Agilent IO Libraries Suite 16.2
Quick Start Guide

This Quick Start Guide describes how to:

- Install the Agilent IO Libraries Suite and instrument software
- Find the information you need to make instrument and interface connections
- Verify instrument communication
- Get started controlling instruments

About the Agilent IO Libraries Suite

The Agilent IO Libraries Suite is a collection of libraries, such as VISA, SICL, and VISA-COM, that give you the ability to use your instruments from instrument control software or from a custom program. The suite also includes utilities that help you quickly and easily connect your instruments to your PC and verify instrument communication. The Agilent IO Libraries Suite is provided at no extra charge with Agilent instruments, interfaces, and software products, or you can download it from **www.agilent.com/find/iosuite**.

Features:

- **VISA, SICL, VISA COM, and Agilent 488 libraries** allow you to programmatically control instruments, send commands, and receive responses and data.
- **Connection Expert** - automatically scans and configures your instrument I/O, helps you locate and update instrument drivers
- **IO Monitor** – traces instrument IO traffic
- **Interactive IO** - sends commands to instruments and reads responses
- **Interactive LXI** - interactively sends and receives LXI events and manages instrument clocks
- **VISA Open Report** - troubleshoot instrument connections for systems with multiple VISA installations
- Easily configures complex and mixed-vendor systems
- Supports modular (PXI, PXIe, PCIe®) instruments and standalone instruments
- Supports popular programming languages and instrument control software

See the IO Libraries Suite Readme on the Agilent *Automation-Ready CD* or the IO Libraries Suite Web page at **www.agilent.com/find/iosuite** for system requirements and revision information.

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Step 1. Install the Agilent IO Libraries Suite

The Agilent IO Libraries Suite is a collection of libraries that give you the ability to use your instruments from instrument control software. You should install the Agilent IO Libraries Suite as your first step before installing hardware because it installs drivers (such as USB drivers) necessary to control your instruments.

1. Disconnect any USB instruments, USB/GPIB converters, and FireWire (IEEE 1394) VXI interfaces that are connected to your PC.

2. Close all applications on your computer. Insert the *Automation-Ready CD* in your CD-ROM drive.
   or…

Download and install the IO Libraries software from **www.agilent.com/find/iosuite**.

3. Follow the instructions as prompted during the installation. You can select either a **Typical** or a **Custom** installation:

- **Typical** - In most cases, you can select a **Typica**l installation which installs the IO Libraries Suite using the recommended settings.

- **Custom** - Select the Custom installation to:
    - Install the IO Libraries Suite in another directory (for 32-bit operating systems only).
    - Save disk space by not installing interface manuals.
    - Use Agilent 32-bit VISA with another vendor's VISA on the same PC in *side-by-side* mode. Details on side-by-side mode are available in online help during the software installation and in the IO Libraries Suite Help following installation.

4. After the IO Libraries have been successfully installed, you will see the Agilent IO Control in the taskbar notification area of your computer screen.

5. Reconnect any equipment that was disconnected in step 1.
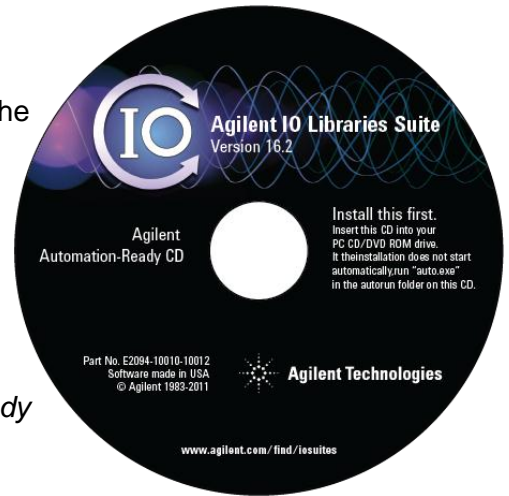
For more information…

You can access online help for the IO Libraries Suite from the documentation menu by clicking 🔟 > **Documentation > IO Libraries Suite Help** (at the bottom right of your screen). You can also use the documentation menu to find connectivity information, API documentation, this quick start guide, interface manuals, and the IO Libraries Suite Readme.

Step 2. Install Instrument and System Support Software

Locate and install the software provided with each instrument -- such as instrument drivers or application software. For Agilent instruments, you can find this software on the *Product Reference CD* supplied with your instrument or you can download the software from the Agilent Web site.

