

# Keysight Technologies

## GPIB, USB and Instrument Control Products

for easy PC-to-instrument connection

- Choose the best way to connect your PC to GPIB, USB and RS-232 instruments
- Take advantage of PC-standard interfaces (USB, LAN, PCI, PCIe®)
- Protect your investment with industry-standard I/O software



# Introduction

## The Keysight Technologies, Inc. GPIB, USB and Instrument Control Products

### Keysight instrument control hardware family benefits

- Easy connection to GPIB, USB and RS-232 instruments – Keysight instrument control hardware offer simple “plug-and-go” set up and configuration.
- Use PC-standard interfaces – Connect via your computer PCI/PCIe® slot or use the built-in USB or LAN ports on your PC to connect to your instruments.
- Choice of interfaces (GPIB, RS-232, USB, LAN, PCI, PCIe® – Keysight offers you a selection of products to meet your I/O needs. We work where you do!
- Use industry-standard I/O libraries – The included industry-standard VISA I/O libraries make it easy for you to use your existing software programs and let you mix and match test instruments and software from different vendors in a single system.

### Easily mix instruments from different vendors

Keysight IO Libraries Suite eliminates the 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 (such as National Instruments), it automatically installs in a side-by-side mode that allows you to use your existing I/O software and the Keysight software together in multi-vendor systems without you being concerned with the behind-the-scenes details.

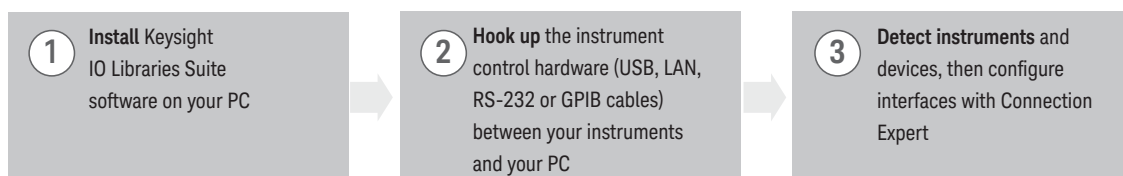
### Works with millions of existing instruments from hundreds of vendors

Use the most trusted and reliable technology for your connections. The IO Libraries Suite ships with more than 150 instruments from Keysight. It works with literally millions of existing instruments—helping you minimize the number of software packages you need. You won’t have to switch between packages as you use a mix of existing and new instruments in the future.

### Work in the environment 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, SIDL, and Keysight 488 (compatible with NI-488.2), giving you even more flexibility to choose the software and hardware from any vendor to get your job done.

