

Installation and Service Guide

Agilent Technologies 89600 Series



Agilent Technologies

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In this book

This book documents the Agilent 89600-Series installation and service procedures. It provides the following:

- software installation instructions
- hardware installation instructions
- PCI card and PCMCIA cardbus installation instructions
- hardware configuration information
- licensing information
- diagnostics, troubleshooting, and replaceable parts information for VXI hardware

This book does not contain operating information. All operating information is contained in the online help.

Other documentation

In addition to the *Installation Guide* (this book), the following documentation also comes with your software:

- *89600 Online Help* is available after you install the software on your computer. The help includes reference information, tutorials on making several kinds of measurements, and a video overview of the analyzer. Separate online help is available for the 89600 WLAN Test and 89604 Distortion Suite applications.
- If the analyzer includes VXI measurement hardware, the printed VXI mainframe *User and Service Manual* is shipped with your analyzer. (You can put the mainframe manual in the 89600-series binder.)
- The complete documentation (PDF files) for the Agilent I/O libraries is located in C:\Program Files\Agilent\IO Libraries\Manuals (if you install the I/O libraries).
- Agilent E1438 and Agilent E1439 operating information is documented in PDF files located in C:\Program Files\Visa\Winnt\age1438\help and C:\Program Files\Visa\Winnt\age1439\help (only for VXI measurement hardware).
- Technical Specifications are available from the online help.

Independent operation of the Agilent 89605, 89606, E2730, and E2731 modules is not supported at this time.

To read the PDF files, you must have Acrobat®¹ Reader installed on your computer. You can install this application from the 89600 Installation CD.

We have allowed room in this binder so that you can put the VXI mainframe documentation in this binder. This way all the documentation you may need for troubleshooting or replacing parts will be in one location.

1. Acrobat® is a trademark of Adobe Systems Incorporated.

Safety summary

Important

Note that this manual contains only the safety information pertaining to installing VXI modules in the VXI mainframe and for installing the IEEE 1394 PCI interface card in your computer. For information on operating your VXI hardware and your computer safely, please refer to the user or service manuals for your VXI mainframe and computer.

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

GENERAL

This product is a Safety Class 1 instrument (provided with a protective earth terminal). The protective features of this product may be impaired if it is used in a manner not specified in the operation instructions.

BEFORE APPLYING POWER

Verify that the product is set to match the available line voltage, the correct fuse is installed, and all safety precautions are taken. Note the instrument's external markings described under Safety Symbols.

GROUND THE PRODUCT

To minimize shock hazard, the instrument chassis and cover must be connected to an electrical protective earth ground. The instrument 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.

FUSES

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

DO NOT OPERATE IN AN EXPLOSIVE ATMOSPHERE

Do not operate the instrument in the presence of flammable gases or fumes.

DO NOT REMOVE THE PRODUCT 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.

WARNING

The **WARNING** sign denotes a hazard. It calls attention to a procedure, practice, or the like, which, if not correctly performed or adhered to, could result in personal injury. Do not proceed beyond a **WARNING** sign until the indicated conditions are fully understood and met.

Caution

The **CAUTION** sign denotes a hazard. It calls attention to an operating procedure, or the like, which, if not correctly performed or adhered to, could result in damage to or destruction of part or all of the product. Do not proceed beyond a **CAUTION** sign until the indicated conditions are fully understood and met.

Safety Symbols



Caution, refer to accompanying documents



Alternating current



Earth (ground) terminal



Direct current



Frame or chassis terminal



Warning, risk of electric shock



Terminal is at earth potential.

Used for measurement and control circuits designed to be operated with one terminal at earth potential.

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1 **Installation Overview**

89600 Series Software

The 89600 Series Software CD-ROM includes software for the following applications:

- 89600 Vector Signal Analyzers (89601 VSA software)
- 89604 Distortion Suite
- 89607 WLAN Test

89604A Distortion Suite

Before you install Agilent 89604 Distortion Suite software, you must install 89600 VSA software. (The 89604 application uses portions of the 89600 software.) If you purchased and licensed the 89600 software, you can use the 89600 application separately from Distortion Suite. If you did not purchase the 89600 software, it runs in the background when you use Distortion Suite, and you cannot use the 89600 application separately.

Note

The 89604A Distortion Suite cannot be installed or co-reside on a PC with 89601A VSA version 3.xx or earlier.

89607 WLAN Test

WLAN Test is licensed in two ways:

- as part of option B7R (WLAN Modulation Analysis) with the 89601 software
- as a stand-alone application

Regardless of how you purchase or license WLAN Test, you must install the 89601 software before you install 89607 WLAN Test software. (The 89607 application uses portions of the 89600 software.) If you purchased and licensed the 89601 software, you can use the 89600 application separately from WLAN Test. If you did not purchase the 89601 software, it runs in the background when you use WLAN Test, and you cannot use the 89600 application separately.

Note

The 89607A WLAN Test application cannot be installed or co-reside on a PC with 89601A VSA version 4.xx or earlier.

Before you start installation

1. Be sure you have the documentation and media listed on [page 16](#).
2. Be sure your computer meets the minimum requirements listed on [page 17](#) for a desktop computer, [page 18](#) for a laptop computer, or [page 19](#) for a VXI embedded computer.
3. Setup your computer and connect peripherals if required.
4. Determine what kind of interface is required for your measurement hardware, using the following table. Note that you may need to install and configure more than one interface. For example, if your measurement hardware includes VXI measurement hardware and an Agilent ESG source, you must configure both an IEEE-1394 interface and a GPIB interface.

Measurement Hardware	Computer Type	Interface
VXI (Agilent 89610, 89611, 89640, 89641)	Laptop or desktop PC	IEEE-1394 VXI to PC
	VXI embedded	none
Agilent E4406	Laptop or desktop PC	LAN, GPIB, LAN/GPIB Gateway (portal), USB-to-GPIB adapter
Agilent ESG-D, ESG-DP, or E4438C	Laptop, desktop, or embedded VXI PC	LAN, GPIB, LAN/GPIB Gateway (portal), USB-to-GPIB adapter
Agilent PSA (used as ADC)*	Laptop, desktop	LAN, GPIB, LAN/GPIB Gateway (portal), USB-to-GPIB adapter *
Agilent PSA (used as a down converter with 89611)*	Laptop, desktop, or VXI embedded PC	LAN, GPIB, LAN/GPIB Gateway (portal), USB-to-GPIB adapter
Agilent ESA	Laptop or desktop PC	GPIB, LAN/GPIB Gateway (portal), USB-to-GPIB adapter
Agilent Infiniium Oscilloscope	Laptop, desktop	LAN, GPIB, LAN/GPIB Gateway (portal), USB-to-GPIB adapter

* To use GPIB with the PSA, your PSA firmware must be version A.4.0 or later. With earlier firmware versions, you must use the LAN connection.

5. Go to “Installation” on [page 20](#) for installation instructions.

Documentation and media required for installation

To perform installation and setup of your 89600 product, you need the following documentation and media:

- Agilent 89600 Series Software installation CD.
- *Installation and Service Guide* for Agilent 89600 Series (this manual).
- If your analyzer requires LAN, GPIB, or IEEE 1394 interfaces, you need your computer's documentation for installation of PCI adapters, PCMCIA cards, or GPIB cards.
- If your analyzer includes an embedded VXI controller, you need its *User and Service Manual*.
- If your VXI measurement hardware includes an 89605, E2730, or E2731 module, you may need the Calibration disks for the module.
- Installation and setup information for a source or other measurement hardware you will be using with 89600 software.

System requirements for a desktop PC

For Agilent 89600-series software on a desktop PC, the PC must meet the following minimum requirements:

- 180 MHz Pentium®¹ or AMD-K6®² CPU (≥300 MHz recommended)
- One empty PCI-bus slot if your analyzer includes VXI measurement hardware (two empty slots recommended)
- 192 Mbytes RAM (256 Mbytes recommended)
- 4 Mbytes Video RAM (8 Mbytes recommended)
- Paging File Size 256 Mbytes (with option AYA, 350 Mbytes recommended)
- available space on the hard drive:
 - 112 Mbytes for 89600 VSA software installation
 - (optional) 60 Mbytes for .NET installation (required only for 89607 WLAN Test and 89604 Distortion Suite)
 - (optional) 4 Mbytes for 89607 WLAN Test installation
 - (optional) 4 Mbytes for 89604 Distortion Suite installation
- Microsoft Windows 2000 or Windows XP
- CD ROM drive for the installation media (can be provided via network access)
- For analyzers including an Agilent Technologies E2730 or E2731 tuner VXI module or an 89605 input module, a 3.5" floppy disk drive may be required (can be provided via network access)

1. Pentium is a U.S. registered trademark of Intel Corporation.
2. K6® is a U.S. registered trademark of Advanced Micro Devices, Inc.

System requirements for a laptop PC

For Agilent 89600-series software on a laptop PC, the PC must meet the following minimum requirements:

- ≥ 300 MHz Pentium or AMD-K6® CPU
- One empty Cardbus Type II slot if your analyzer includes measurement hardware (two empty slots recommended)
- 192 Mbytes of RAM (256 Mbytes recommended)
- 4 Mbytes of Video RAM (8 Mbytes recommended)
- Paging File Size 256 Mbytes (with option AYA, 350 Mbytes recommended)
- available space on the hard drive:
 - 112 Mbytes for 89600 VSA software installation
 - (optional) 60 Mbytes for .NET installation (required only for 89607 WLAN Test and 89604 Distortion Suite)
 - (optional) 4 Mbytes for 89607 WLAN Test installation
 - (optional) 4 Mbytes for 89604 Distortion Suite installation
- Microsoft Windows 2000 or Windows XP
- CD-ROM drive for the installation media (can be provided via network access)
- For analyzers including an Agilent Technologies E2730 or E2731 tuner VXI module or an 89605 input module, a 3.5" floppy disk drive may be required (can be provided via network access)

System requirements for a VXI embedded PC

To install and run the Agilent 89600-series software, you need a VXI embedded controller and the following:

- add 128 Mbytes of RAM
- A 6-slot or 13-slot VXI mainframe
- available space on the hard drive:
 - 112 Mbytes for 89600 VSA software installation
 - (optional) 60 Mbytes for .NET installation (required only for 89607 WLAN Test and 89604 Distortion Suite)
 - (optional) 4 Mbytes for 89607 WLAN Test installation
 - (optional) 4 Mbytes for 89604 Distortion Suite installation
- Microsoft Windows 2000
- CD ROM drive for the installation media (can be provided via network access)
- For analyzers including an Agilent Technologies E2730 or E2731 tuner VXI module or an 89605 input module, a 3.5" floppy disk drive may be required (can be provided via network access)

Installation

Note

If you are installing only a floating license server, skip the rest of this chapter and go directly to [“Setting Up a Floating License Server,” Chapter 9](#).

