoot client connections to the E2050 LAN/GPIB Gateway, including:

- Client Connection Problems
- Client Run-time Errors

Client Connection Problems

Even if the E2050 LAN/GPIB Gateway has been successfully configured and the configuration has been verified, individual clients may still have problems getting a connection to the Gateway.

1. The first step is to verify that the client system has network access to the Gateway. Use the **`ping`** command, as follows:

   - For a Windows 95/98/Me/2000/NT client system, type: **`ping`** *hostname* (or) *IP_address* **Enter**. For example:

```
>ping E2050.agilent.com
Pinging E2050.agilent.com[128.10.0.3] with 32 bytes of
data:
Reply from 128.10.0.3:bytes=32 time=10ms TTL=255
Reply from 128.10.0.3:bytes=32 time=10ms TTL=255
Reply from 128.10.0.3:bytes=32 time=10ms TTL=255
Reply from 128.10.0.3:bytes=32 time=10ms TTL=225
```

   Each line after the **`Pinging`** line is an example of a packet successfully reaching the Gateway from the client system. However, if **`ping`** is unable to reach the host, a message similar to the following is displayed:

```
Pinging E2050.agilent.com[128.10.0.3] with 32 bytes of
data:
Request timed out.
Request timed out.
Request timed out.
```


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This indicates the client was unable to contact the Gateway. The Gateway may be on a different subnet than the client (see your Network Administrator) or the Gateway may have incorrect network configuration values.

- For an HP-UX client system, type: **`ping`** *hostname* (or) *IP_address* **Return**. For example:

```
>ping E2050.agilent.com
PING E2050.agilent.com: 64 byte packets
64 bytes from 128.10.0.3: icmp_seq=0. time=8. ms
64 bytes from 128.10.0.3: icmp_seq=1. time=3. ms
64 bytes from 128.10.0.3: icmp_seq=2. time=3. ms
64 bytes from 128.10.0.3: icmp_seq=3. time=3. ms
```

Each line after the **`PING`** line is an example of a packet successfully reaching the Gateway. If, after several seconds, **`ping`** does not print any lines, use **Ctrl+C** to kill **`ping`**. The **`ping`** command will then report on what it found.

For example, the following indicates the client was unable to contact the Gateway. The Gateway may be on a different subnet than the client (see your Network Administrator) or the Gateway may have incorrect network configuration values

```
----E2050.agilent.com PING Statistics----
7 packets transmitted, 0 packets received, 100% packet
loss
```

2 For an HP-UX client system ONLY, once **`ping`** works, you can try one of the following **`rpcinfo`** commands using the Gateway IP address to verify that the client has access privileges to the Gateway (in the IP allow list configuration):

- **`rpcinfo -p`** *IP_address* **Return**. This **`rpcinfo`** command gives the following response, where the line for program **`395180`** is the LAN server in the Gateway.

```
  program       vers      proto      port
  100000          2        tcp       111  portmapper
  100000          2        udp       111  portmapper
  395180          1        tcp      5055
```


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- You can also try **`rpcinfo -t`** *IP_address* **`395180`** **Return**. This **`rpcinfo`** command gives the response: **`program 395180 version 1 ready and waiting.`** If this is not working properly, see “Troubleshooting Network Configuration”.

3 The Telnet command can be used to verify if a client has network access to the Gateway as well. If the Telnet command returns the message: **`connection refused`**, the client may not have access (check the IP allow list configuration values) or the Gateway has run out of resources and cannot open the Telnet session.

Client Run-time Errors

Common run-time errors that may occur on a client using an E2050 LAN/GPIB Gateway follow.

Message	Description
`iopen` fails: Invalid address errors	Use the Telnet commands to verify that the GPIB address, GPIB interface name, and/or GPIB logical unit configuration values are correct.
`iopen` fails: No connection	The connection to the LAN/GPIB Gateway failed for one of these reasons: ■ A TCP/IP network timeout occurred because the network connection is down or the Gateway is down. ■ The client was denied access to the Gateway because it is not in the IP allow list. Check the IP allow list configuration values and any error messages in a syslog file for more information. ■ The Gateway has reached its maximum concurrent client connections and this new connection was refused. Use the Telnet **`status`** command to determine the current Gateway client connection status and check the **`syslog`** file for error messages. You may need to have a client close its connection or you may need to reboot the Gateway to close all client connections to allow a new connection to be made.
`iopen` fails: Timeout	The client has timed out. The Gateway has not responded within the appropriate timeout time because: ■ The network connection is down or the Gateway is down. ■ The server is busy performing an operation for a different client. Use the Telnet **`status`** command to verify the Gateway status. You may need to increase the Client Timeout Delta configuration value on the LAN client.

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Message	Description
`iopen` fails or I/O operation fails: Out of resources	The Gateway was unable to open another session or perform the operation because it is out of resources. Use the Telnet **`status`** command and look in the **`syslog`** file for any error messages to determine the current Gateway status. You may need to have a client terminate its connection or you may need to reboot the Gateway to close all client connections to reclaim resources.
I/O operation fails: No connection	The connection to the Gateway failed because: ■ The network connection is down or the Gateway is down and a TCP/IP network timeout occurred. ■ The Gateway was powered off and then on or a Telnet **`reboot`** command was executed, either of which terminates any open client connections. Check the **`syslog`** file for reboot messages.
I/O operation fails: Timeout	There are several possible causes: ■ The client may be attempting a transaction to a non-existent or powered-off device. Check the address used, as well as the status of the device. ■ The network connection or Gateway has gone down since the previous I/O operation. ■ The I/O timeout specified is not long enough for the transaction to complete. You may need to verify that the Gateway I/O timeout configuration value is long enough if the client specified a timeout value of infinity. ■ The Gateway is busy performing an I/O operation for another client or another client has the device/interface locked. Use the Telnet **`status`** command to determine if another client is currently executing an operation or if the required device/interface is locked. See “Gateway appears to be hung” for more information.