### Connecting is as easy as 1-2-3

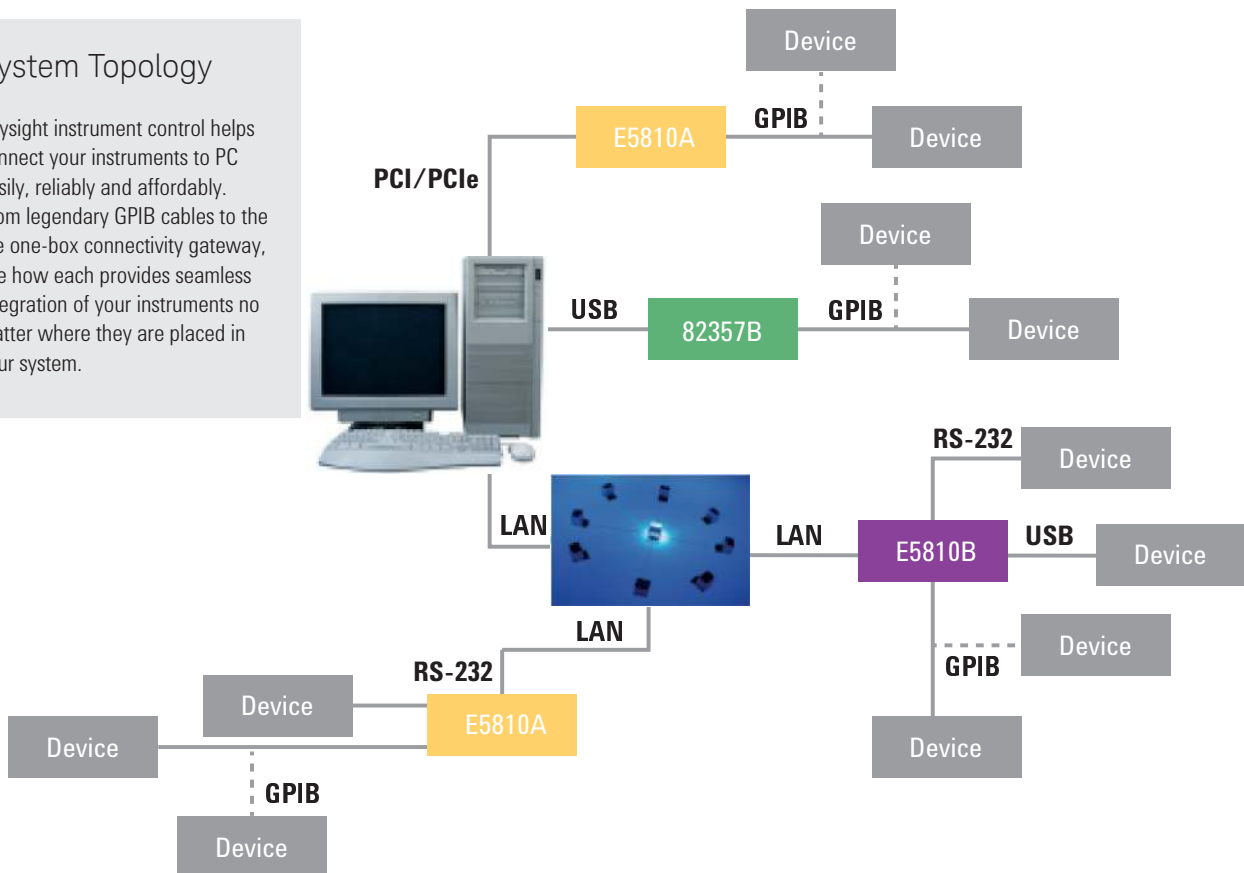


## Select the right connectivity for your need

	Model	Description	Recommended Use	Page
GPIB Boards	82350B	PCI High-Performance GPIB Interface Card	<ul style="list-style-type: none"> <li>Maximum GPIB throughput for all configurations</li> <li>Adding GPIB connection for PCI-based PCs or workstations</li> </ul>	4
	82351A	PCIe-GPIB Interface Card	<ul style="list-style-type: none"> <li>Bandwidth-intensive test applications</li> <li>Adding GPIB connection for PCIe-based PCs or workstations</li> </ul>	6
USB Converters	82357B	USB/GPIB Interface	<ul style="list-style-type: none"> <li>Easiest GPIB connectivity</li> <li>Notebook computer GPIB connections</li> </ul>	8
LAN Converters	E5810B	LAN/GPIB/USB Gateway	<ul style="list-style-type: none"> <li>One-box connectivity – remote GPIB, RS-232 and USB connections</li> <li>Sharing of instruments in a distributed system</li> </ul>	10
	E5810A	LAN/GPIB	<ul style="list-style-type: none"> <li>Connection to remote GPIB and RS-232 instrumentation</li> <li>LAN distributed systems</li> </ul>	12
Cables and Adapter	10833x	GPIB Cables	<ul style="list-style-type: none"> <li>10833A — 1 m</li> <li>10833B — 2 m</li> <li>10833C — 4 m</li> <li>10833D — 0.5 m</li> <li>10833F — 6 m</li> <li>10833G — 8 m</li> </ul>	14
	10834A	GPIB-to-GPIB Adapter	<ul style="list-style-type: none"> <li>Extends the first cable 2.3 cm away from the rear panel to provide clearance for other connectors, switches, and cables.</li> </ul>	14

### System Topology

Keysight instrument control helps connect your instruments to PC easily, reliably and affordably. From legendary GPIB cables to the the one-box connectivity gateway, see how each provides seamless integration of your instruments no matter where they are placed in your system.



# Keysight 82350B PCI High-Performance GPIB Interface for Windows

## 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 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 hardware installation. The GPIB interface card plugs into a 5 volt PCI slot in the backplane of your PC.

For programming capability you have access with the latest version of IO Libraries suite, to program in all standard development environments. Keysight's IO Libraries Suite is easy to use and works with virtually any vendor's instrument or T&M programming software application. It is also able to automatically configure to work with NI-488.2 and Keysight's or NI's VISA, VISA COM. Even if you use NI's IO software, Keysight IO Libraries Suite will configure automatically so you don't have to be concerned with compatibility issues.