89600-series installation consists of 2 to 6 basic steps: install software, set up measurement hardware, install I/O cards in your computer, configure I/O interfaces, and license your software. (If your analyzer does not include measurement hardware, you perform only the first and last steps.)

The details for each of these steps vary, depending on what kind of computer you are using, what type of interface connects your measurement hardware to the computer, and what operating system your computer uses. Details are included in various chapters in this book. You will not need to read and use every chapter. Most of the chapters are included in case you need more detailed instructions or encounter problems with installation.

Note

If your 89600 order included VXI measurement hardware and either an embedded VXI computer or a laptop PC, all installation and licensing may have been done at the factory. If this is true, you only need to connect the hardware to the computer and start the analyzer.

Step 1. Install 89600-series software. See [page 24](#).

If you are installing the 89607 WLAN Test or 89604 Distortion Suite software, you must first install the 89600 VSA software, even if you did not purchase the 89600 software. The installation CD includes 89601 Vector Signal Analyzer, 89607 WLAN Test, and 89604 Distortion Suite software. You can install all these applications and run them for two weeks on a trial license, but you must purchase and license the applications that you want to permanently enable.

If your analyzer does not include measurement hardware, skip to [Step 5](#).

Step 2. Set up your measurement hardware.

- a. For VXI measurement hardware, start on [page 40](#). If the VXI modules are already installed in the mainframe, skip this step and continue with step b.
- b. Set up and configure the LAN and/or GPIB interface in the instruments you plan to connect to the computer, referring to the instrument’s user’s guide for documentation on configuring I/O. (Look in the instrument user guide index under “GPIB” or “I/O configuration.”).

You probably can use the default settings. Just ensure that each instrument on the GPIB has a unique GPIB address; two instruments cannot use the same address.

- Step 3. Install the necessary I/O interface cards in your computer.
- a. For VXI measurement hardware, install the Agilent IEEE 1394 Host Adapter in your computer.
For desktop computer details, go to [page 79](#). Use the instructions in this book rather than any installation instructions that came with the adapter.
For laptop computer details, go to [page 85](#).
 - b. If you require communication via GPIB or LAN and the interface has not been installed in your computer, install the interface card, following the instructions that came with the card. For details, go to [page 88](#).
 - c. Connect all measurement hardware to the appropriate interface on your computer or to the LAN. Plug in and turn on all measurement hardware and your computer (if they are not already on).
- Step 4. Configure I/O for your hardware interfaces.
- a. If your measurement hardware is an Infiniium scope, go to [page 113](#).
 - b. If your analyzer includes VXI measurement hardware, configure IEEE-1394. See [page 95](#) for details.
 - c. If you will be communicating with hardware via LAN, configure LAN. See [page 98](#) for details.
 - d. If you will be communicating with hardware via a LAN/GPIB Gateway, configure LAN-to-GPIB. See [page 105](#) for details.
 - e. If you will be communicating with hardware via a USB/GPIB interface, configure LAN-to-GPIB. See [page 108](#) for details.
 - f. If you will be communicating with hardware via GPIB, configure GPIB. See [page 109](#) for details.

Step 5. License (obtain authorization for) your software.

For a node-locked license, follow these instructions:

1. For an 89600 analyzer, double click the appropriate icon, or click **Start > Programs > Agilent 89600 VSA > Vector Signal Analyzer** or **Spectrum Analyzer**. Continue with [step 4](#).
2. For Distortion Suite, click **Start > Programs > Agilent Distortion Suite > Distortion Suite**. Continue with [step 4](#).
3. For WLAN Test, click **Start > Programs > Agilent WLAN Test > WLAN Test**. Continue with [step 4](#).
4. Follow the instructions for obtaining and installing a site key. If you encounter problems or need more information, see the Licensing chapter, [page 131](#).
5. Continue with Calibrate your analyzer, [Step 6](#).

For a floating or network license, perform these steps:

1. Set up the license server as instructed in [Chapter 9, “Setting Up a Floating License Server,”](#) on [page 141](#).
2. Set up the license client as instructed in [Chapter 10, “Setting Up a Floating License Client,”](#) on [page 157](#).

Step 6. Calibrate your analyzer.

Before making measurements, you should calibrate (or align) your analyzer to optimize measurement accuracy. Refer to the online help for details on calibration for your analyzer configuration.

- In the Agilent 89600 VSA (or Spectrum Analyzer) window, click **Utilities**. Position the pointer on **Calibration**, and press F1 on the keyboard.
- In 89604 Distortion Suite, open help and look for Calibration in the Utilities menu or in the index.
- In 89607 WLAN Test, open help and look for Calibration in the Utilities menu or in the index.

Note

For 2-RF-channel VXI measurements hardware, you can use the fixed equalization feature to better match the channels. See fixed equalization in the online help index.

2 **Installing 89600 Software**

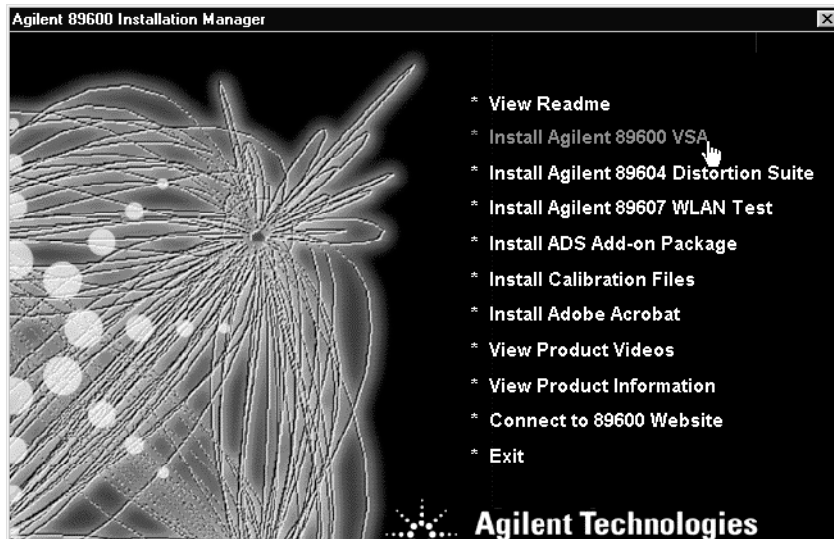
Install 89600 software

The Agilent 89600 Vector Signal Analyzer Installation Manager program guides you through software installation. If you have problems installing your software, please see the Diagnostics chapter (page 164) for troubleshooting help.

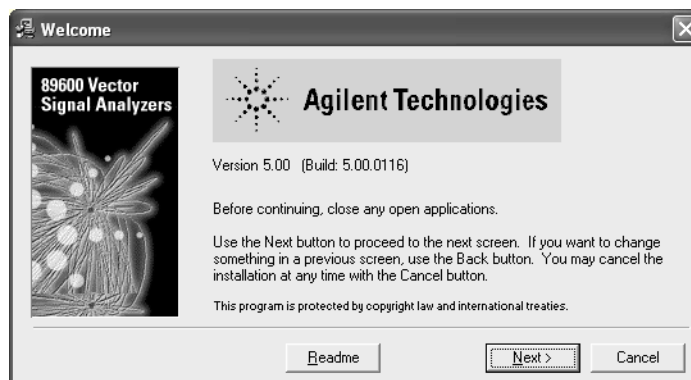
Note

For Agilent Distortion Suite and WLAN Test applications, you must install 89600 VSA software before installing 89604 Distortion Suite or 89607 WLAN Test. The Distortion Suite and WLAN Test applications access 89600 VSA. However, if you did not purchase 89600 software, you will not be able to run 89600 VSA outside Distortion Suite or WLAN Test.

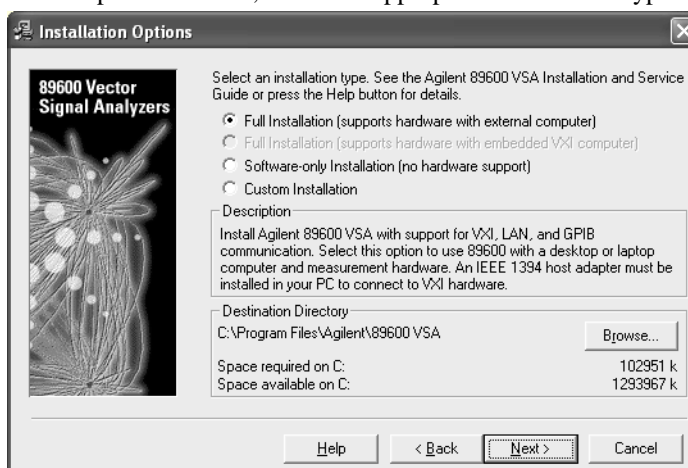
1. Turn on the computer. If the computer is already on, close any applications you have open.
2. Insert the Agilent 89600 Series Software installation CD-ROM.
3. If the installation utility does not start automatically, click **Start > Run**, and type:
drive:\autoplay.exe
where *drive* represents the drive containing the installation CD-ROM.
Click **OK**.
4. When the Agilent 89600 Installation Manager window opens, click **Install Agilent 89600 VSA**.



- When the Welcome window opens, it is a good idea to read the ReadMe file.



- After you read the ReadMe file, close it and click **Next** in the Welcome window.
- Read the license agreement and warranty terms. Click **Yes** to accept the terms and continue installation. Click **No** if you do not accept the terms. If you click No, you will not be able to install the software.
- In the Installation Options window, select the appropriate installation type.

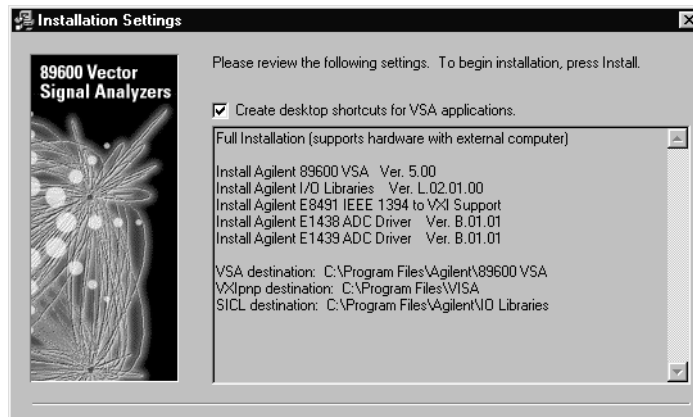


- For a PC with measurement hardware, select **Full Installation (supports hardware with external computer)**.
- For a VXI embedded controller, select **Full Installation (supports hardware with embedded VXI computer)**. This selection is available only if non-Agilent I/O libraries are detected on your computer. Agilent I/O libraries will not be installed with this selection.
- For software only (no measurement hardware), select **Software-only Installation**.
- Custom Installation** is useful if you are installing 89600 license support, adding measurement hardware, or need to install drivers for new VXI hardware, but should not be used for first-time installation of 89600 VSA software.