For modular instruments…

The Agilent IO Libraries Suite supports PXI, PXIe, and PCIe modular instruments. Installation software and drivers are included with most modular instruments. **You must install the modular instrument software on the PC before the IO Libraries Suite can recognize or communicate with the modular instruments.**

Note: Be sure to install the chassis and system support software. This software is typically available from your chassis, embedded controller, or system interface card vendor. If you are using a National Instruments modular chassis or modular instruments, be sure to install the *NI PXI Platform Services* software.

Many modular instruments include a soft front panel driver with the installation software. Be sure to install any soft front panel drivers as they will allow you to verify instrument communication as described in Step 6 of this document.

For standalone instruments…

Standalone instruments are frequency counters, digital multimeters, oscilloscopes, function generators, VXI instruments and so on that connect via GPIB, USB, LAN, serial, or Firewire interfaces. Standalone instruments support direct I/O which means you can send command strings directly to the instrument. These strings are commands that may conform to the IEEE 488.2 or SCPI (Standard Commands for Programmable Instruments) specifications, for example. For standalone instruments, use of an instrument driver is optional.

Tips:

- In Step 5 you will learn how to use Connection Expert to find and update IVI drivers. If you don't have drivers available for standalone instruments, you can wait until Step 5 to install IVI drivers. You can also find drivers at **www.agilent.com/find/drivers**.

- Unlike standalone instruments, modular instruments require an instrument driver and do not support direct I/O. In addition, modular instruments require instrument software that associates the module with a kernel driver. Be sure to install the software included with your modular instruments.

- The term *PXI* is used in this document and the IO Libraries Suite documentation to represent all three supported modular instrument types: PXI, PXIe, and PCIe.

## Step 3. Power Down, Install Instruments, Connect Interface Hardware

Caution: Instrument and interface modules are NOT hot-pluggable. To prevent equipment damage, turn off AC line power to the PC, modular chassis, and VXI mainframes before installing any instrument modules or interface hardware.

Install instruments…

Install the modular or VXI devices, slot covers and any other necessary hardware into the instrument chassis, rack mount components, and so on. If necessary, configure the instruments (to set addresses, for example) from the instrument front panels.

Connect instruments...

You can connect a single instrument directly to each USB, LAN*, or serial port on the PC without using additional interface hardware. If you are NOT installing interface hardware, skip this section and go on to step 4.
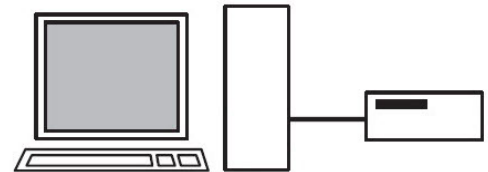
Directly connecting an instrument to a PC with LAN may require a special LAN Crossover Cable.

Some instruments, and multiple instrument installations, require interface hardware, such as a GPIB PC plug-in card, PCIe interface, USB to GPIB converter, LAN/GPIB gateway, or LAN router. Some examples are shown below.
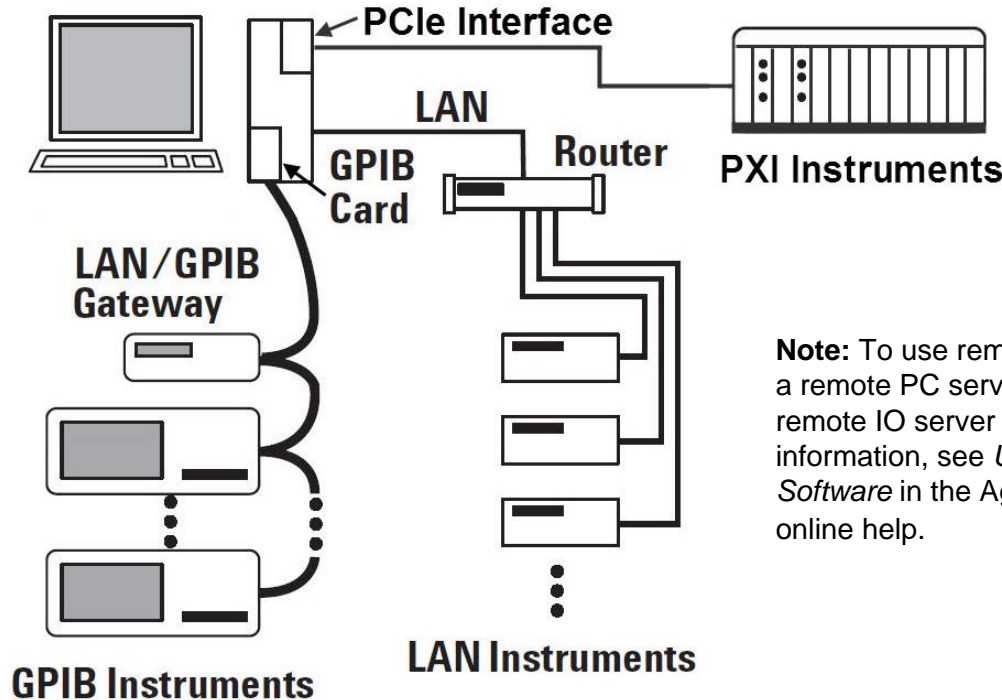
Note: To use remote interfaces connected to a remote PC server, configure and run the remote IO server software. For more information, see *Using the Remote IO Server Software* in the Agilent IO Libraries Suite online help.

