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GPIB RS-232/485 Controllers and RS-232 Converter

GPIB ↔ Serial Controllers and Converter

- Completely IEEE 488.2 compatible
- 256 KB RAM buffer
- 8 RS-232 or RS-485 data transfer rates up to 38.4 kb/s; hardware handshaking, and the XON/XOFF protocols prevent data loss
- Cable lengths extend GPIB
  - Up to 15.6 m (50 ft.) for GPIB-232CT-A and GPIB-232CV-A
  - Up to 1.2 km (4,000 ft.) for GPIB-485CT-A

NI GPIB-232CT-A, NI-GPIB-485CT-A

- Compatible with RS-422 ports (GPIB-485CT-A)
- NI-488.2 for Windows 3.1/DOS
- Applications
  - Integrate an RS-232/485 instrument into a GPIB system
  - Control a GPIB-based test system from a remote computer via RS-232/485

NI GPIB-232CV-A

- Switch-selectable interface parameters include IEEE 488 address, transfer rate, parity, stop bits, word length, and termination mode
- Special SRQ-ON-EMPTY feature for maximum GPIB performance
- Applications
  - Print from a laptop computer to an IEEE 488 printer
  - Interface an RS-232 device to an IEEE 488 bus system



NI GPIB-232CT-A, NI GPIB-485CT-A

Overview

The National Instruments GPIB-232CT-A and GPIB-485CT-A can turn any computer or terminal with an RS-232 or RS-485 port into a full-function IEEE 488.2 controller. With the flip of a switch, the NI GPIB-232CT-A or NI GPIB-485CT-A can make any RS-232 or RS-485 device appear as a GPIB device. The small size of these controllers makes them ideal for use with laptop computers or other computers that have no internal I/O slots available.

The NAT4882 IEEE 488.2 ASIC implements the full range of GPIB controller functions, including those controller functions required and recommended by IEEE 488.2. All GPIB sequences and operations conform to IEEE 488.2. External DIP switches set the operating mode, the GPIB primary address, and serial port parameters.

Depending on the version, the GPIB-232CT-A and GPIB-485CT-A controllers can accept either AC or DC power input. You can connect either the GPIB-232CT-A or the GPIB-485CT-A to up to 14 GPIB instruments. In addition, when you pair the GPIB-485CT-A with an RS-485 board for the PC, such as the National Instruments PCI-485, you can use it as a cost-effective GPIB extender up to 1.2 km (4,000 ft).

Controller Capabilities

Data Buffer – A FIFO data buffer helps maximize performance. The GPIB-232CT-A and GPIB-485CT-A can continue to accept data from the serial or GPIB port while the other port is busy.

Complete Status Update – The GPIB-232CT-A and GPIB-485CT-A handle both continuous and requested status and error reporting in either symbolic or numeric form.

Symbolic status reporting is useful for direct viewing on a terminal (CMPL for complete, ERR for error, and so on). Numeric status reporting is useful for processing by an application.

Modes of Operation

You can use either controllers in either Serial (S) or GPIB (G) mode. These modes are described using the GPIB-232CT-A as an example.

S Mode – Figure 1 shows the GPIB-232CT-A used in the S mode. In S mode, the device on the serial side of the GPIB-232CT-A is a computer or similar intelligent device.

The GPIB-232CT-A acts as a protocol translator between the serial port and GPIB devices and has complete Talker/Listener/Controller capability. For S mode, you can use a full repertoire of GPIB-related commands and others that manage the serial interface and the GPIB-232CT-A itself.

G Mode – Figure 2 shows the GPIB-232CT-A used in the G mode. In G mode, the GPIB-232CT-A makes a serial device appear as a GPIB Talker/Listener to the Controller. The GPIB-232CT-A recognizes two addresses in G mode – it treats one as its GPIB address and the other as the serial device address. When the GPIB-232CT-A receives its GPIB listen address, it treats the data it receives as a programming message. When the GPIB-232CT-A receives the serial device listen address, it simply passes the data it receives to the serial device. When the GPIB-232CT-A receives its GPIB talk address, it sends out status information. When the GPIB-232CT-A receives the serial device talk address, it sends out the serial data received from the device. You can program the GPIB-232CT-A to assert SRQ under a variety of

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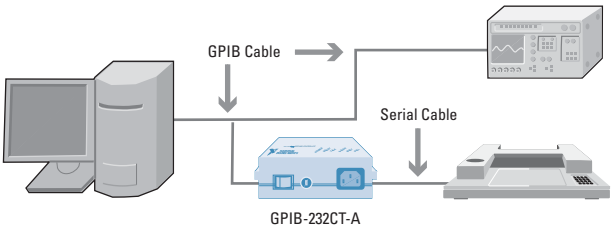


Figure 1. S Mode Application Example

conditions; for example, when it has received any data from the serial device, or when it has received an end-of-string byte from the serial device.

Software – Win32 Compatibility

Native 32-bit compatability with board-level NI-488.2 functions is possible with a Win 32 operating system. For details, refer to the Application Note titled "Board-Level NI-488.2 Software for the GPIB-232CT-A and Windows NT/98/95" (Application Note 130, part number 341585A-01).

Under Windows Me/9x, you can install and use NI-488.2 for DOS to run DOS applications, NI-488.2 for Windows 3.1 to run Win16 applications, and NI-488.2 for Windows 3.1 along with the compatibility release to run Win32 applications.