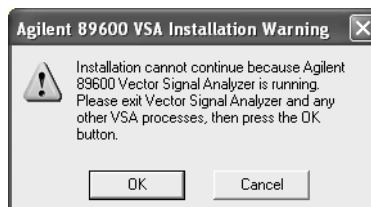
9. If you want to install the software in a directory other than the default directory, click **Browse** to change the destination directory. The default directory (C:\Program Files\Agilent\89600 VSA) is recommended.

For a VXI embedded controller with an external hard disk, change the destination drive to match the hard disk.

10. After you have chosen the installation type and specified or accepted the destination directory, click **Next**. The Installation Settings screen appears. (This screen varies depending on the software installation type you chose.)



11. If you do not want desktop shortcuts (icons) created, click the checkbox to disable that option.
12. Read any information that appears under the INFO or TO DO heading and perform whatever action is required. (See the facing page for details.)
13. In the Installation Settings window, review the list of components that will be installed. If you want to change the list, click **Back**. Otherwise, click **Install**.
14. If you are reinstalling software and have an 89600 application running, you get an Installation Warning message, for example:



Close the application referenced in the warning and click **Install** again. If you get the same Installation Warning message, exit installation, close all applications, reboot your computer, and start installation again.

15. The installation program preconfigures your system environment for 89600. If you are installing 89600-series software for the first time, the installation process may ask you to reboot your computer. Click **OK**.

Note

If you are installing from a remotely mounted CD-ROM drive, the remote drive must be configured to reconnect at logon so that the installation files can be found after the reboot.

INFO, WARNING, or TO DO Details

The information on this page explains what to do if there is information listed under INFO or TO Do in the Installation Settings window (step 12 of the software installation on the previous page).

- **The resident Agilent IO libraries are the same as the bundled version, and will not be reinstalled.** The IO libraries currently installed on your computer are the same version as those on the 89600 installation CD. You can force a reinstall:
 1. Click **Back** and select **Custom Installation, Next**.
 2. Click **Select All**, then continue with [step 13](#) on the previous page.
- **The resident Agilent IO libraries are older than the bundled version. Would you like to update them (recommended)?** The IO libraries currently installed on your computer are an older version than those on the 89600 installation CD. Click **Yes** if you want to update the IO libraries. If you click **No**, the 89600 software is not guaranteed to operate on your computer.
- **The resident Agilent IO libraries are newer than the bundled version, and will not be reinstalled.** If you want to install the IO libraries from the 89600 installation CD, you must remove the currently-installed libraries before proceeding”
 1. Exit installation.
 2. Click **Start > Settings > Control Panel > Add/Remove Programs**.
 3. Highlight Agilent IO libraries, click Add/Remove Programs, and follow the instructions.
 4. Rerun 89600 installation.
- **Any message about resident ADC drivers:** Follow the instructions in the message. If the message says you can force a reinstallation of the drivers for the E1438 or E1439 ADCs, follow these 2 steps:
 1. Click **Back** and select **Custom Installation > Next**.
 2. Click **Select All**, then continue with [step 13](#) on the previous page.
- **A third-party I/O Libraries has been detected on your computer. If you are using an embedded VXI PC, this is the only library you should install. If you are using an external PC, you must install the Agilent I/O Libraries.** Click the appropriate computer type (External PC or Embedded VXI PC).

For an external PC, the Agilent I/O Libraries are installed in secondary mode. The third-party I/O Libraries remain installed.

For an embedded VXI computer, the Agilent I/O Libraries are not installed. Finish software installation, then refer to the documentation for the resident I/O libraries for information on configuring the VXI hardware.

Installing 89600 Software
Install 89600 software

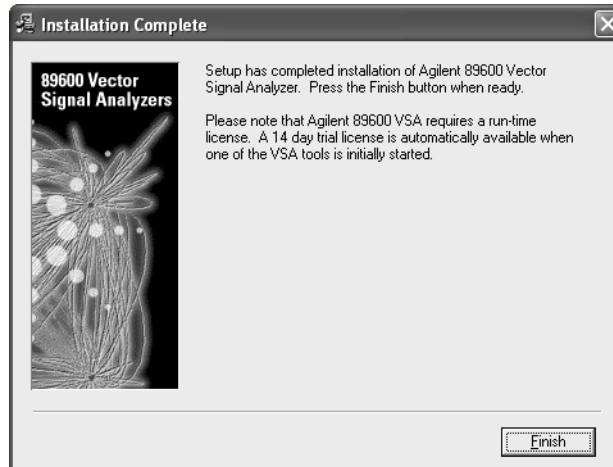
16. After the reboot, log on to your computer. Installation continues.

If you are installing IO libraries, you will see messages advising you of this activity after the 89600 files are installed.

17. When the Installation Complete window appears, click **Finish**.

Note

If you have Agilent EESof ADS software installed on your PC, the Installation Complete window includes a message saying you must install ADS add-ons. You will be told how to do this after 89600 software installation is complete.



18. The 89600 Installation Manager window reappears.

19. Your software has been installed. The Installation Manager includes the following utilities:

If you want to install - - - - - go to this page:

- Agilent WLAN Test - - - - - [page 29](#)
- Agilent 89604 Distortion Suite - - - - - [page 31](#)
- 89600 License Support for floating licenses- - - [page 32](#)
- ADS Add-on Package - - - - - [page 35](#)
- Calibration files (only for analyzers that - - - - [page 36](#)
include an Agilent E2730, E2731, or 89605
VXI module
- Adobe Acrobat Reader - - - - - [page 38](#).

If you do not need any of these utilities, click Exit in the Installation Manager window and continue with [step 2](#) on [page 20](#).

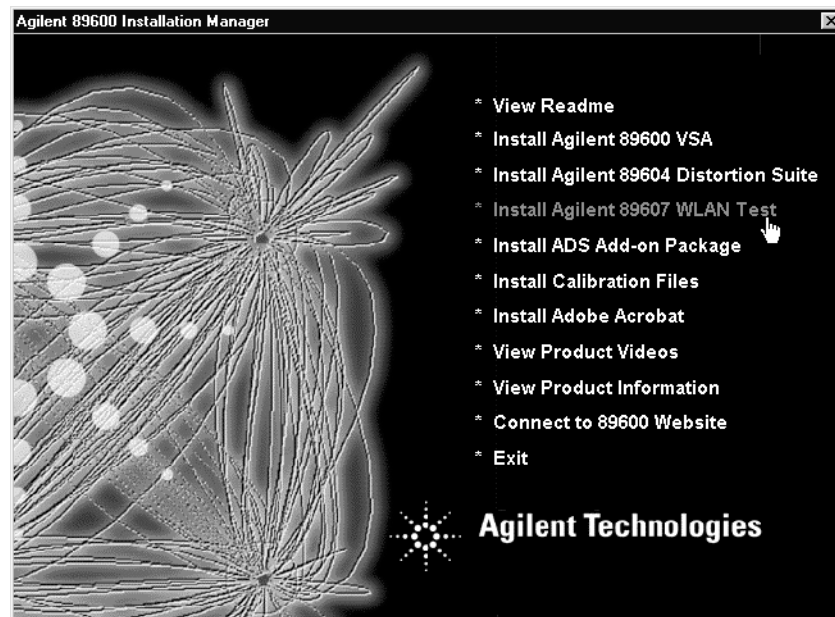
Install Agilent 89607 WLAN Test software

You must install the 89600 VSA software before installing 89607 WLAN Test software.

Note

89607 WLAN Test cannot be installed or co-reside on a PC with 89600A VSA version 4.xx or earlier.

1. To install WLAN Test, click **Install Agilent 89607 WLAN Test** in the Installation Manager window.



2. Follow the instructions in the installation wizard.

Note

Installing the WLAN Test also installs the Microsoft .NET Framework if it is not already present on your PC. This installation may require you to upgrade your browser or install a new service pack. In either case, detailed instructions are provided by the installation wizard.

Installing 89600 Software
Install Agilent 89607 WLAN Test software

3. After WLAN Test is installed, continue as follows:

If you want to install - - - - - go to this page:

Agilent 89604 Distortion Suite - - - - - [page 31](#)

89600 License Support - - - - - [page 32](#)

ADS Add-on Package - - - - - [page 35](#)

Calibration files (only for analyzers that
include an Agilent E2730, E2731, or 89605
VXI module - - - - - [page 36](#)

Adobe Acrobat Reader - - - - - [page 38](#).

If you do not need any of these utilities, click Exit in the Installation Manager window and continue with [step 2 on page 20](#).

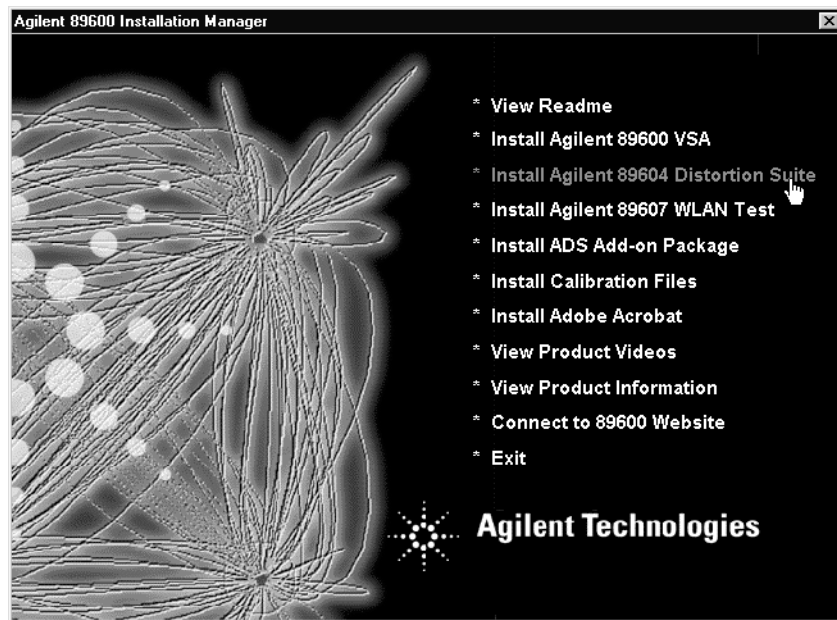
Install Agilent 89604 Distortion Suite software

You must install the 89600 VSA software before installing Distortion Suite software.

