Ethernet GPIB Controller

NI GPIB-ENET/100

- Controls IEEE 488 instruments anywhere on an Ethernet-based TCP/IP network
- Up to 14 GPIB devices can be interfaced to each GPIB-ENET/100
- Shares GPIB equipment from several network hosts
- Compatible with twisted pair (10BaseT or 100BaseTX)
- DHCP or manual IP address assignment
- Maximum GPIB transfer rates
  - More than 900 kbytes/s (IEEE 488.1)
  - More than 1.2 Mbytes/s (HS488)
- GPIB-ENET/100 firmware code contained in Flash EEPROM for easy maintenance – no physical EEPROM changes required
- External DC power supply
- Optional rack-mount and DIN rail/wall-mount hardware

Operating Systems

- Windows 2000/NT/XP/Me/9x
- Mac OS X, Mac OS Classic
- Linux
- Solaris
- HP-UX
- Tru64 UNIX (Digital UNIX)

Recommended Software

- LabVIEW
- LabWindows/CVI
- Measurement Studio

Driver Software

- NI-488.2

Overview

Ethernet ports are a standard feature of today's computers. Most of these computers have operating systems with built-in TCP/IP network software capability. The National Instruments GPIB-ENET/100 Ethernet-to-GPIB controller and NI-488.2 take advantage of this network connectivity in instrument control applications. Using the NI GPIB-ENET/100, networked computers can communicate with and control IEEE 488 devices from anywhere on an Ethernet-based TCP/IP network. You can use a GPIB-ENET/100 to share a single GPIB system among many networked users or to control several test systems from a single networked host computer.

NI-488.2 for the GPIB-ENET/100 is available for a variety of operating systems. You can port application programs written for other National Instruments GPIB interfaces for use with the GPIB-ENET/100, without modifying the code. Additionally, you can monitor data or control your instrumentation system with a Web browser if you use NI-488.2 in combination with NI LabVIEW, LabWindows/CVI, or Measurement Studio.

Description

IEEE 488 and Network Interface Details

The GPIB-ENET/100 uses TCP/IP protocols to convert a computer with an Ethernet port into a GPIB Talker, Listener, and Controller. The GPIB-ENET/100 implements the full range of GPIB controller functions.

Network Details

The Internet Protocol (IP) uses the Internet to route information among network nodes. The Transmission Control Protocol (TCP), used on top of the Internet Protocol, guarantees correct, in-sequence data between network hosts and devices.

Although you commonly use TCP/IP protocols on the Internet, most TCP/IP users are not connected to the actual Internet. Individual institutions and corporations have created their own internal intranets to connect their computers, other network hosts, and devices that use TCP/IP. The regional application depicted in Figure 1 shows an example of both Internet and intranet applications. The Internet application example shows how a user on a workstation in a corporate facility can access a GPIB-ENET/100 installed in a facility at another location. Within the corporate facility, an intranet configuration connects workstations with other GPIB devices, such as printers and plotters. You can share GPIB systems throughout a building, a complex, a country, or around the world.

The GPIB-ENET/100 works with both 10BaseT (10 Mb/s) and 100BaseTX (100 Mb/s) networks. It automatically detects the type of network available and communicates at the highest speed possible.

