Keysight Technologies
GPIB, USB and Instrument Control for easy PC-to-Instrument Connections

Data Sheet

KEYSIGHT TECHNOLOGIES

Introduction

Keysight instrument control hardware enable:

- Easy connection to GPIB instruments based on simple plug-and-play setup and configuration
- Use of PC-standard interfaces that are prevalent even on notebook PCs, such as USB and LAN
- A wide selection of interfaces to fit your test system application – PCI, PCIe®, USB and LAN
- Use of industry-standard I/O libraries which makes integration of existing instruments and software programs in a single system easy, even if you use multiple instrument vendors.

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Connecting is as Easy as 1-2-3

1. **Install** Keysight IO Libraries Suite software on your PC
2. **Hook up** the instrument control hardware (USB, LAN, RS-232 or GPIB cables) between your instruments and your PC
3. **Detect instruments** and devices, then configure interfaces with Connection Expert

Establish a connection in less than 15 minutes

Keysight IO Libraries Suite eliminates the many working hours it takes to connect and configure PC-controlled test systems, especially if it involves instruments from multiple vendors. In fact, with IO Libraries, connecting your instruments to a PC is as easy as connecting a PC to a printer.

Easily mix instruments from different vendors

Keysight IO Libraries Suite eliminates headaches associated with trying to combine hardware and software from different vendors. The software is compatible with GPIB, USB, LAN and RS-232 test instruments that adhere to the supported interface standards, no matter who makes them.

When you install the IO Libraries Suite, the software checks for the presence of other I/O software on your computer. If it finds another vendor's VISA libraries, it automatically installs in a side-by-side mode that allows you to use the existing I/O software and the Keysight software together in multi-vendor systems.

Work in the environment that's comfortable to you

In addition, the IO Libraries are compatible with a variety of application development environments and programming APIs including Keysight or NI VISA, VISA COM, SICL, Keysight 488 (compatible with NI-488.2), and Keysight VEE. There is flexibility to choose the software and hardware of your choice to get your job done.

Works with millions of existing instruments from hundreds of vendors

Keysight instrument control hardware and IO Libraries are trusted and known for their reliability. The IO Libraries ships with more than 150 instruments from Keysight Technologies. If you already own an Keysight instrument control hardware or instrument, you can download the latest version of Keysight IO Libraries Suite for free.

Keysight IO Libraries Suite 17.0

System requirements	
PC software	
Operating system	– Windows 8 and 8.1 32-bit and 64-bit (Windows 8, Windows 8 Pro, and Windows 8 Enterprise) – Windows 7 SP1 32-bit and 64-bit (Starter, Home Basic, Home, Premium, Professional, Ultimate, Enterprise) – Windows Vista SP1 and SP2, 32-bit and 64-bit (Home Basic, Home Premium, Business, Ultimate, Enterprise Editions) – Windows XP SP3 32-bit (Professional and Home) – Windows Server 2012 64-bit (Standard) – Windows Server 2008 R2 SP1, 64-bit (Standard and Enterprise)
PC hardware	
Processor	600 MHz class (800 MHz or greater recommended)
Hard disk space required	1.5 GB
RAM	– 256 MB minimum (1 GB or greater recommended) – Windows Vista, Windows 7, or Windows 8: 1 GB minimum
Display	1024 x 768 96 or 120 DPI
Input device	Microsoft mouse or compatible pointing device
Device for installation	DVD-ROM
Web connection for installation, upgrades and drivers	
IO Libraries Media contents	
IO Libraries Suite	– I/O libraries: VISA, VISA COM, SICL, Keysight 488 – Connection Expert – I/O utilities – Full online help for all I/O libraries and utilities
Keysight Command Expert	
Version 2.2.1 of the IVI Shared Components (see www.ivifoundation.org/)	– Microsoft .NET Framework 2.0 SP2 – Microsoft .NET Framework 4.0
Supported interfaces[1]	
GPIB	Standard IEEE 488.1
USB	USB 3.0 or lower (with USBTMC-USB488, USBTMC, and Composite protocol)
LAN/Ethernet	Standard LAN (with HiSLIP, LXI, VXI-11, SICL-LAN and sockets)
RS-232/Serial	
PXI	AXIe, PXI, PXIe, PCI and PCIe devices
VXI	FireWire (32/64-bit, not supported on Windows 8)
Supported development environments and supported I/O software	
VB6	VISA COM, VISA, SICL, Keysight 488, Excel VBA
C/C++	VISA COM, VISA, Keysight 488
.NET languages (VB.NET, C#)	VISA COM, VISA, Keysight 488
LabVIEW	VISA, Keysight 488
MATLAB	VISA
VEE Pro	Direct I/O and/or instrument drivers
I/O utilities	
Connection Expert	Automatically scans your instrument IO, helps you get connected quickly and easily and displays the status of your instruments and I/O interfaces.
Interactive IO	Lets you quickly send commands to instruments and read responses.
IO Monitor	Lets you monitor and debug I/O calls made on any of Keysight's supported buses using SICL, VISA, VISA COM, or Keysight IVI instrument drivers (drivers released after September 18, 2010)
IO control	Provides easy access to the IO Libraries Suite from the Windows system tray.
VXI resource manager	Provides configuration of the IEEE 1394 connection from PC to VXI.
viFind32/viFind64	Debug utility uses VISA functions to find resources and lists them ina console window.
PXI Chassis	Provides a new PXI/AXIe Chassis view showing PXI and AXIe chassis with details of the card in each slot. You can see chassis and instrument addresses, start soft front panels, make trigger reservations, customize the chassis numbering in multi-chassis systems, and delete manually-added chassis.

