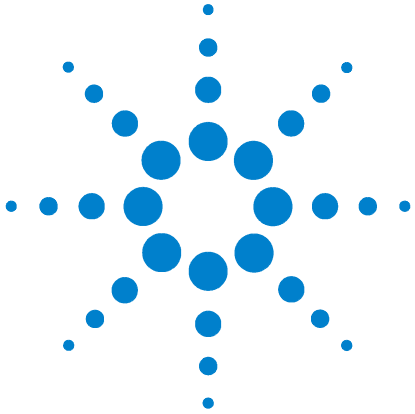

Agilent N8201A Performance Downconverter Synthetic Instrument Module, 3 Hz to 26.5 GHz

User's Guide

Edition, July 10, 2007

N8201-90006

Agilent Technologies

Notices

Windows®

Adobe Acrobat Reader®

Manual Part Number

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Edition

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A **CAUTION** notice denotes a hazard. It calls attention to an operating procedure, practice, or the like that, if not correctly performed or adhered to, could result in damage to the product or loss of important data. Do not proceed beyond a **CAUTION** notice until the indicated conditions are fully understood and met.

A WARNING notice denotes a hazard. It calls attention to an operating procedure, practice, or the like that, if not correctly performed or adhered to, could result in personal injury or death. Do not proceed beyond a WARNING notice until the indicated conditions are fully understood and met.

Introducing the N8201A Performance Downconverter

The Agilent Technologies N8201A performance downconverter down converts a microwave signal to an IF signal providing IF output frequencies of 7.5, 21.4, and 321.4 MHz to offer three different signal bandwidth capabilities. External mixing can be utilized to down convert microwave signals up to 110 GHz. The N8201A is based upon the industry's most accurate spectrum analyzer, the PSA Series.

Agilent's synthetic instrument family offers the highest-performing RF/MW LAN-based modular instrumentation and the smallest footprint for automated test systems; providing the maximum flexibility and minimizing the cost of an ATS over its lifetime.

Agilent's synthetic instrument modules use LAN eXtension for Instrumentation (LXI) modular format. LXI differs from other modular formats (such as VXI and PXI) by using an external computer and local area network (LAN), rather than embedded computers, for control.

The LXI standard supports the IEEE 1588 time synchronization and protocol standard, which allows synchronous triggering of different instruments, even with different-length LAN cables. The IEEE 1588 precision time protocol (PTP) enables a common sense of time over a distributed system.

Synthetic instrument modules offered by Agilent Technologies include the following:

- N8201A performance downconverter, 3 Hz to 26.5 GHz
- N8211A performance analog upconverter, 250 kHz to 20 / 40 GHz
- N8212A performance vector upconverter, 250 kHz to 20 GHz
- N8221A IF digitizer, 30 MS/s
- N8241A arbitrary waveform generator, 15-Bit, 1.25 GS/s or 625 MS/s
- N8242A arbitrary waveform generator, 10-Bit, 1.25 GS/s or 625 MS/s

For further information, refer to:

http://www.agilent.com/find/synthetic

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1 Software Installation

This installation process installs the required software and instrument drivers used by the N8201A performance downconverter:

"Verify the PC Meets Minimum Requirements" on page 10
"Step 1. Install the Agilent I/O Libraries" on page 11
"Step 2. Install the IVI Shared Components" on page 13
"Step 3. Install the IVI-COM Drivers" on page 14
"Step 4. Install the Agilent Synthetic Instrument GUI" on page 15
"Step 5. Install the Agilent Synthetic Instrument Finder" on page 16
"Step 6. Install the N8201A Performance Downconverter User Interface" on page 17

Install the following only if the N8201A performance downconverter has Option H02

"(Optional) Step 7. Install the Agilent N8201A Option H02 Spectrum Analyzer GUI" on page 19

Install the following only if the N8201A performance downconverter has Option H02

(Steps 8, 9, and 10 are available to support legacy installations.)

"(Optional) Step 8. Install the Microsoft Virtual Machine (VM)" on page 20
"(Optional) Step 9. Install the Apache HTTP Server" on page 21
"(Optional) Step 10. Install the SA Remote Web Server" on page 23

Installing Software and Instrument Drivers

Verify the PC Meets Minimum Requirements

- 1 GHz Intel Pentium processor
- Microsoft Windows XP Professional or Home Edition (Service Pack 1 or 2), Windows 2000 (Service Pack 2)
- 512 MB of RAM
- Up to 40 MB of available hard-disk space
- Microsoft Internet Explorer 6.0 (or higher), or Netscape 7.1 or 8.0

The following software and instrument drivers are required to operate the N8201A performance downconverter.

CAUTION If the following software or instrument drivers are installed on the PC to be used, uninstall them and install the software and instrument drivers shipped on the *Agilent N8201A Performance Downconverter Synthetic Instrument Module, 3 Hz to 26.5 GHz, Instrument Drivers and Documentation CD (N8201-90004)*:

1. Agilent I/O Libraries
2. IVI Shared Components
3. IVI-COM Drivers
4. Agilent Synthetic Instrument GUI
5. Agilent Synthetic Instrument Finder
6. Agilent N8201A Performance Downconverter User Interface

Install the following only if the downconverter has Option H02

(Optional) 7. Agilent N8201A Option H02 Spectrum Analyzer GUI
(Optional) 8. Microsoft Virtual Machine (VM)
(Optional) 9. Apache HTTP Server
(Optional) 10. SA Remote Web Server

---

1 Place the *Agilent N8201A Performance Downconverter Synthetic Instrument Module, 3 Hz to 26.5 GHz, Instrument Drivers and Documentation CD* in the CD-ROM drive.

NOTE Adobe Acrobat Reader is used during this installation process.

- **a** If your computer does not have Adobe Acrobat Reader 5.0 or later, install it from the *Instrument Drivers and Documentation CD (N8201-90004) described above*.
- **b** Click **Adobe Acrobat Reader 5.0** to install the software.

---

2 Click **Instrument Drivers**.

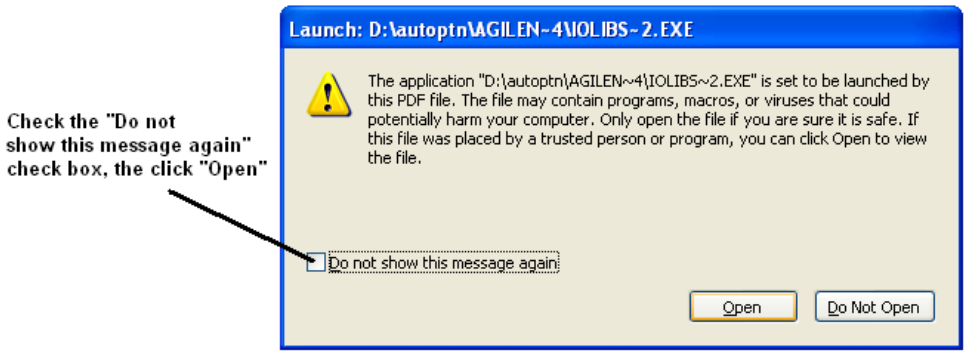
Step 1. Install the Agilent I/O Libraries

1 Select **Agilent I/O Libraries**.

1. Agilent I/O Libraries
2. IVI Shared Components
3. IVI-COM Drivers
4. Agilent Synthetic Instrument GUI
5. Agilent Synthetic Instrument Finder
6. Agilent N8201A Performance Downconverter User Interface
Install the following only if the downconverter has Option H02
(Optional) 7. Agilent N8201A Option H02 Spectrum Analyzer GUI
Install the following only if the downconverter has Option H02 (Steps 8, 9, and 10 are available to support legacy installations.)
(Optional) 8. Microsoft Virtual Machine (VM)
(Optional) 9. Apache HTTP Server
(Optional) 10. SA Remote Web Server

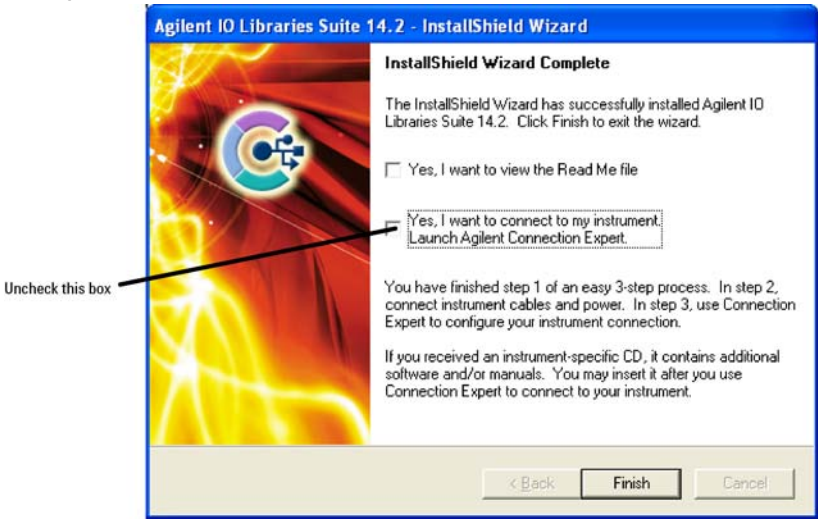
2 Click the check box, "**Do not show this message again**" so that the check box is selected. This will stop the message from displaying each time a selection is made from the Software and Driver Installation menu.

3 Click **Open**.



4 Follow the instructions and accept the default settings.

5 Uncheck the check box stating, "**Yes, I want to connect to my instrument. Launch Agilent Connection Expert**". The instrument will be connected later in the process after all of the required software has been installed.



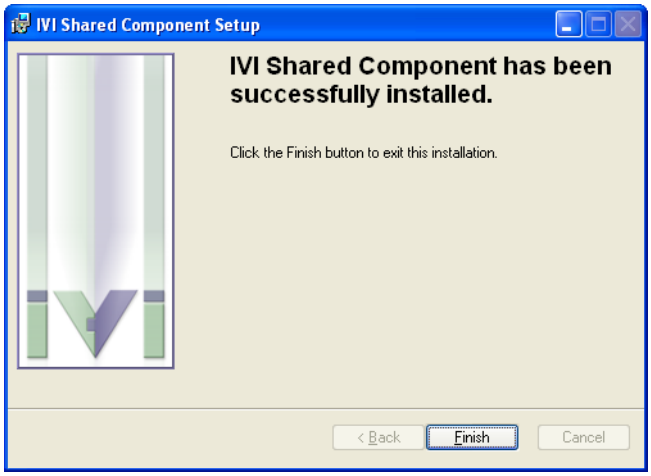
6 Click **Finish**.

Step 2. Install the IVI Shared Components

1 Select **IVI Shared Components**.

1. Agilent I/O Libraries
2. IVI Shared Components
3. IVI-COM Drivers
4. Agilent Synthetic Instrument GUI
5. Agilent Synthetic Instrument Finder
6. Agilent N8201A Performance Downconverter User Interface
Install the following only if the downconverter has Option H02
(Optional) 7. Agilent N8201A Option H02 Spectrum Analyzer GUI
Install the following only if the downconverter has Option H02 (Steps 8, 9, and 10 are available to support legacy installations.)
(Optional) 8. Microsoft Virtual Machine (VM)
(Optional) 9. Apache HTTP Server
(Optional) 10. SA Remote Web Server

2 Follow the installation instructions and accept the default settings.



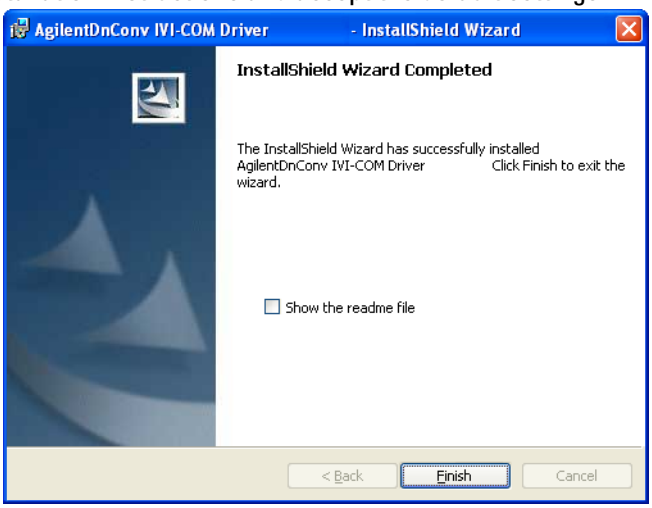
3 Click **Finish**.

Step 3. Install the IVI-COM Drivers

1 Select **IVI-COM Drivers.**

1. Agilent I/O Libraries
2. IVI Shared Components
3. IVI-COM Drivers
4. Agilent Synthetic Instrument GUI
5. Agilent Synthetic Instrument Finder
6. Agilent N8201A Performance Downconverter User Interface
Install the following only if the downconverter has Option H02
(Optional) 7. Agilent N8201A Option H02 Spectrum Analyzer GUI
Install the following only if the downconverter has Option H02 (Steps 8, 9, and 10 are available to support legacy installations.)
(Optional) 8. Microsoft Virtual Machine (VM)
(Optional) 9. Apache HTTP Server
(Optional) 10. SA Remote Web Server

2 Follow the installation instructions and accept the default settings.



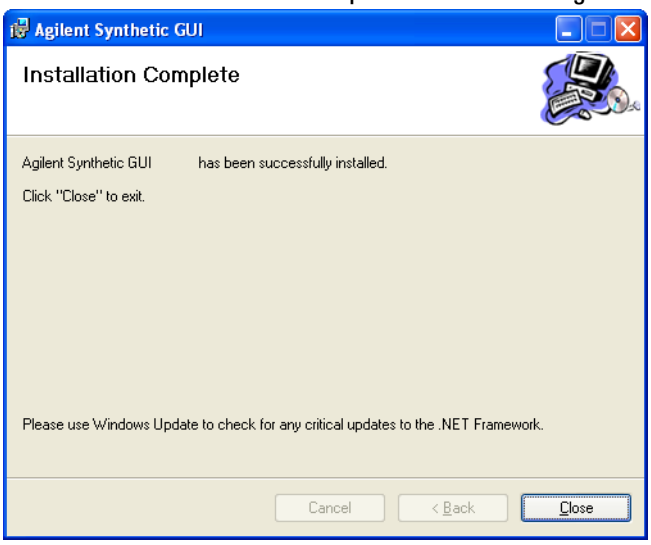
3 Click **Finish**.

Step 4. Install the Agilent Synthetic Instrument GUI

1 Select **Agilent Synthetic Instrument GUI**.

1. Agilent I/O Libraries
2. IVI Shared Components
3. IVI-COM Drivers
4. Agilent Synthetic Instrument GUI
5. Agilent Synthetic Instrument Finder
6. Agilent N8201A Performance Downconverter User Interface
Install the following only if the downconverter has Option H02
(Optional) 7. Agilent N8201A Option H02 Spectrum Analyzer GUI
Install the following only if the downconverter has Option H02 (Steps 8, 9, and 10 are available to support legacy installations.)
(Optional) 8. Microsoft Virtual Machine (VM)
(Optional) 9. Apache HTTP Server
(Optional) 10. SA Remote Web Server

2 Follow the installation instructions and accept the default settings.



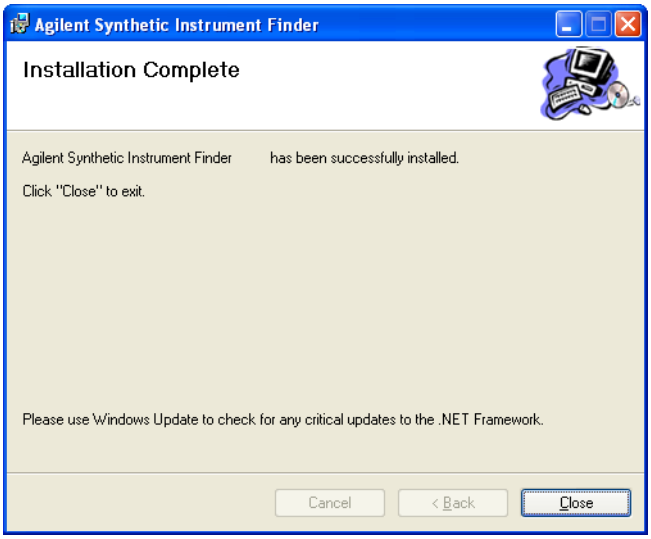
3 Click **Close**.

Step 5. Install the Agilent Synthetic Instrument Finder

1 Select **Agilent Synthetic Instrument Finder**.

1. Agilent I/O Libraries
2. IVI Shared Components
3. IVI-COM Drivers
4. Agilent Synthetic Instrument GUI
5. Agilent Synthetic Instrument Finder
6. Agilent N8201A Performance Downconverter User Interface
Install the following only if the downconverter has Option H02
(Optional) 7. Agilent N8201A Option H02 Spectrum Analyzer GUI
Install the following only if the downconverter has Option H02 (Steps 8, 9, and 10 are available to support legacy installations.)
(Optional) 8. Microsoft Virtual Machine (VM)
(Optional) 9. Apache HTTP Server
(Optional) 10. SA Remote Web Server

2 Follow the installation instructions and accept the default settings.



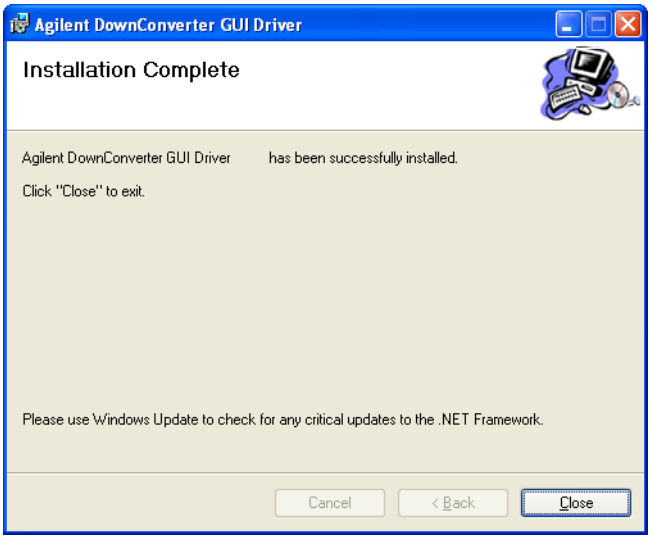
3 Click **Close**.

Step 6. Install the N8201A Performance Downconverter User Interface

1 Select **Agilent N8201A Performance Downconverter User Interface**.

1. Agilent I/O Libraries
2. IVI Shared Components
3. IVI-COM Drivers
4. Agilent Synthetic Instrument GUI
5. Agilent Synthetic Instrument Finder
6. Agilent N8201A Performance Downconverter User Interface
Install the following only if the downconverter has Option H02
(Optional) 7. Agilent N8201A Option H02 Spectrum Analyzer GUI
Install the following only if the downconverter has Option H02 (Steps 8, 9, and 10 are available to support legacy installations.)
(Optional) 8. Microsoft Virtual Machine (VM)
(Optional) 9. Apache HTTP Server
(Optional) 10. SA Remote Web Server

2 Follow the installation instructions and accept the default settings.



3 Click **Close**.

Installing Optional Software and Instrument Drivers

Software for steps 7, 8, 9, and 10 can be installed on your PC, but Option H02 is required to use these software applications with the N8201A performance downconverter; prior to continuing, verify that Option H02 is installed.

To Verify that Option H02 is Installed

1. Start the Synthetic Instrument Finder (from the Windows Desktop, click **Start** > **All Programs** > **Agilent SI Tools** > **Synthetic Instrument Finder**).
2. Select an instrument, from the left-hand pane of the Synthetic Instrument Finder, and right-click on the instrument with the mouse.
3. Select **Interactive IO**.
4. Type *OPT? at the Command prompt and click **Send & Read**.
5. Read the response in the Instrument Session History box; the required option should be listed as H02.

If Option H02 is Installed

- If Option H02 is installed, proceed to "(Optional) Step 7. Install the Agilent N8201A Option H02 Spectrum Analyzer GUI" on page 19.
- If Option H02 is installed, you can also use the SA Remote Web Server. To use this optional interface, you must perform "(Optional) Step 8. Install the Microsoft Virtual Machine (VM)" on page 20, "(Optional) Step 9. Install the Apache HTTP Server" on page 21, and "(Optional) Step 10. Install the SA Remote Web Server" on page 23; this interface can be installed along with the Agilent N8201A Option H02 Spectrum Analyzer GUI, but only one interface can be used at any given time.

If Option H02 is Not Installed

- If Option H02 is not installed, software installation is complete!

  The N8201A performance downconverter can be manually controlled on instruments without Option H02 by using the Agilent Synthetic Instrument GUI.
  (Refer to "Starting the Agilent Synthetic Instrument GUI" on page 64.)

  - Without Option H02, the Agilent N8201A Option H02 Spectrum Analyzer GUI cannot be used and does not need the software installed.
  - Without Option H02, the N8201A performance downconverter cannot be used with the SA Remote Web Server and does not need software installed for the Microsoft Virtual Machine (VM), the Apache HTTP Server, or the SA Remote Web Server.

  a. Close the Interactive IO dialog box.

  b. Close the Synthetic Instrument Finder dialog box.

  c. Click **Exit CD-ROM.** The software and driver installation is complete!

  d. **Restart** the computer and continue to "Hardware Setup and Configuration" on page 25.

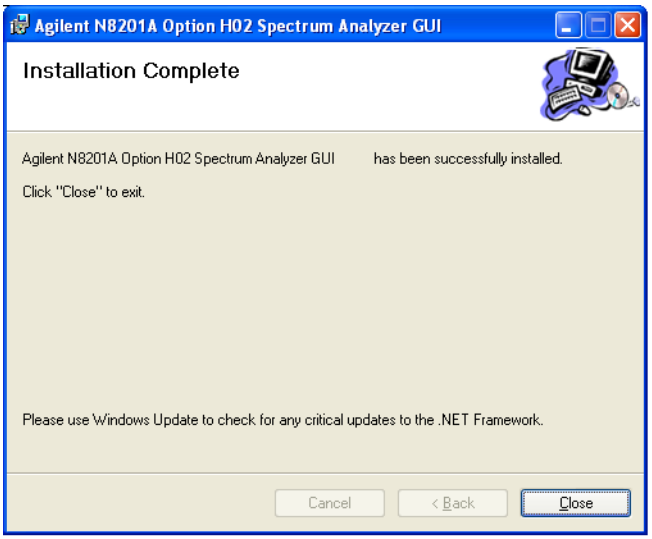
(Optional) Step 7. Install the Agilent N8201A Option H02 Spectrum Analyzer GUI

NOTE Before performing this optional installation step, read about "Installing Optional Software and Instrument Drivers" on page 18.

1 Select **Agilent N8201A Option H02 Spectrum Analyzer GUI**.

1. Agilent I/O Libraries
2. IVI Shared Components
3. IVI-COM Drivers
4. Agilent Synthetic Instrument GUI
5. Agilent Synthetic Instrument Finder
6. Agilent N8201A Performance Downconverter User Interface
Install the following only if the downconverter has Option H02
(Optional) 7. Agilent N8201A Option H02 Spectrum Analyzer GUI
Install the following only if the downconverter has Option H02 (Steps 8, 9, and 10 are available to support legacy installations.)
(Optional) 8. Microsoft Virtual Machine (VM)
(Optional) 9. Apache HTTP Server
(Optional) 10. SA Remote Web Server

2 Follow the installation instructions and accept the default settings.

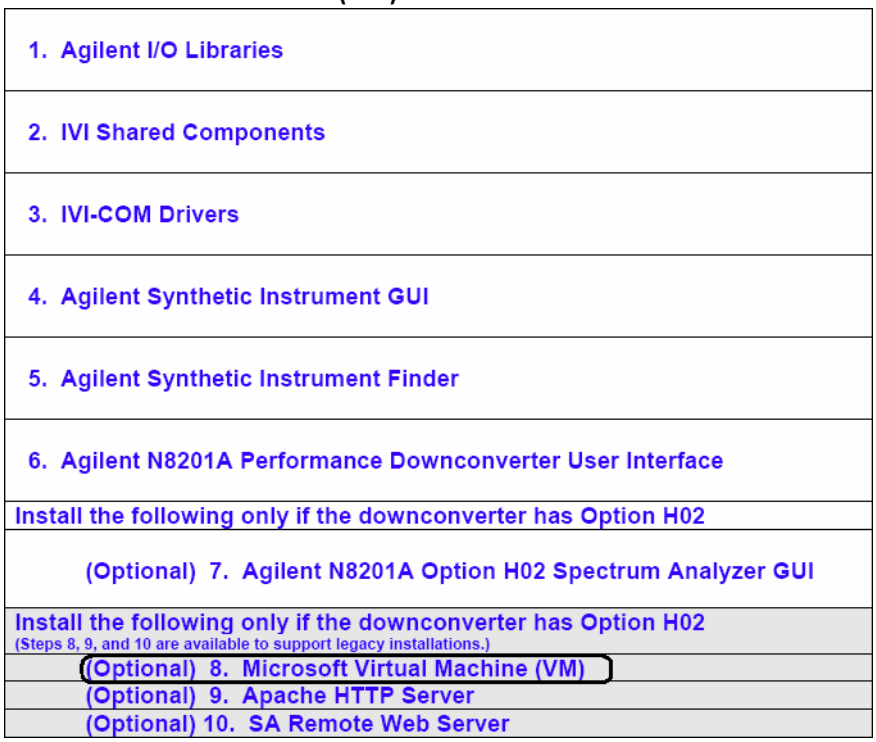


3 Click **Close**.

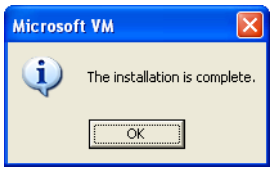
(Optional) Step 8. Install the Microsoft Virtual Machine (VM)

NOTE Before performing this optional installation step, read about "Installing Optional Software and Instrument Drivers" on page 18.

