BLACK BOX®
NETWORK SERVICES

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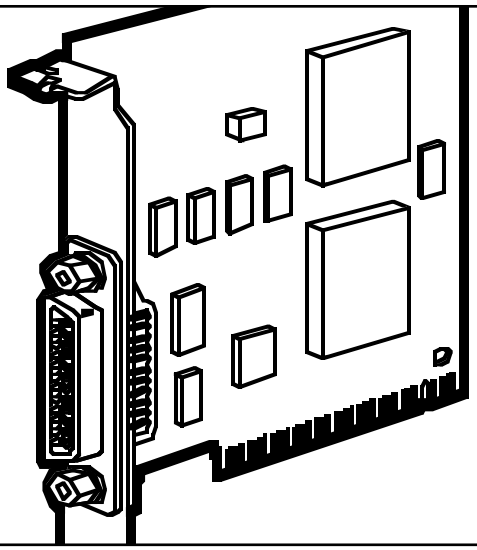
IEEE 488 PERSONAL PCI CARD



Get the maximum out of your IEEE 488 bus. Control up to 14 devices with this card.

Key Features

- ***Turns your PC into a 488 controller.***
- ***Adds digital capabilities to your IEEE 488 controller.***
- ***Plug-and-play and easy to program with HP style commands.***
- ***Up to 4 cards can be used in one PC.***
- ***Functions as a PCI bus master.***
- ***Provides 8 channels of digital input/output lines.***
- ***Includes drivers for Windows systems.***
- ***1-MBps speed.***

Also known as GPIB (General Purpose Interface Bus), IEEE 488 is the international standard for a parallel interface used for attaching sensors and programmable instruments to a computer.

Now, Black Box can help you expand the capabilities of your IEEE 488 interface. With the IEEE 488 Personal PCI Card, you can convert your PC or PC/AT® into a high-performance 488-compliant controller for up to 14 IEEE 488 devices.

Use this interface board, for example, to control IEEE 488 instruments in a test system, or use it with 488 peripherals such as plotters.

The card features 32-bit PCI local bus compatibility and transfers data across the 488 bus at sustained speeds in excess of 1 MegaByte per second (MBps) via the IEEE 488.2 handshake protocol.

Easy to program via familiar HP® style commands, the IEEE 488 Personal PCI Card fully supports plug-and-play operation. Just install it in the PCI slot of your PC. Up to four PCI cards can be used in one PC.

Each card provides eight channels of general-purpose digital I/O lines, which are arranged in two 4-bit groups that you can individually program as inputs or outputs. To access these eight lines, just attach the DB9 ribbon cable that ships with the card.

The IEEE 488 Personal PCI Card can be used to generate PCI interrupts in response to digital signal states. You can also set it up to synchronise the IEEE 488 Group Execute Trigger with digital signal states generated by external events.

With the card, you get various software drivers that integrate IEEE 488.2 control into Windows® applications, provides true multi-tasking device locking, and includes interactive control. The following drivers are included:

- Driver 488/W95—Windows 95 driver with C, Delphi™, and Visual Basic® support.
- Driver 488/WNT—Windows NT® driver with C, Delphi, and Visual Basic support.
- Driver 488/NI—National Instruments compatible Windows drivers for IEEE 488.2 hardware.

When used in a Windows 95 or 98 systems, the IEEE 488 Personal PCI Card supports plug-and-play installation—you don't have to physically configure the hardware; it does it automatically.

Package Includes

- IEEE 488 Personal PCI Card
- CD-ROM with drivers
- Users' manual

Technically Speaking

IEEE 488 (also known as GPIB or General Purpose Interface Bus) is an international standard for a parallel interface that has greatly simplified the connection of sensors and programmable instruments to a computer. With it, instruments from different manufactures can be connected by a single standard cable.

Two IEEE 488 standards are in use: the older IEEE 488.1 standard, which deals with the hardware only, and the newer IEEE 488.2 standard, which also addresses software issues like data formats and error handling.

IEEE 488.1 is a clearly defined mechanical, hardware, and electrical protocol specification. It doesn't address data formats, status reporting, message-exchange protocol, or common configuration or device-specific commands.

IEEE 488.2 enhances the IEEE 488.1 standard by specifying data formats, status reporting, error handling, controller functionality, and common instruments commands. It focuses mainly on the software protocol issues and thus maintains compatibility with the hardware-oriented IEEE 488.1 standard. IEEE 488.2 systems tend to be more compatible and reliable.