1. See the latest information on supported interfaces and operating systems for IO Libraries Suite 17 at www.keysight.com/find/iolib_revmatrix

Keysight 82357B USB/GPIB Interface Converter

Features

- Fast and easy connection to GPIB instruments
- Uses standard USB and IEEE-488 interfaces
- Maximum GPIB transfer rate of 1.15 MB/s
- Parallel polling capability

Best for

- Easiest GPIB connectivity
- Notebook computer GPIB connection

Connect GPIB instruments quickly and easily to your computer's USB port

The Keysight 82357B USB/GPIB interface provides a direct connection from the USB port on your desktop and laptop computers to GPIB instruments. Once the software is loaded, your computer automatically detects the 82357B when it is connected to the USB port of the computer.

The 82357B is a plug-and-play device. It is also hot-pluggable, making it easy to connect and disconnect without having to shut down the computer. No external power supplies are necessary.

The 82357B USB/GPIB interface implements USB 1.1 (12 Mbits/s) and is compatible with USB 2.0. The 82357B USB/GPIB interface uses a thin, flexible, high-quality USB cable that is USB 2.0-compliant. The USB cable is shielded, and the connector is specified to 1,500 insertions, ensuring a durable connection and reliable data transfer.



Boosting performance with simplest connectivity

82357B technical specifications	
General requirements	
Minimum system requirements	Refer to page 4 for requirements in using the Keysight IO Libraries software (included with the instrument control hardware)
Supported standards	– Supports USB 2.0 high speed – Standard USB endpoints supported – IEEE-488.1 and IEEE-488.2 compatible – SICL and VISA 2.2
Unsupported GPIB modes of operation	– Pass Control – Non-System Controller mode
General characteristics	
Power	USB bus-powered device, +5 V, 500 mA (maximum), 200 mA (typical)
Maximum data rate (GPIB)	1.15 MB/s
Connectors	– Standard 24-pin IEEE-488 (GPIB) – Standard USB A
USB hubs	Self-powered hubs
Parallel polling	A single parallel poll can easily check up to eight individual devices at once, corresponding to the number of data lines on the GPIB
Cable	2.5 meters, shielded, connector rated for 1,500 insertions
LED indicators	READY, ACCESS, FAIL
Maximum instrument connection	14 instruments—daisy chain via GPIB. A maximum of 4 converters can be connected to the PC.
Configuration	Plug-and-play
Warranty	1 year
EMC and safety	– IEC 61010-1: 2001/EN 61010-1: 2001 – USA: UL61010-1: 2004 – Canada: CSA C22.2 No. 61010-1: 2004
Dimensions	
Length, width, and height	105 mm (L) x 64 mm (W) x 30 mm (H) (including connectors)
Weight	215 grams
Environmental specifications	
Operating environment	0 °C to 55 °C
Operating humidity	Up to 90% at 40 °C non-condensing
Storage environment	–40 °C to 70 °C
Storage humidity	Up to 90% at 65 °C non-condensing
Ordering information	
Includes	Keysight IO Libraries Suite and VISA/SICL programming manuals on CD-ROM
Accessories	GPIB cables/adapter (see page 12)

Keysight 82350C High Performance PCI-GPIB Interface Card [NEW]

Features

- PCI IEEE-488 interface for PCs
- Transfer rates up to 900 KB/s
- Dual processor support on the latest Windows operating system

Best for

- Maximum GPIB throughput for all configurations
- Standard and low-profile brackets allow flexible connection



82350C with standard profile bracket



82350C with low-profile bracket

Powerful performance for automation or manufacturing test application

The 82350C PCI-GPIB interface card converts any PCI bus computer into an instrumentation control and data acquisition system. It comes with direct PCI computer connection, and transaction overhead is minimized for the best overall operating performance.