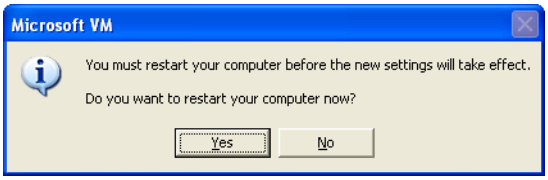
1 Select **Microsoft Virtual Machine (VM)**.



2 Follow the installation instructions and accept the default settings.



3 Click **OK**.

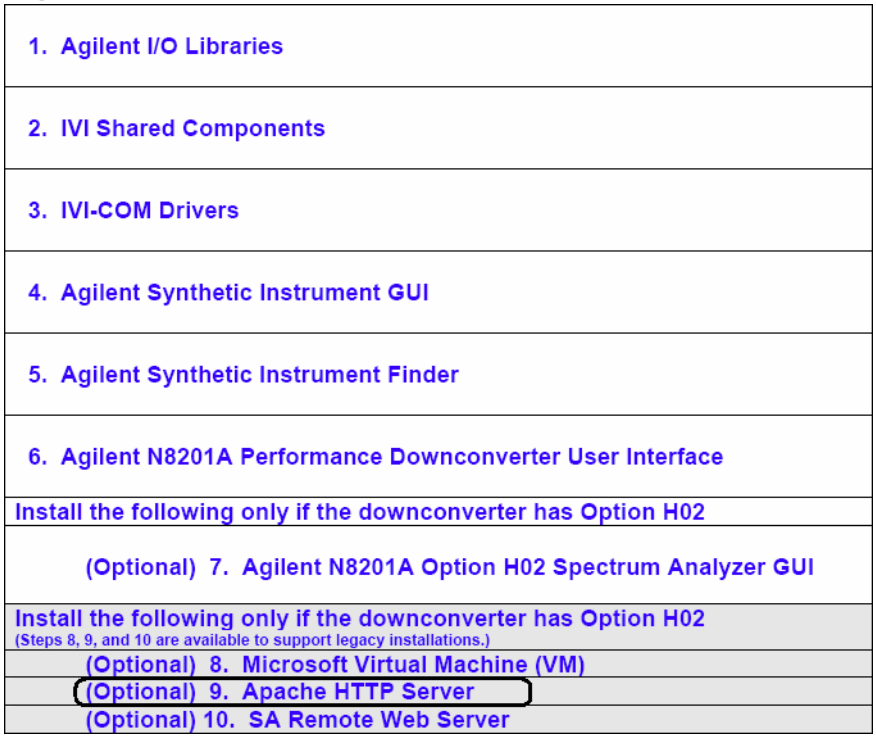


4 Click **No** on the Microsoft VM dialog box. This step will be completed later in the process *after* the SA Remote Web Server is installed.

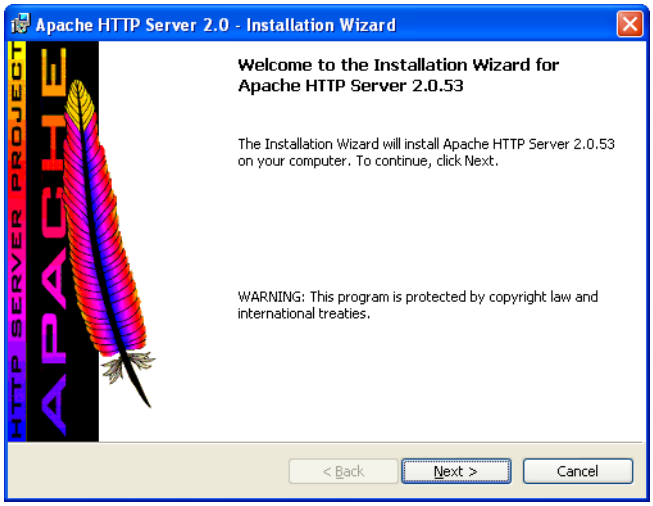
(Optional) Step 9. Install the Apache HTTP Server

NOTE Before performing this optional installation step, read about "Installing Optional Software and Instrument Drivers" on page 18.

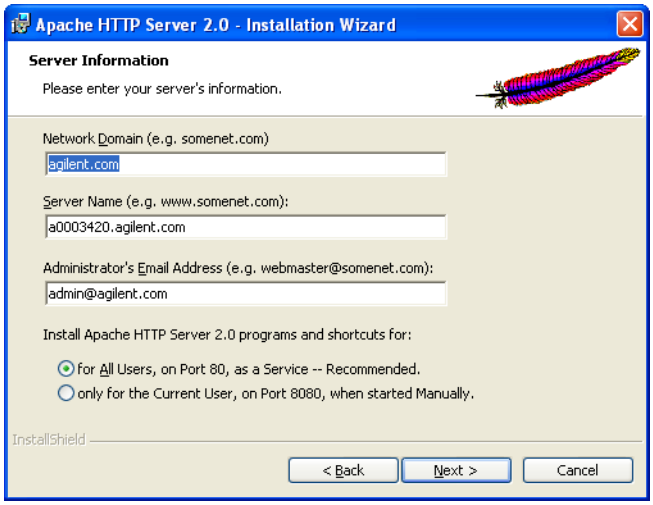
1 Select **Apache HTTP Server**.



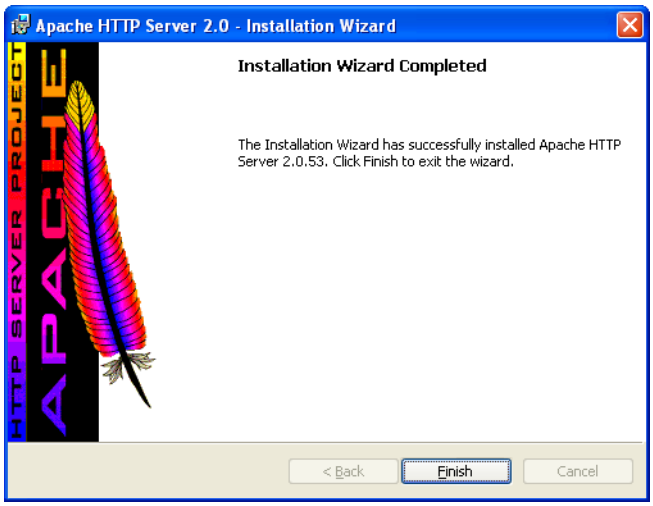
2 Follow the installation instructions and accept the default settings



3 Click **Next**.



4 Click **Next**.

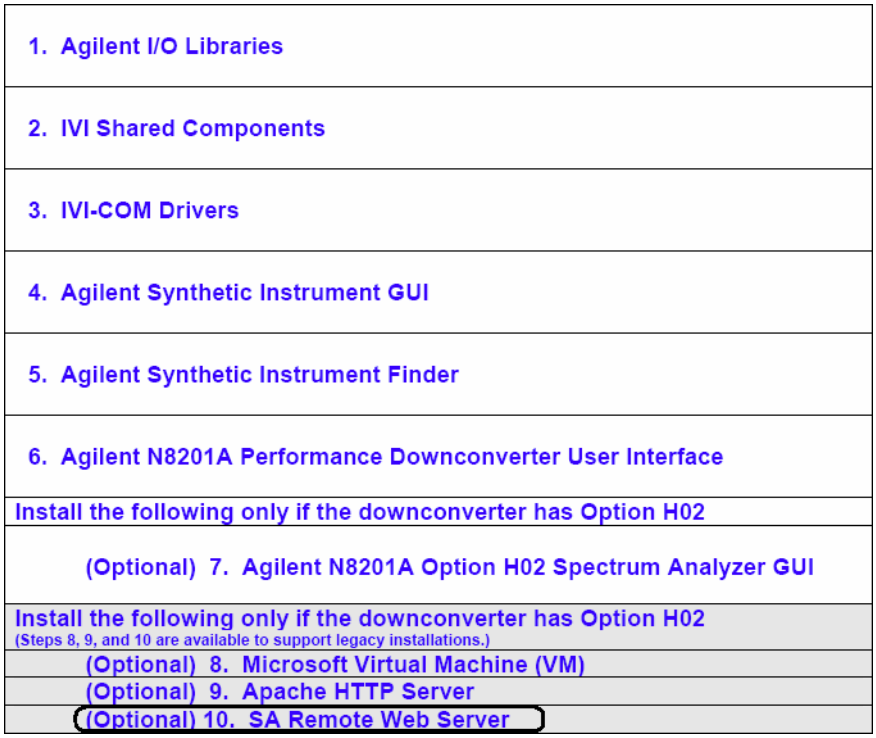


5 Click **Finish**.

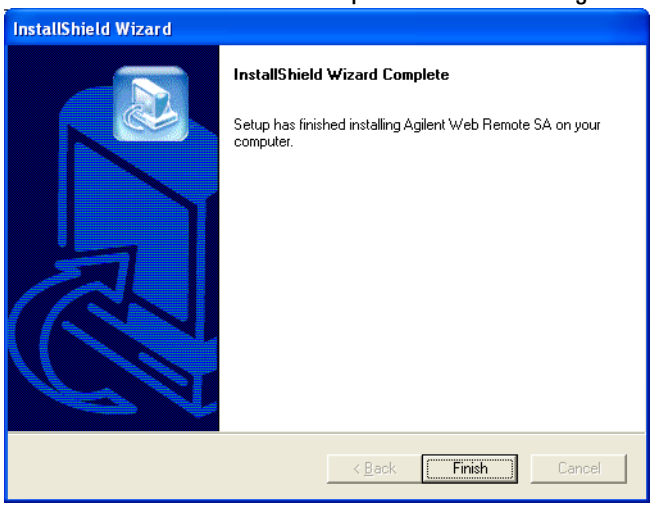
(Optional) Step 10. Install the SA Remote Web Server

NOTE Before performing this optional installation step, read about "Installing Optional Software and Instrument Drivers" on page 18.

1 Select **SA Remote Web Server**.

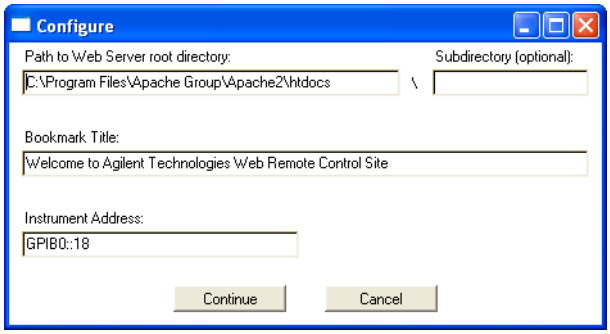


2 Follow the installation instructions and accept the default settings.



3 Click **Finish**.

4 Click **Cancel** on the Configure dialog box. This step will be completed later in the process after restarting the computer.



5 Close the Agilent N8201A Performance Downconverter Software and Driver Installation menu (**driver_installation_list.pdf** dialog box).

6 Click **Exit CD-ROM.** The software and driver installation is complete.

7 **Restart** the computer and continue to "Hardware Setup and Configuration" on page 25.

NOTE **Restart the computer!**

2
Hardware Setup and Configuration

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Step 1. Unpack the N8201A Performance Downconverter

WARNING The unique shape of the N8201A performance downconverter was intended to allow multiple instruments to reside in a compact system that is both modular and transportable. With instruments adjacent to each other, handles could not be installed on the respective instruments. Exercise caution when lifting and carrying the instrument to avoid personal injury. At 25.9 kilograms (57 pounds) shipping weight and 19 kilograms (42 pounds) net weight, it is recommended that two people be utilized for instrument lifting and transport.

NOTE Verify that any options ordered are included with the shipment by checking the packing literature included with the shipment.

The serial number label on the N8201A performance downconverter only verifies hardware/firmware options. The packing literature verifies all items shipped.

Verify the Shipment

1 Inspect the shipping container for damage.

Signs of damage may include a dented or torn shipping container or cushioning material that shows signs of unusual stress or compacting.

2 Carefully remove the contents from the shipping container and verify that the order is complete.

The following items are shipped standard with each N8201A performance downconverter:

- instrument drivers, synthetic graphical user interface, and documentation CD-ROM (p/n N8201-90004)
- three-prong AC power cord specific to geographic location

(Optional) Prepare the Instrument for Rack Mounting

CAUTION If the N8201A performance downconverter is to be placed in a system rack, the feet currently attached can be replaced with the rack mount feet (part number W1312-40032) supplied with the accessories. Failure to do so can result in a safety issue.

Step 2. Connect LAN Cables and Turn On Power

Before connecting to a LAN, verify your local policy by contacting the system administrator in your Information Technology (IT) department and inquire about connecting instruments to the LAN.

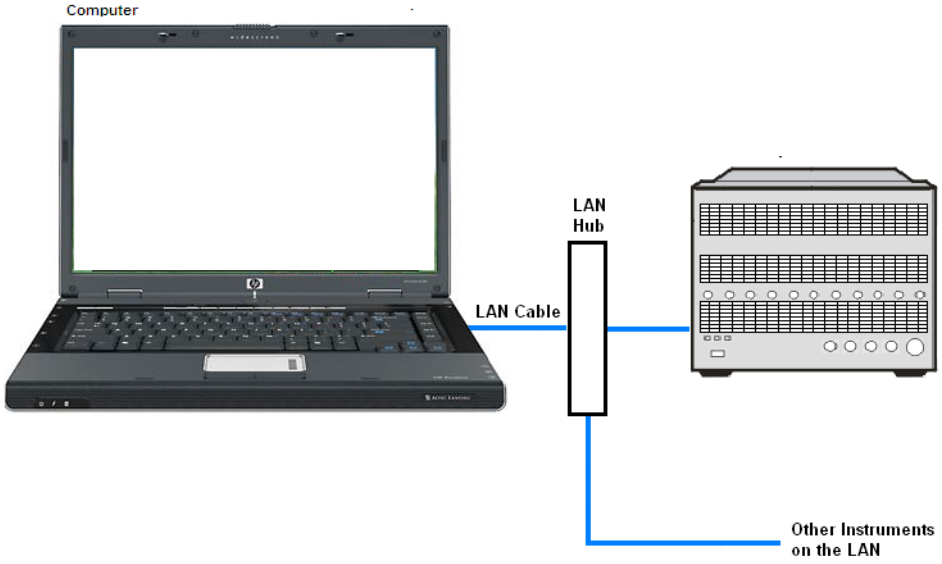
- If the network uses DHCP [Dynamic Host Configuration Protocol], an address is assigned to the device automatically. If you need to know what the IP address is, it can be determined using the Synthetic Instrument Finder. (Refer to "Step 3. Verify Connection with Synthetic Instrument Finder" on page 30.)
  - If DHCP is not present, but the instrument is set to use DHCP (the default), the instrument waits two minutes for its DHCP request to time out. When the N8201A performance downconverter is used in this situation, there is a time delay of approximately three minutes between the time of when the N8201A performance downconverter's power is turned on and when it is available for use.
  - If the network does not use DHCP, you can use Auto IP or configure your LAN settings manually. Although you can also manually configure LAN settings in a network with DHCP, it is recommended that you do so with the assistance of your system administrator.

- If the network uses Auto IP (does not use DHCP), the N8201A performance downconverter acquires a 169.254.xxx.xxx address. (Refer to "How to Set a Static IP Address" on page 54.)

NOTE If you wish to communicate directly between the N8201A performance downconverter and your PC without the use of a LAN hub, you can connect directly to your PC. (Refer to "(Optional) Connect to a LAN with a Cross-Over LAN Cable" on page 29.)

1 Connect a LAN cable from the LAN connector on your PC to an empty connector on your internal local area network or LAN hub.

2 Connect a LAN cable from the LAN connector on the rear panel of the N8201A performance downconverter to an empty connector on your internal local area network or LAN hub.



3 Turn on power to the PC.

4 Turn on power to the N8201A performance downconverter and wait until the LAN LED turns solid green or until you hear an attenuator click from within the N8201A performance downconverter; this can take up to four minutes depending on whether the instrument is using DHCP or Auto IP.

(Optional) Connect to a LAN with a Cross-Over LAN Cable

If you wish to communicate directly between the N8201A performance downconverter and your PC without the use of a LAN hub, you can connect directly to your PC.

1 Connect a cross-over LAN cable from the LAN connector on your PC to the LAN connector on the rear panel of the N8201A performance downconverter.

2 Turn on power to the PC.

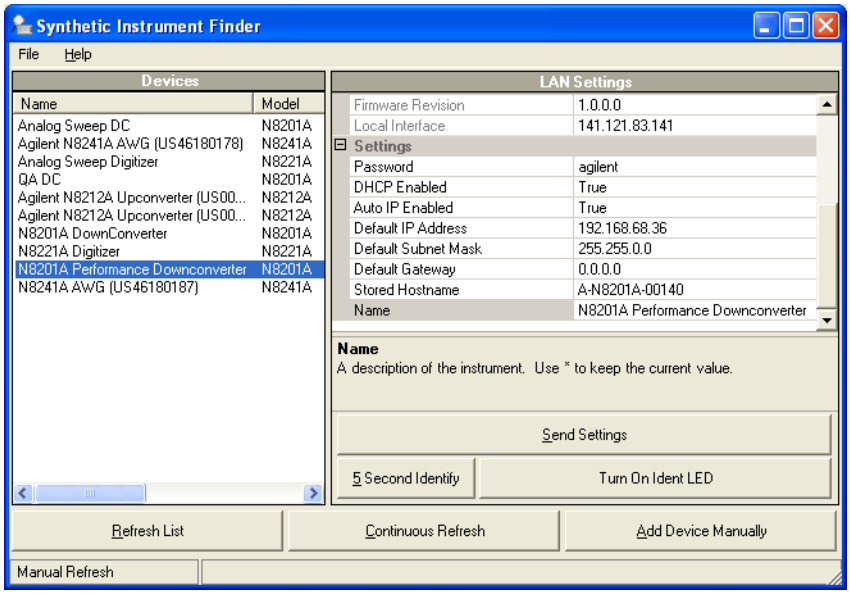
3 Turn on power to the N8201A performance downconverter and wait until the LAN LED turns solid green or until you hear an attenuator click from within the N8201A performance downconverter; this can take up to four minutes depending on whether the instrument is using DHCP or Auto IP.

Step 3. Verify Connection with Synthetic Instrument Finder

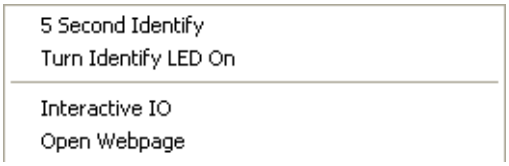
Agilent supplies a program named the **Synthetic Instrument Finder** that enables connection between a PC and instruments that are connected on a LAN [Local Area Network].

1 From the Windows Desktop,
click **Start** > **All Programs** > **Agilent SI Tools** > **Synthetic Instrument Finder**.

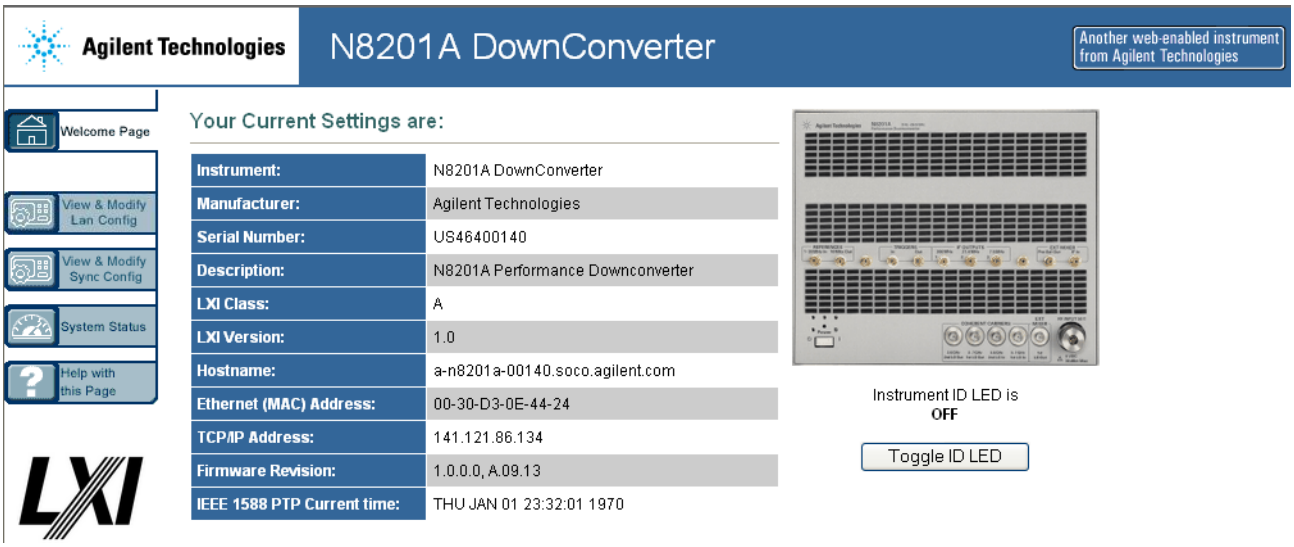
The Synthetic Instrument Finder should appear and look similar to the following.



2 Select an instrument, from the left-hand pane of the Synthetic Instrument Finder, and right-click on an instrument with the mouse.



3 Select **Open Webpage** and a Web browser should appear that allows viewing and modifying settings for instruments on the network.



- If this Web page does not open or you experience an error, refer to "Troubleshooting" on page 48.

- If this Web page opens, you have verified connectivity and can continue on to one of the following:
  - With Option H02 **not** installed, refer to "Using the Agilent Synthetic Instrument GUI" on page 63
  - With Option H02 installed, refer to "(Optional) Step 4. Connect to the Agilent N8201A Option H02 Spectrum Analyzer GUI" on page 32
  - With Option H02 installed, refer to "(Optional) Step 5. Connect to an SA Remote Web Server" on page 34.

(Optional) Step 4. Connect to the Agilent N8201A Option H02 Spectrum Analyzer GUI

NOTE

If Option H02 is **not** installed, the Agilent N8201A Option H02 Spectrum Analyzer GUI software cannot be used!