Note

The 89604A Distortion Suite cannot be installed or co-reside on a PC with 89600A VSA version 3.xx or earlier.

1. To install Distortion Suite, click **Install Agilent 89604 WLAN Test** in the Installation Manager window.



2. Follow the instructions in the installation wizard.

Note

Installing the Distortion Suite also installs the Microsoft .NET Framework if it is not already present on your PC. This installation may require you to upgrade your browser or install a new service pack. In either case, detailed instructions are provided by the installation wizard.

3. After Distortion Suite is installed, continue as follows:

If you want to install - - - - - go to this page:

ADS Add-on Package - - - - - [page 35](#)

Calibration files (only for analyzers that
include an Agilent E2730, E2731, or 89605
VXI module - - - - - [page 36](#)

Adobe Acrobat Reader - - - - - [page 38](#).

If you do not need any of these utilities, click Exit in the Installation Manager window and continue with [step 2](#) on [page 20](#).

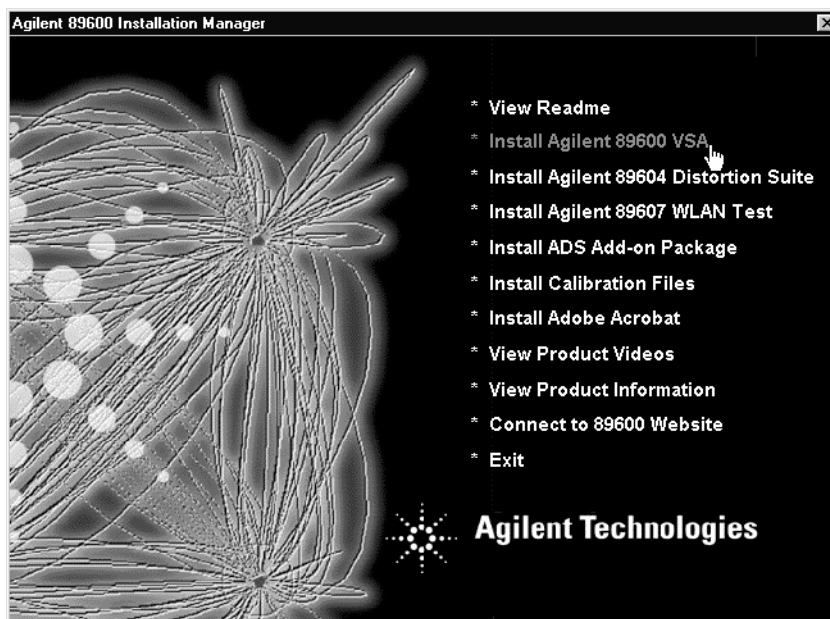
Install 89600 license support

If you will be using a floating license for your software, you must install 89600 license support as follows.

Note

If you are installing 89600 license support for a license server (a PC on which you will *not* run the 89600 software), skip this chapter and go to [Chapter 9, “Setting Up a Floating License Server.”](#)

1. In the Installation Manager Window, click **Install Agilent 89600 VSA**.

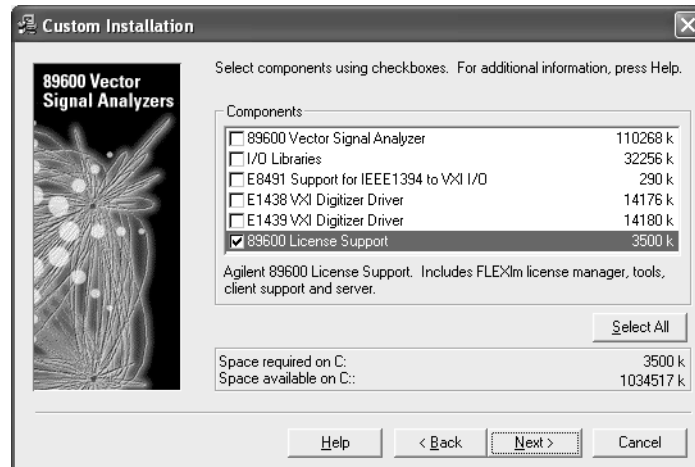


2. When the Welcome window opens, click **Next**.
3. Click **Yes** in the Software License and Warranty window.

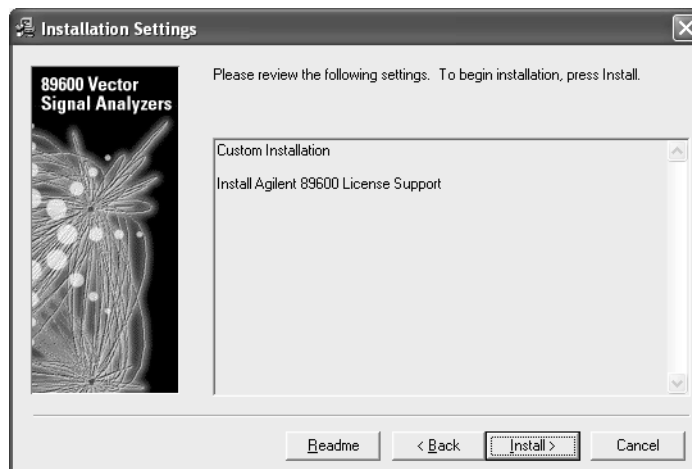
- In the Installation Options window, click **Custom Installation**. Specify the same directory where you installed the 89600 software.



- In the Installation Options window, check the **89600 License Support** check box.



- Click **Next**. The Installation Settings screen appears.



- In the Installation Settings window, review the list of components that will be installed. If you want to change the list, click **Back**. Otherwise, click **Install**.
- After 89600 License Support is installed, continue as follows:

Installing 89600 Software
Install 89600 license support

If you want to install - - - - - go to this page:

ADS Add-on Package - - - - - [page 35](#)

Calibration files (only for analyzers that
include an Agilent E2730, E2731, or 89605

VXI module - - - - - [page 36](#)

Adobe Acrobat Reader - - - - - [page 38](#).

**If you do not need any of these utilities, click Exit in the Installation Manager
window and continue with [step 2](#) on [page 20](#).**

Install ADS add-on package

To use the analyzer with Agilent's EEsof Advanced Design System (ADS) program, you must have both programs installed on your computer. You must also integrate the two programs, following the instructions on this page.

If you have not yet installed your 89600 software, go to [page 20](#).

The 89600 Installation program detects versions of ADS installed on your computer. If you have more than one ADS version installed, the installation program will select the latest version that the 89600 software supports.

ADS versions prior to 1.3 are not supported with the 89600 analyzer.

Note

To permanently enable the ADS integration, you must have purchased and licensed option 105 for your 89600 analyzer. If you did not purchase this option, you can integrate and use the 89600/ADS interface while your trial license is in effect but not after you install your permanent license.

1. In the Installation Manager Window, click **Install ADS Add-on Package**.
 - a. If the message in the window says an ADS version is installable, click the **Install** button at the bottom of the window.
 - b. If the message says a version requires the ADS Add-on CD, use the ADS Add-on tools and documentation to install the add-on.
2. After you have installed the ADS Add-on Package, you can use other utilities in the Installation Manager Window:

If you want to install - - - - - go to this page:

Calibration files (only for analyzers that

include an Agilent E2730, E2731, or 89605

VXI module - - - - - [page 36](#)

Adobe Acrobat Reader - - - - - [page 38](#).

If you do not need any of these utilities, click Exit in the Installation Manager window and continue with [step 2](#) on [page 20](#).

Install calibration files

The files contain factory calibration information unique to each 89605, E2730, and E2731 module. The files are required to ensure the accuracy of measurement results. When you make measurements, the analyzer will prompt you if the calibration files are not in the proper location. You will have the option of copying the files into the proper folder or running the measurement without calibration information. Measurement accuracy will be degraded if the calibration files are not in place.

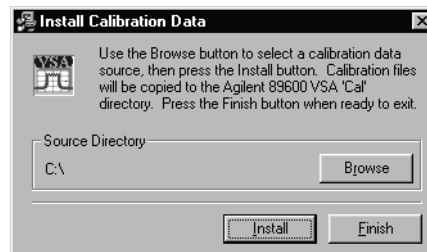
Note

Beginning with 89601A version 4.00, calibration files can be read directly from some modules. When calibration files are embedded in the module, the calibration disk for that module may not be included. For other modules, you must install the calibration files from the disks.

If the calibration files are not stored in your modules and you do not have the calibration diskettes, contact your sales and service office for information on getting the files.

To install the calibration files from diskette, follow these steps:

1. If your computer can access both the CD-ROM drive and the 3.5" disk drive simultaneously, go to [step 2](#). If your laptop computer requires you to swap the CD-ROM drive and the 3.5" disk drive:
 - a. Click **Exit** in the Installation Manager window.
 - b. Click **Start > Programs > Agilent 89600 VSA > Install Calibration Files**.
 - c. Go to [step 3](#).
2. In the main Installation window, click **Install Calibration Files**.



3. Insert the calibration disk in the drive on your computer.
4. In the Install Calibration Data window, and if necessary, click **Browse** and specify the disk drive where you inserted the calibration diskette.

5. Click **Install**. If no calibration files are found at the specified location, you get an error message. Verify that you specified the correct source drive. Click **OK**.
6. Insert another calibration disk (if you have more than one) and click **Install** again.
7. When you have installed all the calibration files, click **Exit**.
8. Put the calibration disks in the holder in the *89600 Installation Guide* binder. If you move the E2730, E2731, or 89605 module to another system or install a replacement module, you must copy the calibration files for the module. The file names are <module#_serial#.cal> (for example, 89605A_USXXXX0125.cal). To find the serial number of a module:
 - a. Start the 89600 software. Click **Start > (All) Programs > Agilent 89600 VSA > Vector Signal Analyzer**.
 - b. Click **Utilities > Hardware**, and the appropriate tab for the module.
 - c. Select the module from the list.
 - d. Then click **Info...** The information window lists the module serial number, driver revision, and firmware revision.
9. To install new calibration files, you can click **Start > Programs > Agilent 89600 VSA > Install Calibration Files**.

If you want to install - - - - - **go to this page:**
Adobe Acrobat Reader - - - - - [page 38](#).

Otherwise, click Exit in the Installation Manager window and continue with [step 2](#) on [page 20](#).