The 82350C interface card is fully compatible with IEEE-488 control and communication standard, de-couples GPIB transfers from PCI bus transfers. Buffering provides I/O and system performance that is superior to direct memory access (DMA). The hardware is software configurable and compatible with the plug-and-play standard for easy installation. The GPIB interface card offers high flexibility to plug into standard or low profile PC with a bracket change.

82350C technical specifications	
General requirements	
Minimum system requirements	Refer to page 4 for requirements in using the Keysight IO Libraries software (included with the instrument control hardware)
Software requirements	Keysight IO Libraries Suite version 17.0 onwards
PCI bus slot	Universal 3.3 V and 5 V PCI slot, 32 bits
Supported standards	PCI rev 2.1, IEEE 488.1 and IEEE 488.2 compatible
General characteristics	
Power	Backplane +3.3 V or +5 V PCI
Connectors	– Standard 24-pin IEEE-488 (GPIB) – Universal +3.3 V & +5 V PCI
Maximum data rate	900 KB/s
Maximum instrument connection	14 instruments - daisy chain via GPIB
Buffering	Built-in
Configuration	Plug and play
EMC	IEC 61326-1:2005/EN61326-1:2006
Warranty	1 year
Dimension	
Length, width and height	156 mm (L) X 121 mm (W) X 21.6 mm (H)
Weight	0.072 kg
Environmental specifications	
Operating environment	–5 °C to 60 °C
Operating humidity	Up to 90% at 40 °C non condensing
Storage environment	–40 °C to 70 °C
Storage humidity	Up to 90% at 65 °C non condensing
Ordering information	
Includes	Keysight Instrument Control DVD, Low profile bracket, Quick start poster

Keysight 82351B High Performance PCIe-GPIB Interface Card [NEW]

Features

- High transfer rate of 1.4 MB/s
- High flexibility via up-plugging (to x4 or x8 PCIe slots)
- 3.3 V signal level for lower power consumption

Best for

- Bandwidth-intensive test applications
- Standard and low-profile brackets allow flexible connection

Faster data transfer speed for high-throughput test application

The 82351B PCIe-GPIB interface card offers the fast data transfer rate associated with PCIe to support high-bandwidth PC applications, ensuring that data is consistently retained without being overwritten during the transfer to memory.

PCIe is the next generation of PCI and offers unsurpassed speed and performance, making PCIe cards an ideal choice for many computer platforms and automation applications. It is full backward compatible with PCI-configured software or coding, removing the need to reconfigure any code. The 82351B is highly flexible with plug-and-play configuration and enables usage in a low-profile PC with a bracket change.



82351B with standard profile bracket



82351B with low-profile bracket

82351B technical specifications	
General requirements	
Minimum system requirements	Refer to page 4 for requirements in using the Keysight IO Libraries software (included with the instrument control hardware)
Software requirements	Keysight IO Libraries Suite version 17.0 onwards
PCI bus slot	3.3 V PCI slot, 32 bits
Supported standards	– PCIe rev 1.0a – IEEE-488.1 and IEEE-488.2 compatible
General characteristics	
Power	Backplane +3.3 V PCIe
Connectors	– Standard 24-pin IEEE-488 (GPIB) – +3.3 V PCIe
Maximum data rate	1.4 MB/s
Maximum instrument connection	14 instruments - daisy chain via GPIB
Buffering	Built-in
Configuration	Plug and play
EMC	IEC 61326-1:2005/EN61326-1:2006
Warranty	1 year
Dimension	
Length, width and height	156 mm (L) X 121 mm (W) X 21.6 mm (H)
Weight	0.074 kg
Environmental specifications	
Operating environment	–5 °C to 60 °C
Operating humidity	Up to 90% at 40°C non condensing
Storage environment	–40 °C to 70 °C
Storage humidity	Up to 90% at 65 °C non condensing
Ordering information	
Includes	Keysight Instrument Control DVD, Low profile bracket, Quick start poster

Keysight 82350B High Performance PCI-GPIB Interface Card

Features

- PCI IEEE-488 interface for PCs
- Transfer rates up to 900 KB/s
- Dual processor support on the latest Windows operating system

Best for

Maximum GPIB throughput for all configurations

High performance for manufacturing test applications

The 82350B is Keysight's highest-performance GPIB interface. With a direct PCI computer connection, transaction overhead is minimized for the best overall performance.