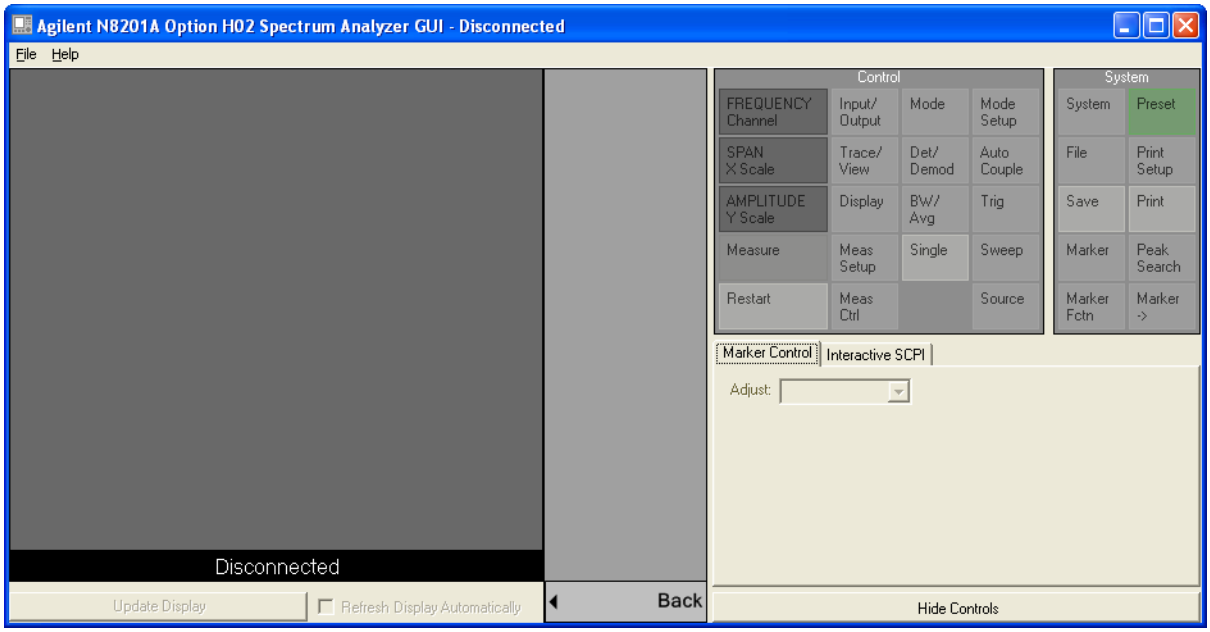
In addition to Option H02, you must have performed "(Optional) Step 7. Install the Agilent N8201A Option H02 Spectrum Analyzer GUI" on page 19; this interface can be installed along with the SA Web Remote Server, but only one interface can be used at any given time. (For further software installation information, refer to "Installing Optional Software and Instrument Drivers" on page 18.)

The N8201A performance downconverter can be manually controlled on instruments without Option H02 by using the Agilent Synthetic Instrument GUI.
(Refer to "Starting the Agilent Synthetic Instrument GUI" on page 64.)

This section describes how to access and use the Agilent N8201A Option H02 Spectrum Analyzer GUI.

1 From the Windows Desktop, click
Start > **All Programs** > **Agilent SI Tools** > **N8201A Option H02 Spectrum Analyzer GUI**.

2 Click **File > Connect** (upper-left corner)
on the Agilent N8201A Option H02 Spectrum Analyzer GUI.



3 Enter the VISA Address (for example, TCPIP0::**141.121.87.18**::inst0::instr) of the instrument being connected to and click **OK**.

- If you don't know the IP address of the instrument, that is used as part of the VISA Address connection string, refer to the Default IP Address that is displayed when verifying connection with the Synthetic Instrument Finder. (Refer to "Step 3. Verify Connection with Synthetic Instrument Finder" on page 30.)

The Agilent N8201A Option H02 Spectrum Analyzer GUI controls the N8201A performance downconverter that is equipped with Option H02 and simulates the functionality of an Agilent PSA spectrum analyzer. To learn how to use the controls of this GUI interface, refer to the PSA documentation.

PSA documentation is available from the *Agilent N8201A Performance Downconverter Synthetic Instrument Module, 3 Hz to 26.5 GHz, Instrument Drivers and Documentation CD* (refer to "Installing Software and Instrument Drivers" on page 10) or from the Web at:

http://www.agilent.com/find/psa

(Optional) Step 5. Connect to an SA Remote Web Server

NOTE

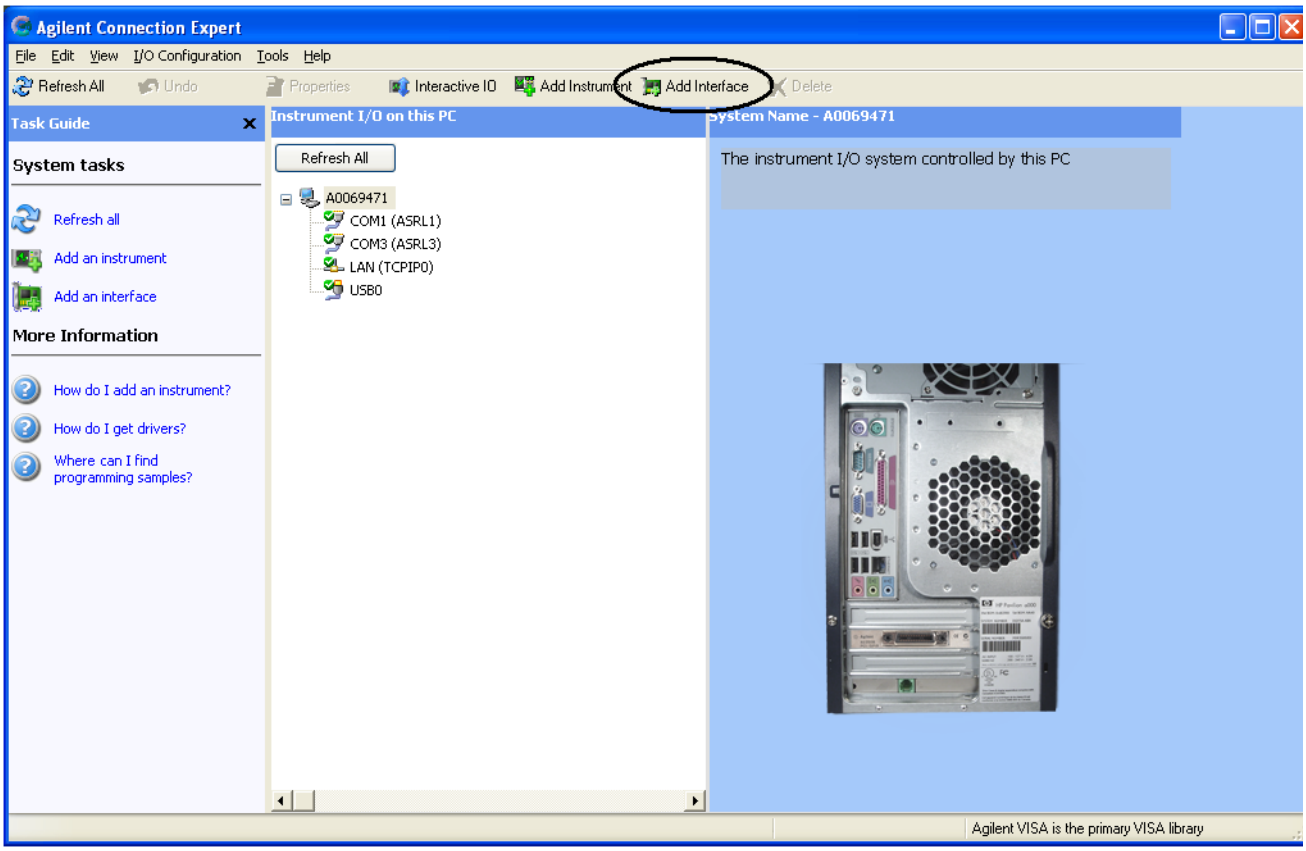
If Option H02 is **not** installed, the SA Remote Web Server software cannot be used!

In addition to Option H02, you must have installed the Microsoft Virtual Machine (VM), the Apache HTTP Server, and the SA Remote Web Server software; this interface can be installed along with the Agilent N8201A Option H02 Spectrum Analyzer GUI, but only one interface can be used at any given time. (For further software installation information, refer to "Installing Optional Software and Instrument Drivers" on page 18.)

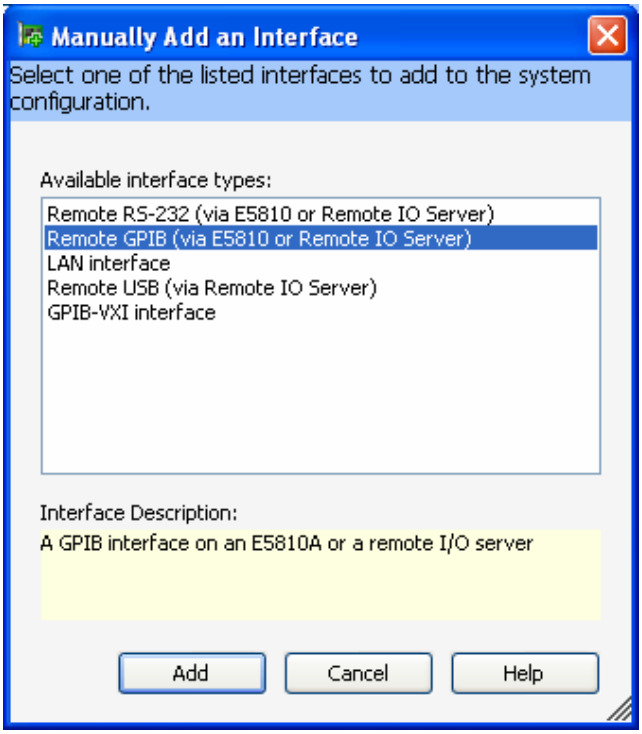
The N8201A performance downconverter can be manually controlled on instruments without Option H02 by using the Agilent Synthetic Instrument GUI.
(Refer to "Starting the Agilent Synthetic Instrument GUI" on page 64.)

1 From the Windows Desktop,
select **Start** > **All Programs** > **Agilent I/O Libraries Suite** > **Agilent Connection Expert**.

2 Click **Add Interface**.



3 Select **Remote GPIB (via E5810 or Remote IO Server)**.



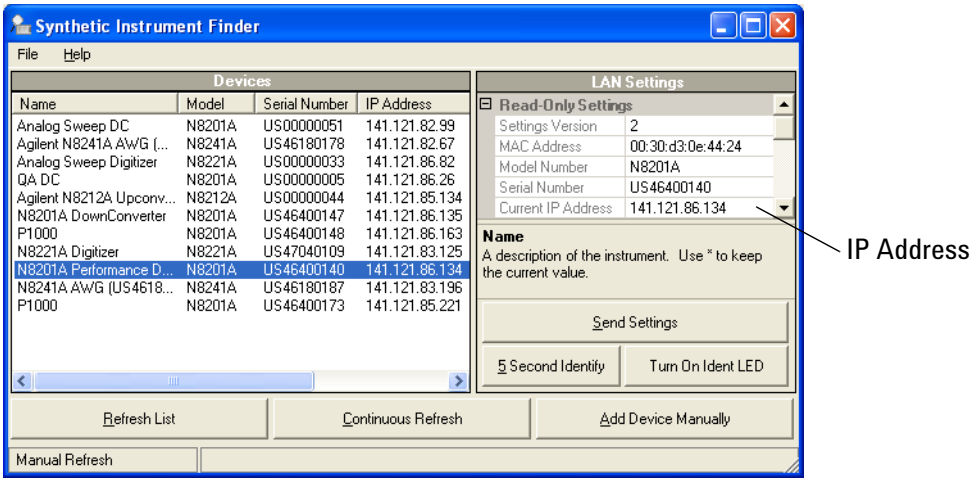
4 Click **Add**.

5 Enter the N8201A performance downconverter's IP address.

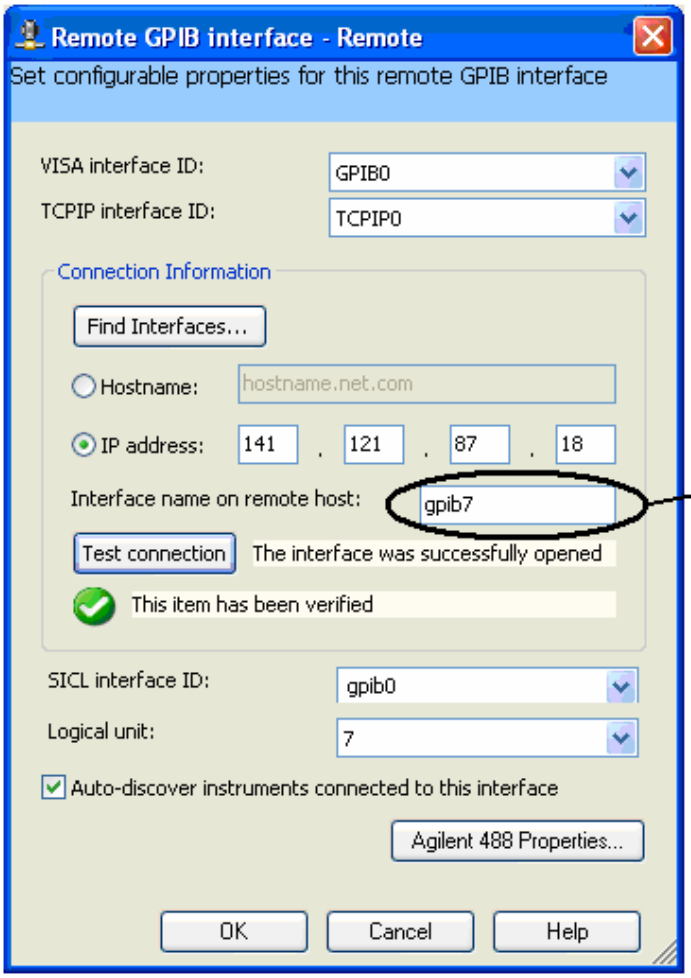
If you do not know the IP address, use the Synthetic Instrument Finder.

a From the Windows Desktop,
select **Start** > **All Programs** > **Agilent SI Tools**> **Synthetic Instrument Finder**.

b Select an instrument from the list of instruments shown to see its IP address.



The Remote GPIB interface dialog box should look similar to the following:



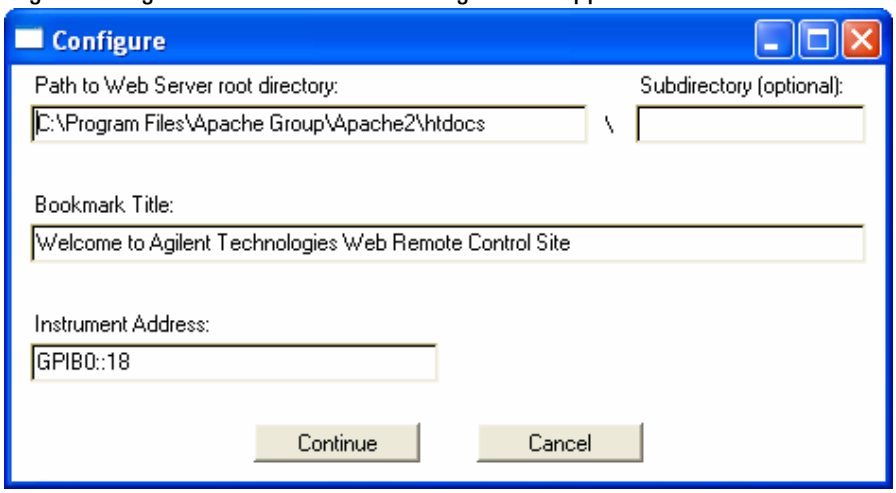
6 Select **IP address** and enter the IP Address of the N8201A performance downconverter in the Remote GPIB Interface dialog box.

7 Enter **gpib7** for the Interface Name on Remote Host.

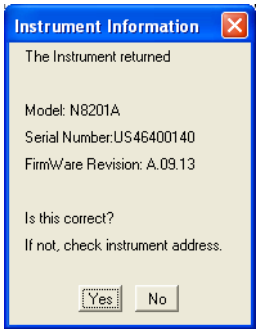
8 Click **Test connection**. If the connection was successful, text stating "The interface was successfully opened" should appear.

9 Click **OK**.

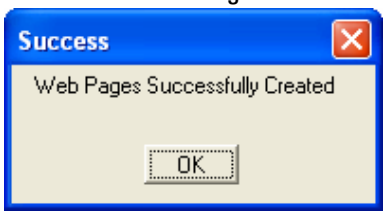
10 From the Windows Desktop,
select **Start** > **All Programs** > **Agilent Web Remote** > **SA** > **Configure** and a Configure dialog box similar to the following should appear.



11 Click **Continue** and a dialog box similar to the following should appear.



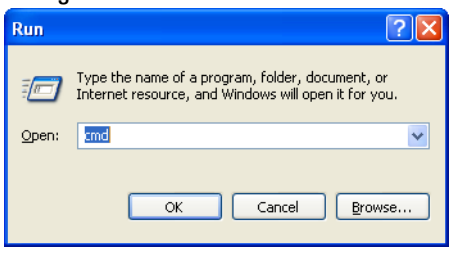
12 Click **Yes** on the Instrument Information dialog box.



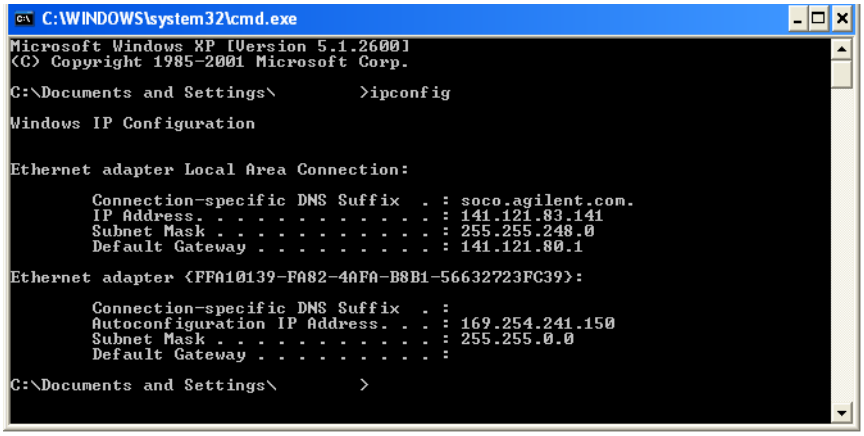
13 Click **OK**.

14 From the Windows Desktop, select **Start** > **Run.**

15 Enter **CMD** in the Run dialog box to select the Command Window.



16 From the command window prompt, type **ipconfig** to get the IP Address of your computer.



17 Write down your computer's IP address.

IP Address: __ __ __ . __ __ __ . __ __ __ . __ __ __

This IP address is needed in the following steps.

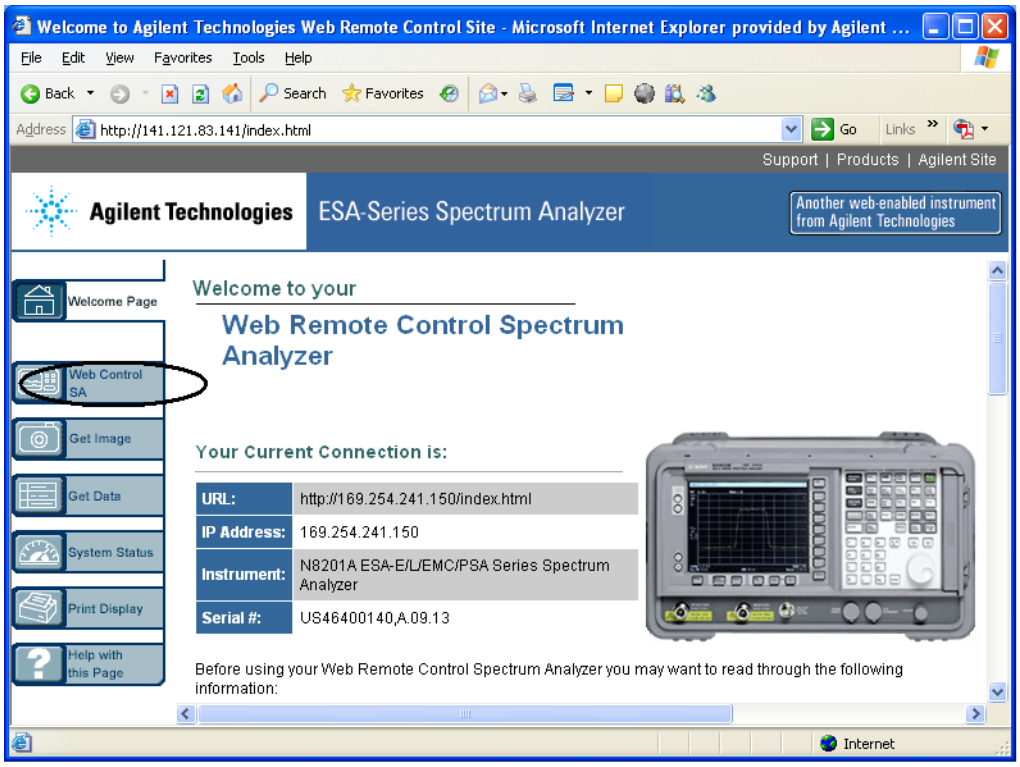
If you are attempting to access the web server from another machine, you need to make sure to use the hostname or IP Address of the adapter that is on the same network as the machine you are using. (In regards to the example above, if you are trying to access the webpage from a machine on the network that is connected to the adapter with the 169.254.241.150 address, you need to use 169.254.241.150 and *not* 141.121.83.141 as the IP Address.)

18 From the Windows Desktop,
select **Start** > **All Programs** > **Agilent Web Remote** > **SA** > **Start Server** to start the Spectrum Analyzer Instrument Server.

19 From the Windows Desktop, select Microsoft's Internet Explorer.

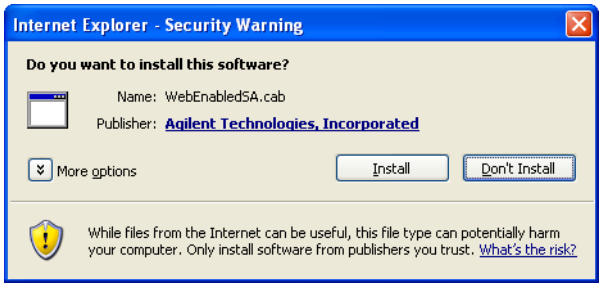
20 Insert your PC's IP address (from the command window above).

Use the following syntax: `http://141.121.83.141/index.html` and a display similar to the following should appear.

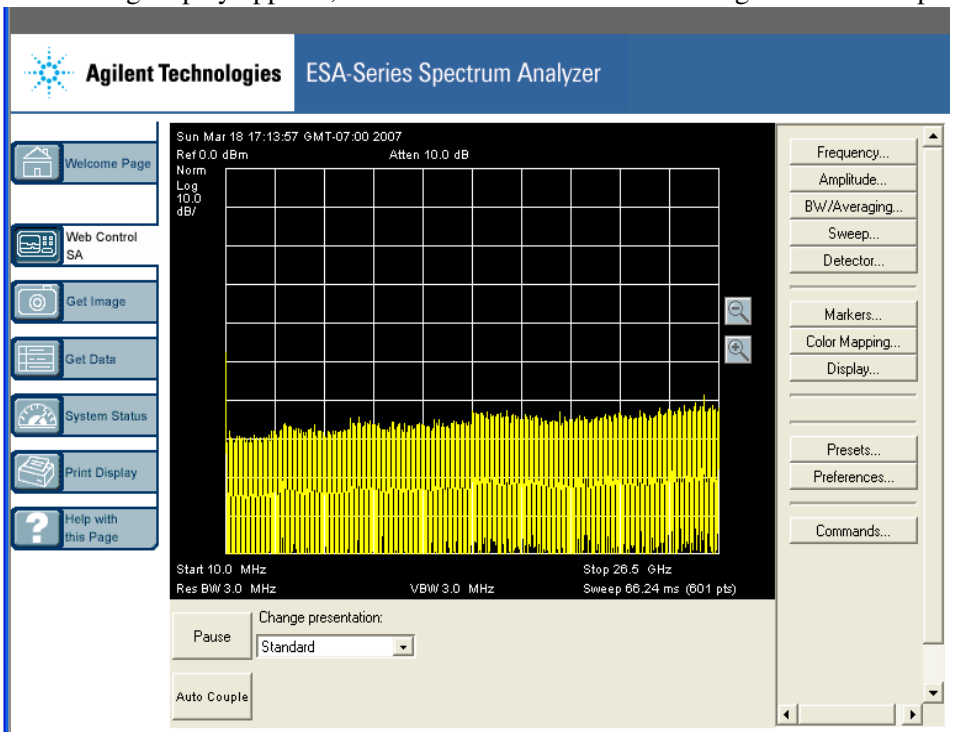


21 Select **Web Control SA** on the left of the web page.

- If one of the following dialog boxes appears, click **Run** or **Install** and accept the installation.



If the following display appears, the SA Remote Web Server configuration is complete!



(Optional) Step 6. Verify Operation < 3 GHz

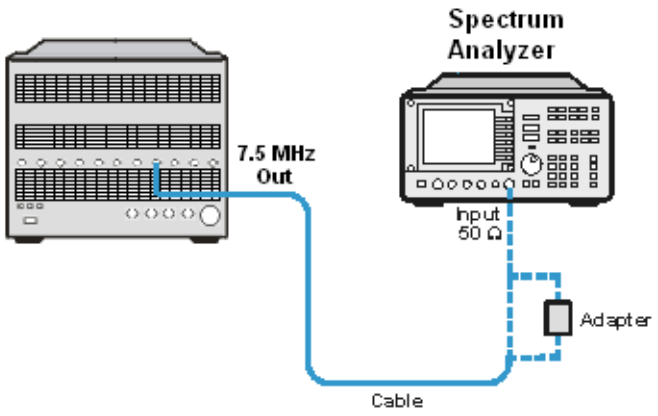
Operation verification is a test that, when completed, will ensure that the downconverter is operating correctly in the low band (< 3 GHz).