Install Adobe Acrobat Reader

You can install Adobe Acrobat Reader directly from the 89600 software installation CD, or you can download from the Adobe Web site (<http://www.adobe.com>).

To install from the 89600 CD, click **Install Adobe Acrobat** in the Installation Manager Window, then follow the instructions in subsequent windows.

Click **Exit** in the Installation Manager window.

If you are installing measurement hardware, continue with [step 2 on page 20](#). Otherwise, continue with [step 5 on page 22](#).

3 **Setting Up VXI Hardware**

Introduction

This chapter includes instructions on configuring your VXI measurement hardware, installing the VXI hardware modules into the VXI mainframe, and connecting front-panel cables. See chapter 1, “Installation Overview” ([page 20](#)) to learn which procedures you must perform to install your Agilent 89600 series product.

Note

If you purchased an Agilent 89610, 89611, 89640, or 89641, everything in this chapter was done at the factory except connecting the cables for an external down converter. If your analyzer uses an external down converter, see the appropriate illustration at the end of the chapter. Otherwise, continue with [step 2 b](#) on [page 20](#).

For information on configuring other measurement hardware, see the online help under **Installation and Licensing > Hardware Setup**.

Inspect Agilent 89600-series VXI modules

The Agilent 89600-series VXI modules were carefully inspected both mechanically and electrically before shipment. They should be free of marks or scratches upon receipt.

If a module was damaged in transit, do the following:

- Save all packing materials.
- File a claim with the carrier
- Call your Agilent Technologies sales and service office (phone numbers available at www.agilent.com/find/89600).

Note

If you ordered a 2-channel analyzer, the two E1438 or E1439 modules must have the same amount of memory.

Set up Agilent 89600 series VXI mainframe and modules

Caution

To protect circuits from static discharge, observe anti-static techniques whenever handling the Set logical addresses

Important

For safety, environment, regulatory, and mains power specifications, see the user or service manual for your VXI mainframe.

Set logical addresses

1. Check the logical address switches for each VXI module. (See the illustration for each module on the following pages.) Except for the E2730 and E2731 modules, each module in the system must have a unique logical address. The following table lists the factory default settings (the addresses for second-channel 89605, E1438, AND E1439 modules must be different).

For 2-channel systems, the addresses must be different for the two modules

VXI module	Default address	Figure showing address switch location
Agilent 89605	14 (0000 1110)	Figure 3-1 on page 3-43
Agilent E2730 or E2731	255 (1111 1111)	Figure 3-2 on page 3-43
Agilent E1439	194 (1100 0010)	Figure 3-3 on page 3-44
Agilent 89606	15 (0000 1111)	Figure 3-4 on page 3-44
Agilent E1438	192 (1100 0000)	Figure 3-5 on page 3-45

2. If you need to change the address setting for a module, use a small screwdriver or similar tool to move the switches to the correct position. The figures on the following pages show the location and default setting of the logical address switches for each module.

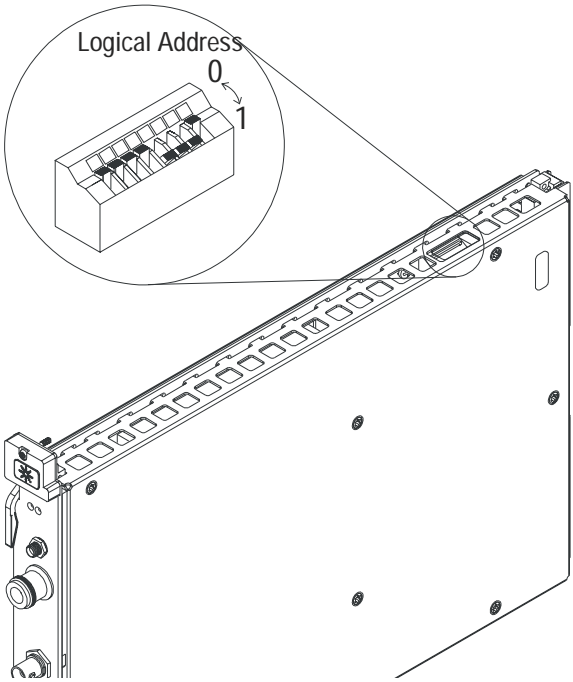


Figure 3-1 89605 Input module -- address 14 (000 1110)

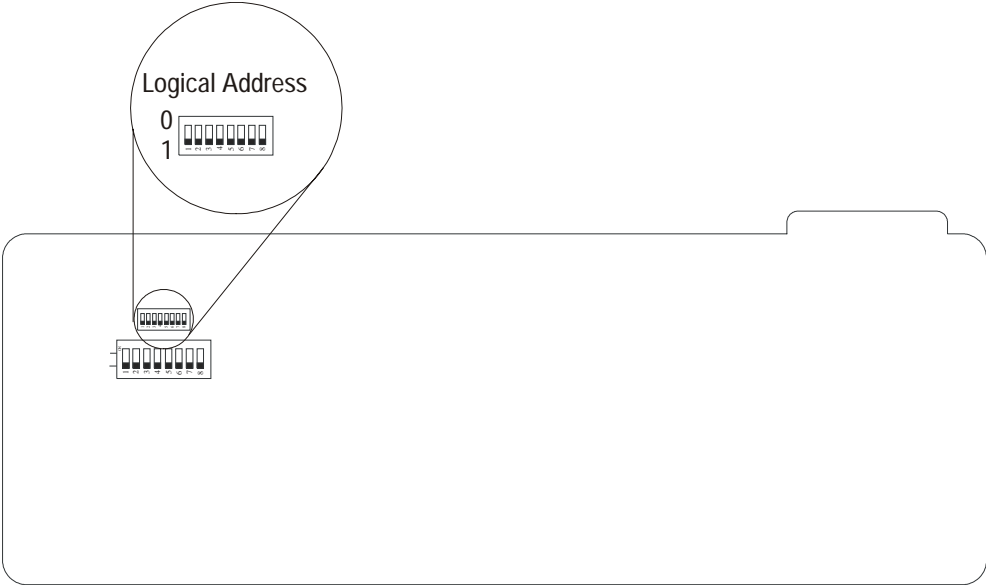


Figure 3-2 E2730 or E2731 RF Tuner module -- address 255 (1111 1111) (This setting enables dynamic addressing, so that the address is automatically assigned.)

Setting Up VXI Hardware
Set up Agilent 89600 series VXI mainframe and modules

For 2-channel systems, the addresses must be different for the two e1439 modules.

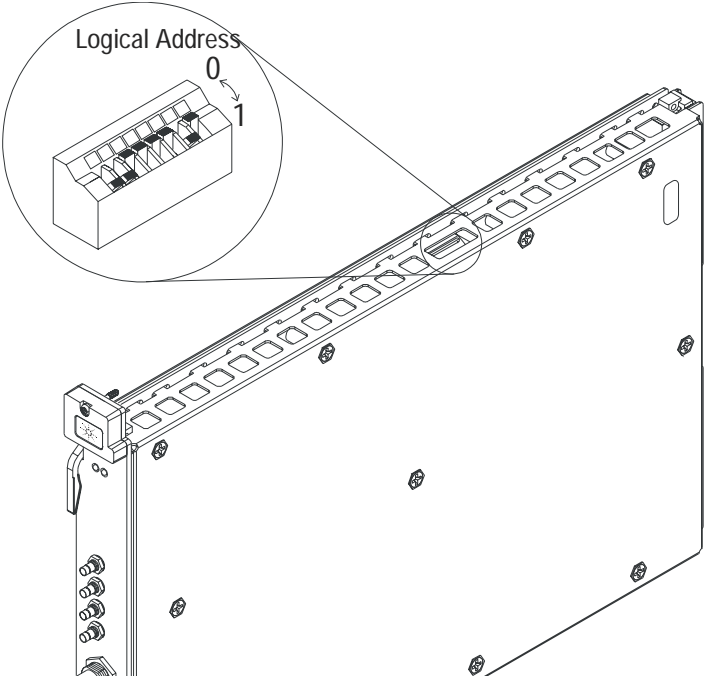


Figure 3-3 E1439 ADC module -- address 194 (1100 0010)

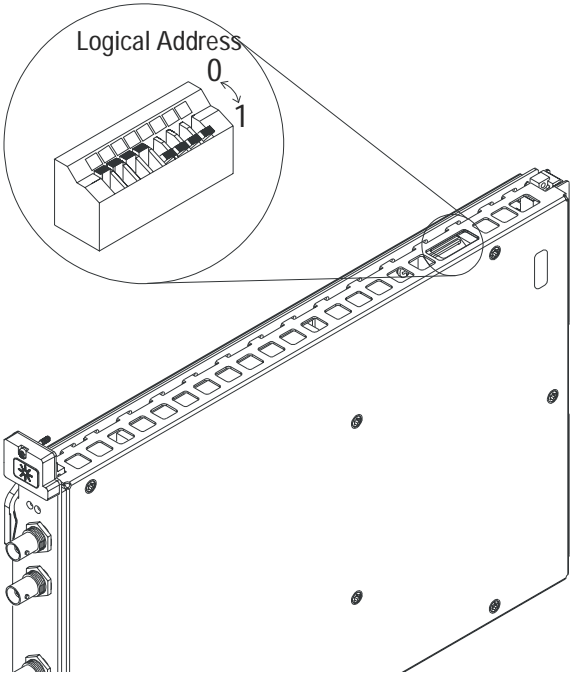


Figure 3-4 89606 module -- address 15 (0000 1111)

For 2-channel systems, the addresses must be different for the two e1438 modules.

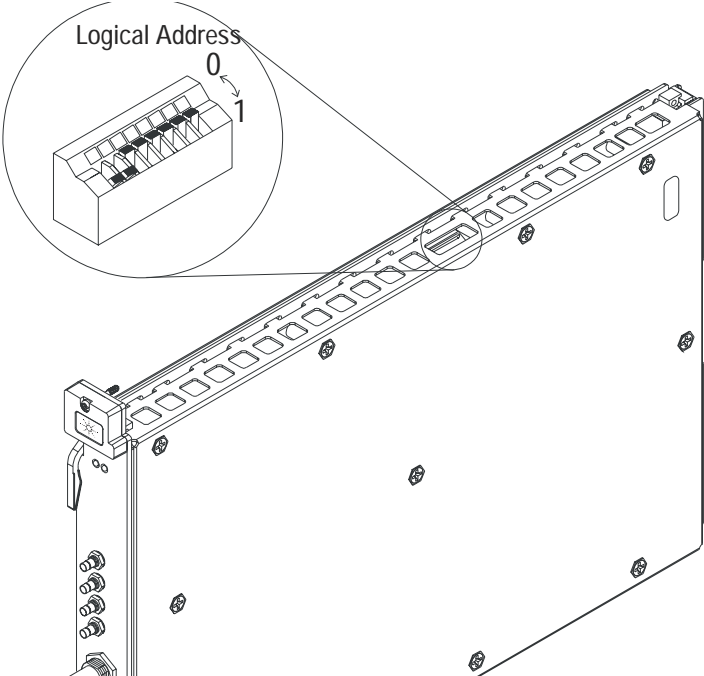


Figure 3-5

E1438 ADC module -- address 192 (1100 0000)

Install the modules in the mainframe

1. Unpack your VXI mainframe.

Important

For safety, environment, regulatory, and mains power specifications, see the user or service manual for your VXI mainframe.