The 82350B card de-couples GPIB transfers from PCI bus transfers. Buffering provides connectivity and system performance that is superior to direct memory access (DMA). The hardware is software-configurable and compatible with the plug-and-play standard for easy hardware installation. The GPIB interface card plugs into a 5 volt PCI slot in the backplane of your PC.



This traditional GPIB connection still offers the highest throughput

82350B technical specifications	
General requirements	
Minimum system requirements	Refer to page 4 for requirements in using the Keysight IO Libraries software (included with the instrument control hardware)
PCI bus slot	5-V PCI slot, 32 bits
Supported standards	IEEE 488.1 and IEEE 488.2 compatible, PCI rev 2.1
General characteristics	
Power	Backplane +5 V PCI
Connectors	– Standard 24-pin IEEE-488 (GPIB) – +5 V PCI
Maximum data rate	900 KB/s
Maximum instrument connection	14 instruments–daisy chain via GPIB
Buffering	Built-in
Configuration	Plug-and-play
EMC and safety	– IEC 61326-1: Group 1, Class A – IEC 61010-1
Warranty	1 year
Dimensions	
Length, width, and height	122 mm (L) x 122 mm (W) x 22 mm (H) (a full-height PCI card)
Weight	0.091 kg
Environmental specifications	
Operating environment	0 °C to 55 °C
Operating humidity	Up to 90% at 40 °C non-condensing
Storage environment	–40 °C to 70 °C
Storage humidity	Up to 90% at 65 °C non-condensing
Ordering information	
Includes	Keysight IO Libraries Suite and VISA/SICL programming manuals on CD-ROM
Accessories	GPIB cables/adapter (see page 12)

Keysight 82351A High Performance PCIe-GPIB Interface Card

Features

- Compact half-height size (68.9 mm)
- High transfer rate of 1.4 MB/s
- High flexibility via up-plugging (to x4 or x8 PCIe slots)
- 3.3 V signal level for lower power consumption

Best for

- Bandwidth-intensive PC applications
- Adding GPIB connection for PCIe based PCs or workstations

High transfer rate for demanding test applications

The Keysight 82351A PCIe-GPIB interface card is designed for integration into next generation PCs or workstations. It offers fast data transmission for various demanding test applications that require data to be transferred to memory fast enough without any loss or overwriting. PCIe (PCI Express) is an evolutionary version of PCI that offers a higher transfer rate across a low number of wires. It is also backward-compatible with PCI software, so you don't need to perform any code re-configuration. The powerful bus architecture of PCIe allows bidirectional data transmission, and the implementation of a new class of test applications.



New standard for high-speed internal devices

82351A technical specifications	
General requirements	
Minimum system requirements	Refer to page 4 for requirements in using the Keysight IO Libraries software (included with the instrument control hardware)
PCI bus slot	3.3 V PCIe slot, 32 bits
Supported standards	– PCIe rev. 1.0a – IEEE 488.1 and IEEE 488.2 compatible
General characteristics	
Power	Backplane +3.3 V PCIe
Connectors	– Standard 24-pin IEEE-488 (GPIB) – +1.5 V PCIe
Maximum data rate	1.4 MB/s
Maximum instrument connection	14 instruments–daisy chain via GPIB
Buffering	Built-in
Configuration	Plug-and-play
EMC and safety	– IEC 61010-1: 2001/EN61010-1: 2001 – IEC 61326: 2002/EN61326: 1997+A1: 1998+A2: 2001+A3: 2003 – Pollution Degree 2 – Indoor use only
Warranty	1 year
Dimensions	
Width, depth, and height	120.8 mm (W) x 158.0 mm (D) x 21.6 mm (H)
Weight	0.082 kg
Environmental specifications	
Operating environment	–5 °C to 60 °C
Operating humidity	Up to 90% at 40 °C non-condensing
Storage environment	–40 °C to 70 °C
Storage humidity	Up to 90% at 65 °C non-condensing
Ordering information	
Includes	Keysight IO Libraries Suite and VISA/SICL programming manuals on CD-ROM
Accessories	GPIB cables/adapter (see page 12)