CAUTION Make sure that the total power of all signals at the downconverter input **does not exceed** +30 dBm (1 watt).

Performing a Self-Test

Instrument Connections

- Downconverter: 7.5 MHz Out
- Spectrum Analyzer: RF Input



NOTE The N8201A performance downconverter can be controlled with either the SA Remote Web Server or the Agilent Synthetic Instrument GUI, but only one interface can be used at any given time.

- If Option H02 is **not** installed, the N8201A performance downconverter can be manually controlled using the Agilent Synthetic Instrument GUI.
- If Option H02 is installed, you can use either the SA Remote Web Server or the Agilent Synthetic Instrument GUI.

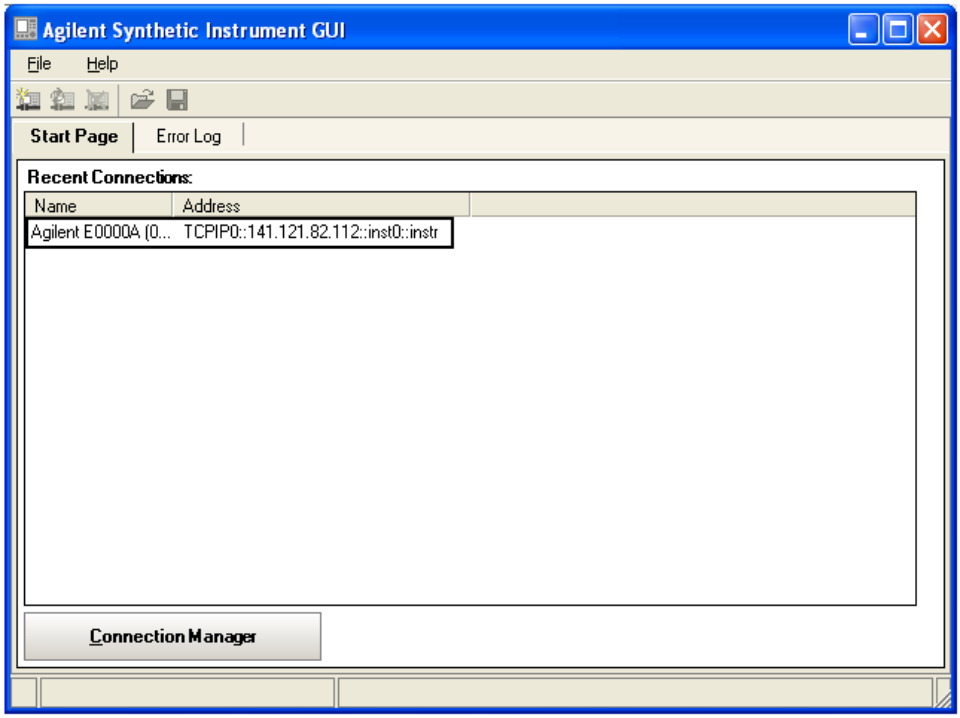
  (For information on using these different interfaces, refer to "(Optional) Step 4. Connect to the Agilent N8201A Option H02 Spectrum Analyzer GUI" on page 32 or "Starting the Agilent Synthetic Instrument GUI" on page 64.)

Perform the following procedure to run a self-test:

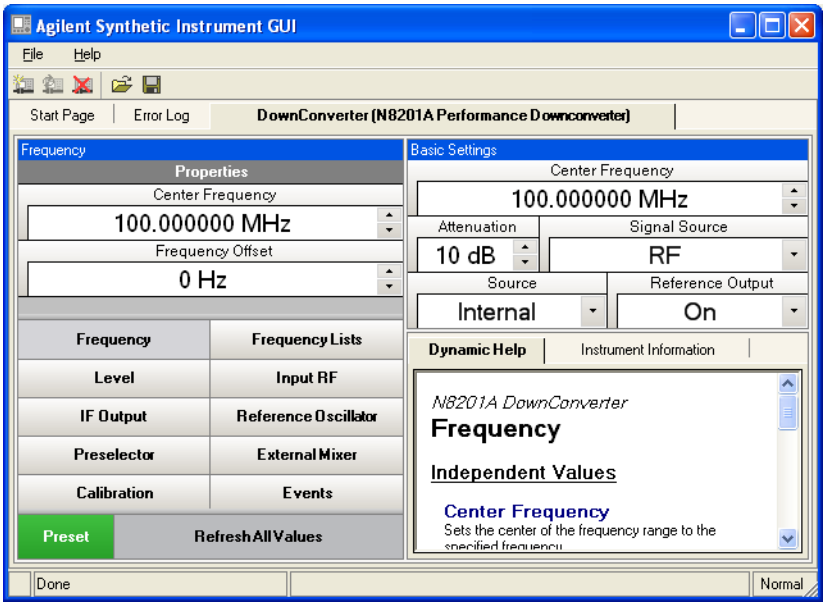
1 Close **SA Remote Web Server**.

2 From the Windows Desktop,
select **Start** > **All Programs** > **Agilent SI Tools** > **Agilent Synthetic Instrument GUI**.

3 Click the listed downconverter in the "Agilent Synthetic Instrument GUI, Recent Connections" dialog box.



4 The following dialog box should appear.



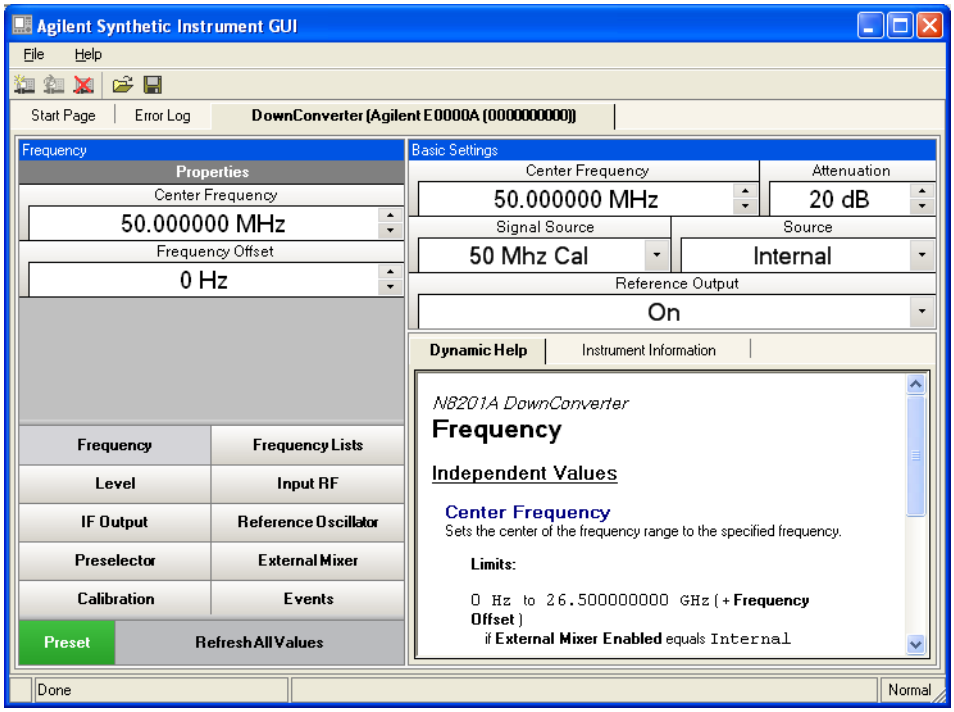
Measurement Procedure

5 Tune the Spectrum Analyzer to the following:

- Frequency: 7.5 MHz
- Amplitude: 10 dBm
- Span: 100 kHz

6 Tune the downconverter to the following:

- Level: Attenuator: 20 dBm
- RF Enabled: Enabled
- Input RF: Signal Source: 50 MHz Cal
- Frequency: 50 MHz



7 Verify that a 7.5 MHz signal is present on the spectrum analyzer.

(Optional) Step 7. Verify Operation > 3 GHz

Operation verification is a test that, when completed, will ensure that the N8201A performance downconverter is operating correctly in the high band (> 3 GHz).

CAUTION Make sure that the total power of all signals at the N8201A performance downconverter input **does not exceed** +30 dBm (1 watt).

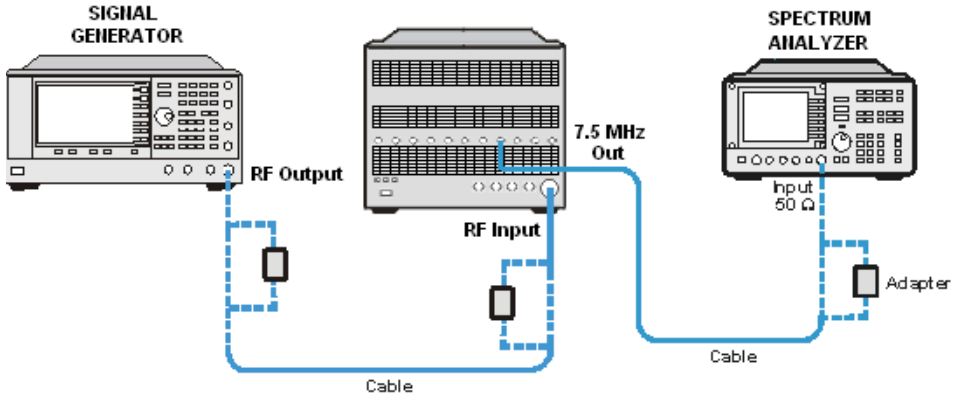
Performing a Self-Test

Downconverter to Spectrum Analyzer Connections

- Downconverter: 7.5 MHz Out
- Spectrum Analyzer: RF Input

Downconverter to Source Connections

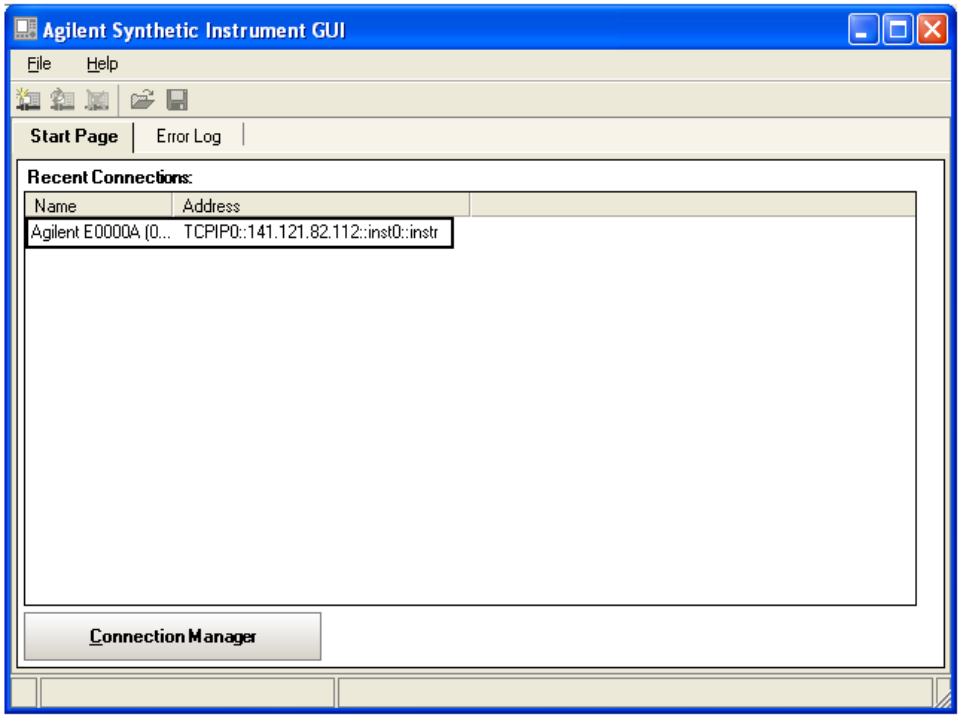
- Downconverter: RF Input
- Source: RF Output



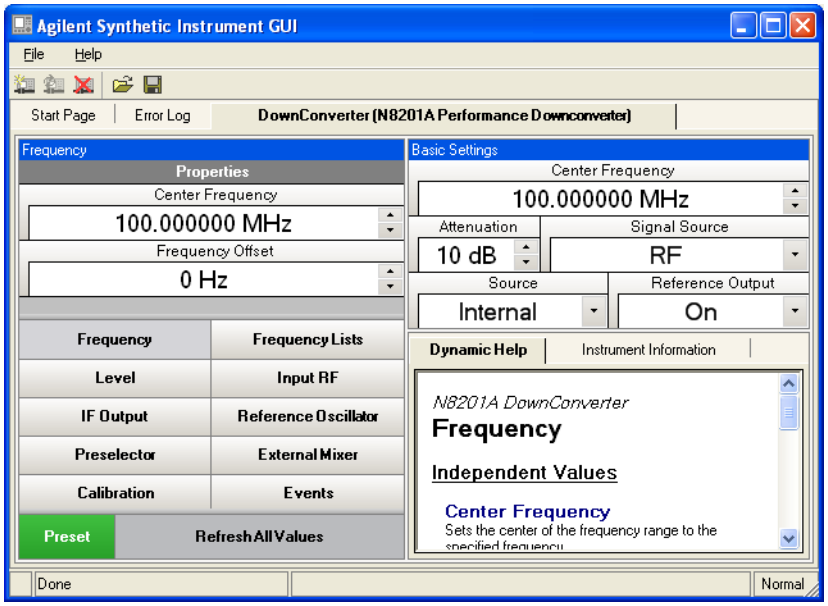
Perform the following procedure to run a self-test:

1 From the Windows Desktop,
select **Start** > **All Programs** > **Agilent SI Tools** > **Agilent Synthetic Instrument GUI**.

2 Click the downconverter in the Agilent Synthetic Instrument GUI dialog box listed under Recent Connections.



3 The following dialog box should appear.



Measurement Procedure

4 Tune the Spectrum Analyzer to the following:

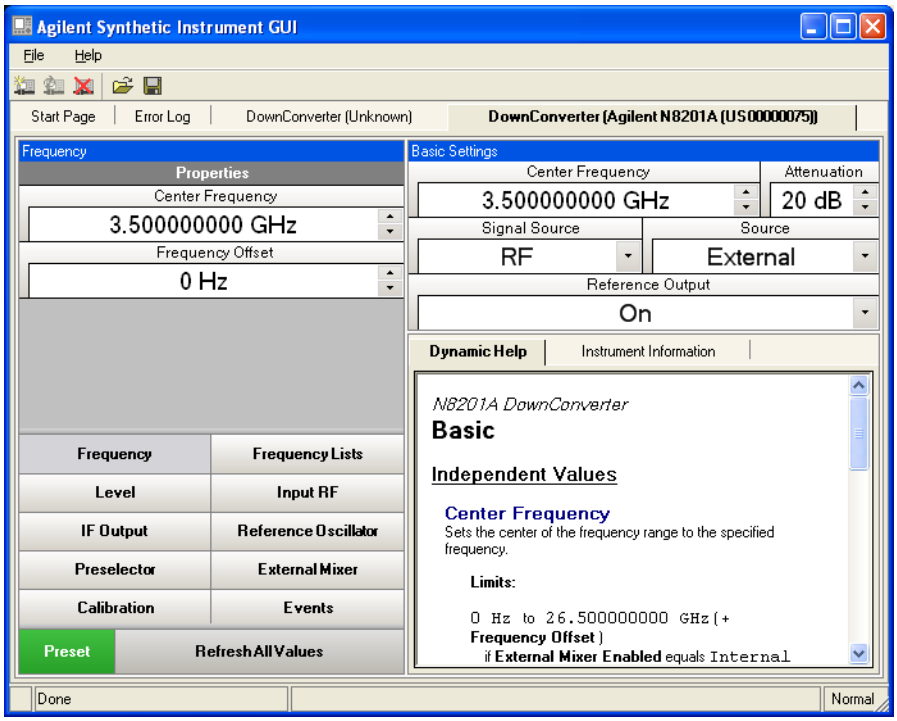
- Frequency: 7.5 MHz
- Amplitude: 10 dBm
- Span: 100 kHz

5 Tune the downconverter to the following:

- Center Frequency: 3.5 GHz
- Attenuator: 20 dBm
- RF Enabled: Enabled
- Source: Internal

6 Tune the Source to the following:

- Frequency: 3.5 GHz
- Amplitude: 0 dBm
- RF On



Verify that a 7.5 MHz signal is present on the spectrum analyzer.

Troubleshooting

Alternative Ways to Verify Connectivity to the PC

In addition to using "Step 3. Verify Connection with Synthetic Instrument Finder" on page 30 and "(Optional) Step 4. Connect to the Agilent N8201A Option H02 Spectrum Analyzer GUI" on page 32, connectivity can be verified between the N8201A performance downconverter and the PC with the following:

- Verify that the LAN LED on the N8201A performance downconverter's rear panel is green or blinking green. This indicates a good connection.

  If the LED is off, there is a problem with your LAN connection.

- Verify that the LAN LED on the N8201A performance downconverter's front panel (next to the LAN port) is solid green.

  If the LED turns red, this indicates a problem with your LAN connection. This takes approximately 60 seconds.

- Ping the N8201A performance downconverter from the PC.

  a From the Windows Desktop, select **Start** > **Run**.

  b At the Open prompt, type **CMD** and press **Enter** to open a command window.

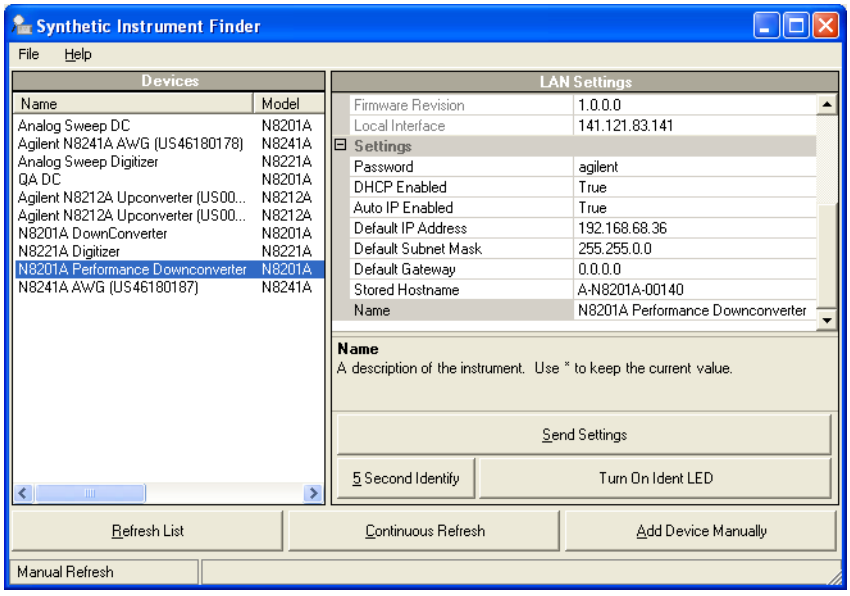
  c At the command prompt, type `Ping` and the instrument's IP address (for example, `Ping 141.121.84.108`.) or type `Ping` and the instruments *hostname* (for example, `Ping a-n8201a-00179`).

How to Use the Synthetic Instrument Finder

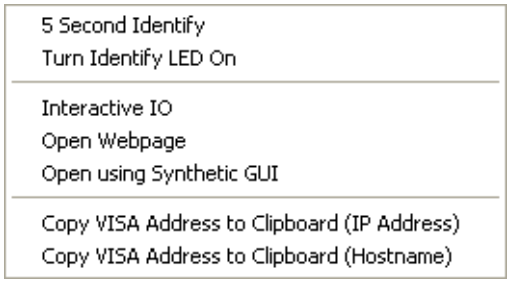
Agilent supplies a program named the **Synthetic Instrument Finder** that enables connection between a PC and instruments that are connected on a LAN [Local Area Network].

1 From the Windows Desktop,
click **Start** > **All Programs** > **Agilent SI Tools** > **Synthetic Instrument Finder**.

The Synthetic Instrument Finder should appear and look similar to the following.



2 Select an instrument, from left-hand pane of the Synthetic Instrument Finder, and right-click on an instrument with the mouse.



The Synthetic Instrument Finder window is divided into two main sections:

- right pane contains information specific to the instrument highlighted in the left pane.
- left pane contains a list of equipment available on your LAN for connection.

Right-Pane Functions

Send Settings Sends the current instrument settings to the N8201A performance downconverter. Use this function if you modified the settings in Instrument Finder.

5 Second Identify Flashes the LAN LED for five seconds.

Turn On Ident LED When On, the LAN LED continuously flashes on and off. Once the Turn On Ident LED button is pressed, the button name changes to Turn Off Ident LED.

Refresh List Updates the device's list.

Continuous Refresh Updates the device's list every one minute.

Add Device Manually Allows you to add a device for connection. Use this feature only if your instrument does not appear in the Devices list.

a Click **Add Device Manually**. The Devices area will display a new listing titled "Unknown".

b In the Manual settings area, enter in the MAC address, serial number, and model number of the device.

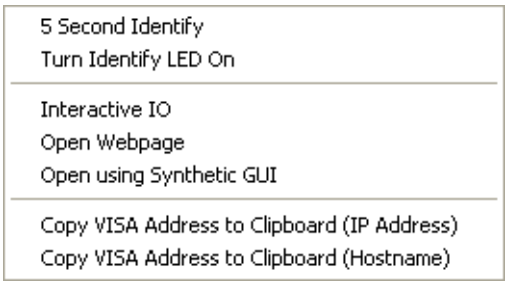
c In the LAN settings area, enter in the information for the new device. (Make sure that you scroll down the list to get to the editable settings area.)

d Click **Send Settings** to enter this information in the Devices area.

e Double-click the new listing to open the webpage, or right-click and select Open using Synthetic GUI to use the virtual interface.

Left-Pane Functions

In the left pane, right-click on the N8201A performance downconverter and the following menu should appear.

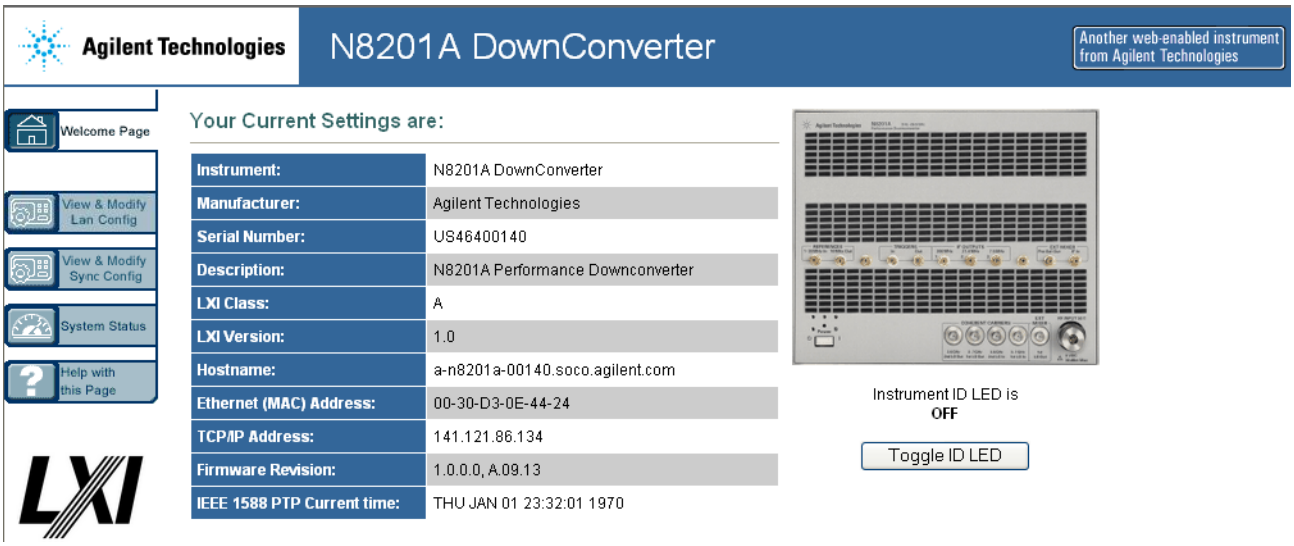


Interactive IO Opens the Agilent Interactive IO application which allows SCPI commands to be sent to the instrument. (The Interactive IO option is only available if the Agilent Connection Expert has been installed on the PC.)