## Features

- PCI IEEE-488 interface for PCs
- Transfer rates up to 900 KB/s
- Dual-processor support
- Interface to 14 GPIB instruments (via daisy chain)

## Recommended use

- Maximum GPIB throughput for all configurations



*This traditional GPIB connection still offers the highest throughput*

## 82350B technical specifications

<b>General requirements</b>	
Minimum system requirements	Windows XP / Vista / 7 / 8
Software requirements	Keysight IO Libraries Suite (included) Please see requirements on page 14
PCI bus slot	5-V PCI slot, 32 bits
Supported standards	PCI rev 2.2 IEEE 488.1 and IEEE 488.2-compatible
<b>General characteristics</b>	
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
<b>Dimensions</b>	
Length, width, and height	122 mm (L) x 122 mm (W) x 22 mm (H) (a full-height PCI card)
Weight	0.091 kg
<b>Environmental specifications</b>	
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
<b>Recommended accessories</b>	
	<b>GPIB cables/adaptor (refer to page 14)</b>

# Keysight 82351A PCI Express High-Performance GPIB Interface Card

## High transfer rate for demanding test applications

The 82351A offers fast data transmission for various demanding test applications to ensure data is not lost or overwritten during transfers to memory.

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. PCIe's powerful bus architecture allows bi-directional data transmission, and the implementation of a new class of test applications.

## 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
- Compatibility with industry standard PCIe® rev 1.0a and IEEE-488
- Interface to 14 GPIB instruments (max)

## Recommended use

- Bandwidth-intensive test applications
- Adding GPIB connection to PCIe-based PCs or workstations



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*New standard for high-speed internal devices*

## 82351A technical specifications

<b>General requirements</b>	
Minimum system requirements	Windows XP / Vista / 7 / 8
Software requirements	Keysight IO Libraries Suite (included) Please see requirements on page 14
PCI bus slot	3.3 V PCIe slot, 32 bits
Supported standards	PCIe rev. 1.0a IEEE 488.1 and IEEE 488.2-compatible
<b>General characteristics</b>	
Power	Backplane +3.3 V PCIe
Connectors	Standard 24-pin IEEE-488 (GPIB) +5 V PCI
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 Canada: CSA C22.2 No. 61010-1:2004 IEC61326-1:1997+A1:1998/EN61326-1:1997+A1 Pollution Degree 2 This product is rated for indoor use only.
Warranty	1 year
<b>Dimensions</b>	
Length, width, and height	158.0 mm (W) x 120.8 mm (D) x 21.6 mm (H)
Weight	0.082 kg
<b>Environmental specifications</b>	
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
<b>Recommended accessories</b>	
	<b>GPIB cables/adaptor (refer to page 14)</b>

# Keysight 82357B USB/GPIB Interface

## 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 computer USB port.

With the 82357B USB/GPIB interface and its convenient plug-and-play feature, you just plug and go. 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 2.0 and is backward compatible with USB 1.1. 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.

## Features

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

## Recommended use

- Easiest GPIB connectivity
- Notebook computer GPIB connections



*Boosting performance with the simplest connectivity*



## 82357B technical specifications

<b>General requirements</b>	
Minimum system requirements	Windows XP / Vista / 7 / 8
Software requirements	Keysight IO Libraries Suite (included) Please see requirements on page 14
Supported standards	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
<b>General characteristics</b>	
Power	USB bus-powered device, +5 V, 500 mA (max), 200 mA (typ)
GPIB transfer rate	1.15 MB/s or better
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-meter, shielded connector rated for 1500 insertions
LED indicators	READY, ACCESS, FAIL
Maximum connections	Maximum of 4 converters can be connected to the PC
Instrument connections	14 instruments—daisy chain via GPIB
Configuration	Plug-and-play
Warranty	1 year
EMC and Safety <sup>1</sup>	IEC 61010-1:2001/EN 61010-1:2001 Canada: CSA C22.2 No. 61010-1:2004 USA: UL 61010-1:2004
<b>Dimensions</b>	
Length, width, and height	105 mm (L) x 64 mm (W) x 30 mm (H) (includes connectors)
Weight	215 grams
<b>Environmental specifications</b>	
Operating environment	0 °C to 55 °C
Operating humidity	–40 °C to +70 °C
Storage environment	Up to 90% at 40 °C non-condensing
Storage humidity	Up to 90% at 65 °C non-condensing

1. If you're using Keysight IO Libraries Suite 15.0 or higher, you're not required to install the driver separately as it would come built into the Suite.