Keysight E5810B LAN/GPIB/USB Gateway

Features

- Remote access and control of GPIB, USB and RS-232 instruments
- Faster GPIB transfer rate of up to 1.2 MB/s
- Supports 1000BASE-T (1 Gigabit)/ 100BASE-TX/10BASE-T LAN/ Ethernet connection
- Power switch for hard reset
- Password-protected web interface for configuration
- LCD display for easy setup and use

Best for

- Connection to GPIB, USB and RS-232 instrumentation
- Shared test systems

One-box connectivity solution—now with USB capability

The E5810B is the next generation of the E5810A and expands the gateway's capability to include USB connectivity. The E5810B connects up to 14 GPIB instruments, up to four USB instruments via a self-powered hub and an RS-232 instrument, giving test engineers a fast and efficient one-box solution to control various instrument interfaces over LAN, even remotely via wireless connection.

The E5810B's versatility makes it ideal for system integrators, manufacturing testing, automated testing and other applications requiring an unlimited connection range and simultaneous connectivity to multiple instruments, both locally and remotely.



The E5810B is the next generation of the E5810A and provides a gateway between networked-equipped computer systems (using LAN) and GPIB/USB/RS-232 instruments.

High transfer rates enhance performance

With an improved GPIB transfer rate of 1.2 MB/s, test engineers can reduce test time and improve production throughput. The E5810B also features 1000BASE-T (1 Gigabit) LAN/Ethernet compatibility in addition to existing 100BASE-TX and 10BASE-T supportability to meet the demands of higher network bandwidth. This will also allow optimal data transfer rates when a USB 2.0 instruments is connected to the IO interface.

Configure your instrument via the LCD display

With the E5810B's built-in LCD display, users can quickly retrieve the IP address of the gateway and other system messages without needing to install additional software.

The E5810B also comes with LED indicators on the front panel display, allowing users to determine the connection statuses of the gateway box at a glance. The green indicators cover LAN connection, GPIB, USB or RS-232 instrument activity and whether the gateway is powered on, while a lit red FAULT indicator points to possible hardware failure.

Perform wireless communication

The E5810B enables wireless communication to instruments where LAN connection is unavailable or inconvenient by connecting a wireless router to the E5810B.

Safeguard information with security functions

The E5810B comes with protection features to safeguard sensitive information, requiring a secure password to access and modify all web configuration pages, while the secure erase feature is a standard product feature in all Keysight equipment that will erase the system's preset and data information. Press the preset button on the E5810B's front panel to erase data information securely.

Keysight E5810B Technical Specifications

General requirements	
Minimum system requirements	Refer to page 4 for requirements in using the Keysight IO Libraries software (included with the instrument control hardware)
Supported standards	– GPIB Standard IEEE 488.1 and IEEE 488.2 – USB 2.0 or lower (with the USBTMC-USB488 protocol) – LAN/Ethernet: 10BASE-T/100BASE-TX/1000BASE-T networks – RS-232 – VXI-11 Protocol – VISA 2.2 and Keysight SICL
General characteristics	
Power consumption	– +12 VDC, 2 A – Isolated ELV supply source
Connectors	Standard 24-pin IEEE-488 (GPIB), USB 2.0, RS-232 (9-pin), LAN RJ-45
Maximum data rates	– 1.2 MB/s for GPIB – 115 Kb/s for RS-232 – 480 Mb/s for USB
Maximum instrument connection	– 14 GPIB instruments – 1 USB connection (supports up to 4 USB instruments via self-powered hub) – 1 RS-232 instrument – Up to 16 simultaneous connectivity connections
LED indicators	Power, LAN, GPIB, USB, RS-232, FAULT
EMC and safety	– IEC61326-1:2005 / EN61326-1:2006 – Canada: ICES/NMB-001: Issue 4, June 2006 – Australia / New Zealand: AS/NZS CISPR11:2004 – IEC 61010-1:2010 / EN 61010-1:2010 (3rd Edition)
Warranty	3 years
Network protocols	See the E5810B User's Manual for supported network protocols and functions
Dimensions	
Width, depth and height	226.5 mm (8.92 in) × 238 mm (9.37 in) × 61mm (2.36 in)
Weight	1.3 kg
Environmental specifications	
Operating environment	– Operating temperature from 0 °C to 55 °C – Relative humidity up to 95% RH at 40 °C – Altitude up to 2000 m – Pollution Degree 2 – Installation Category II (through an AC/DC adapter)
Storage environment	– Storage temperature from –40 °C to 70 °C – Relative humidity up to 90% RH at 65 °C
Ordering information	
Standard shipped accessories	– Power cord and adapter Printed Quick Start Guide – Keysight Automation-Ready CD with Keysight IO Libraries Suite
Options	– Option 100 – Rack Mount Kit – GPIB cables/adapter (see page 12)