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Ethernet GPIB Controller

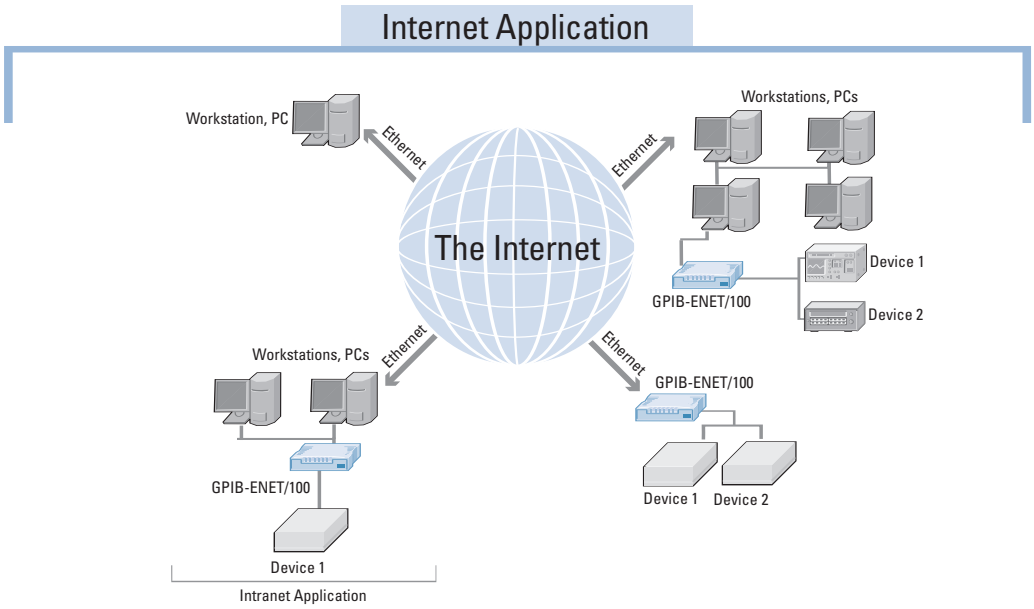


Figure 1. Regional Application Configuration

Performance

The National Instruments GPIB-ENET/100 is a GPIB controller that delivers high performance by combining:

- A high-performance 32-bit CPU
- Fast Ethernet controller
- A TNT family GPIB interface ASIC
- Substantial onboard buffer RAM
- Efficient firmware design

Typical sustained data throughput is more than 900 kbytes/s. This performance is comparable to that of GPIB plug-in boards. Data transfer rates can vary substantially with the NI GPIB-ENET/100 because of the variable network traffic and the unique operating characteristics each subnet displays.

Cabling

You can connect the GPIB-ENET/100 directly to 10BaseT or 100BaseTX networks using CAT 5 twisted pair Ethernet cables (see Figures 2a and 2b). If you need to connect the GPIB-ENET/100 to a different type of network, such as a coax network (10Base2), you can add a converter to your setup. For example, you can place a coax-to-twisted pair converter between the GPIB-ENET/100 and the coax Ethernet tap.

You can also connect a GPIB-ENET/100 controller directly to a computer Ethernet port, without using an Ethernet hub, using an Ethernet crossover cable (see Figure 2c).

Network Addressing

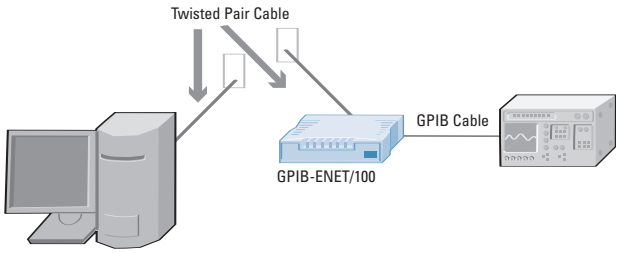
Each GPIB-ENET/100 receives a unique Ethernet hardware address at the factory. This address is a 48-bit value used to specify the source and destination of Ethernet packets. The TCP/IP protocols also require an Internet address. The Internet address is a 32-bit value used to locate a device on the network; the Internet address has no relationship to the Ethernet address.

You can assign the Internet address to the GPIB-ENET/100 automatically or manually. If the network uses the DHCP protocol, the GPIB-ENET/100 automatically configures its Internet address. If DHCP is not available, you can use the NI Ethernet Device Configuration utility to assign the Internet address manually (see Figure 3a). Network parameters not assigned by DHCP are stored in nonvolatile memory. After the Internet address has been assigned, you can associate the address to a GPIB interface using Measurement and Automation Explorer (MAX), as shown in Figure 3b, and use the same programs previously written for other NI GPIB interfaces.