Open Webpage Opens the Web page associated with the currently selected instrument. From this Web page, settings for the instrument can be viewed and modified.

Tip: There are two other ways to access the device's Web page:

- By double-clicking on the Device listing in the Synthetic Instrument Finder.
- By typing in the device's hostname or IP address in your Internet browser.



Open using Synthetic GUI Opens the Synthetic Instrument GUI.

Copy VISA Address to Clipboard (IP Address) Copies the VISA IP address to the clipboard for use in other applications.

Copy VISA Address to Clipboard (Hostname) Copies the VISA hostname to the clipboard for use in other applications. It is recommended that you use this address on networks with DHCP and DNS network capability.

How to Reset the LAN Configuration

On the instrument front panel, near the power switch, is a recessed button labeled “RESET”. This button enables you to place the LAN configuration of the instrument into a known state.

When this button is pressed (a straightened paper clip will do the job) the following settings are made and the system reboots.

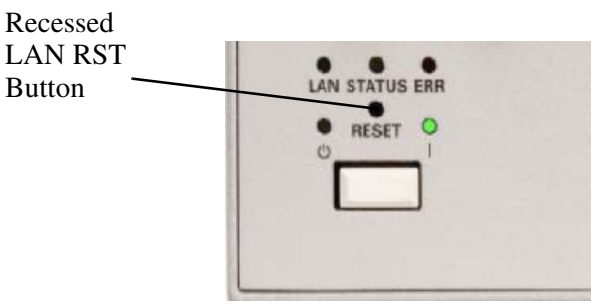
- Subnet Mask is set to 255.255.0.0
- DHCP is set to on
- Auto IP is set to on
- If DHCP and Auto IP are set to off, the IP address will be set to 192.168.EE.FF, where EE and FF are the last two parts of the MAC address (AA.BB.CC.DD.EE.FF). This is designed to prevent multiple instruments from using the same default IP address (refer to the instrument label).

NOTE If you had manually configured LAN settings before, you may have to reconfigure your instrument to reset DHCP and Auto IP to OFF. Refer to “How to Set a Static IP Address" on page 54.

- The instrument hostname is set to A-N82XXA-NNNNN, where N82XXA is the instrument model number (such as N8201A) and NNNNN represents the last five digits of the instrument serial number.

If the instrument is in an environment with a DHCP server, it is assigned an IP address through DHCP. The IP address can be found by using the instrument hostname as the URL in a web browser.

Without DHCP, the instrument will use Auto IP and acquire a 169.254.X.X address. If no DHCP is present, but the instrument is set to use DHCP (the default), the instrument will wait two minutes for its DHCP request to time out. In this case, there is a time delay of approximately three minutes between when the instrument is powered on and when it is usable.



How to Set a Static IP Address

The DHCP server automates the process of setting up the IP addresses on your network by default. When the N8201A performance downconverter is turned on, it searches for a DHCP server on the network and selects a “dynamic IP address”. Each time the N8201A performance downconverter is rebooted, the N8201A performance downconverter may get a different IP address. To set the N8201A performance downconverter to a static IP address, rather than allowing the DHCP server to select an auto IP address:

1 Assign a N8201A performance downconverter instrument IP address that will work with your computer.

NOTE

For a company wide network, your system administrator will have to assign an IP address that is compatible with your PC. If you have a private LAN network or a direct connection from your PC to the instrument, you can assign the IP address. Refer to “Step 1. Unpack the N8201A Performance Downconverter" on page 26.

2 Connect the N8201A performance downconverter in one of the following two configurations:

- Connect a LAN cable from the LAN connector on your PC to an empty connector on your internal local area network or LAN hub. Connect a LAN cable from the LAN connector on the rear panel of the N8201A performance downconverter to an empty connector on your internal local area network or LAN hub.

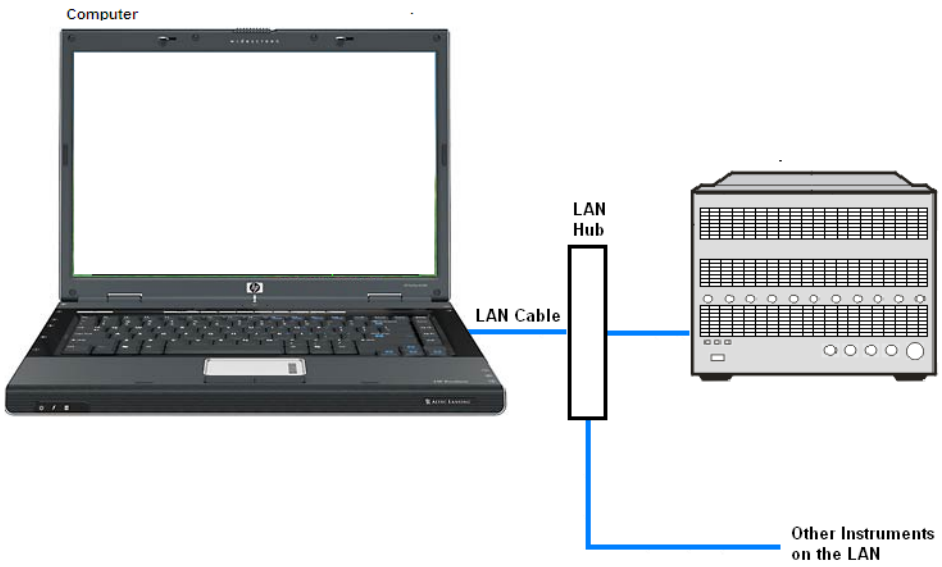


Figure 1 Connecting the PC LAN cable to a company/private LAN to the instrument LAN

- Connect a cross-over cable from the LAN connector on your PC to the LAN connector on the rear panel of the N8201A performance downconverter.

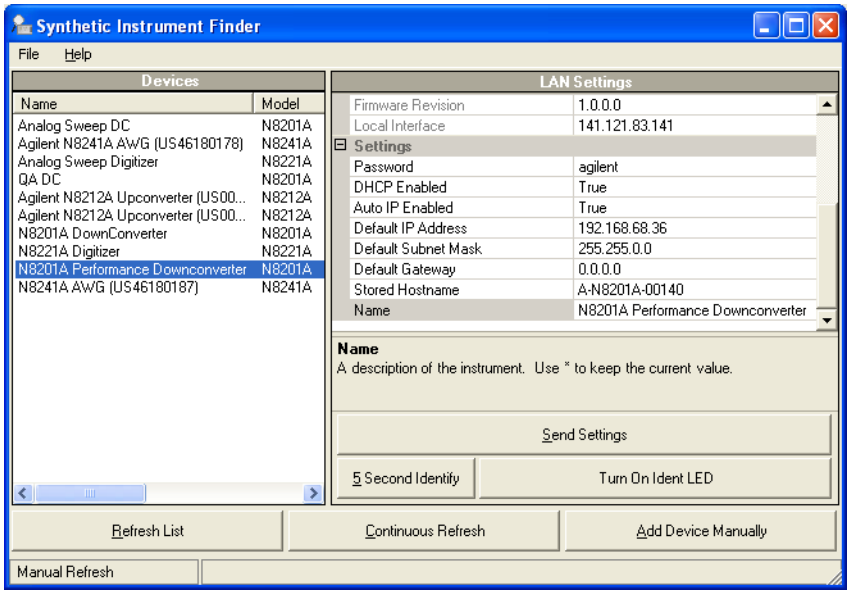
Figure 2 Connecting the PC LAN cable to the instrument LAN (cross-over cable)

3 Turn on power to the PC.

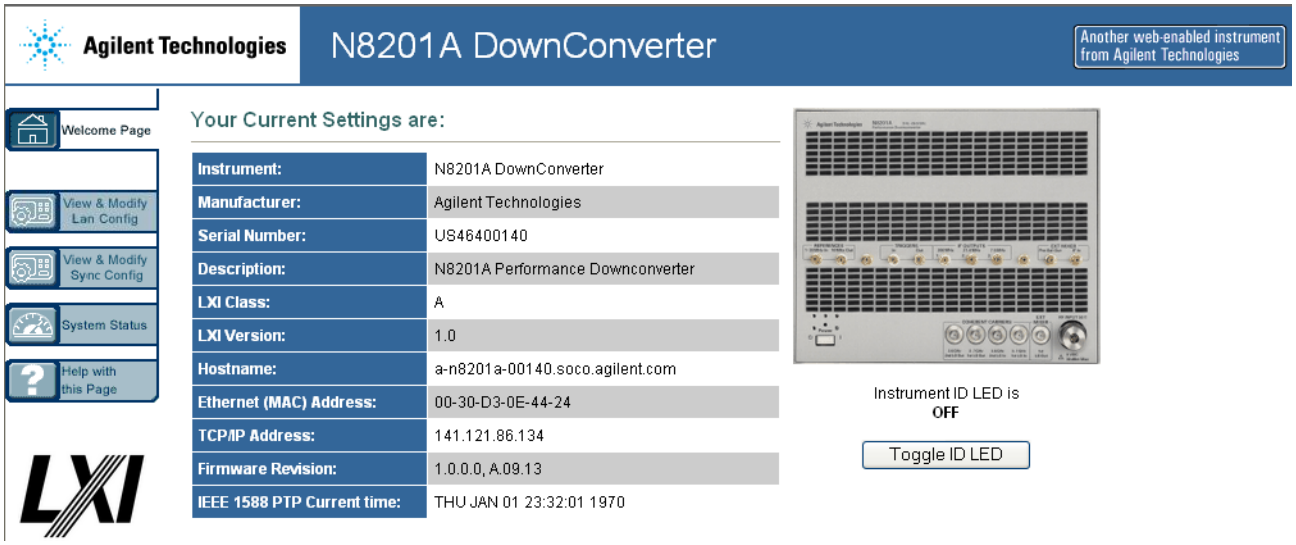
4 Turn on power to the N8201A performance downconverter and wait until the LAN LED turns solid green; this takes about 60 seconds.

5 From the Windows Desktop,
click **Start** > **All Programs** > **Agilent SI Tools** > **Synthetic Instrument Finder**.

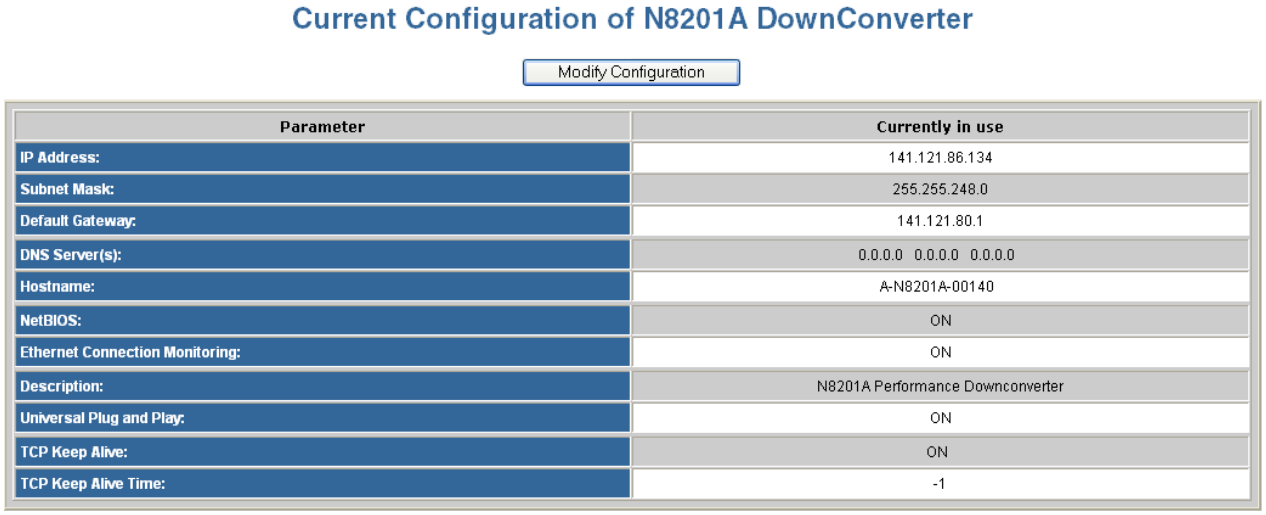
The following Synthetic Instrument Finder dialog box should appear.



6 Select the N8201A performance downconverter listed in the Agilent Synthetic Instrument Finder dialog box to access the N8201A performance downconverter Web page.



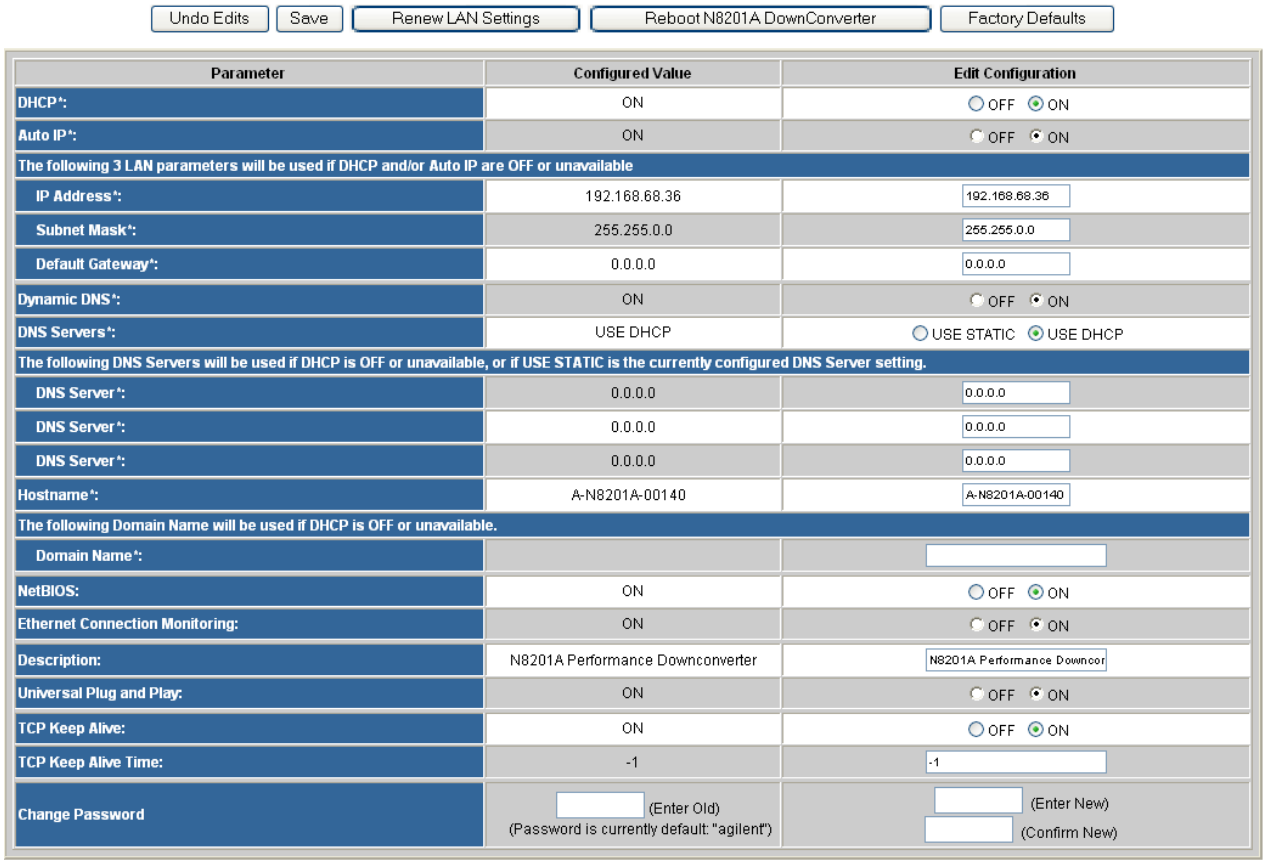
7 Click **View & Modify LAN Config** in the left-pane of the Web page. The following dialog box should appear.



8 Click **Modify Configuration** to access the Password dialog.

9 Click **Submit** (accept the default password) and the following dialog box should appear. The default password is set to "**agilent**".

Tip: You can change the password from the View & Modify LAN Connections. (Scroll down the Parameter column until you locate the Change Password parameter.)



Undo Edits | Save | Renew LAN Settings | Reboot N8201A DownConverter | Factory Defaults

Parameter	Configured Value	Edit Configuration
DHCP*:	ON	OFF ON
Auto IP*:	ON	OFF ON
The following 3 LAN parameters will be used if DHCP and/or Auto IP are OFF or unavailable		
IP Address*:	192.168.68.36	192.168.68.36
Subnet Mask*:	255.255.0.0	255.255.0.0
Default Gateway*:	0.0.0.0	0.0.0.0
Dynamic DNS*:	ON	OFF ON
DNS Servers*:	USE DHCP	USE STATIC USE DHCP
The following DNS Servers will be used if DHCP is OFF or unavailable, or if USE STATIC is the currently configured DNS Server setting.		
DNS Server*:	0.0.0.0	0.0.0.0
DNS Server*:	0.0.0.0	0.0.0.0
DNS Server*:	0.0.0.0	0.0.0.0
Hostname*:	A-N8201A-00140	A-N8201A-00140
The following Domain Name will be used if DHCP is OFF or unavailable.		
Domain Name*:		
NetBIOS:	ON	OFF ON
Ethernet Connection Monitoring:	ON	OFF ON
Description:	N8201A Performance Downconverter	N8201A Performance Downcor
Universal Plug and Play:	ON	OFF ON
TCP Keep Alive:	ON	OFF ON
TCP Keep Alive Time:	-1	-1
Change Password	(Enter Old) (Password is currently default: "agilent")	(Enter New) (Confirm New)

10 Change the **DHCP** and **Auto IP** radio-buttons to **Off**. Change the IP address, Subnet Mask, and Default Gateway values to meet your network requirements.

11 Click **Save** to save the new settings. Parameters marked with an asterisk (*) also require that you click "Renew LAN settings" before changes take effect.

NOTE For the new settings to become effective, you may first cycle the power of the instrument and then cycle the power of the PC.

How to Troubleshoot Connectivity Problems on the Network

The Synthetic Instrument Finder program is used to find instruments on a network when the N8201A performance downconverter is connected through a router or cross-over cable. There are three possible configurations:

- connecting the PC through a company wide site LAN connection to the N8201A performance downconverter
- connecting the PC to the same private LAN network as the instrument
- connecting the PC directly to the instrument using a cross-over cable - this would typically be used for troubleshooting and is not normally used to control an instrument directly

The N8201A performance downconverter is shipped with a default IP address. This default IP address is **192.168.EE.FF**, where EE and FF are the last two parts of the Media Access Control (MAC) address (AA.BB.CC.DD.EE.FF).

How to Determine a PCs Configuration Settings

From a DOS Window

1. From the Windows Desktop, click **Start** > **Run**.
2. At the **`Open:`** prompt, type **`CMD`** and press **Enter** to open a DOS window.
3. At the command prompt, type **`ipconfig/all`** to display the PCs network connection details.

Or,

From the PCs Control Panel

1. From the Windows Desktop, click **Start** > **Settings** > **Control Panel** > **Network and Internet Connections**.
2. From the Network and Internet Connections window, double-click the **Local Area Connection**.
3. In the Local Area Connection Status dialog, click the **Support** tab and click **Details** to display the PCs Network Connection Details.

   The Network Connection Details include:

   - Physical Address
   - DHCP status, enabled or disabled (displayed when using the DOS window ipconfig command only)
   - Auto configuration enabled or disabled (displayed when using the DOS window ipconfig command only)
   - IP Address
   - Subnet Mask

- Default Gateway
- DHCP Server Address
- Lease Obtained
- Lease Expired
- Primary WINS Servers
- Secondary WINS Servers

If the Instrument was Unable to Join the LAN

or

If the LAN LED is Red

Possible Causes	Possible Solutions
The instrument is not connected to a LAN.	If connecting the instrument to a switch or hub, verify that the instrument is connected with a standard LAN cable.
An incorrect LAN cable is being used.	• If connecting the instrument directly to a PC, verify that the instrument is connected with a cross-over cable. • If connecting the instrument to a switch or hub, verify that the instrument is connected with a standard LAN cable.
The device's LAN port is not active.	Connect the instrument to a known working LAN port.
The device is configured to use DHCP, but no DHCP server is available.	• Disable DHCP. Refer to "How to Set a Static IP Address" on page 54. • Connect the device to a LAN that uses a DHCP server.
The instrument is configured to use a duplicate static IP address.	• Make sure that no other device is using the same IP address as your instrument. • Configure your instrument to use a different IP address. Refer to "How to Set a Static IP Address" on page 54.

If the Instrument's IP Address or Hostname Cannot be Found with Ping

Possible Causes	Possible Solutions
The instrument was unable to join the LAN.	See "If the Instrument was Unable to Join the LAN" on page 60.
The instrument's LAN settings are incorrect.	Verify that the instrument's settings are appropriate for your LAN.
A firewall is preventing communication between your PC and your instrument.	Make sure that your firewall settings allow communication between your PC and other devices.
The instrument is using Auto-IP (That is, the instrument assigned itself a 169.254.x.x IP address) and your PC is not using Auto IP (That is, PC does not have a 169.254.x.x IP address.)	• Disable Auto-IP on the instrument. • Configure your PC to use Auto-IP.

If the Instrument is Not Found by the Synthetic Instrument Finder

Possible Causes	Possible Solutions
The instrument was unable to join the LAN.	See "If the Instrument was Unable to Join the LAN" on page 60.
The instrument and PC are on different switches/hubs and different subnets.	• Put the instrument on the same switch or hub as your PC. • If the instrument is using DHCP, make sure that the instrument and the PC are put on the same subnet. • If the instrument is using a static IP address, make sure that the instrument IP address and subnet mask put the instrument on the same subnet as your PC.

If the Instrument's Hostname and PC Cannot Communicate

Possible Causes	Possible Solutions
No DNS server is available.	Communicate with the instrument using the instrument's IP address.
The DNS server has not been updated.	Wait several minutes.
The PC cannot communicate with the device over LAN.	See "If the Instrument's IP Address or Hostname Cannot be Found with Ping" on page 61.

If the Instrument Web Page is Not Visible

Possible Causes	Possible Solutions
• The instrument has not yet joined the LAN. • The instrument is unable to join the LAN.	See "If the LAN LED is Red" on page 60.
Your PC cannot communicate with the device over your LAN.	See "If the Instrument was Unable to Join the LAN" on page 60.
You are attempting to use the device's hostname and the hostname is not working.	See "If the Instrument's Hostname and PC Cannot Communicate" on page 61.
Your browser is configured to use a proxy, and the proxy does not allow communication with instruments on the LAN.	Disable or reconfigure the proxy settings. Open Internet Explorer and select Tools > Internet Options > Connections > LAN Settings...

If the Software Driver Will Not Open the Connection

Possible Causes	Possible Solutions
Your PC cannot communicate with the device over your LAN.	See "If the Instrument's IP Address or Hostname Cannot be Found with Ping" on page 61.
Someone else is currently connected to the instrument.	Make sure that no one else is connected to the instrument.

3 Using the Agilent Synthetic Instrument GUI

"Starting the Agilent Synthetic Instrument GUI" on page 64
"Features of the Agilent Synthetic Instrument GUI" on page 66
"Settings on the Agilent Synthetic Instrument GUI" on page 71

NOTE

The N8201A performance downconverter can be controlled with either the SA Remote Web Server or the Agilent Synthetic Instrument GUI, but only one interface can be used at any given time.

- If Option H02 is **not** installed, the N8201A performance downconverter can be manually controlled using the Agilent Synthetic Instrument GUI.
- If Option H02 is installed, you can use either the Agilent N8201A Option H02 Spectrum Analyzer GUI, the SA Remote Web Server, or the Agilent Synthetic Instrument GUI.

  (For information on using these different interfaces, refer to "(Optional) Step 4. Connect to the Agilent N8201A Option H02 Spectrum Analyzer GUI" on page 32, "(Optional) Step 5. Connect to an SA Remote Web Server" on page 34, or "Starting the Agilent Synthetic Instrument GUI" on page 64.)