⚠️ **See the instrument and interface user's manuals for safety, installation, and configuration information.**

Step 4. Apply Power, Run Agilent Connection Expert

After connecting your instruments to the PC or interface, apply power to the instruments, chassis, and the PC.

To open Connection Expert, double-click the Agilent IO Control in the taskbar notification area of your computer screen.

Connection Expert recognizes LAN, PXI, USB, GPIB, Serial COM port (RS-232), and VXI instruments (connected over Firewire or GPIB). All of the interfaces and instruments found are listed in the Explorer Pane. A green check mark next to an interface or instrument indicates that the connection has been verified.

Tip:
If your LAN instrument(s) are not shown, right-click the LAN interface and click **Add Instrument**. You can then click **Auto Find**, **Add Address**, or **Search** to add LAN instruments. Click **Help** in the **Add LAN Instruments** dialog box for more information.

Step 5. Check/Update/Install IVI Instrument Drivers

Connection Expert allows you to find and update IVI instrument drivers and soft front panel drivers. Follow the steps below to check the installed driver and to find/update IVI instrument drivers for all instruments.

Tip:
Finding and updating drivers requires Internet access. Only Agilent IVI drivers are found in the driver search. To manually search for non-IVI drivers, click the **Agilent Driver Web Site** button in the **Driver Update** dialog box. You can also find drivers on the CDs supplied with your Agilent products.

Step 6. Verify Instrument Communications

Right-click on an instrument in the Connection Expert Explorer Pane and select **Send Commands To This Instrumen**t. Depending on the instrument type, Connection Expert tries to open a user interface to the instrument.

For an instrument that supports direct I/O...

The Agilent Interactive IO application opens allowing you to send SCPI commands and IEEE488.2 common commands to the instrument and read back instrument responses. For example, click **Commands** and select ***IDN?** (instrument identification query) from the list.
Click **Send & Read** to query the instrument's ID. If the instrument is connected, powered-on, and communicating, the response appears under **Instrument Session History**.
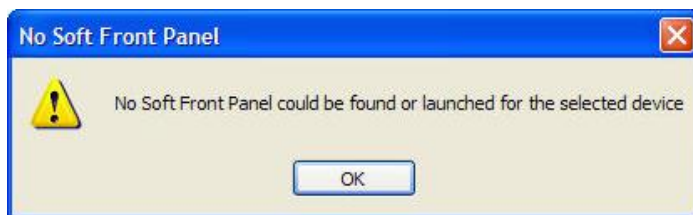
For a modular instrument...

If you installed a soft front panel driver in Step 2, the soft front panel opens giving you a user interface to the instrument.