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Message	Description
Gateway appears to be hung	There are several possible causes. For all of the following, use of client timeouts and/or Gateway timeouts (the I/O timeout and LAN timeout configuration values) can be used to ensure that the Gateway will not "hang" indefinitely. If you determine that the Gateway is truly hung, you may be able to free it by terminating a particular client connection at the client, thus freeing up the resources to allow the Gateway to proceed. Otherwise, you may have to use the Telnet **`reboot`** command. ■ The network connection has gone down or the Gateway has gone down. ■ The Gateway may be attempting a transaction to a non-existent or powered-off device. Check the address used, as well as the status of the device. ■ The Gateway is busy performing a very long transaction to a (slow) device, or it is waiting for input from a device. ■ A client may be waiting for access to a device/interface locked by another client. Use the Telnet **`status`** command to determine what clients have which devices or interface locked and which clients are waiting for those locks to be freed before they can proceed. Check for possible deadlock situations and, if possible, make sure the clients owning locks and the connections to those clients are still up and functioning.

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A

Specifications

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Specifications

This appendix provides specifications for the E2050 LAN/GPIB Gateway, including:

- Power Requirements
- Environmental
- GPIB Characteristics

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Power Requirements

	E2050	AC/DC Adapter
Input Voltage	5Vdc	100-240Vac
Input Current	~0.8A Typical	9.75A
Frequency Range	dc	50/60Hz
Output Current	N/A	2.0A Maximum
Power Consumption	4W (Typical) 10W (Maximum)	

Environmental

	Operating	Non-Operating (Storage)
Temperature	0°C to +40°C	–40°C to +70°C
Relative Humidity	15% to 80% at 40°C	90% R.H. at 60°C 24 hrs.

GPIB Characteristics

The GPIB connection conforms to IEEE 488.1 - 1987 specifications. Per this specification, the following constraints exist:

Total Bus length:	Less than 2 meters x number of devices and no more than 20 meters total length.
Length between devices:	Less than 2 meters between each device or equivalent standard load.
Total number of devices:	15 devices or less (includes Gateway).
Address restrictions:	Address 31 is a reserved IEEE 488 address. Address 21 is normally used by the E2050 LAN/GPIB Gateway, unless changed in the configuration table.
Drivers:	48mA three-state drivers (E2).

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Notes:

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Glossary

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Glossary

address
A string uniquely identifying a particular interface or a device on that interface which is interpreted at the E2050 LAN/GPIB Gateway to identify the interface or device.

BOOTP requests
Broadcast messages sent at power-on from the E2050 LAN/GPIB Gateway to the BOOTP server's bootpd daemon to gain configuration information for the LAN/GPIB Gateway. The BOOTP request contains the LAN/GPIB Gateway 's LAN hardware address.

BOOTP response
The configuration information that the BOOTP server's bootpd daemon sends to the E2050 LAN/GPIB Gateway in response to the Gateway's BOOTP requests. The Gateway then uses this information to complete its power-on initialization sequence.

BOOTP server
The server computer system running the bootpd daemon used in the configuration of devices on the local area network.

client
Part of the client/server model used in distributed computing. A client is a computer system that requests services from a server computer system, such as I/O application requests, networking requests, and so forth.

controller
A computer used to communicate with a remote device such as an instrument. In the communications between the controller and the device, the controller is in charge of and controls the flow of communication that is, it does the addressing and/or other bus management). The controller acts as the SICL/LAN client.

device
A unit that receives commands from a controller. Typically a device is an instrument but could also be a computer acting in a non-controller role, or another peripheral such as a printer or plotter.

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gateway
Hardware that permits a network connection between the LAN that your computer understands, and the instrument specific interface that your device understands.

instrument
A device that accepts commands and performs a test or measurement function.

interface
A connection and communication media between devices and controllers, including mechanical, electrical, and protocol connections.

LAN
Local Area Network. The E2050 LAN/GPIB Gateway can be used on either Ethertwist or ThinLAN networks. The Gateway can also be used on ThickLAN or fiber optic networks by purchasing the appropriate converter and MAU.

lock
A state that prohibits other users from accessing a resource, such as a device or interface.

logical unit
A logical unit is a number associated with an interface. In Agilent SICL, a logical unit uniquely identifies an interface. Each interface on the controller must have a unique logical unit.

server
Part of the client/server model used in distributed computing. The server is a computer system designated to act as a main servicer of requests from other client computer systems, such as I/O application requests, networking requests, and so forth.

SICL
The Agilent Standard Instrument Control Library, which is software used for I/O application programming.

SRQ
Service Request. An asynchronous request (an interrupt) from a remote device indicating that the device requires servicing.

symbolic name
A name corresponding to a single interface. This name uniquely identifies the interface on a controller or gateway. If there is more than

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one interface on the controller or gateway, each interface must have a unique symbolic name.

TFTP
The Trivial File Transfer Protocol, which is an extension to BOOTP.

VEE
The Agilent Visual Engineering Environment, which is software used for I/O application programming.

VISA
The Agilent Virtual Instrument Software Architecture library, which is software used for I/O application programming.

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