To verify that Option H02 is installed:

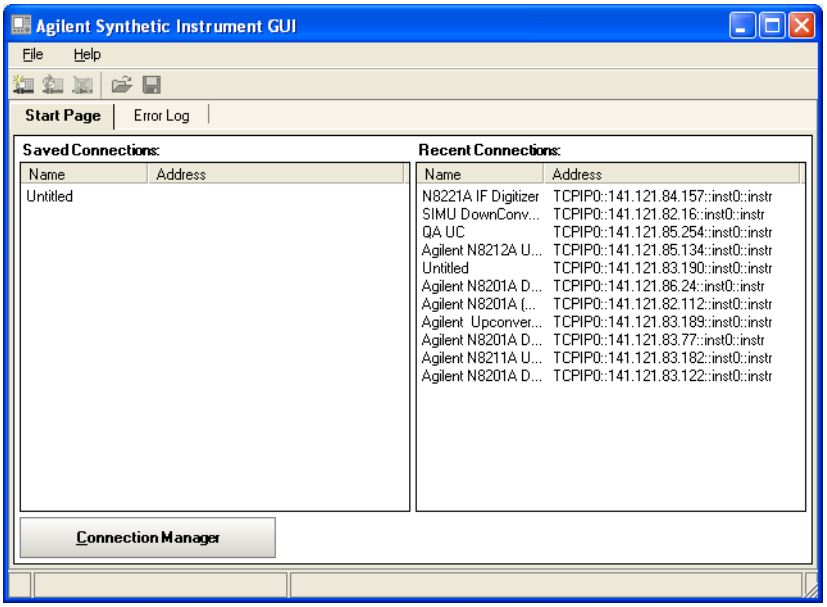
1. Start the Synthetic Instrument Finder (from the Windows Desktop, click **Start** > **All Programs** > **Agilent SI Tools** > **Synthetic Instrument Finder**).
2. Select an instrument, from the left-hand pane of the Synthetic Instrument Finder, and right-click on the instrument with the mouse.
3. Select **Interactive IO**.
4. Type `*OPT?` at the Command prompt and click **Send & Read**.
5. Read the response in the Instrument Session History box; the required option should be listed as H02.

Starting the Agilent Synthetic Instrument GUI

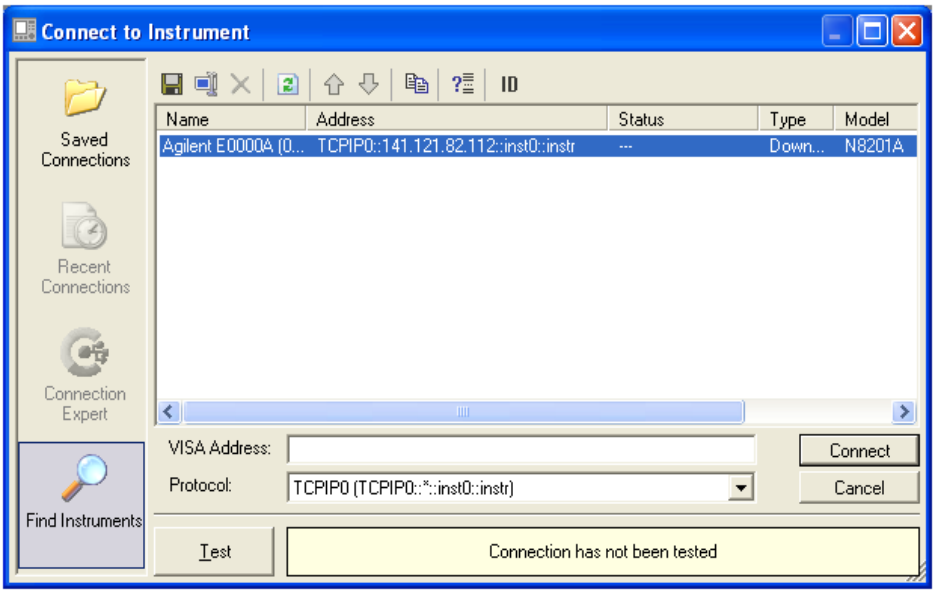
This section describes how to access and use the Agilent Synthetic Instrument GUI.

1 From the Windows Desktop,
click **Start** > **All Programs** > **Agilent SI Tools** > **Agilent Synthetic Instrument GUI**.

2 Click **Connection Manager** (lower-left corner)
on the Agilent Synthetic Instrument GUI dialog box.



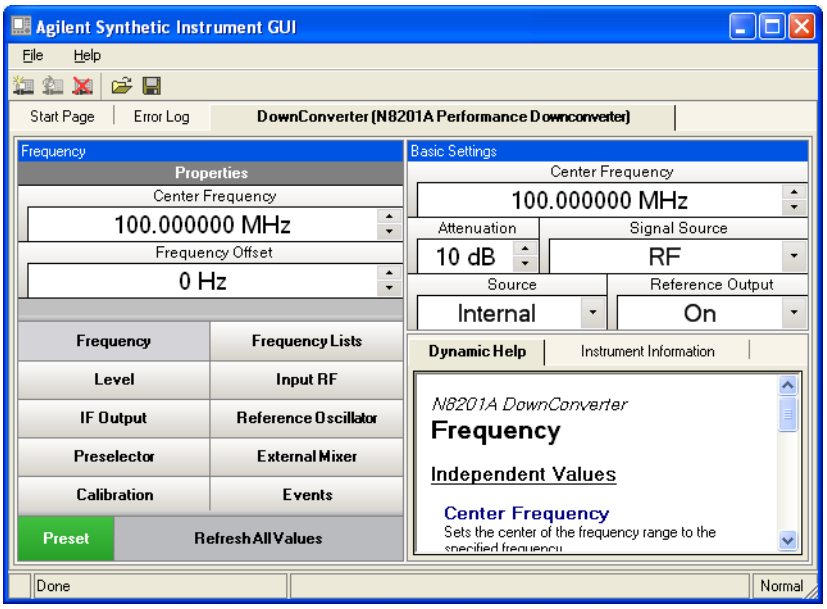
3 Click **Find Instruments** (lower-left corner) on the Connect to Instrument dialog box.



4 Select an N8201A performance downconverter and click **Test** (lower-left corner) on the Connect to Instrument dialog box.

- If the bottom of the dialog box displays the message “Connection Succeeded“, the instrument was found and communication has been established.
- If the bottom of the dialog box displays the message “N8201A is not supported”, the instrument is not communicating. Refer to “Troubleshooting" on page 48.

5 Click **Connect** (lower-right corner) on the Connect to Instrument dialog box and the following dialog box should appear.



If the Agilent Synthetic Instrument GUI appears, the N8201A performance downconverter has successfully connected using a LAN connection!

Left Pane

The lower portion of the left pane displays the settings available for adjustment on the N8201A performance downconverter. Click a function button to activate that function and the related functions are displayed in the Properties area. For example, **Center Frequency** is the active function and all settings associated with Center Frequency are available for modification.

Right Pane

The upper portion of the right pane always displays the functions that are most commonly used for a measurement. These functions are also accessible from the left pane. Changing one of these parameters changes the setting in the left pane as well.

The lower portion of the right pane can have three tabs: Dynamic Help, Instrument Information, and the Event Log. For more information on theses areas, refer to “Dynamic Help" on page 69, “Instrument Information" on page 70, and “Event Log" on page 70.

Features of the Agilent Synthetic Instrument GUI

File Menu

The File menu accesses options for instrument connection, save and recall settings, and exiting the application. Theses tasks are also available by clicking the icons on the tool bar.

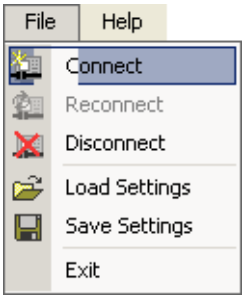


Figure 3 File sub menu

Connect

Accesses the Connect to Instrument dialog box which is used to connect to an instrument on the LAN hub.

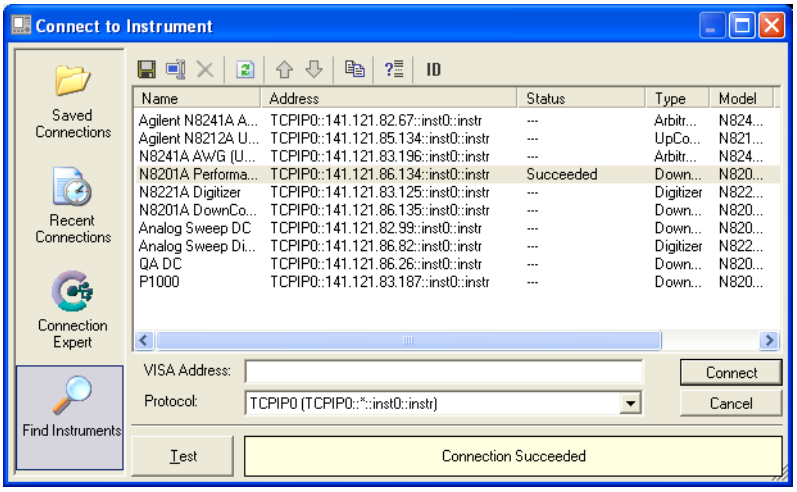


Figure 4 Connect to Instrument Window

Reconnect

Re-establishes the connection to the instrument if the instrument has been disconnected.

Disconnect

Terminates the connection to the active instrument that is using the Synthetic Instrument GUI.

Load Settings

Accesses the Load Instrument Properties dialog box where you can recall user-definable instrument settings.

Save Settings

Accesses the Save Instrument Properties dialog box where you can save instrument settings for use at a later time.

Exit

Closes the Agilent Synthetic Instrument GUI application.

Help

The Help menu displays the current versions of the GUI and drivers.

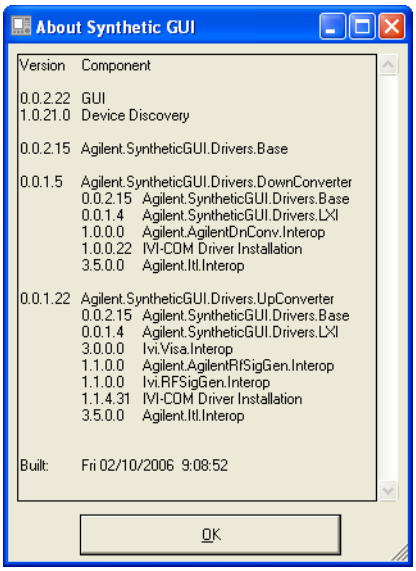


Figure 5 Help About Synthetic GUI

Left Pane

Start Page

The Start Page lists the instruments previously connected to the Agilent Synthetic Instrument GUI.

Error Log

Displays a history of all instrument and GUI related errors and messages.

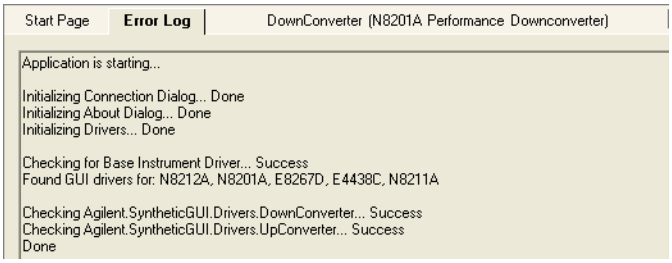


Figure 6 Error Log

Connection Manager Accesses the Connect to Instrument dialog box.

Table 1 Controls available from the Connect to Instrument Dialog Box

Saved Connections	Accesses user defined connections.
Recent Connections	Displays a list of instruments that have recently been controlled by the Agilent Synthetic Instrument GUI.
Connection Expert	Accesses Agilent Connections Expert.
Find Instruments	Lists the instruments found in Instrument Finder.
Test	Tests the connection between the PC and the highlighted instrument.

Right Pane

The upper portion of the right pane always displays the functions that are most commonly used for a measurement. These functions are also accessible from the left pane. Changing one of these parameters changes the setting in the left pane as well.

The lower portion of the right pane can have the following tabs: Dynamic Help, Instrument Information, and Event Log.

Dynamic Help

Provides information about the function currently selected in the left pane.

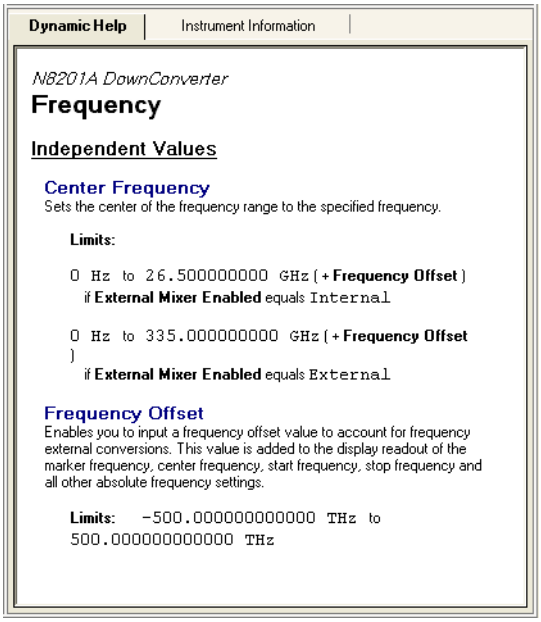


Figure 7 Dynamic Help

Instrument Information

Provides information about your N8201A performance downconverter such as the serial number, IP address, software revision used, and so on.

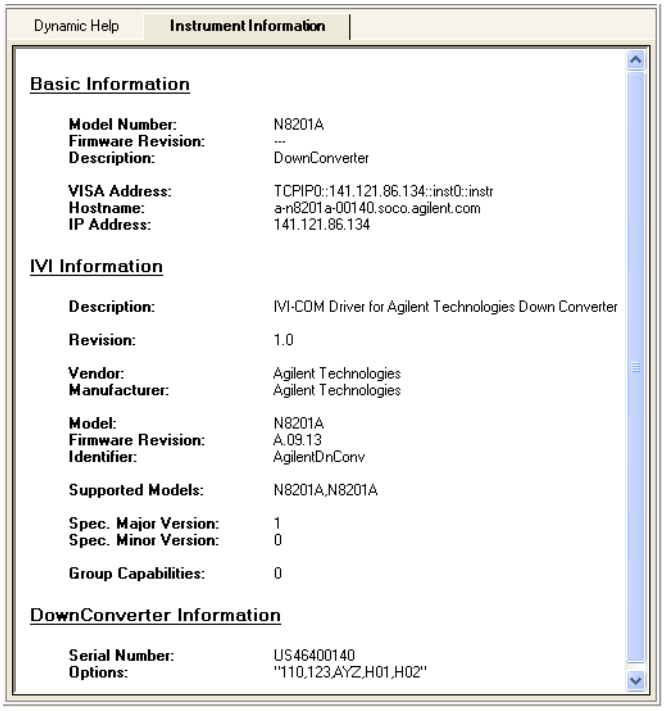


Figure 8 Instrument Information Page

Event Log

When enabled in the Events parameters area, displays the event log history.

Figure 9 Event Log History

Settings on the Agilent Synthetic Instrument GUI

Frequency

Sets the center frequency or frequency offset of the N8201A performance downconverter.

Center Frequency

Sets the center frequency while the span remains constant. The frequency range of the N8201A performance downconverter is 3 Hz to 26.5 GHz plus the frequency offset. If the External Mixer Enabled equals External, the frequency range is 3 Hz to 335 GHz.

Frequency Offset

Enables you to input a frequency offset value to account for external frequency conversions. This value is added to the display readout of the marker frequency, center frequency, start frequency, stop frequency, and all other absolute frequency settings. Limits are –500 THz to 500 THz.

Frequency List

Sets up a list of frequencies for the instrument to step through. The list begins with Start Frequency, and adds the Step Frequency until the Stop Frequency is reached. The next trigger causes the list to be repeated.

Disabled Prevents a frequency step sequence from being initiated.

Start Sets the first frequency that will be swept on a list sweep.

Stop Sets the last frequency that will be swept before the list is repeated.

Step Sets the difference between successive swept frequencies.

Trigger Setup Sets up the trigger that will be used to step through the frequency list.

Trigger Source

Sets the source of triggers. When the specified trigger occurs, the instrument will move to the next frequency in its frequency list. Possible values are:

EXT - TTL	LX10	LX11	LX12	LX13
LX14	LX15	LX16	LX17	LAN0
LAN1	LAN2	LAN3	LAN4	LAN5
LAN6	LAN7	ALARM0		

Trigger Source (set to ALARM0)

Table 2 Controls available when Trigger Source is set to **ALARM0**

Alarm Mode	Defines the way that Alarm Time will be interpreted. In absolute mode, the alarm will begin firing at the time of day specified in Absolute Alarm Time. In relative mode, the alarm will begin firing at a time relative to when the alarm is set up.
Relative Alarm Time	Defines the number of seconds after pressing Execute Trigger that the first alarm will occur.
Absolute Alarm Time	Defines the time that the first alarm will occur.
Alarm Period	Defines the time between successive alarms.
Alarm Repeat	Defines the number of times the alarm will be repeated. A value of 1 means that the alarm will occur once and will not be repeated. A value of 2 means that the alarm will occur twice. A value of 0 means that the alarm will be repeated until the alarm is disabled.

Trigger Detection

Controls the trigger polarity. It is Positive to trigger on a rising edge and Negative to trigger on a falling edge.

Execute Trigger

Sends the new trigger settings to the instrument

Level

Sets the input attenuation. The input attenuation can be set from 0 to 70 dB in 2 dB steps.The input impedance is set to 50 ohms. Input attenuation is used to minimize compression caused by a signal level that is too high in amplitude.

Input RF

Accesses the functions to select the input signal source (choices are RF, 50 MHz Cal, or External Mixer), enable a preamplifier, and to set the coupling to either AC or DC.

IF Output

Accesses the functions to set the IF Bandwidth and IF Frequency.

Table 3 Grouped Values

IF Output	IF Bandwidth Limits	IF Frequency Limits	Input Impedance Limits
IF Output 1	0 to 3 MHz	21.4 MHz	50 Ohm
IF Output 2	100 MHz	321.4 MHz	50 Ohm
IF Output 3	10 MHz	7.5 MHz	50 Ohm

Reference Oscillator

Allows you to use either the internal or an external reference oscillator for making measurements.

Reference Output

Switches the 10 MHz out signal on the front panel of the N8201A performance downconverter On and Off.

Reference Input Source

Specifies whether to use an External or Internal source for the reference oscillator. If set to External, a value must be specified for External Frequency with limits from 1 MHz to 30 MHz.

Preselector (Option 123)

Adjust

Allows you to manually adjust the preselector filter center frequency to optimize its response on the signal of interest. When enabled, the center frequency must be set to 3.045 GHz or greater.

Limits are: –250 MHz to 250 MHz.

PreSelector Enabled

Enables or disables the preselector.

Enabled: Can be set if the Center Frequency is greater than 3.045000000 GHz.

Possible Values: Enabled, Disabled

Peak

Performs a peak search.

Enabled: Can run if Center Frequency is greater than 3.045000000 GHz.

External Mixer

Selects either the internal mixer or an external mm-wave mixer.

- When Internal mixing is selected, normal operation and all other external mixing functions are unavailable.
- When External mixing is selected, you can analyze high frequency signals (that is, higher than the spectrum analyzer's maximum frequency) by using an appropriate external mixer.

Band Selects a band, or sets the frequency band to be user defined.

User Defined values:

- K - 18 to 26.5 GHz
- A - 26.5 to 40 GHz
- Q - 33 to 50 GHz
- U - 40 to 60 GHz
- V - 50 to 75 GHz
- E - 60 to 90 GHz
- W - 75 to 110 GHz
- F - 90 to 140 GHz
- D - 110 to 170 GHz

- G - 140 to 220 GHz
- Y - 170 to 260 GHz
- J - 220 to 325 GHz

Harmonic A user defined frequency band. Limits are –50 to –1 or 1 to 50.

Mixer Bias Turns on/off the mixer bias and adjusts an internal bias source for use with external mixers. The bias signal is present on the center conductor of the IF INPUT connector on the front panel.

Bias Level Sets the bias level. Limits are –10 mA to 10 mA.

Calibration

Accesses the Align system and immediately executes an alignment cycle of all the subsystems (Align RF, Align IF, Align ADC, and Align Current Sys Gain). The instrument will change any current system settings currently underway, perform the full alignment, and then return to the current system settings that were in place before the calibration began.

A calibration nominally takes 35 seconds to perform.

The N8201A downconverter will meet its specifications when:

- It is stored a minimum of two hours within the operating temperature range and turned on for at least 30 minutes followed by a calibration.
- When a calibration has been performed within the past 24 hours or when the temperature changes 3 °C.
- The front panel 1st LO OUT connector is terminated with a 50 ohm load.

Events (Settling Events and Event Logging)

Settling Event

Allows you to define the parameters of the Settling Event. The Settling Event has a positive edge when the frequency is set and a negative edge when the system is stabilized.

Settling Channel

Selects the channel to configure. Possible values are:

LXI0	LXI1	LXI2	LXI3
LXI4	LXI5	LXI6	LXI7
LAN0	LAN1	LAN2	LAN3
LAN4	LAN5	LAN6	LAN7

Settling Mode

Selects the operating mode for the Settling Channel: Disabled, Driven, or Wired OR.

Wired OR is only available for LXI channels.Use Wired OR if more than one instrument is driving the LXI channel. When only one instrument is driving the LXI channel then use the Driven mode.

Settling Destination Path

The target of the LAN event. The Settling Destination Path can be either an IP address, a hostname, or 'All'. (The function is only visible if Settling Channel is a LAN channel and can be set if the Settling mode is not Disabled.)

Settling Slope

Determines whether an event will occur on positive or negative edges. Possible values are: Positive or Negative.

NOTE Settling mode must be enabled for Settling Slope to be set.

Execute Settling Event

Starts a settling event after all of the parameters are define.

Event Logging

When enabled, a history of all instrument errors and messages are displayed.

Enable Logging

Enables or disables event logging.

Event Log

Displays the event log in the right pane when the Event Log page is selected.

Clear Event Log

Clears the event log.

Disable All Events

Prevents any previously events from occurring.

Preset

Sets the instrument to a known state and clears any current settings.

Refresh All Values

Re-reads the settings from the instrument.

4
Front and Rear Panel Features

"N8201A Performance Downconverter Front Panel Features" on page 80
"N8201A Performance Downconverter Rear Panel Features" on page 85
"Interconnect Cabling" on page 87
"Operational Considerations" on page 88

CAUTION Electrostatic discharge (ESD) can damage the highly sensitive components in your instrument. ESD damage is most likely to occur as the instrument is being installed or when cables are connected and disconnected. Protect the circuits from ESD damage by wearing a grounding strap that provides a high resistance path to ground. Alternately, ground yourself to discharge any static charge built-up by touching the outer shell of any grounded instrument chassis before touching the port connectors.

N8201A Performance Downconverter Front Panel Features

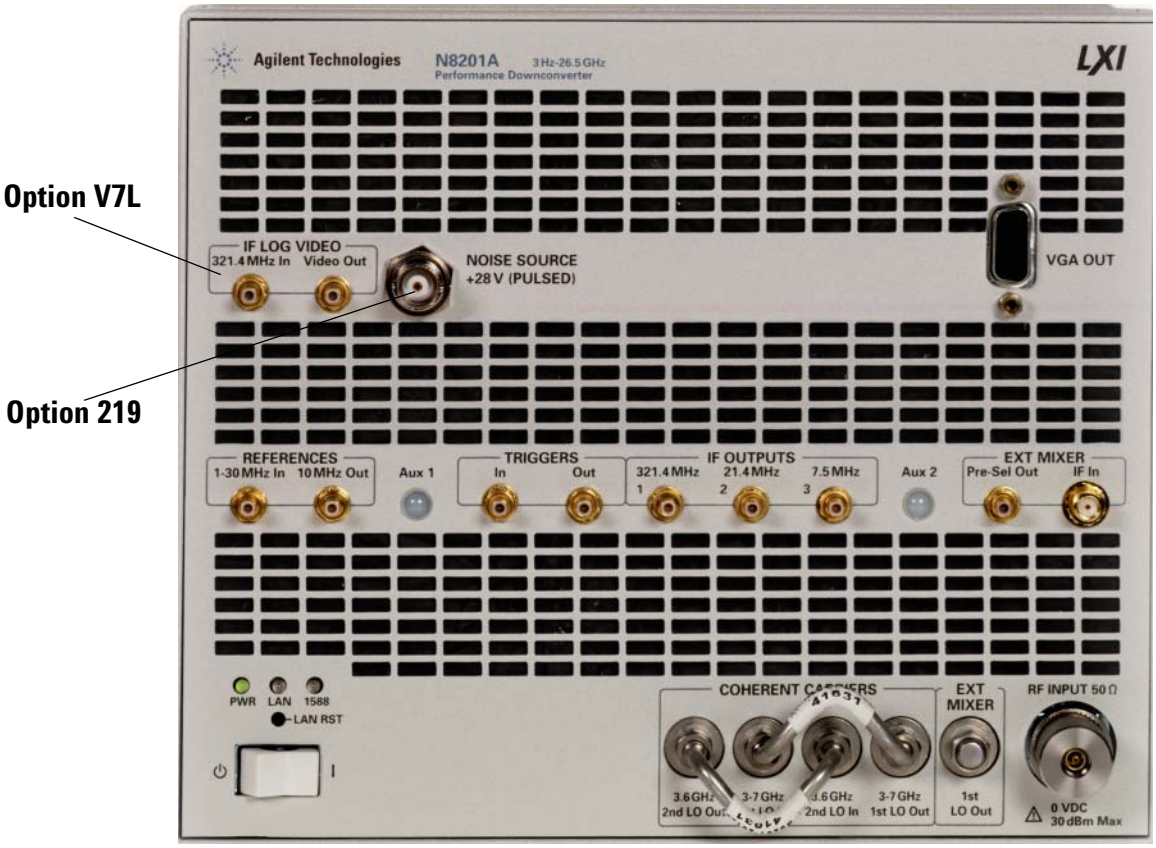


Figure 10 N8201A performance downconverter front panel features

RF INPUT

The input for an external 3 Hz to 26.5 GHz RF signal. If AC Coupled, the range is 20 MHz to 26.5 GHz.

