

# Ethernet Serial Device Servers for RS-232 and RS-485

## NI ENET-232 Series, NI ENET-485 Series

- Ethernet TCP/IP interfaces
  - 100BaseTX (100 Mb/s)
  - 10BaseT (10 Mb/s)
- Compatible with PC serial port
  - 2 and 4 ports
  - RTS/CTS hardware handshake lines
  - 128 B transmit and receive FIFOs
  - DHCP or manual IP address assignment

### ENET-232

- RS-232 interface
- 230.4 kb/s maximum transfer rate
- 15.6 m (50 ft) cable length, maximum

### ENET-485

- RS-485 or RS-422 interface
- 460 kb/s maximum transfer rate
- 31 devices per port, maximum
- Automatic transceiver-control mode for 2-wire RS-485 devices
- 1.2 km (4,000 ft) cable length, maximum

### Operating Systems

- Windows 2000/NT/XP
- Linux
- Solaris

### Recommended Software

- LabVIEW
- LabWindows/CVI
- Measurement Studio
- Lookout

### Other Compatible Software

- C/C++
- Visual Basic
- Any package that uses the Microsoft Windows Serial (COM) port interface

### Driver Software (included)

- NI-SDS (Windows only)
- NI-VISA



## Overview

The National Instruments ENET-232 and ENET-485 serial device servers connect either 100BaseTX (100 Mb/s) or 10BaseT (10 Mb/s) Ethernet networks to asynchronous serial ports for communication with serial devices. You can buy serial device servers with either 2 or 4-port options and use standard RS-232, RS-422, or RS-485 communications. All products are shipped with driver software for Windows 2000/NT/XP. You can install and use these serial device servers as standard serial ports from your existing applications or with applications written with NI-VISA. Development environments, such as Visual Basic, Visual C++, and Excel, as well as National Instruments LabVIEW, LabWindows/CVI, Measurement Studio, and Lookout application software products, can access the add-in serial ports using standard serial I/O functions.

## Description

The TCP/IP communication protocol, which handles all communication between the serial device server and the host PC, runs on embedded firmware in the serial device server. A configuration utility configures the IP address of the serial device server and exposes all additional serial ports to the operating system for immediate use by any application software package using standard Microsoft Windows Serial (COM) port interface.

## Specifications

FIFO size .....	128 B
Maximum transfer rate .....	460 kb/s
Ethernet connector .....	RJ-45
Serial connectors .....	DB-9
Noise emissions .....	Class A

### Power Requirements

+9 VDC .....	600 mA typical, 1.0 A maximum
Dimensions .....	21.0 by 12.4 by 3.7 cm (8.25 by 4.89 by 1.44 in.)

### Operating Environment

Ambient temperature .....	0 to 70 °C
Relative humidity .....	10 to 90%, noncondensing

### Storage Environment

Ambient temperature .....	-40 to 85 °C
Relative humidity .....	5 to 95%, noncondensing

### Electrostatic Discharge Protection

Case contact and air discharge .....	±4 kV
RS-232 and RS-485 data lines .....	±15 kV (HBM)

## Ordering Information

Model	Serial Port	Number of Ports	Part Number
ENET-232/2	RS-232	2	778064-P2*
ENET-232/4	RS-232	4	778064-P4*
ENET-485/2	RS-485/RS-422	2	778065-P2*
ENET-485/4	RS-485/RS-422	4	778065-P4*

\*External 12 VDC power supply included

P = Power Cord Type    0 = U.S. 120 VAC    4 = Universal Euro 240 VAC  
                                   2 = Swiss 220 VAC    5 = North American 240 VAC  
                                   3 = Australian 240 VAC    6 = United Kingdom 240 VAC

Dual rack-mount kit .....187322-02  
 DIN rail mounting kit .....777972-01

## BUY ONLINE!

Visit [ni.com/info](http://ni.com/info) and enter *enet232* and/or *enet485*.