A typical soft front panel user interface

If a soft front panel could not be found for the modular instrument, Connection Expert displays this message:

> **Tip:**
> Many LAN-based instruments have a Web interface that allows you to configure the instrument, send commands, and read responses. To open a Web interface, select the LAN-based instrument in the Connection Expert Explorer Pane and Click the **Instrument Web Interface…** button in the Instrument Properties Pane. If a Web interface is available, it will display on your screen.
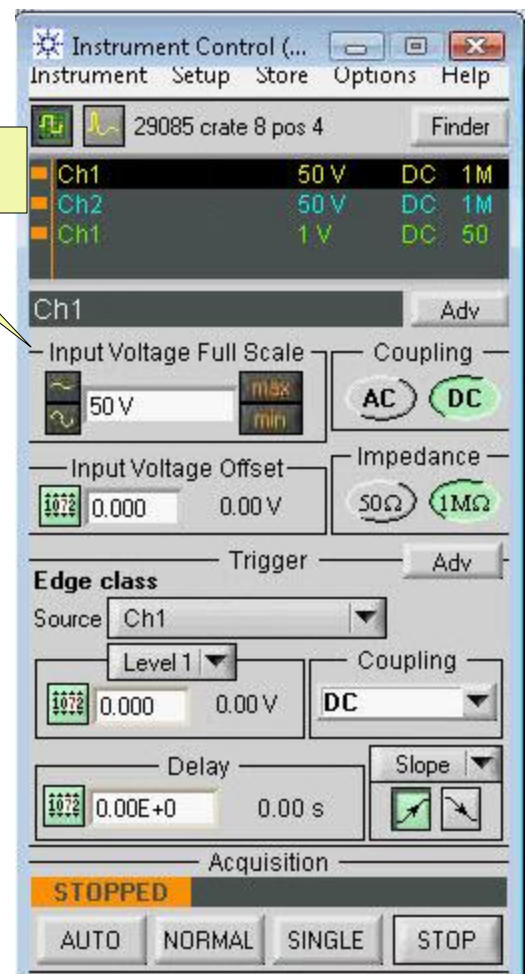
Step 7. Control Instruments

Writing your own test programs…

- Several example programs in C++, C#, and Microsoft ® Visual Basic are provided as part of the Agilent IO Libraries Suite installation. You can find these samples in:
    - *C:\ProgramData\Agilent\Agilent IO Libraries Programming Samples* on Windows® Vista®, Windows 7, and Windows Server 2008 R2.
    - *C:\Documents and Settings\All Users\Agilent\IO Libraries Suite Programming Samples* on Windows XP

- **Agilent Command Expert** is a new FREE software application that provides fast and easy instrument control in many PC application environments. You can use Command Expert to generate code in C#, VB.NET, and C/C++. You can launch Command Expert from the *Connection Expert* Tools menu.*

- For specific test instrument programming information, including instrument drivers, the SCPI instrument control language, and specific programming examples, refer to your instrument's user or programming manual (these are often on the CD provided with your instrument).

- For more information, download the IVI Getting Started Guide from **www.ivifoundation.org** which provides excellent information on using IVI drivers in a variety of programming environments such as C++, Visual C# or Visual Basic.NET, LabVIEW, MATLAB, and Agilent VEE Pro.

Using specialized instrument control software…

- **Agilent Command Expert** is a new FREE software application that provides fast and easy instrument control in many PC application environments. You can launch Command Expert from the *Connection Expert* Tools menu.*
- **Agilent VEE Pro** is an award winning, easy-to-use graphical language environment that provides a quick path to measurement and analysis. Agilent VEE is a Visual Engineering Environment that allows you to program by creating intuitive "block diagrams." You select and edit objects from pull-down menus or toolbars and connect them to each other by wires to specify the program's flow. Agilent VEE allows seamless operation with hardware and software from Agilent and other manufacturers.
- **MATLAB** with the Instrument Control Toolbox extends the functionality of Agilent instruments by enabling custom measurements, data analysis, waveform generation, and automated test development. Many Agilent instruments have a MATLAB integrated solution.
- **LabVIEW** is a popular platform and development environment for a visual programming language from National Instruments.

Using non-programming solutions…

- Some instruments have specialized software applications developed specifically for the instrument. For example, Agilent BenchLink Data Logger Pro Software is available for the 34970A/34972A/34980A instruments and provides instrument control, multiple scan lists, and decision making without having to write your own programs.
- Depending on the type of instrument, you can use Interactive IO, instrument soft front panels, and instrument Web interfaces (as described in Step 6 in this guide).

* If this menu choice is grayed out, you need to install Command Expert. Install Command Expert from the *Automation-Ready CD* or download the Command Expert installer from **www.agilent.com/find/commandexpert**.

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LXI

www.lxistandard.org
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Product specifications and descriptions in this document subject to change without notice.

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