CAUTION The total power of all signals at the downconverter input **must not exceed** +30 dBm (1 watt).

Power

The front panel power switch is a standby switch *only*; it is not a LINE switch (power disconnecting device). When in Standby, the LED is amber, When ON the LED is green.

Line Power LED

The power indicator has the following states:

State	Power Status	Illumination
OFF	No power connected to rear panel	None
Standby	Standby power. This is not a LINE switch or power disconnecting device.	Solid amber
ON	Power is on	Solid green

The green LED indicates when the downconverter standby switch is set to the on position. The green LED is off when the switch is in the standby position.

The yellow LED indicates when the downconverter standby switch is set to the standby position. The yellow LED is off when the switch is in the on position

LAN LED

The LAN LED indicator works in the following states:

State of the LAN	LAN Status	Illumination
ON	Normal operation	Solid green
ON	Device identity.	Blinking green
OFF	LAN error fault: • No valid or duplicate IP address • Unable to obtain or renew previously obtained DHCP lease. • Disconnected LAN cable	Solid Red
OFF	This is the state when: • The system is initializing or • A LAN reset has be initialized	None

1588 LED

The IEEE 1588 LED clock status has the following states:

State of the Clock	Clock Status	Illumination
OFF	Not synchronized	None
ON	Synchronized, clock is IEEE 1588 Slave	Solid green
ON	Synchronized, clock is IEEE 1588 Master	Blinking green (once every second)
ON	Synchronized, clock is IEEE 1588 to Grand Master	Blinking green (once every two seconds
OFF	IEEE 1588 is in a fault state	Solid red

COHERENT CARRIERS

NOTE Do not remove the cables connecting the coherent carrier inputs and outputs. These cables are connected at the factory and must remain so for proper instrument operation.

3-7 GHz 1st LO In Provides the 1st LO input signal (3 to 7 GHz) to the downconverters internal LO distribution circuitry.

3-7 GHz 1st LO Out Provides the 1st LO output signal (3-7 GHz at +15 dBm max) as a coherent carrier reference for phase locking two receivers.

3.6 GHz 2nd LO In Provides the 2st LO input signal (3.6 GHz) to the downconverters internal LO distribution circuitry.

3.6 GHz 2nd LO Out Provides the 2nd LO output signal (3.6 GHz at +3 dBm) as a coherent carrier reference for phase locking two receivers.

EXT MIXER

1st LO Out The 1st LO output (3-7 GHz at +15 dBm max) allows connections for external mixing. The 1st LO output routes the internal first LO signal to an external mixer, which uses the higher harmonics to mix with the high frequency signals. The external mixer's IF output connects to the downconverter's IF input port.

Pre-Sel Out The Preselected external mixer tune output offers tuning voltage for a preselected mixer.

IF In (Option AYZ) The IF input (321.4 MHz Nominal at -20 dBm, +10 dBm max) allows connections for external mixing. This port is only functional when Option AYZ is ordered.

IF OUTPUTS

321.4 MHz The 321.4 MHz IF output signal is present. Conversion gain is nominally +2 to +4 dB (with 0 dB input attenuation). Conversion gain varies nominally ±3 dB as a function of tune frequency. The conversion gain drops at higher frequencies.

21.4 MHz The 21.4 MHz IF output signal is present. Conversion gain is nominally +10 dB (with 0 dB input attenuation). The conversion gain drops at higher frequencies.

7.5 MHz The 7.5 MHz IF output signal is present. The 7.5 MHz output signal is at nominally at +13 dBm.

TRIGGERS

These SMB trigger input and output connectors are used to control the waveforms and create event-based signal simulation. These connectors support LVTTL logic levels.

In allows external triggering of measurements.

Out used to synchronize other test equipment with the downconverter.

REFERENCES

1 - 30 MHz In Selects an external reference to phase lock all oscillators in the instrument. You can select any external reference frequency between 1 and 30 MHz.

10 MHz Out A switched output of the analyzer's internal 10 MHz reference signal locks other test equipment to the same frequency reference used by the downconverter. The 10 MHz out signal is at +5 dB.

IF LOG VIDEO (Option V7L)

321.4 MHz In

Connector SMB male

Impedance of 50 ohm (nominal)

Video Out

Connector SMB male

Impedance of 50 ohm (nominal)

Maximum input power +10 dBm

NOISE SOURCE +28 V (PULSED) (Option 219)

Connector BNC female

Output voltage On 28.0 +/- 0.1 V (60 mA maximum)

Off < 1 V

VGA OUT

Connector VGA compatible, 15-pin mini D-SUB

Format VGA (31.5 kHz horizontal, 60 Hz vertical sync rates, non-interlaced) Analog RGB

Resolution 640 x 480

N8201A Performance Downconverter Rear Panel Features

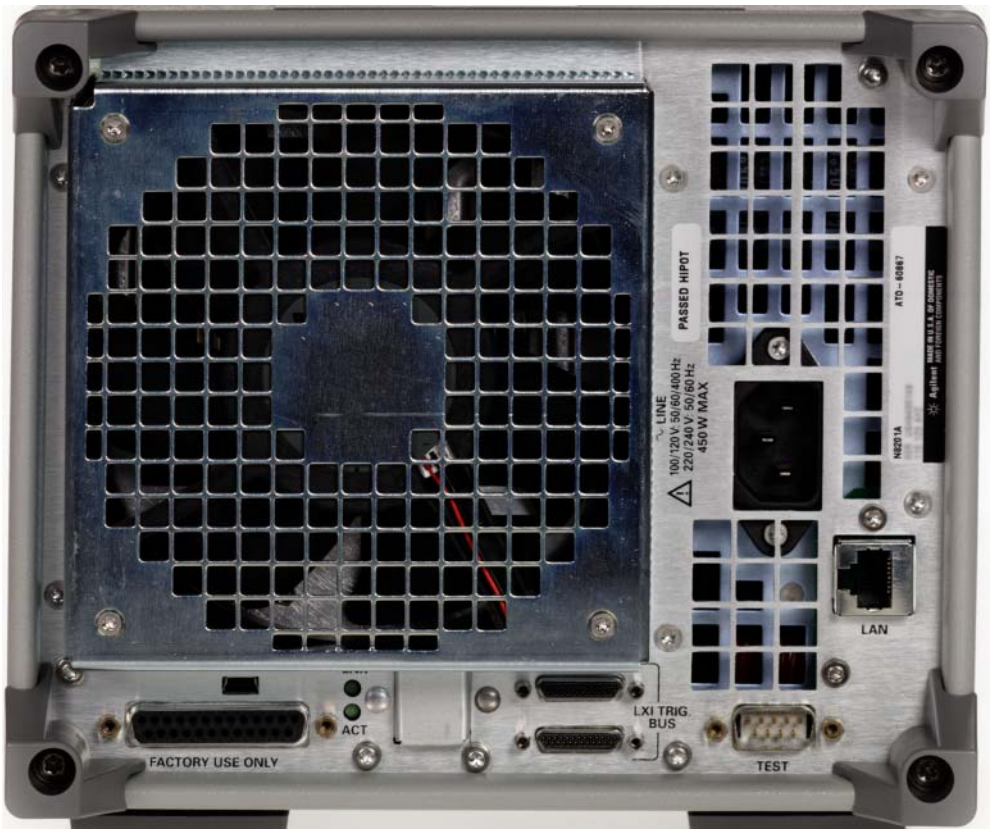


Figure 11 N8201A performance downconverter rear panel features

AC Power Receptacle

The AC voltage is connected here. The power cord receptacle accepts a three-pronged power cable that is shipped with the synthetic downconverter. The voltage range is 100/120/220/240 volts with a frequency range of 50 to 60 Hz and is automatically selected by the power supply.

LAN

This LAN interface allows ethernet local area network communication through a 100BaseT LAN cable.

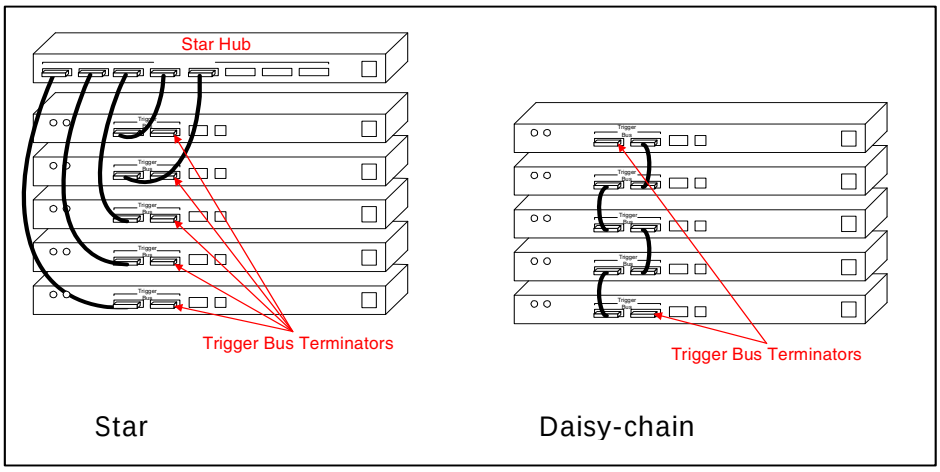
LXI Trigger Bus

The LXI (LAN eXtensions for Instrumentation) Trigger Bus is a hardware bus providing eight trigger channels using M-LVDS (low-voltage differential signaling). Cables connect various instruments together in a daisy chain or star configuration. Any instrument in a cluster can send or receive triggers on any of the channels.

NOTE

For more information about the LXI Trigger Bus and LAN triggering, refer to the following "LXI Consortium" white papers on your "Agilent N8201A Performance Downconverter Documentation CD":

- White_Paper_1_The_Appliaction_of_IEEE_1588_to_Test_and_Measurement_System
- White_Paper_2_LXI_Triggering
- White_Paper_3_Wired_Trigger_Bus_Physical_Aspects



USB

This is not a functional connector.

DB-9 (TEST)

This connector is for factory testing only.

Interconnect Cabling

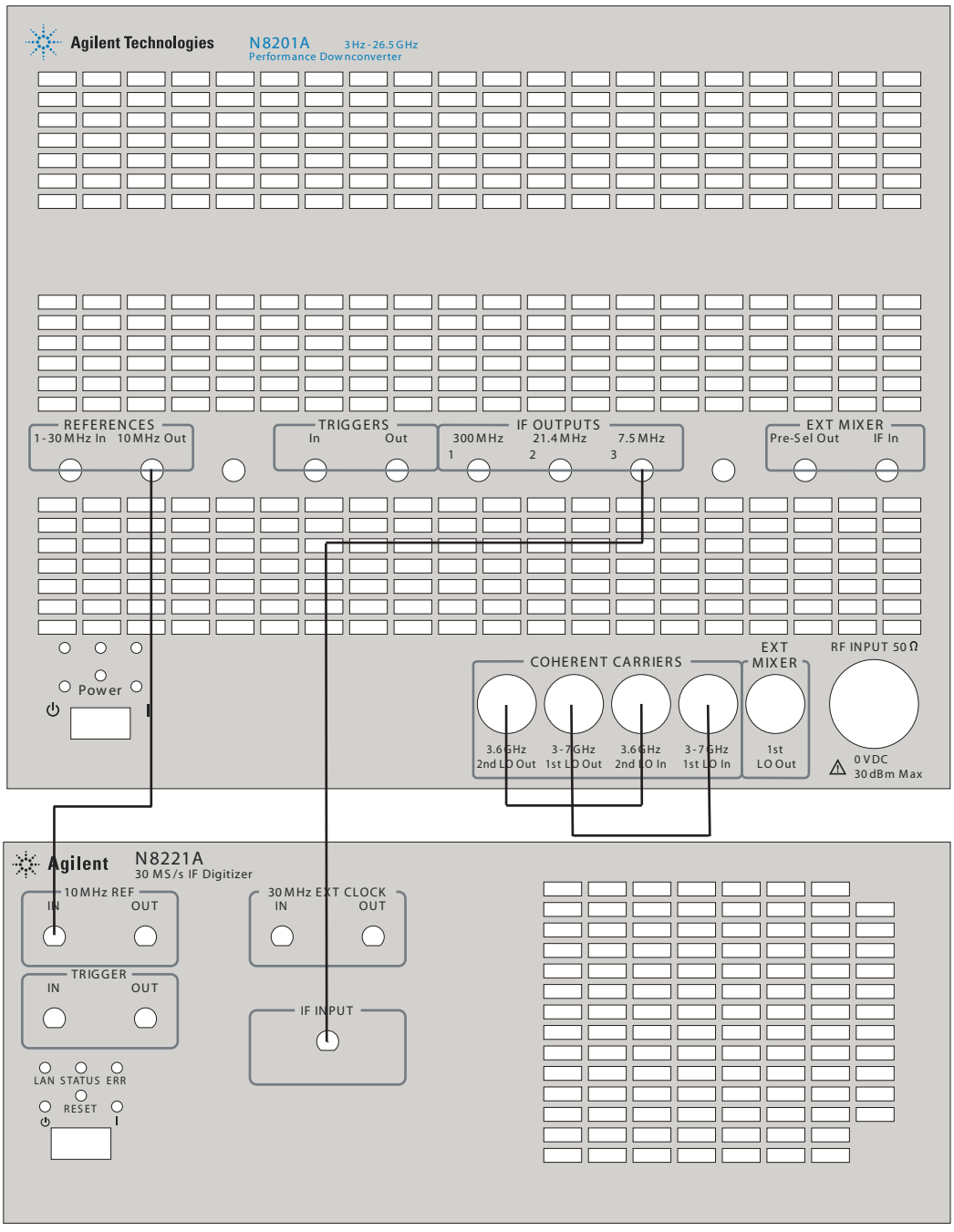


Figure 12 Interconnect cabling for the N8221A IF digitizer/N8201A performance downconverter

Operational Considerations

This section includes instructions for configuring a LAN interface to the Agilent Technologies N8221A IF digitizer and the N8201A performance downconverter. The instructions assume that the computer being used has a LAN card installed and is configured for TCP/IP protocol.

Agilent 89601A Vector Signal Analysis Software

The Agilent Technologies 89601A vector signal analysis (VSA) software is the virtual instrument interface for the N8221A IF digitizer/N8201A performance downconverter and offers a wide range of troubleshooting tools for analyzing signals.

Configuring the Local Area Network (LAN) Interface

You must ensure that the IP addresses for your computer and N8221A IF digitizer/N8201A performance downconverter are compatible, then configure the LAN interface. The IP address consists of four groups of numbers separated by periods (for example 169.254.xxx.xxx).

5
Preventive Maintenance

"Using, Inspecting, and Cleaning RF Connectors" on page 90"
"General Procedures and Techniques" on page 93
"Instrument Removal" on page 96"
"Instrument Installation" on page 98

This chapter provides preventative maintenance information, which should be reviewed prior to working with the Agilent system. This information applies to all Agilent-supplied instruments in the system and the system as a whole.

Using, Inspecting, and Cleaning RF Connectors

Taking proper care of cables and connectors will protect your system's ability to make accurate measurements. One of the main sources of measurement inaccuracy can be caused by improperly made connections or by dirty or damaged connectors.

The condition of system connectors affects measurement accuracy and repeatability. Worn, out-of-tolerance, or dirty connectors degrade these measurement performance characteristics.

Repeatability

If you make two identical measurements with your system, the differences should be so small that they will not affect the value of the measurement. Repeatability (the amount of similarity from one measurement to another of the same type) can be affected by:

- Dirty or damaged connectors
- Connections that have been made without using proper torque techniques (this applies primarily when connectors in the system have been disconnected, then reconnected).

CAUTION

Static-Sensitive Devices
This system contains instruments and devices that are static-sensitive. Always take proper electrostatic precautions before touching the center conductor of any connector, or the center conductor of any cable that is connected to any system instrument. Handle instruments and devices only when wearing a grounded wrist or foot strap. When handling devices on a work bench, make sure you are working on an anti-static worksurface.

RF Cable and Connector Care

Connectors are the most critical link in a precision measurement system. These devices are manufactured to extremely precise tolerances and must be used and maintained with care to protect the measurement accuracy and repeatability of your system.

To extend the life of your cables or connectors:

- Avoid repeated bending of cables—a single sharp bend can ruin a cable instantly.
- Avoid repeated connection and disconnection of cable connectors.
- Inspect the connectors before connection; look for dirt, nicks, and other signs of damage or wear. A bad connector can ruin the good connector instantly.
- Clean dirty connectors. Dirt and foreign matter can cause poor electrical connections and may damage the connector.
- Minimize the number of times you bend cables.
- Never bend a cable at a sharp angle.

- Do not bend cables near the connectors.
- If any of the cables will be flexed repeatedly, buy a back-up cable. This will allow immediate replacement and will minimize system down time.

Before connecting the cables to any device:

- Check all connectors for wear or dirt.
- When making the connection, torque the connector to the proper value.

Proper Connector Torque

- Provides more accurate measurements
- Keeps moisture out of the connectors
- Eliminates radio frequency interference (RFI) from affecting your measurements

The torque required depends on the type of connector. Refer to Table 4.
Never exceed the recommended torque when attaching cables.

Table 4 Proper Connector Torque

Connector	Torque cm-kg	Torque N-cm	Torque in-lbs	Wrench P/N
Type-N	52	508	45	hand tighten
3.5 mm	9.2	90	8	8720-1765
SMA	5.7	56	5	8710-1582

Connector Wear and Damage

Look for metal particles from the connector threads and other signs of wear (such as discoloration or roughness). Visible wear can affect measurement accuracy and repeatability. Discard or repair any device with a damaged connector. A bad connector can ruin a good connector on the first mating. A magnifying glass or jeweler's loupe is useful during inspection.

SMA Connector Precautions

Use caution when mating SMA connectors to any precision 3.5 mm RF connector. SMA connectors are not precision devices and are often out of mechanical tolerances, even when new. *An out-of-tolerance SMA connector can ruin a 3.5 mm connector on the first mating*. If in doubt, gauge the SMA connector before connecting it. The SMA center conductor must *never* extend beyond the mating plane.

Cleaning Procedure

1. Blow particulate matter from connectors using an environmentally-safe aerosol such as Aero-Duster. (This product is recommended by the United States Environmental Protection Agency and contains tetrafluoroethane. You can order this aerosol from Agilent (see Table 5).)
2. Use alcohol and a lint-free cloth to wipe connector surfaces. Wet a small swab with a small quantity of alcohol and clean the connector with the swab.
3. Allow the alcohol to evaporate off of the connector before making connections.

CAUTION

Do not allow excessive alcohol to run into the connector. Excessive alcohol entering the connector collects in pockets in the connector's internal parts. The liquid will cause random changes in the connector's electrical performance. If excessive alcohol gets into a connector, lay it aside to allow the alcohol to evaporate. This may take up to three days. If you attach that connector to another device it can take much longer for trapped alcohol to evaporate.

Table 5 Cleaning Supplies Available from Agilent

Product	Part Number
Aero-Duster	8500-6460
Isopropyl alcohol	8500-5344
Lint-Free cloths	9310-0039
Small polyurethane swabs	9301-1243

WARNING

Cleaning connectors with alcohol should only be performed with the instruments' mains power cord disconnected, in a well ventilated area. Connector cleaning should be accomplished with the minimum amount of alcohol. Prior to connector reuse, be sure that all alcohol used has dried, and that the area is free of fumes.

WARNING

If flammable cleaning materials are used, the material should not be stored, or left open in the area of the equipment. Adequate ventilation should be assured to prevent the combustion of fumes, or vapors.

General Procedures and Techniques

This section introduces you to the various cable and connector types used in the system. Read this section before attempting to remove or install an instrument! Each connector type may have unique considerations.

Always use care when working with system cables and instruments.

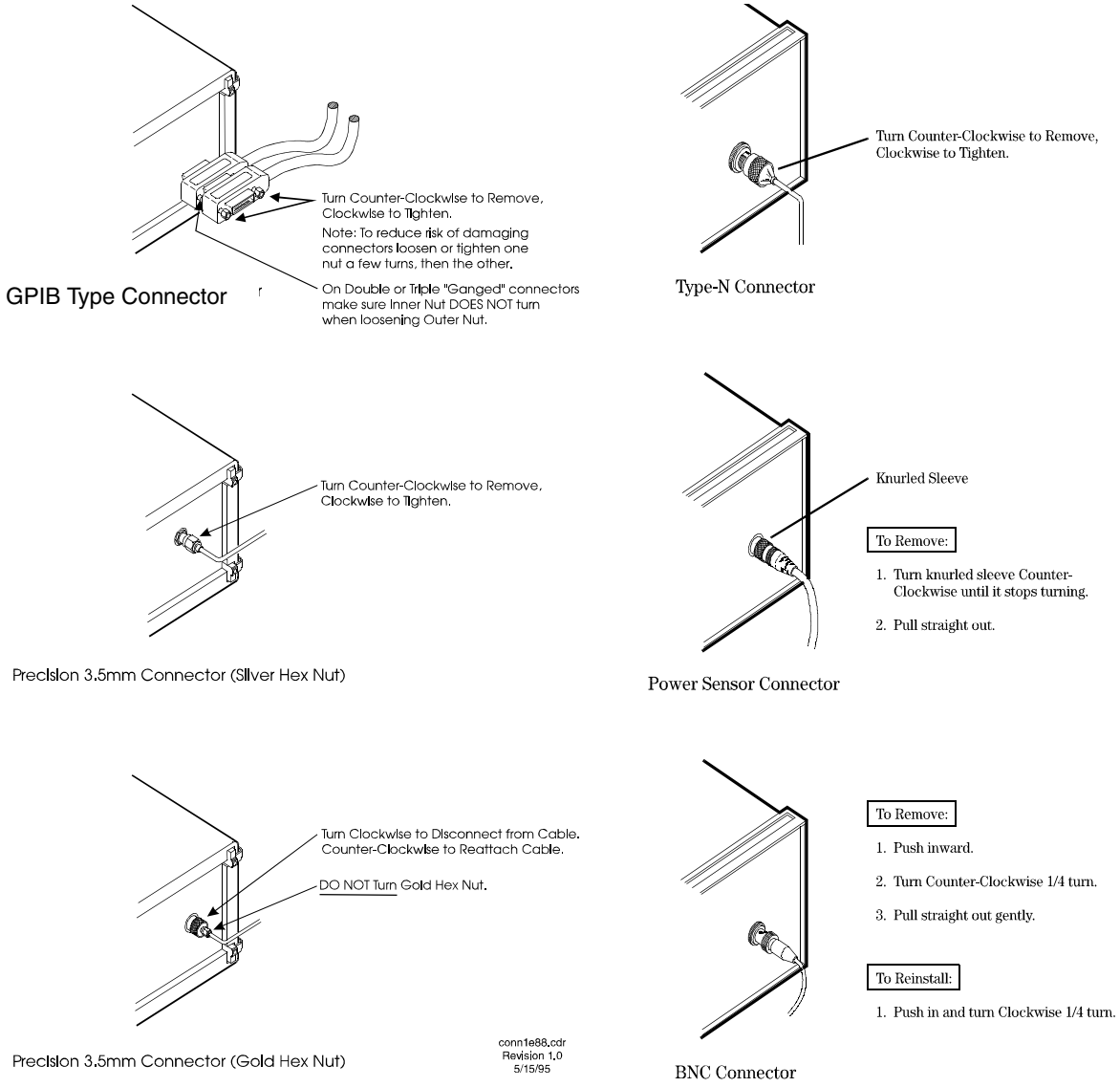


Figure 13 GPIB, 3.5 mm, Type-N, power sensor, and BNC connectors

Connector Removal

GPIB connectors

These are removed by two captured screws, one on each end of the connector; these usually can be turned by hand. Use a flathead screwdriver if necessary.