Keysight GPIB, USB and Instrument Control Products Summary

Cables

Keysight also offers a variety of cables that provide easy and reliable connections. Keysight cables are engineered for exceptional reliability and durability, even under the harshest conditions.



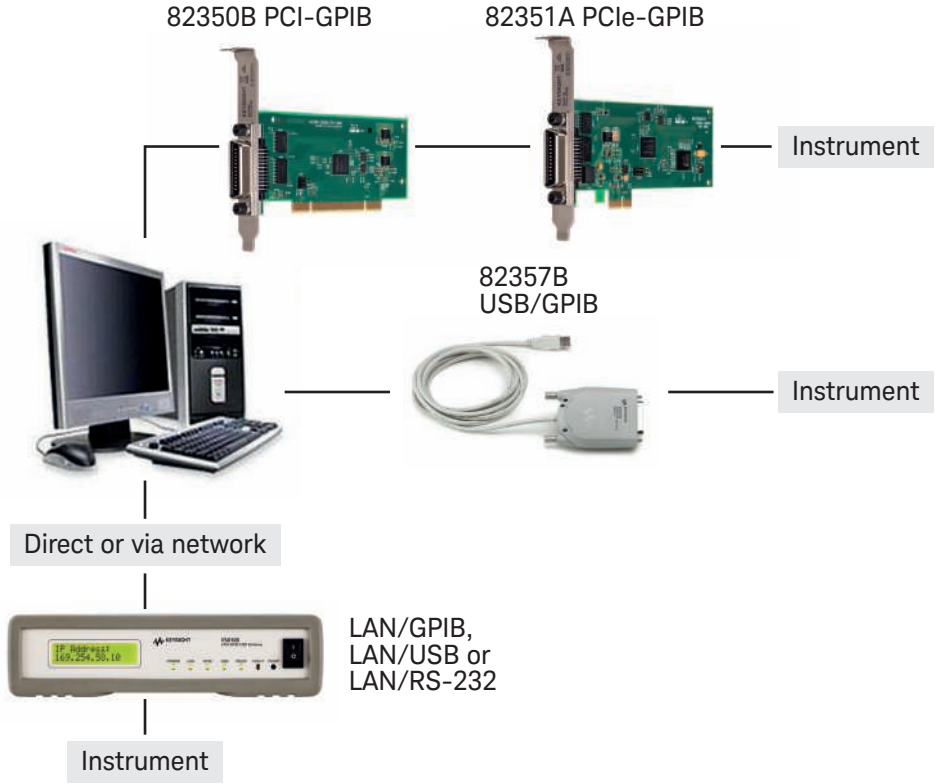
Cable	Length
10833D GPIB cable	0.5 meter
10833A GPIB cable	1 meter
10833B GPIB cable	2 m
10833C GPIB cable	4 m
10833F GPIB cable	6 m
10833G GPIB cable	8 m

Adapters

The 10834A GPIB-to-GPIB adapter can help when limited rear-panel space and other design considerations make cabling difficult. The 10834A adapter extends the first cable by 2.3 cm away from the rear panel to provide clearance for other connectors, switches, and cables.

Type	Product	Best for
GPIB board	82350B PCI-GPIB card	– GPIB connection for PCI-based PCs or workstations – Maximum throughput for all configurations up to 900 KB/s
	82351A PCIe-GPIB card	– GPIB connection for PCIe-based PCs or workstations – High throughput applications up to 1.4 MB/s
	82350C PCI-GPIB card	– Maximum GPIB throughput for all configurations – Standard and low-profile brackets allow flexible connection
	82351B PCIe-GPIB card	– Bandwidth-intensive test applications – Standard and low-profile brackets allow flexible connection
USB converter	82357B USB/GPIB card	– GPIB connectivity, even for notebook computers – Easiest GPIB instrument set-up to PC
LAN converter	E5810A LAN/GPIB gateway	– Connection to remote GPIB and RS-232 instruments – Test-system sharing and collaboration among multiple users
	E5810B LAN/GPIB/USB gateway	– One-box connectivity - remote GPIB, RS-232 and USB connections – Test-system sharing and collaboration among multiple users
Cable	10833x GPIB cables	– Connection between GPIB instruments (daisy-chain) – Connection from GPIB instrument to the PCI/GPIB or PCIe/GPIB card – Connection from GPIB instrument to the LAN/GPIB/USB gateway
Adapter	10834A GPIB-to-GPIB adapter	– 2.3-cm clearance at GPIB instrument's rear panel