# Keysight E5810B LAN/GPIB/USB Gateway

## One-box connectivity solution for easy GPIB, USB and RS-232 instrument control via standard LAN

The E5810B allows users to control various instrument interfaces remotely over wired or wireless LAN (with a wireless router). Now with USB capability, the E5810B connects up to 14 GPIB instruments, four USB instruments via a self-powered hub and an RS-232 instrument, giving test engineers a fast and efficient one-box solution. The E5810B is ideal for system integrators, automated testing and other applications requiring unlimited connection range and simultaneous connectivity to multiple instruments. It can be used during design verification, where the gateway makes it easy for engineers to share a rack of test equipment. For manufacturing, users can easily connect several test systems via a local LAN and control them with a single, centrally located PC; these systems can be accessed remotely for troubleshooting and debug.

## Greater ease of use

The E5810B comes with an improved GPIB transfer rate of 1.2 MB/s and 1000BASE-T (1 Gigabit) LAN/Ethernet compatibility in addition to existing 100BASE-TX and 10BASE-T supportability.

With the 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 connection statuses of the gateway box at a glance.

## 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

## Recommended use

- One-box connectivity – remote GPIB, RS-232 and USB connections
- Sharing of instruments in a distributed system

## Security functions

- With the E5810B, a secure password is required to access and modify all web configuration pages. The gateway comes with the secure erase feature, which will erase the systems preset and data information securely.

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*Make LAN to GPIB, USB and RS-232 connections with greater ease*

## E5810B technical specifications

<b>General requirements</b>	
Minimum system requirements	Windows XP / Vista / 7 / 8
Supported Web browsers	Internet Explorer 6.0 or greater Internet Explorer 7.0 or higher is recommended for Windows Vista, Windows 7, Windows 8, Windows Server 2008 R2 and Windows Server 2012
Software requirements	Web browser Keysight IO Libraries Suite (included) Please see requirements on page 14
Supported standards	GPIB Standard IEEE 488.1, 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
<b>General characteristics</b>	
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	1 year
<b>Dimensions</b>	
Length, width, and height	226.5 mm (8.92 in) × 238 mm (9.37 in) × 61 mm (2.36 in)
Weight	1.3 kg
<b>Environmental specifications</b>	
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
<b>Recommended accessories</b>	
	<b>GPIB cables/adaptor (see page 14)</b> <b>Option 100 – Rack Mount Kit</b>

# Keysight E5810A LAN/GPIB

## Remote access and collaboration with GPIB instruments via your LAN

The Keysight E5810A LAN/GPIB gateway provides a high-performance solution for remote access of GPIB and RS-232 test instruments over your standard LAN.

The Keysight E5810A can use DHCP, if available, to automatically configure necessary network parameters, including its IP address. The gateway can be controlled from multiple locations and by multiple users via your LAN, so it is easy to share the control of instruments from locations worldwide.

Remote access of GPIB and RS-232 instruments with the E5810A is easy. First, enter its IP address (as displayed on the gateway) into any Web browser to gain access to the connected instruments via E5810A. Then, use your Web browser to send instrument commands interactively and you are able to view your measurement results right away. You can use the digital display and LEDs to check the IP address and troubleshoot locally.

You can access programming capability in all standard development environments with the latest version of IO Libraries Suite.

## Features

- Remote access and control of GPIB and RS-232 instruments via LAN
- Easy set up and use via digital display and Web browser

## Recommended use

- Connection to remote GPIB and RS-232 instrumentation
- LAN distributed systems

## System use

- For system environments, the E5810A gateway can be rack-mounted. The rack mount kit (Option 100) allows two devices to be placed side-by-side in one rack width. For guidelines to select the appropriate instrument control hardware for a remote connection, see page 3.



*Take advantage of LAN technology for your GPIB instruments and test systems*

## E5810A technical specifications

<b>General requirements</b>	
Minimum system requirements	Available 10BASE-T/100BASE-TX LAN port (client computers) Windows XP / Vista / 7 / 8
Supported Web browsers	Internet Explorer 6.0 or greater Internet Explorer 7.0 or higher is recommended for Windows Vista, Windows 7, Windows 8, Windows Server 2008 R2 and Windows Server 2012
Software requirements	Web browser Keysight IO Libraries Suite (included) Please see requirements on page 14
Supported standards	IEEE 488.1 and IEEE 488.2-compatible 10BASE-T/100BASE-TX networks VXI-11 protocol EIA-232
<b>General characteristics</b>	
Power supply	100–240 V±10%
Power consumption	(7 watts) 25 VA peak
Power line frequency	47 to 63 Hz
Connectors	Standard 24-pin IEEE-488 (GPIB), RS-232 (9-pin), LAN RJ-45
Maximum data rates	More than 900 KB/s—GPIB port 115 Kb/s—RS-232 port
RS-232 baud rate	300, 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200 b/s
RS-232 flow control	None, RTS/CTS, XON/XOFF, DTR/DSR
RS-232 parity	None, Odd, Even, Space, Mark
RS-232 bits	5, 6, 7, 8
RS-232 stop bits	1, 2
RS-232 SRQ interrupts	on RI, DSR, DCD, CTS
Max instrument connections	14 instruments—daisy chain via GPIB 1 RS-232 device Up to 16 simultaneous I/O connections
Indicators	LEDs for Power, Activity and Fault
EMC and safety *	IEC 61326-1 Group 1, Class A IEC 61010-1
Warranty	1 year
Network protocols	See the E5810A User's Manual for supported network protocols and functions
<b>Dimensions</b>	
Length, width, and height	211 mm (W) x 230 mm (D) x 41 mm (H) (1U height, ½ rack)
Weight	1.6 kg
<b>Environmental specifications</b>	
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
<b>Recommended accessories</b>	
	<b>GPIB cables/adapter (refer to page 14)</b> <b>Rack mount kit (Option 100)</b>