2. Set the mainframe's power switch to off (0).

Caution

Be sure the power is off before installing modules in the mainframe. Installing or removing a module with power on may damage components in the module.

3. Be sure to put each module in the correct slot (see "Configure your system," [page 47](#)).
4. Place the module's card edges (top and bottom) into the module guides in the slot.
5. Install the module into the mainframe as instructed in steps 1, 2, and 3 of [Figure 3-6](#). (Note: the E2730 module does not have insertion/extraction levers.)

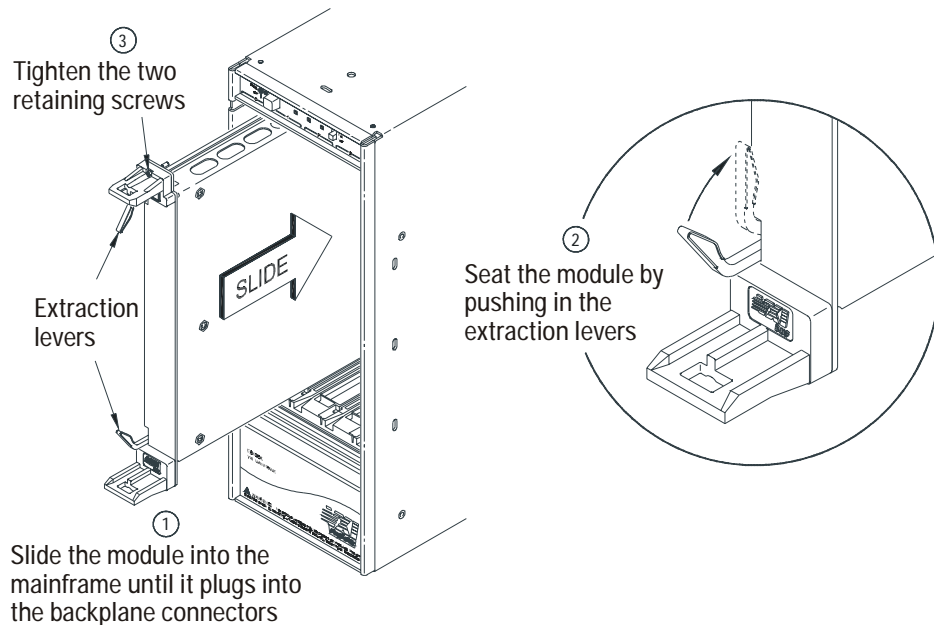


Figure 3-6

Installing a VXI module in the mainframe

Configure your VXI hardware

Your Agilent 89600 series VXI modules must be installed in a specified order in the VXI mainframe. There are eight possible configurations:

- Agilent 89610 Single-channel DC-40 MHz analyzer ([page 48](#))
- Agilent 89610 Two-channel DC-40 MHz analyzer ([page 49](#))
- Agilent 89611 70 MHz IF analyzer ([page 50](#))
- Agilent 89611 Two-channel 70 MHz IF analyzer ([page 51](#))
- Agilent 89640 DC-2.7 GHz analyzer ([page 52](#))
- Agilent 89640 DC-2.7 GHz analyzer with second IF/baseband channel ([page 53](#))
- Agilent 89640 DC-2.7 GHz analyzer with second RF channel ([page 54](#))
- Agilent 89641 DC-6 GHz analyzer ([page 55](#))
- Agilent 89641 DC-6 GHz analyzer with second IF/baseband channel ([page 56](#))
- Agilent 89641 DC-6 GHz analyzer with second RF channel ([page 57](#))

Note

If you are using a VXI mainframe with more than 4 slots, the Agilent E8491 module or VXI imbedded PC must be installed in slot 0. The other 89600 series modules are not required to be installed in slots 1 through 3. However, the modules must be installed relative to each other in the order described in [Figure 3-7](#) through [Figure 3-16](#).

89610 Single-channel DC-40 MHz analyzer

This configuration includes 3 modules, which must be installed in this order:

Table 3-1

Mainframe slot	VXI module
0	Agilent E8491 Interconnect
1	Agilent 89606 Baseband Input
2	Agilent E1438 ADC

Note that this illustration shows an 89606B input module. Your analyzer might include an 89606A input. The configuration is the same for both modules.

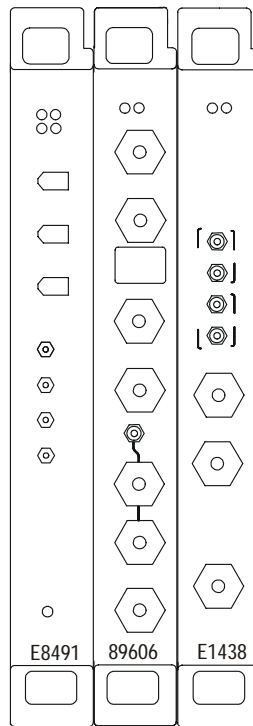


Figure 3-7

89610 DC-40 MHz analyzer

89610 Two-channel DC-40 MHz analyzer

This configuration includes 4 modules, which must be installed in this order:

Table 3-2

Mainframe slot	VXI module
0	Agilent E8491 Interconnect
1	Agilent 89606 Baseband Input
2	Agilent E1438 ADC
3	Agilent E1438 ADC

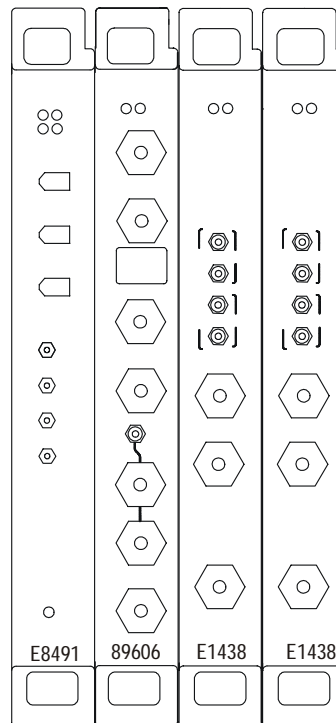


Figure 3-8

89610 Two-channel DC-40 MHz analyzer

Setting Up VXI Hardware
 Install the modules in the mainframe

89611 70 MHz IF analyzer

This configuration includes 3 modules, which must be installed in this order:

Table 3-3

Mainframe slot	VXI module
0	Agilent E8491 Interconnect
1	Agilent 89605 RF Input
2	Agilent E1439 RF ADC

Note that this illustration shows an 89605B input module. Your analyzer might include an 89605A input. The configuration is the same for both modules.

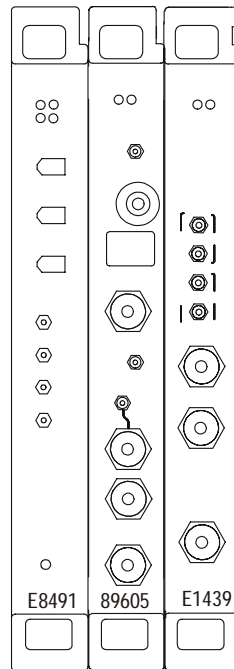


Figure 3-9

89611 analyzer

89611 Two-channel 70 MHz IF analyzer

This configuration includes 5 modules, which must be installed in this order:

Table 3-4

Mainframe slot	VXI module
0	Agilent E8491 Interconnect
1	Agilent 89605 RF Input
2	Agilent E1439 RF ADC
3	Agilent 89605B RF Input
4	Agilent E1439 RF ADC

Note

The 2-channel 89611 requires an 89605B module and an E1439C module for the second channel (slots 3 and 4 in [Figure 3-10](#)). The modules for channel 1 can be either 89605B or A and E1439 C or A.

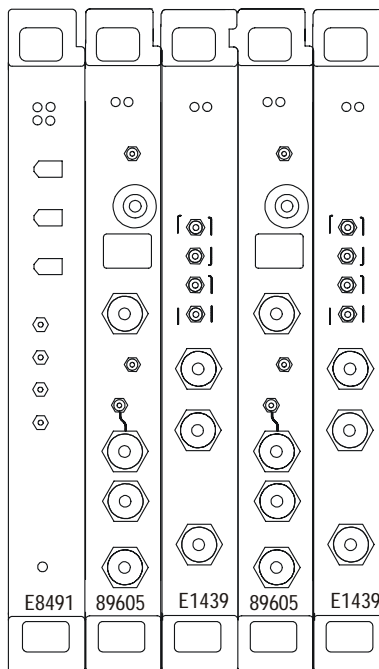


Figure 3-10

2-channel 89611 analyzer

Setting Up VXI Hardware
 Install the modules in the mainframe

89640 DC-2.7 GHz analyzer

This configuration includes 4 modules, which must be installed in this order:

Table 3-5

Mainframe slot	VXI module
0	Agilent E8491 Interconnect
1	Agilent 89605 RF Input
2	Agilent E2730 RF Tuner
3	Agilent E1439 RF ADC

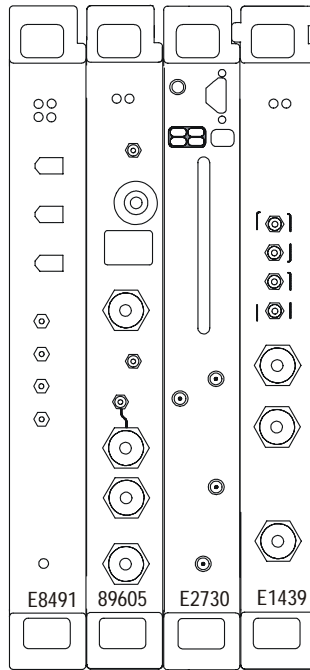


Figure 3-11

89640 DC-2.7 GHz analyzer

89640 DC-2.7 GHz analyzer with second IF/baseband channel

This configuration includes 6 modules, which must be installed in this order:

Table 3-6

Mainframe slot	VXI module
0	Agilent E8491 Interconnect
1	Agilent 89605 RF Input
2	Agilent E2730 RF Tuner
3	Agilent E1439 RF ADC
4	Agilent 89605B RF Input
5	Agilent E1439 RF ADC

Note

The 2-channel 89640 requires an 89605B module and an E1439C module for the second channel (slots 3 and 4 in [Figure 3-12](#)). The modules for channel 1 can be either 89605B or A and E1439 C or A.