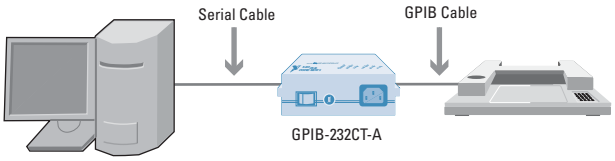


Figure 2. G Mode Application Example

NI GPIB-232CV-A

Overview

The National Instruments GPIB-232CV-A IEEE 488 to RS-232 protocol converter transparently converts data between the two ports without control codes or special commands. The NI GPIB-232CV-A also increases the efficiency of the interface system by isolating a slow device from the faster port using its built-in DMA controller and 256 kb RAM buffer. You can use the GPIB-232CV-A with virtually all PCs.

The GPIB-232CV-A links either a GPIB controller to an instrument with an RS-232 port or a GPIB device to a computer through the computer serial port. For example, the GPIB-232CV-A can interface a GPIB device, such as an IEEE 488 spectrum analyzer, to a computer with an RS-232 port; or it can connect an RS-232 device, such as a printer or plotter, to a GPIB network. Data transfers in either direction are possible at all times.

Depending on the version, the GPIB-232CV-A can accept either AC or DC power input.

Modes of Operation

You can configure the GPIB-232CV-A to run in one of two modes – device mode or controller mode. Device mode configures the GPIB-232CV-A to perform as a GPIB Talker/Listener controlled by another GPIB Controller. Controller mode configures the GPIB-232CV-A as a GPIB Controller that addresses a single GPIB device to talk or listen.

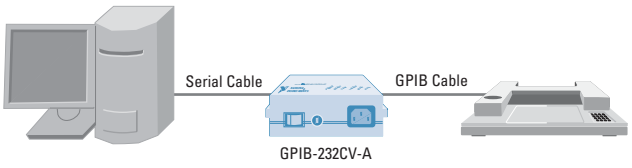


Figure 3. G Mode Application Example

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GPIB RS-232/485 Controllers and RS-232 Converter

Ordering Information

GPIB-232CT-A
- GPIB-232CT-A hardware only
  - AC version 776668-0P
  - DC version 776899-Y1
- GPIB-232CT-A and NI-488.2 for Windows 3.1/DOS
  - AC version 776667-0P
  - DC version 776900-Y1

GPIB-485CT-A
- GPIB-485CT-A hardware only
  - AC version 777146-0P
  - DC version 777147-Y1
- GPIB-485CT-A and NI-488.2 for Windows 3.1/DOS
  - AC version 777148-0P
  - DC version 777149-Y1

GPIB-232CV-A
- GPIB-232CV-A hardware only
  - AC version 776669-0P
  - DC version 776898-Y1

P = Power cord type
- 1 = U.S. 120 VAC
- 2 = Swiss 220 VAC
- 3 = Australian 240 VAC
- 4 = Universal Euro 240 VAC
- 5 = North American 240 VAC
- 6 = United Kingdom 240 VAC

Y = Power supply type
- 0 = 115 VAC
- 3 = 230 VAC

Cables

National Instruments recommends you use the following cables with the GPIB-232CV-A/GPIB-232CT-A.

Serial null modem cable (9-pin D-Sub to 9-pin D-Sub)
- 1 m 182238-01
- 2 m 182238-02
- 4 m 182238-04

RS1 cable (9-pin D-Sub to 25-pin D-Sub)
- 1 m 181074-10

GPIB-232CV-A/Mac cable (9-pin D-Sub to Macintosh port, 8-pin DIN)
- 1 m 182514-01

National Instruments recommends you use the following cables with the GPIB-485CT-A.

RS2 cable (9-pin female D-Sub to 9-pin female D-Sub)
- 1 m 183283-01
- 2 m 183283-02
- 4 m 183283-04

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Visit ni.com/info and enter gpib232cta, gpib485cta, and/or gpib232cva.

Specifications

Power Requirements

AC version (50 to 60 Hz)
- 100 to 120 ±10% VAC ..... 5 VA
- 220 to 240 ±10% VAC ..... 5 VA

DC version
- 5 to 13 VDC ..... 700 mA

Physical

Dimensions
- AC version ..... 7.6 by 4.4 by 11.8 cm (3.0 by 1.7 by 4.7 in.)
- DC version ..... 7.6 by 2.8 by 11.8 cm (3.0 by 1.1 by 4.7 in.)

Weight ..... 340.2 g (12 oz)

I/O Connectors

GPIB port ..... IEEE 488 standard 24-pin
Serial port ..... Standard 9-pin male D-Sub

Operating Environment

Temperature ..... 0 to 40 °C
Relative humidity ..... 10 to 90%, noncondensing

Storage Environment

Temperature ..... -20 to 70 °C
Relative humidity ..... 10 to 95%, noncondensing

Noise Emissions

FCC Class A verified (AC version)
FCC Class B verified (DC version)

Compliance

Online at ni.com/hardref.nsf

Serial Port

Full-duplex with optional echo
7 or 8 data bits, 1 or 2 stop bits
Odd, even, or no parity
Baud rates: 300, 600, 1200, 2400, 4800, 9600 b/s; 19.2, 38.4 kb/s

RS-232 Specific

Asynchronous RS-232 EIA level
DTE configuration
XON/XOFF and DTR/RTS/CTS handshake

RS-485 Specific

Asynchronous EIA-485 level
Hardware handshake and XON/XOFF

GPIB-232CV-A GPIB Transfer Rate

GPIB reads into buffer memory ..... Up to 625 kbytes/s

GPIB-232CV-A Buffer Details

C-Mode
- Serial to GPIB ..... 256 KB

D-Mode, small serial buffer
- Serial to GPIB ..... 256 B
- GPIB to serial ..... 256 KB

D-Mode, large serial buffer
- Serial to GPIB ..... 32 KB
- GPIB to serial ..... 224 KB

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