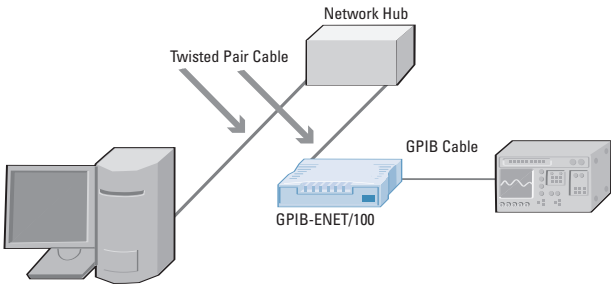
Firmware

The necessary command interpretation, IEEE 488.2 and TCP/IP protocol management, and system upkeep of the GPIB-ENET/100 are stored in Flash EPROM as an onboard firmware operating system. Although code is installed at the factory, you can easily upgrade the firmware by downloading new code to the GPIB-ENET/100 memory. You can download the firmware at your site with a special utility provided with NI-488.2. Firmware upgrades are instantaneous; you do not need to replace the physical EEPROM inside the GPIB-ENET/100.

A. Standard Configuration for Intranet and Internet Applications



B. Isolated Network Using Desktop Hub and Standard Twisted Pair Cabling



C. Isolated Network Using Crossover Cable

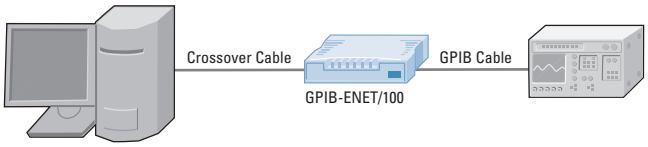
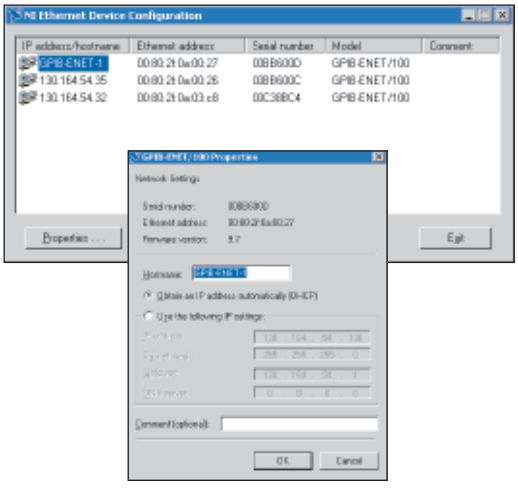


Figure 2. Network Cabling Configurations

A. Detect NI Ethernet-based controllers and assign their IP addresses or host names



B. Associate the IP address or host name of the GPIB-ENET/100 to a GPIB interface in Measurement & Automation Explorer

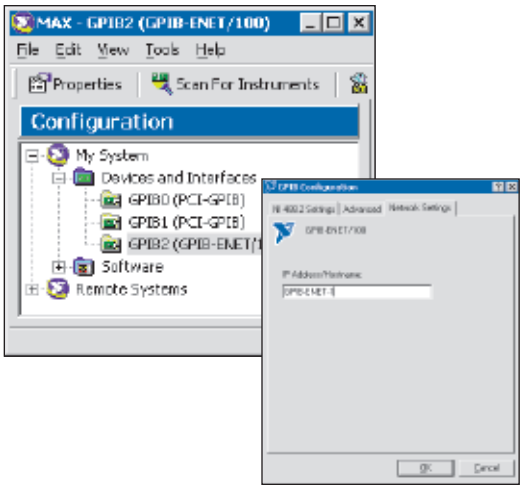


Figure 3. Easy Steps to Configure Your GPIB-ENET/100

Ethernet GPIB Controller

Ordering Information

Hardware

GPIB-ENET/100 and NI-488.2 for Windows 2000/XP[1]
- U.S. 120 VAC 778209-01
- Swiss 220 VAC 778209-02
- Australian 240 VAC 778209-03
- Universal Euro 240 VAC 778209-04
- North American 240 VAC 778209-05
- United Kingdom 240 VAC 778209-06

[1] NI-488.2 for Windows 2000/XP available in English, Japanese, Korean, simplified Chinese, and traditional Chinese.