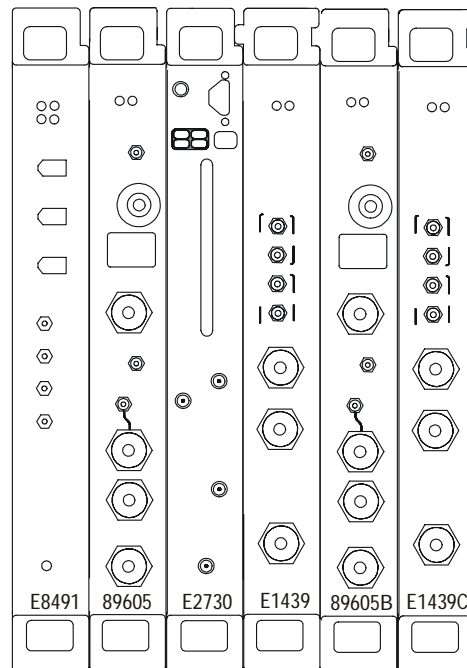


Figure 3-12

89640 DC-2.7 GHz analyzer with second IF/baseband channel

89640 DC-2.7 GHz analyzer with second RF channel

This configuration includes 7 modules, which must be installed in this order:

Table 3-7

Mainframe slot	VXI module
0	Agilent E8491 Interconnect
1	Agilent 89605 RF Input
2	Agilent E2730 RF Tuner
3	Agilent E1439 RF ADC
4	Agilent 89605B RF Input
5	Agilent E2730 RF Tuner
6	Agilent E1439 RF ADC

Note

The 2-channel 89640 requires an E2730B modules for both channels and an 89605B module and an E1439C module for the second channel (slots 3 and 4 in [Figure 3-13](#)). The modules for channel 1 can be either 89605B or A and E1439C or A.

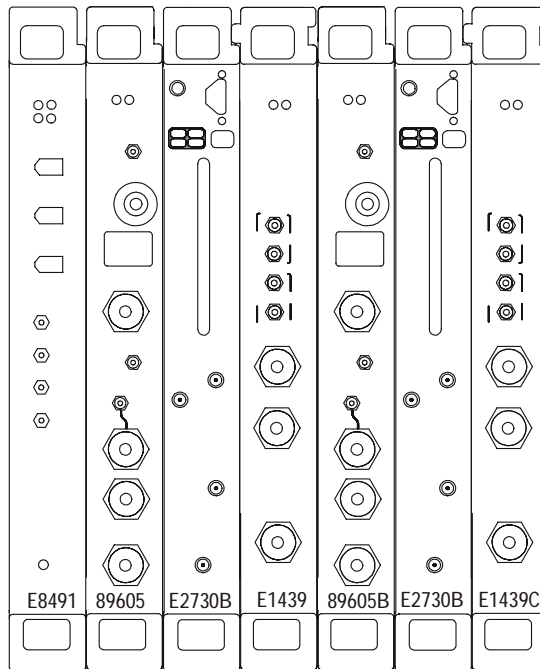


Figure 3-13

89640 DC-2.7 GHz analyzer with second RF channel

89641 DC-6 GHz analyzer

This configuration includes 4 modules, which must be installed in this order:

Table 3-8

Mainframe slot	VXI module
0	Agilent E8491 Interconnect
1	Agilent 89605 RF Input
2	Agilent E2731 RF Tuner
3	Agilent E1439 RF ADC

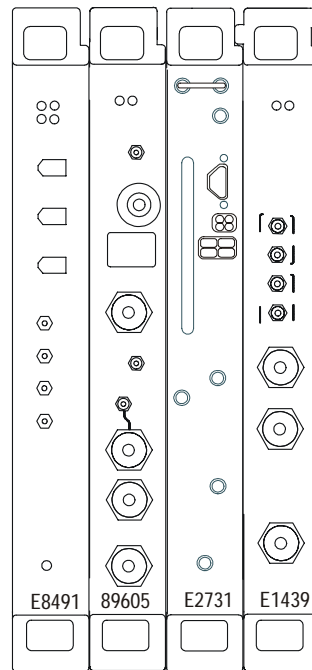


Figure 3-14

89641 DC-6 GHz analyzer

89641 DC-6 GHz analyzer with second IF/baseband channel

This configuration includes 6 modules, which must be installed in this order:

Table 3-9

Mainframe slot	VXI module
0	Agilent E8491 Interconnect
1	Agilent 89605 RF Input
2	Agilent E2731 RF Tuner
3	Agilent E1439 RF ADC
4	Agilent 89605B RF Input
5	Agilent E1439 RF ADC

Note

The 2-channel 89641 requires an 89605B module and an E1439C module for the second channel (slots 3 and 4 in [Figure 3-15](#)). The modules for channel 1 can be either 89605 B or A and E1439 C or A.

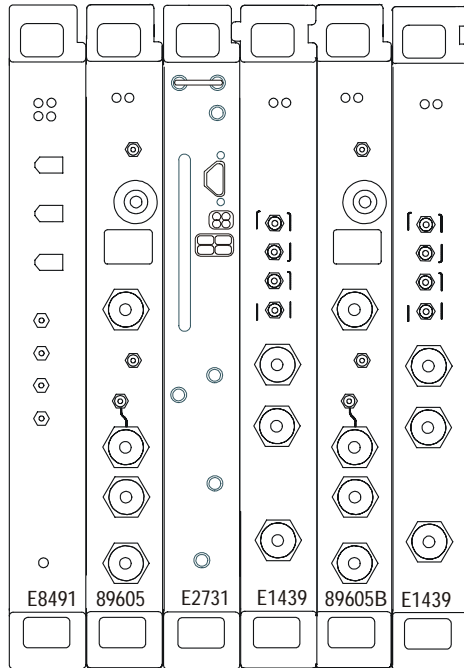


Figure 3-15

89641 DC-6 GHz analyzer with second IF/baseband channel

89641 DC-6 GHz analyzer with second RF channel

This configuration includes 7 modules, which must be installed in this order:

Table 3-10

Mainframe slot	VXI module
0	Agilent E8491 Interconnect
1	Agilent 89605 RF Input
2	Agilent E2731 RF Tuner
3	Agilent E1439 RF ADC
4	Agilent 89605B RF Input
5	Agilent E2731 RF Tuner
6	Agilent E1439 RF ADC

Note The 2-channel 89641 requires an 89605B module, an E2731B module, and an E1439C module for the second channel (slots 3 and 4 in [Figure 3-16](#)). The modules for channel 1 can be either 89605B or A, E2731B or A, and E1439C or A.

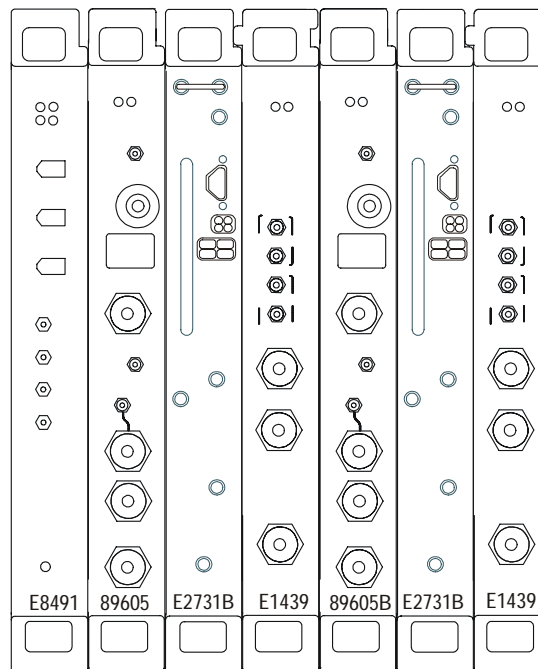


Figure 3-16 89641 DC-6 GHz analyzer with second RF channel

Connect front panel cables

The illustrations on the following pages show the cable connections for 11 configurations of Agilent 89600 series analyzers. Below each illustration is a table listing each cable, termination, and adapter with a description and part number.

For a single-channel 89610A, see [page 59](#).

For a two-channel 89610A, see [page 60](#).

or an 89610A with external down converter, see [page 61](#).

For a single-channel 89611A, see [page 62](#).

For an 89611A with PSA option H70, see [page 63](#)

For a two-channel 89611A, see [page 65](#).

For a single-channel 89640A, see [page 66](#).

For an 89640A with second IF/baseband channel, see [page 67](#).

For an 89640A with second RF channel, see [page 68](#).

For an 89640A with external down converter, see [page 70](#).

For a single-channel 89641A, see [page 71](#).

For an 89641A with second IF/baseband channel, see [page 72](#).

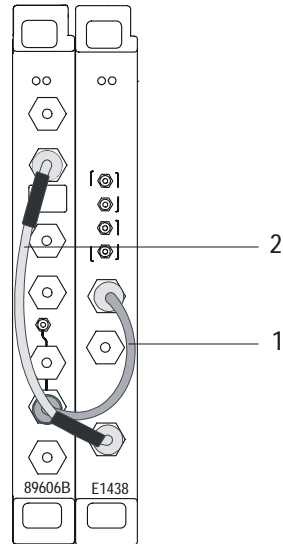
For an 89641A with second RF channel, see [page 73](#).

For an 89641A with external down converter, see [page 75](#).

Note

If you change or replace any cables, be sure to do a calibration to compensate for variance in cable characteristics before you make measurements.