# GPIB Cables and Adapter

## Keysight connectivity software

Keysight connectivity software helps you establish a connection **in less than 15 minutes**.

Keysight IO Libraries Suite eliminates the hours of effort it takes to connect and configure PC-controlled test systems. This connectivity software ships with each Keysight instrument control hardware and over 150 Keysight test and measurement instruments. Connecting your instruments to a PC is as easy as connecting a PC to a printer — even if you use multiple instruments from different vendors.

Now the enhanced version 16.3 or higher is with expanded compatibility with other vendors' IO software. You can now use any programming API with any standard T&M software development environment. Simply install Keysight's IO libraries Suite on your PC, then cable the interfaces and instruments to your PC. The IO Libraries Connection Expert utility will find the interfaces and instruments connected to your computer and configure them properly.

## System Requirements

Keysight IO Libraries version 16.3

### PC software

#### Operating system

- Windows 8 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, Home Premium, Business, Ultimate, Enterprise Editions)
- Windows XP Pro or Home edition SP3 or later, 32-bit only
- 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)
- RAM: Windows XP: 256 MB minimum (1 GB or greater recommended)
- Windows Vista or 7: 1 GB minimum
- Hard disk space required: 1.5 GB
- Display: 1024 x768, 96 or 120 DPI

If you already own an Keysight I/O product or instrument, you can download the latest version of Keysight IO Libraries Suite at no cost.

For more information, visit: [www.keysight.com/find/iosuite](http://www.keysight.com/find/iosuite)

## Cables

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

Cable	Length
10833D GPIB cable	0.5 m
10833A GPIB cable	1.0 m
10833B GPIB cable	2.0 m
10833C GPIB cable	4.0 m
10833F GPIB cable	6.0 m
10833G GPIB cable	8.0 m

## Adapter

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 to 2.3 cm away from the rear panel to provide clearance for other connectors, switches, and cables.



## Measurement Automation—Quick and Easy

Whatever instrument you're programming—whether a signal analyzer, oscilloscope, power supply or DMM—Keysight VEE graphical language software and instrument control hardware provide you the ease and flexibility to set up and automate the way you want for your application need. Make measurements quickly, easily and affordably today.



## Related Literature

Pub number	Literature
5989-0123EN	Modern Connectivity—Using USB and LAN I/O Converters, application note 1475-1
5988-5897EN	Simplified PC Connections for GPIB Instruments, application note 1409-1
5989-1412EN	Using LAN in Test Systems: The Basics, application note 1465-9
5989-1413EN	Using LAN in Test Systems: Network Configuration, application note 1465-10
5989-1417EN	Using USB in the Test and Measurement Environment, application note 1465-12
5988-9818EN	Computer I/O Considerations, application note 1465-2
5989-3312EN	Create flexible test systems that easily incorporate USB, LAN, GPIB and RS-232C
5989-3312EN	Tips and Tricks for Using USB, LAN and GPIB
5989-1889EN	Keysight Connectivity Hardware for PC-to-Instrument Connections

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A personalized view into the information most relevant to you.



[www.axiestandard.org](http://www.axiestandard.org)

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[www.lxistandard.org](http://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](http://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](http://www.keysight.com/find/ThreeYearWarranty)

Keysight's commitment to superior product quality and lower total cost of ownership. The only test and measurement company with three-year warranty standard on all instruments, worldwide.



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Korea	080 769 0800
Malaysia	1 800 888 848
Singapore	1 800 375 8100
Taiwan	0800 047 866
Other AP Countries	(65) 6375 8100

**Europe & Middle East**

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