Software

NI-488.2
- Windows NT 778220-02
- Windows Me/9x 778258-02
- Linux 778259-02
- Mac OS X 778251-02
- Mac OS Classic 778257-02
- Solaris 778256-02
- HP-UX 778377-02
- Tru64 UNIX 778378-02

Contact NI for availability with other OSs.

Cables

GPIB
- X2 cable (double shielded)
  - 1 m 763061-01
  - 2 m 763061-02
  - 4 m 763061-03
  - 8 m 763061-04

Ethernet
- CAT 5 twisted-pair 10/100BaseT cable (E1 cable)
  - 1 m 182219-01
  - 5 m 182219-05
  - 10 m 182219-10
- CAT 5 twisted-pair crossover cable (E4 cable)
  - 1 m 187375-01
  - 5 m 187375-05
  - 10 m 187375-10
- CAT 5 shielded twisted-pair 10/100 BaseT cable (E5 cable)
  - 1 m 189174-01
  - 5 m 189174-05
  - 10 m 189174-10

Additional Hardware Options

Rack-mount kit (single/dual case) 187322-02
DIN-rail/wall-mount kit (single unit) 777972-01

BUY NOW!

For complete product specifications, pricing, and accessory information, call (800) 813-3693 (U.S. only) or go to ***ni.com/gpib***.

Specifications

Ethernet Port

10BaseT or 100BaseTX
Ethernet address set at the factory
Internet address configuration by DHCP or by configuration utility

IEEE 488 Compatibility

Full-Function Talker, Listener, and Controller
IEEE 488.1 and IEEE 488.2 compatible
Handles all primary and secondary addresses
Address is software selectable

Performance

IEEE 488 interlocked handshake	More than 900 kbytes/s
IEEE 488 non-interlocked (HS488) handshake	More than 1.1 Mbytes/s

Physical

Dimensions	21.0 by 12.4 by 3.7 cm (8.25 by 4.89 by 1.44 in.)
Weight	400 g (14.2 oz)

I/O Connectors

GPIB	IEEE 488 standard 24 pin
Ethernet	RJ-45

Network Specifications

Connection type	IEEE 802.3 compliant 10BaseT (10 Mb/s) 100BaseTX (100 Mb/s)
Duplex mode	Half duplex

Power Requirement

9 to 30 VDC	425 mA maximum
15 VDC	250 mA typical

Operating Environment

Ambient Temperature	0 to 65 °C
Relative humidity	10 to 90%, noncondensing

Storage Environment

Ambient Temperature	-40 to 100 °C
Relative humidity	5 to 95%, noncondensing

Noise Emissions

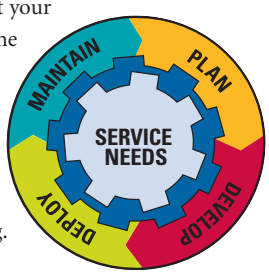
FCC Class A verified

Compliance

Online at ***ni.com/hardref.nsf***

NI Services and Support

NI has the services and support to meet your needs around the globe and through the application life cycle – from planning and development through deployment and ongoing maintenance. We offer services and service levels to meet customer requirements in research, design, validation, and manufacturing. Visit *ni.com/services*.



Training and Certification

NI training is the fastest, most certain route to productivity with our products. NI training can shorten your learning curve, save development time, and reduce maintenance costs over the application life cycle. We schedule instructor-led courses in cities worldwide, or we can hold a course at your facility. We also offer a professional certification program that identifies individuals who have high levels of skill and knowledge on using NI products. Visit *ni.com/training*.

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Hardware Services

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NI Factory Installation Services (FIS) is the fastest and easiest way to use your PXI or PXI/SCXI™ combination systems right out of the box. Trained NI technicians install the software and hardware and configure the system to your specifications. NI extends the standard warranty by one year on hardware components (controllers, chassis, modules) purchased with FIS. To use FIS, simply configure your system online with *ni.com/pxiadvisor*.

Calibration Services

NI recognizes the need to maintain properly calibrated devices for high-accuracy measurements. We provide manual calibration procedures, services to recalibrate your products, and automated calibration software specifically designed for use by metrology laboratories. Visit *ni.com/calibration*.

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