# 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 9.x
- 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.

# Ethernet GPIB Controller

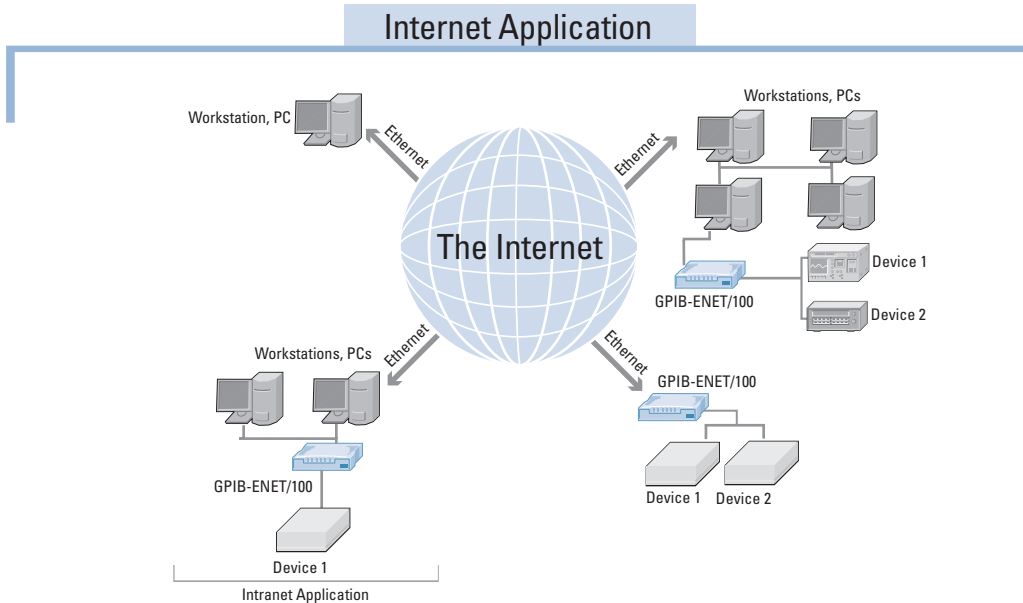


Figure 1. Regional Application Configuration

## 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.

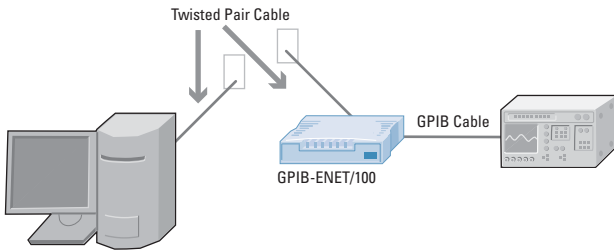
You can assign the Internet address to the GPIB-ENET/100 automatically or manually. If the network uses the DHCP protocol, the GPIB-ENET/100 automatically configures its Internet address. If DHCP is not available, you can use the NI Ethernet Device Configuration utility to assign the Internet address 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

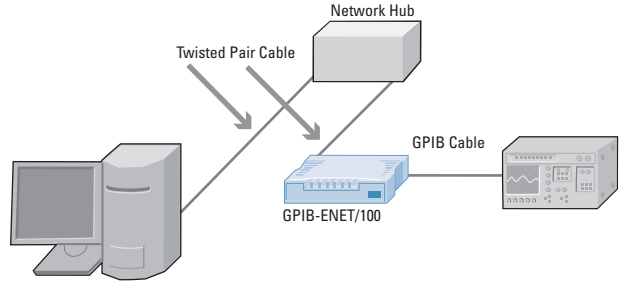
The necessary command interpretation, IEEE 488.2 and TCP/IP protocol management, and system upkeep of the GPIB-ENET/100 are stored in Flash EPROM as an onboard firmware operating system. Although code is installed at the factory, you can easily upgrade the firmware by downloading new code to the GPIB-ENET/100 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 EPROM inside the GPIB-ENET/100.

# Ethernet GPIB Controller

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

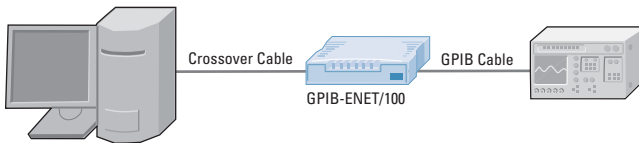
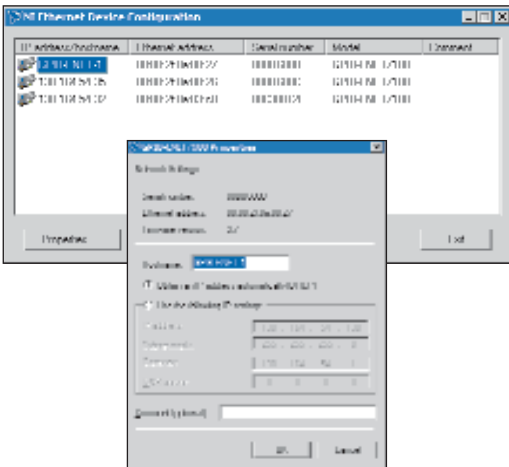


Figure 2. Network Cabling Configurations

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

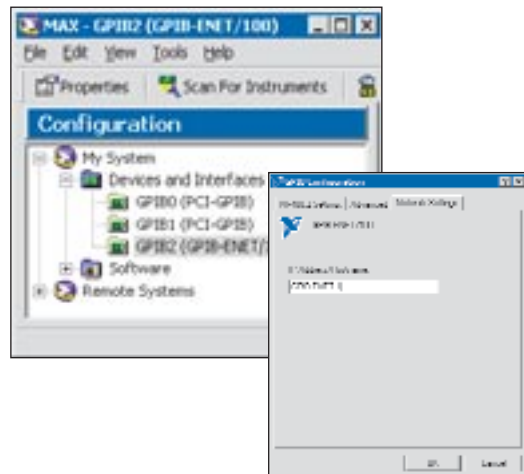


Figure 3. Easy Steps to Configure Your GPIB-ENET/100

# Ethernet GPIB Controller

## Ordering Information

### Software

GPIB-ENET/100	
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

### Software

NI-488.2	
Windows 2000/XP/Me/98 .....	778598-0Y
Windows NT .....	778220-0Y
Windows 95 .....	778258-0Y
Mac OS X .....	778251-0Y
Mac OS 9.x, 8.x, 7.x .....	778257-0Y
Solaris .....	778256-0Y
HP-UX .....	778377-0Y
Tru64 UNIX .....	778378-0Y

Contact NI for availability with other operating systems.

Y = 1 Includes a multiuser software license with which you can install NI-488.2 on several computers in a single physical network.

Y = 2 Includes a single-user software license with which you can install NI-488.2 on a single computer in a single physical network.

### 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 ONLINE!

Visit [ni.com/info](http://ni.com/info) and enter *gpibenet100*.

## 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](http://ni.com/hardref.nsf)