Typical configurations of PC-to-instrument connection



Related Keysight Literature

Publication title	Pub number
Simplified PC Connections for GPIB Instruments, Application note 1409-1	**5988-5897EN**
This article covers the common PC-to-GPIB instrument configurations. It explains the I/O hardware and software considerations for easy GPIB instrument hook-up and automation. Where to download: www.keysight.com	
Modern Connectivity–Using USB and LAN Connectivity Converters, Application note 1475-1	**5989-0123EN**
As more and more instruments are equipped with PC-standard interfaces such as USB and LAN, various instrument control converters are available in the market today, besides the traditional PCI/GPIB cards. What are the advantages of one over the other? What are the key factors that you need to consider before you decide on buying the instrument control product that's most suitable for your application? This article explains all of the above, with a detailed comparison of data rates over various interfaces. Where to download: www.keysight.com	
Computer Connectivity Considerations, Application note 1465-2	**5988-9818EN**
This article complements the above (5989-0123EN) with additional focus on instrument-to-PC configuration, and cost comparison. Where to download: www.keysight.com	
Tips and Tricks for Using USB, LAN and GPIB	**5989-3312EN**
This article provides a variety of tips and tricks that will help you create flexible test systems that can easily incorporate USB, LAN, GPIB and RS-232C. Where to download: www.keysight.com	
Tips on using Keysight GPIB Solutions in National Instrument's LabVIEW Environment	**5990-3731EN**
This article provides answers to frequently asked questions about incorporating Keysight GPIB instrument control hardware into a National Instrument's LabVIEW system. Easy-to-follow steps are also documented in a video. Where to download: www.keysight.com/find/gpibtips	
System Developer Guide: Using LAN in Test Systems: The Basics, Application note 1465-9	**5989-1412EN**
This article is the first of a series of four application notes with System Developers in mind. It explains with great depth how you can simplify test integration by taking advantage of open connectivity standards. Meet your throughput requirements yet stay within budget. Where to download: www.keysight.com	
System Developer Guide: Using LAN in Test Systems: Network Configuration, Application note 1465-10	**5989-1413EN**
This article is the second of a series of four application notes with System Developers in mind. It explains with great depth how you can simplify test integration by taking advantage of open connectivity standards. Meet your throughput requirements yet stay within budget. Where to download: www.keysight.com	
System Developer Guide: Using LAN in Test Systems: PC Configuration, Application note 1465-11	**5989-1415EN**
This article is the third of a series of four application notes with System Developers in mind. It explains with great depth how you can simplify test integration by taking advantage of open connectivity standards. Meet your throughput requirements yet stay within budget. Where to download: www.keysight.com	
System Developer Guide: Using USB in the Test and Measurement Environment, Application note 1465-12	**5989-1417EN**
This article is the fourth of a series of four application notes with System Developers in mind. It explains with great depth how you can simplify test integration by taking advantage of open connectivity standards. Meet your throughput requirements yet stay within budget. Where to download: www.keysight.com	

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www.lxistandard.org
LAN eXtensions for Instruments puts the power of Ethernet and the Web inside your test systems. Keysight is a founding member of the LXI consortium.

www.pxisa.org
PCI eXtensions for Instrumentation (PXI) modular instrumentation delivers a rugged, PC-based high-performance measurement and automation system.

Three-Year Warranty
www.keysight.com/find/ThreeYearWarranty
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China	800 810 0189
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India	1 800 112 929
Japan	0120 (421) 345
Korea	080 769 0800
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Singapore	1 800 375 8100
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Belgium	0800 58580
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France	0805 980333
Germany	0800 6270999
Ireland	1800 832700
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Italy	800 599100
Luxembourg	+32 800 58580
Netherlands	0800 0233200
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Sweden	0200 882255
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