GPIB connectors often are stacked two or three deep. When you are removing multiple GPIB connectors, disconnect each connector one at a time. It is a good practice to connect them back together even if you have not yet replaced the instrument; this avoids confusion, especially if more than one instrument has been removed.

When putting GPIB connectors back on, you must again detach them from one another and put them on one at a time.

Precision 3.5 mm connectors

These are precision connectors. Always use care when connecting or disconnecting this type of connector. When reconnecting, make sure you align the male connector properly. Carefully join the connectors, being careful not to cross-thread them.

Loosen precision 3.5 mm connectors on flexible cables by turning the connector nut counter-clockwise with a 5/16 inch wrench. Always reconnect using an 8 inch-lb torque wrench (Agilent part number 8720-1765). Semirigid cables are metal tubes, custom-formed for this system from semirigid coax cable stock.

3.5 mm connectors with a gold hex nut

The semirigid cables that go to the RF outputs of some devices have a gold connector nut. These do not turn. Instead, the RF connector on the instrument has a cylindrical connector body that turns. To disconnect this type of connector, turn the connector body on the instrument clockwise. This action pushes the cable's connector out of the instrument connector.

To reconnect, align the cable with the connector on the instrument. Turn the connector body counterclockwise. You may have to move the cable slightly until alignment is correct for the connectors to mate. When the two connectors are properly aligned, turning the instrument's connector body will pull in the semirigid cable's connector. Tighten firmly by hand.

3.5 mm connectors with a silver hex nut

All other semirigid cable connectors use a silver-colored nut that *can* be turned. To remove this type of connector, turn the silver nut counter-clockwise with a 5/16 inch wrench.

When reconnecting this type of cable:

- Carefully insert the male connector center pin into the female connector. (Make sure the cable is aligned with the instrument connector properly before joining them.)

- Turn the silver nut clockwise by hand until it is snug, then tighten with an 8 inch-lb torque wrench (part number 8720-1765).

Bent Semirigid Cables

Semirigid cables are not intended to be bent outside of the factory. An accidental bend that is slight or gradual may be straightened carefully by hand. Semirigid cables that are crimped will affect system performance and must be replaced. Do not attempt to straighten a crimped semirigid cable.

Instrument Removal

To remove an instrument from the system, use one of the following procedures.

Required tools

- #2 Phillips screwdriver
- #2 POZIDRIV screwdriver

Standard instrument

To remove an instrument from a rack

	Step	Notes
1	Turn off system power, but leave the system computer turned on.	• If you do plan to turn computer power off for any reason, have the computer system administrator: • Shut down all running software. • Shut down the computer.
2	Read "General Procedures and Techniques", then disconnect all cables on the front and on the rear panel.	• Most cables are fairly easy to remove and reconnect, and have no special considerations (besides making sure you put the cables back in the right place). • Semirigid cables require more care, especially when reconnecting them. *Make sure all semirigid cables, on the front and back of an instrument are fully disconnected before removing the unit.*
3	When *all* cables are disconnected (including the power cord), remove the screws in the instrument's rack "ears" that hold it in the rack.	
4	Slide the instrument out.	• If you feel any resistance when attempting to pull the instrument out, STOP! Look inside the cabinet and carefully examine all surrounding cables. Make sure all cables are fully disconnected.

Half-Rack-Width Instrument

To remove a half-width instrument from a system rack

1	Power off the system.	• For details see the system installation guide.
2	Remove the selected instrument's power cord from the power strip in the rack.	
3	The instrument is attached to the half-rack width instrument beside it; remove that instrument's power cord from the power strip also.	• The instruments are secured together by lock links at the front and rear. The lock links at the rear attach with screws. The lock links at the front hook together.
4	Remove the power cord and other cables from the front and rear of both instruments.	• Note the location of cables for re-installation.
5	Remove the four corner screws on the front of the rack panel that secures the instruments in place.	• The screws are located near the corners of the face of the instrument. • Use a #2 Phillips screwdriver.
6	Slide both instruments, as a single unit, out from the front of the rack and set them on a secure, flat surface.	

Bench Top Instrument

To remove an instrument from a bench top system

1	Power off each instrument in the system.	
2	Unplug the selected instrument's power cord from the AC power supply.	
3	Remove the power cord and other cables from the front and rear of the instrument.	• Note the location of cables for re-installation.

Instrument Installation

To install or reinstall an instrument in a system, use one of the following procedures.

Required tools

- #2 Phillips screwdriver
- #2 POZIDRIV screwdriver
- system installation guide

Standard rack instrument

To install an instrument

	Step	Notes
1	Slide the instrument gently into the rack.	
2	Insert the screws in the rack ears.	• Most cables are fairly easy to remove and reconnect and have no special considerations (besides making sure you put the cables back in the right place). • Semirigid cables require more care, especially when reconnecting them. *Make sure all semirigid cables, on the front and back of an instrument are fully disconnected before removing the unit.*
3	To reconnect the semirigid cables, carefully align them before you insert the male connector.	• Do not insert the male pin in at an angle or you will damage the female connector. RF connector center pins are very delicate, and if damaged must be replaced. System performance may be greatly impaired if there is a bad RF connector.
4	Turn on system power and restart the system computer if necessary.	

Half-Rack-Width Instrument

To install the instrument in a rack

Step	Note
1 Make sure the system is powered off.	
2 Insert the attached instruments in the same slot from which you removed them, sliding them along the support rails until they meet the rack-mount ears.	• The rack-mount ears stop the instruments at the correct depth.
3 Replace the rack panel in front of the instruments and secure the four corner screws.	• The screws are located near the corners of the face of the instrument. • Use a #2 Phillips screwdriver.
4 Confirm that the instrument is turned off.	
5 Connect the appropriate cables to the instruments (front and rear), including the power cords.	
6 Power on the system.	.

Bench Top Instrument

To install an instrument in a bench top system

1 Make sure the system is powered off.	
2 Connect all cables to the instrument (front and rear), including the power cord.	
3 Connect the power cord to the AC power source.	
4 Power on the system.	
5 Set the instrument GPIB address, if necessary.	

6
Service, Support, and Safety Information

"Safety and Regulatory Information" on page 102"
"Service and Support" on page 109

This chapter provides safety and regulatory information that should be reviewed prior to working with the Agilent system. The information contained in this chapter applies to all Agilent-supplied instruments in the system and the system as a whole.

It also contains information on servicing and obtaining support for an Agilent system or instrument, including procedures for removing an instrument from a system, returning it to Agilent, and reinstalling it.

Safety and Regulatory Information

EMC

Complies with European EMC Directive 89/336/EEC, amended by 93/68/EEC

- IEC/EN 61326
- CISPR Pub 11 Group 1, Class A
- AS/NZS CISPR 11:2002
- ICES/NMB-001

Complies with Canadian EMC Requirements

This ISM device complies with Canadian ICES-001

Cet appareil ISM est conforme a la norme NMB du Canada.

Safety

Complies with European Low Voltage Directive 73/23/EEC, amended by 93/68/EEC

- IEC/EN 61010-1
- Canada: CSA C22.2 No. 61010-1
- USA: UL 61010-1

Safety Summary

The following general safety precautions must be observed during all phases of operation of this instrument or system. Failure to comply with these precautions or with specific warnings elsewhere in this manual violates safety standards of design, manufacture, and intended use of this instrument or system. Agilent Technologies, Inc. assumes no liability for the customer's failure to comply with these requirements.

General

This product has been designed and tested in accordance with the standards listed on the Manufacturer's Declaration of Conformity, and has been supplied in a safe condition. The documentation contains information and warnings that must be followed by the user to ensure safe operation and to maintain the product in a safe condition. Contact your Agilent sales representative to obtain a copy of the Declaration of Conformity. Alternately, contact Agilent via: www.Agilent.com.

Compliance with German Noise Requirements

This is to declare that this instrument is in conformance with the German Regulation on Noise Declaration for Machines (Laermangabe nach der Maschinenlaermrerordnung -3.GSGV Deutschland.)

Acoustic Noise Emission/Geraeuschemission	
LpA <70 dB Operator position Normal position per ISO 7779	LpA <70 dB am Arbeitsplatz normaler Betrieb nach DIN 45635 t.19

All light-emitting diodes (LEDs) used in this product are Class 1 LEDs per IEC 60825-1.

Equipment Installation

Install the instrument or system so that the detachable power cord is readily identifiable and is easily reached by the operator. The detachable power cord is the disconnecting device. It disconnects the mains circuits from the mains supply before other parts of the instrument or system. The instrument front panel switch is only a standby switch and is not a LINE switch. Alternatively, an externally installed switch or circuit breaker (which is readily identifiable and is easily reached by the operator) may be used as a disconnecting device.

WARNING **This is a Safety Class 1 Product (provided with a protective earthing ground incorporated in the power cord). The mains plug shall be inserted only in a socket outlet provided with a protective earth contact. Any interruption of the protective conductor inside or outside of the product is likely to make the product dangerous. Intentional interruption is prohibited (IEC 348 clauses 17.3.3 c and 17.3.4).**

WARNING **DO NOT OPERATE IN AN EXPLOSIVE ATMOSPHERE.**
Do not operate the instrument or system in the presence of flammable gases or flames.

WARNING **Danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type recommended. Discard used batteries according to manufacturer's instructions.**

WARNING **DO NOT REMOVE AN INSTRUMENT COVER.**

Operating personnel must not remove instrument covers. Component replacement and internal adjustments must be made only by qualified service personnel.

Instruments that appear damaged or defective should be made inoperative and secured against unintended operation until they can be repaired by qualified service personnel.

Environmental Conditions

WARNING **If this product is not used as specified, the protection provided by the equipment could be impaired. This product must be used only in a normal condition (in which all means for protection are intact).**

CAUTION Unless otherwise noted in the specifications, this instrument or system is intended for indoor use in an installation category II, pollution degree 2 environment per IEC 61010 second edition and 664 respectively. This instrument or system is designed to operate at altitudes up to 4600 meters, and at temperatures between 0°C and 55 °C.

CAUTION **Ventilation Requirements:** When installing the product in a cabinet, the convection into and out of the product must not be restricted. The ambient temperature (outside the cabinet) must be less than the maximum operating temperature of the product by 4 °C for every 100 watts, then forced convection must be used.

Before Applying Power

CAUTION Verify that the product is set to match the available line voltage, the correct-rating service breaker is installed, the correct fuse is installed, and all safety precautions are taken. Note the instrument external markings described in Table 6, “Safety symbols and instrument markings,” on page 107.

Position the instrument so that it is not difficult to operate the disconnecting device.

This instrument has autoranging line voltage input, be sure the supply voltage is within the specified range.

WARNING **The mains wiring and connectors shall be compatible with the connector used in the premise electrical system. Failure to ensure adequate earth grounding by not using the correct components may cause product damage and serious injury.**

Magnetic Susceptibility

CAUTION Degradation of some product specifications can occur in the presence of ambient power frequency magnetic fields of 30 A/m or greater. The product self-recovers and operates as specified when removed or shielded from the ambient magnetic fields.

Vibration

CAUTION Degradation of some product specifications can occur if this instrument is operated while subjected to continuous vibrations of less than or equal to 0.21 grms in the 5 Hz to 500 Hz frequency range.

Ground the Instrument or System

WARNING **To minimize shock hazard, the instrument chassis and cover must be connected to an electrical protective earth ground. The instrument and/or system must be connected to the AC power mains through a grounded power cable, with the ground wire firmly connected to an electrical ground (safety ground) at the power outlet. Any interruption of the protective (grounding) conductor or disconnection of the protective earth terminal will cause a potential shock hazard that could result in personal injury.**

WARNING **This is a Safety Class 1 Product (provided with a protective earthing ground incorporated in the power cord). The mains plug shall be inserted only in a socket outlet provided with a protective earth contact. Any interruption of the protective conductor inside or outside of the product is likely to make the product dangerous. Intentional interruption is prohibited (IEC 348 clauses 17.3.3 c and 17.3.4).**

CAUTION Always use the three-prong AC power cord supplied with this product. Failure to ensure adequate earth grounding by not using this cord may cause product damage.

CAUTION The detachable power cord is the disconnecting device. It disconnects the mains circuit from the mains supply before other parts of the instrument or system. The instrument front panel switch is only a standby switch and is *not* a line switch.

Fuses and Circuit Breakers

Refer to individual instrument manuals for detailed information on operator accessible fuses.

WARNING **Use only fuses with the required rated current, voltage, and specified type (normal blow, time delay). Do not use repaired fuses or short-circuited fuse holders. To do so could cause a shock or fire hazard.**

WARNING **For continued protection against fire hazard, replace fuses and circuit breakers only with the same type and ratings. The use of other fuses or circuit breakers or materials is prohibited (IEC 348 clause 17.3.5.d).**

WARNING **The premise wiring should have a system-dedicated circuit breaker in the mains wiring for installation of the system.**

Agilent system cabinet power strips are equipped with a thermal circuit breaker for each power phase. If one phase shorts or overloads, one or both of the circuit breakers in the power strip trip. Unplug the power strip before trying to locate and correct the electrical problem, then reset both circuit breakers on the power strip to restore power to the cabinet.

Maintenance

WARNING **To prevent electrical shock, disconnect the instrument and/or system from mains before cleaning. Use a dry cloth or one slightly dampened with water to clean the external case parts. Do not attempt to clean internally.**

Safety symbols and Instrument Markings

Symbols and markings in manuals and on instruments alert you to potential risks, provide information about conditions, and comply with international regulations. Table 6 defines the symbols and markings you may find in a manual or on an instrument.

Table 6 Safety symbols and instrument markings

Safety symbols	Definition
	Warning: risk of electric shock.
	Warning: hot surface.
	Caution: refer to instrument documentation.
	The CE mark is a registered trademark of the European Community.
	The CSA mark is a registered trademark of the CSA-International. This instrument is in compliance with CSA 1010 Edition2.
 N10149	The C-tick mark is a registered trademark of the Spectrum Management Agency of Australia. This signifies compliance with the Australian EMC Framework regulations under the terms of the Radio Communications Act of 1992.
	This symbol indicates separate collection for electrical and electronic equipment, mandated under EU law as of August 13, 2005. all electric and electronic equipment are required to be separated from normal waste for disposal (Reference WEEE Directive, 200/96/EC).
ISM1-A	This text indicates that the instrument is an Industrial Scientific and Medical Group 1 Class A product (CISPER 11, Clause 4).
ICES/NMB-001	This text indicates product compliance with the Canadian Interference-Causing Equipment Standard (ICES-001).
	Laser radiation symbol: marked on products that have a laser output.
	Alternating current.
	Both direct and alternating current.
	Three-phase alternating current.
	Earth (ground) terminal.
	Protective earth (ground) terminal.
	Frame or chassis terminal.

Table 6 Safety symbols and instrument markings (continued)

Safety symbols	Definition
	Terminal is at earth potential. Used for measurement and control circuits designed to be operated with one terminal at earth potential.
	Terminal for neutral conductor on permanently installed equipment.
	Terminal for line conductor on permanently installed equipment.
	Standby (supply); units with this symbol are not completely disconnected from AC mains when this switch is in the standby position. To completely disconnect the unit from AC mains, either disconnect the power cord, or have a qualified/licensed electrician install an external switch.
	OFF (supply); a switch with this symbol opens the instrument's power supply circuit, disconnecting it with the mains supply.
	ON (supply); a switch with this symbol closes the instrument's power supply circuit, connecting it with the mains supply.

Service and Support

Any adjustment, maintenance, or repair of this product must be performed by qualified personnel. Contact your Agilent Technologies Service Center for assistance.

WARNING **There are no user serviceable parts inside the system. Any servicing instructions are for use by qualified personnel only. To avoid electrical shock, do not perform any servicing unless you are qualified to do so.**

WARNING **The opening of covers or removal of parts is likely to expose dangerous voltages. Disconnect the product from all voltage sources while it is being opened.**

CAUTION Any operator-replaceable parts or supplies are required to be examined or supplied by Agilent Technologies.

Agilent on the Web

You can find information about technical and professional services, product support, and equipment repair and service on the Web:

http://www.agilent.com

Click on **Technical Support**.

Return Procedure

In any correspondence or telephone conversations with Agilent Technologies, please refer to the instrument by its model number (N8201A, for example) and serial number. With this information, the customer engineer can determine whether your instrument is still within its warranty period and provide accurate shipping information.

Shipping the Instrument

Use the following procedure to package and ship your instrument for service. For instructions on removing an instrument from the system and re-installing it, refer to the system user's guide.

To package the instrument for shipping

Step		Notes
1	Place the instrument in its original packaging materials.	• If the original packaging materials are not available, use a professional packaging service. Contact your Agilent Service Center for more information.
2	Surround the instrument with at least 3 to 4 inches of its original packing material or bubble-pack to prevent the instrument from moving in its shipping container.	
3	After wrapping it with packing material, place the instrument in its original shipping container or a strong shipping container that is made of double-walled corrugated cardboard with 159 kg (350 lb) bursting strength.	• The shipping container must be large and strong enough to accommodate your instrument and allow at least 3 to 4 inches on all sides for packing material.
4	Seal the shipping container securely with strong nylon adhesive tape.	
5	Mark the shipping container "FRAGILE, HANDLE WITH CARE" to help ensure careful handling.	
6	Use the address obtained from your Agilent customer engineer.	
7	Retain copies of all shipping papers.	

CAUTION Damage can result if the original packaging materials are not used. Packaging materials should be anti-static and cushion the downconverter on all sides. NEVER USE STYRENE PELLETS IN ANY SHAPE AS PACKAGING MATERIALS. They do not adequately cushion the instrument or prevent it from moving in the shipping container. Styrene pellets can also cause equipment damage by generating static electricity or by lodging in fan motors.

7 Glossary

Auto-IP Auto-IP is a method used by a device to self select an IP address. When a device is using Auto-IP, it randomly selects an address of the form `169.254.x.x`. If another device is already using that address, it selects another random address, and continues to select new addresses until it finds one that is not being used by any other instrument.

Cross-Over Cable A cross-over cable can be used to connect two devices directly to each other, without a **network switch** or any other hardware in-between. It is common to use **static IP addresses** when devices are connected using a cross-over cable, because there is no **DNS**, and there are no other devices on the connection that could cause an **IP address conflict**.

Default Gateway The default gateway is used by a device to communicate with devices that have IP addresses that are on different subnets. This would usually be the IP address of the router that connects the device's subnet to the rest of the network.

DHCP [Dynamic Host Configuration Protocol] In order to avoid **IP address conflicts**, and to simplify the process of connecting devices to a network, larger networks will sometimes use DHCP to assign IP addresses to devices.

When a device is configured to use DHCP, it attempts to communicate with the **DHCP server** when it is powered on. If it is able to communicate with the server, it asks the server for the correct network settings (including **IP Address, Subnet Mask, Gateway**, and so on) to communicate on the network. If the device is unable to communicate with the DHCP server, it will either go into a failure mode, or (if configured to do so) it will attempt to assign itself an IP address. (See **Auto-IP**)

Because the IP address assigned to an instrument can be different every time it is powered on, you cannot remember the IP address and expect to always be able to use that address to communicate with the instrument. However, networks using DHCP will often also use **DNS**, which can allow you to communicate with a device using a **hostname** that will stay the same, even if the device's IP address has changed.

DHCP Server The DHCP server responds to devices' requests for network settings. It is responsible for ensuring that no two devices attempt to use the same IP address.

DNS [Domain Name Server] A domain name server allows someone to communicate with a device using the device's hostname. When a device joins a network, it tells the domain name server its hostname and its IP address. When a hostname is used, the domain name server is asked which IP address the name corresponds to, and that address is then used to communicate with the instrument.

If the IP address of the device changes, it can request that its entry in the domain name server be updated. Any following requests that use the same hostname as before, will be sent to the new address.

Hostname A hostname is a unique name that can be used to communicate with a device on a network. Hostnames are commonly used in situations where devices have their addresses assigned to them using **DHCP**.

Hostnames can only be used if there is some way that the network can keep track of which hostname corresponds to an instrument. This is usually done using **DNS**.

Networks without DNS have no way to associate a hostname with a device. This is often true of small private LAN networks (for example, a network consisting of two devices connected using a **cross-over cable**, or through a simple router). In these cases, it is probably easiest to use **static IP addresses**.

IP Address [Internet Protocol Address] An IP address is a unique number assigned to a device which is used to send or receive data to and from other devices.

The most common IP addresses are IP Version 4. These addresses are usually written as four numbers (from 1 to 255) separated by periods. For example, `192.168.1.1` and `169.254.12.34` and `141.121.84.241` are all IP addresses.

A device's IP address can be assigned to it manually (See **Static IP Address**), assigned to it by another computer (See **DHCP**) or can be self-determined (See **Auto-IP**).

IP Address Conflict An IP address conflict occurs when two devices attempt to join the same network with the same **IP address**. When this happens, it may become impossible to communicate with either instrument over the LAN. Using dynamically assigned addresses can help avoid this problem. (See **DHCP** or **Auto-IP.**)

LAN [Local Area Network] A LAN is a network of devices connected to each other using LAN cables and **network switches**.

Network Switch A network switch is used to connect several devices together to form a LAN. It has several LAN ports that LAN cables can be connected to.

If it is necessary to create a network with more devices than can connect to a single network switch, one (or more) switches can be attached to the first switch.

Private LAN A private LAN network is defined as a local area network in which LAN-enabled instruments and Windows PCs are not connected to a site LAN (workgroup LAN, Intranet, or enterprise LAN). When using a private LAN, the designer of the LAN is responsible for defining all private LAN parameters.

Private Network All of the devices on a private network use IP addresses that have been reserved for private use. The most common private network IP addresses are of the form `192.168.x.x` and `169.254.x.x`. Devices which have been assigned a private network IP address cannot generally communicate with other devices outside of their private network. Many devices can use the same IP address (for example, `192.168.1.1`) as long as they each belong to different private networks.

Router A router can be used to transfer messages between two (or more) networks. Routers are often used to connect a private network to a larger network (for example, a company network, or the Internet). The router can also be used to isolate a local network from a larger corporate or public network.

Site LAN A site LAN is a local area network in which LAN-enabled instruments and Windows PCs are connected to a site LAN (workgroup LAN, Intranet, or enterprise LAN) through (optional) routers, hubs, and/or switches.

Static IP Address A device uses a static IP address when it always attempts to use the same IP address every time that it is turned on. Using a static IP address can be useful if you always want to communicate with an instrument using the same address every time it is turned on. However, using a static IP address can lead to **IP address conflicts** if two instruments are given the same static IP address.

Subnet (Subnetwork) A subnet is a group of devices which is a subset of a larger group of devices. Breaking a large network down into many smaller subnets can make the network easier to manage, and can decrease the amount of traffic that gets sent between devices.

One thing a device on a network can do is send a message to all of the other devices on its subnet. If a network consists of only a single subnet, that message would have to be sent to every device on the network. However, if the network has been broken down into subnets, the message would only be sent to other devices on the same subnet as the device sending the message.

Subnet Mask A subnet mask is used to specify how a network is broken down into **subnets**. Subnet masks look like IP addresses; they are of the form `x.x.x.x`. Common subnet masks include `255.0.0.0`, `255.255.0.0` (use this for private networks), and `255.255.255.0`.

When written in binary, subnet masks usually become several `1`s followed by several `0`s.

For example:

`255.255.0.0`

would become

`11111111.11111111.00000000.00000000.`

The subnet mask can be used with a device's IP address to determine the address of the subnet that the device is on. To do this, you perform a logical AND of the subnet mask and the IP address. (A logical AND combines two binary numbers into a single number. The new number contains 1s in positions where both numbers had 1s, and 0s everywhere else.)

For example, if a device has an IP address of 192.168.12.34 and the subnet mask 255.255.255.0 then:

192.168.12.34 =	11000000.	10101000.	00001100.	00100010
255.255.255.0 =	11111111.	11111111.	11111111.	00000000
Subnet Address =	11000000.	10101000.	00001100.	00000000
	192	168	12	0

The device is on the subnet with the 192.168.12.0 address.

A device with the IP address 192.168.12.100 is on the same subnet as the device with the IP address 192.168.12.34 (the 192.168.12.0 subnet), but a device with an IP address of 192.168.100.34 is on a different subnet (the 192.168.100.0 subnet).

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