Most devices can be adapted to the IEEE 488 specification. The specification says nothing about the function of the device itself, or about the form of the device's data. Instead, it defines a separate interface that can be added to the device. Only the signals passing into the interface from the IEEE 488 bus and from the device are defined in the standard.

There are three classes of devices that can be connected to the IEEE 488 bus: *Listeners, Talkers,* and *Controllers.* Some devices include more than one of these functions. The IEEE 488 standard allows a maximum of 15 devices to be connected on one bus. A minimum system consists of one *Controller* and one *Talker* or *Listener* device.

A *Controller* is the device that sends instructions. It's possible to have several *Controllers* on the bus at once but only one may be active at a time. The *Controller* that's in charge at the moment is called the *Active Controller*.

The *Controller* that's in charge of the entire bus is called the *System Controller*. It has several unique capabilities, including the ability to send Interface Clear (IFC) and Remote Enable (REN) commands. IFC clears all device interfaces and returns control to the *System Controller*. REN allows devices to respond to bus data once they are addressed to listen. The *System Controller* may optionally pass control to another *Controller*, which then becomes *Active Controller*.

A *Listener* is a device that can receive data from the bus when instructed by the *Controller*. A *Talker* transmits data on the bus when instructed. The *Controller* can set up a *Talker* and a group of *Listeners* in order to send data between groups of devices.

The IEEE 488 interface system consists of 16 signal lines and 8 ground lines. The 16 signal lines are divided into 3 groups (8 data lines, 3 handshake lines, and 5 interface-management lines).

The lines DIO1 through DIO8 are used to transfer addresses and control information and data. The formats for addresses and control bytes are defined by the IEEE 488 standard. Data formats are undefined and may be ASCII or binary. DIO1 is the Least Significant Bit.

The three handshake lines (NRFD, NDAC, DAV) control the transfer of message bytes among devices and form the method for acknowledging the transfer of data. This handshaking process guarantees that bytes on the data lines are sent and received without any transmission errors. It's one of the unique features of the IEEE 488 bus.

The NRFD (Not Ready for Data) handshake line is asserted by a *Listener* to indicate it is not yet ready for the next data or control byte. Note that the *Controller* will not see NRFD released (meaning the devices are ready for data) until all devices have released it.

The NDAC (Not Data Accepted) handshake line is asserted by a *Listener* to indicate it has not yet accepted the data or control byte on the data lines. Note that the *Controller* will not see NDAC released (i.e., data accepted) until all devices have released it.

The DAV (Data Valid) handshake line is asserted by the *Talker* to indicate that a data or control byte has been placed on the data lines and has had the minimum specified stabilizing time. The byte can now be safely accepted by the devices.

Five interface management lines (ATN, EOI, IFC, REN, SRQ) manage the flow of control.

The ATN (Attention) signal is asserted by the *Controller* to indicate that it is placing an address or control byte on the data bus.

The EOI (End or Identify) signal has two uses. A *Talker* may assert EOI simultaneously with the last byte of data to indicate end-of-data. Or the *Controller* may assert EOI along with ATN to initiate a parallel poll. Although many devices do not use parallel poll, all devices should use EOI to end transfers.

The IFC (Interface Clear) signal is used by the *System Controller* in order to initialize all device interfaces to a known state.

The REN (Remote Enable) signal is used by the *System Controller*. REN enables a device to go into remote mode when addressed to listen. When in remote mode, a device will ignore its local front-panel controls.

The SRQ (Service Request) line is like an interrupt: it may be asserted by any device to request the *Controller* to take some action. The *Controller* must determine which device is asserting SRQ by conducting a serial poll. The requesting device releases SRQ when it's polled.

Specifications

Data Transfer Rate (Maximum): 1 MegaByte per second (MBps)

Distance (Maximum): 20 m (65.6 ft.)

Connectors: (1) DB9 F, (1) standard IEEE 488 with metric studs

Operating Temperature: 32 to 158°F (0 to 70°C)

Humidity Tolerance: Up to 95% non-condensing

Power: From PC

Size: PCI-slot card

Weight: <1 lb. (<0.5 kg)

Ordering Information

ITEM

CODE

IEEE 488 Personal PCI Card.....IC098C

You may also need…

IEEE 488 Cable (with Molded Connectors)

6.6-ft. (2-m).....EXN02M

13.1-ft. (4-m) EXN04M