Cable connections, 89610



	Description	Connection	Part number
1	black BNC-BNC cable (172 mm)	89606 10 MHz Ref Out to E1438A Ext Clock/Ref	8120-6237
2	black BNC-BNC cable (267mm)	89606 To ADC Analog In to E1438 Analog In	8121-0133

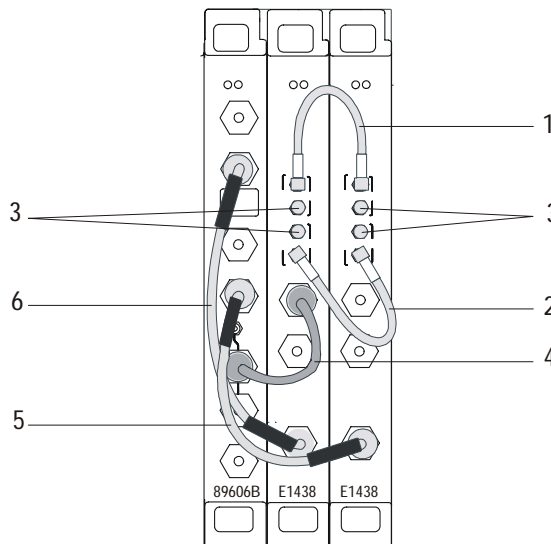
After you have installed and configured the IEEE-1394 interface in your PC, you must connect the IEEE 1394 interface cable between the PC and one of the E8491 module IEEE ports.

Continue with [step 2 b](#) on [page 20](#).

Cable connections, two-channel 89610

The following cable connections for the 2-channel 89610 are especially important:

- You must connect one set of Clock connectors and one set of Sync connectors between the two E1438 modules. The two cables used for these connections must be exactly the same length to avoid timing and synchronization problems.
- You must connect the 10 MHz Ref Out from the 89606 module to the Ext Clock/Ref connector on the E1438 module adjacent to the 89606 module.
- If you use external trigger, you must connect the trigger signal to the channel 1 ADC (E1438) trigger input.

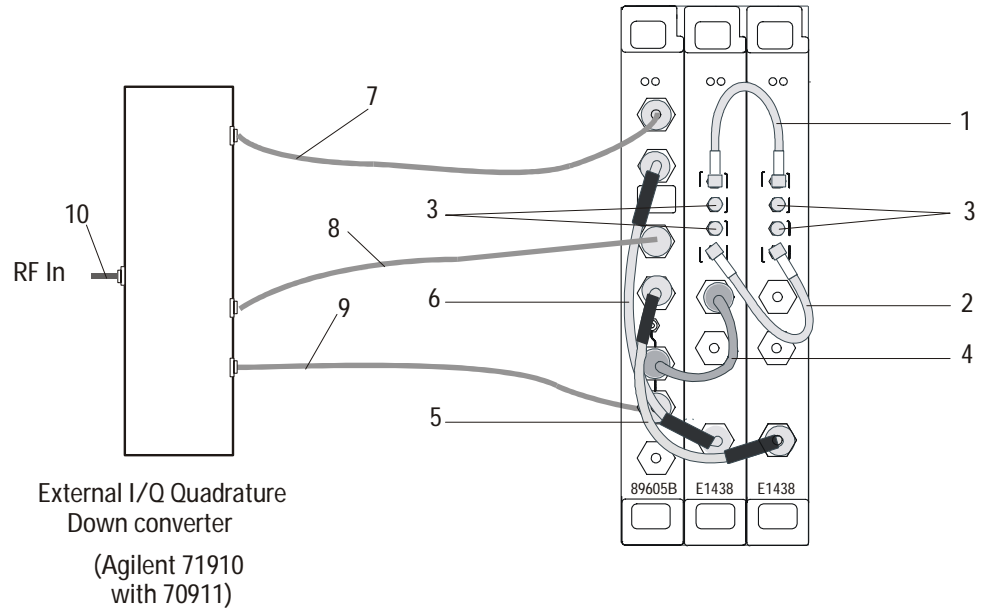


	Description	Connection	Part number
1	orange SMB-SMB cable (100 mm)	E1438 #1 <i>Clock</i> to E1438 #2 <i>Clock</i>	03585-61603
2	orange SMB-SMB cable (100 mm)	E1438 #1 <i>Sync</i> to E1438 #2 <i>Sync</i>	03585-61603
3	50 ohm SMB term (Qty 4)	Unused E1438 <i>Clock</i> & <i>Sync</i> connectors	1250-0676
4	black BNC-BNC cable (172 mm)	89606 <i>10 MHz Ref Out</i> to E1438A #1 <i>Ext Clock/Ref</i>	8120-6237
5	black BNC-BNC cable (215 mm)	89606 <i>To ADC 2 Analog In</i> to E1438A #2 <i>Analog In</i>	8121-0132
6	black BNC-BNC cable (267 mm)	89606 <i>To ADC 1 Analog In</i> to E1438A #1 <i>Analog In</i>	8121-0133

After you have installed and configured the IEEE-1394 interface in your PC, you must connect the IEEE 1394 interface cable between the PC and one of the E8491 module IEEE ports.

Continue with [step 2 b](#) on [page 20](#).

Cable connections, 89610 with external down converter

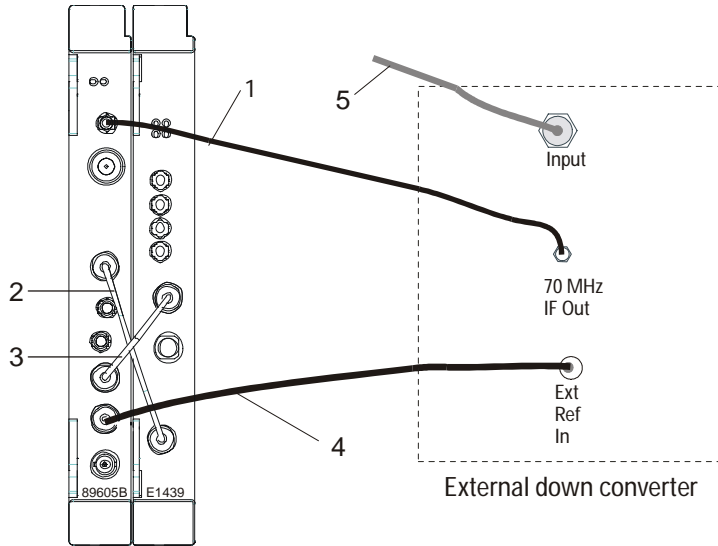


	Description	Connection	Part number
1	orange SMB-SMB cable (100 mm)	1438 #1 to E1438 #2 Clock	03585-61603
2	orange SMB-SMB cable (100 mm)	E1438 #1 to E1438 #2 Sync	03585-61603
3	50 ohm SMB term (Qty 4)	Unused E1438 Clock & Sync connectors	1250-0676
4	black BNC-BNC cable (172 mm)	89606 to E1438 Ext Clock/Ref	8120-6237
5	black BNC-BNC cable (215 mm)	89606 to E1438 #2 Analog In	8121-0132
6	black BNC-BNC cable (267mm)	89606 to E1438 #1 Analog In	8121-0133
7	varies	down converter I Out to 89606 Ch1 In	user supplied
8	varies	down converter Q Out to 89606 Ch2 In	user supplied
9	BNC	89606 10 MHz Ref Out to down converter Ext Ref In	user supplied
10	varies	down converter RF input	user supplied

After you have installed and configured the IEEE-1394 interface in your PC, you must connect the IEEE 1394 interface cable between the PC and one of the E8491 module IEEE ports.

Continue with [step 2 b](#) on [page 20](#).

Cable connections, 89611



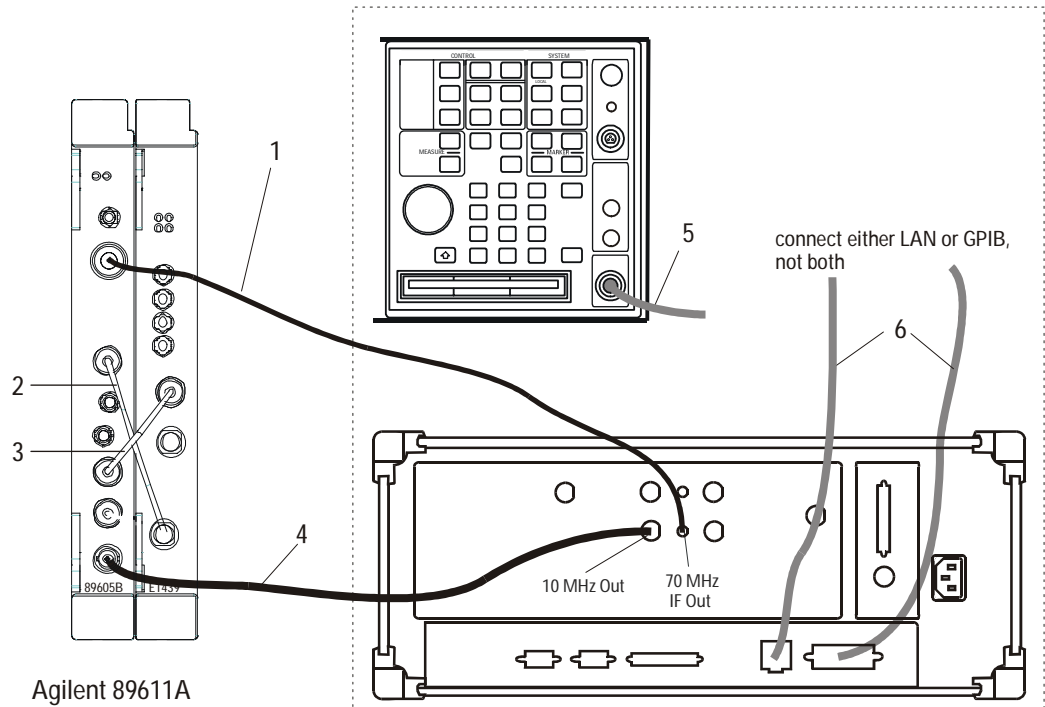
	Description	Connection	Part number
1	SMA-SMA cable (requires a type N-SMA adapter)	from external tuner IF output to 89605 <i>Ch 1 Input</i>	8121-0790 (cable) 1250-1250 (adapter)
2	black BNC-BNC cable (215 mm)	from 89605 <i>To ADC Analog In</i> to E1439 <i>Analog In</i>	8121-0132
3	black BNC-BNC cable (215 mm)	from 89605 <i>10 MHz Ref Out</i> to E1439 <i>Ext Clock/Ref</i>	8121-0132
4	BNC-BNC cable	from 89605 <i>10 MHz Ref Out</i> to external tuner <i>Ext Ref In</i> (or from external tuner <i>10 MHz Ref Out</i> to 89605 <i>Ext Ref In</i>)	user supplied
5	varied	input to down converter	user supplied

After you have installed and configured the IEEE-1394 interface in your PC, you must connect the IEEE 1394 interface cable between the PC and one of the E8491 module IEEE ports.

Continue with [step 2 b](#) on [page 20](#).

Cable connections, 89611 with PSA Option H70

This configuration replaces the VXI tuner module with an Agilent PSA option H70.



Agilent 89611A

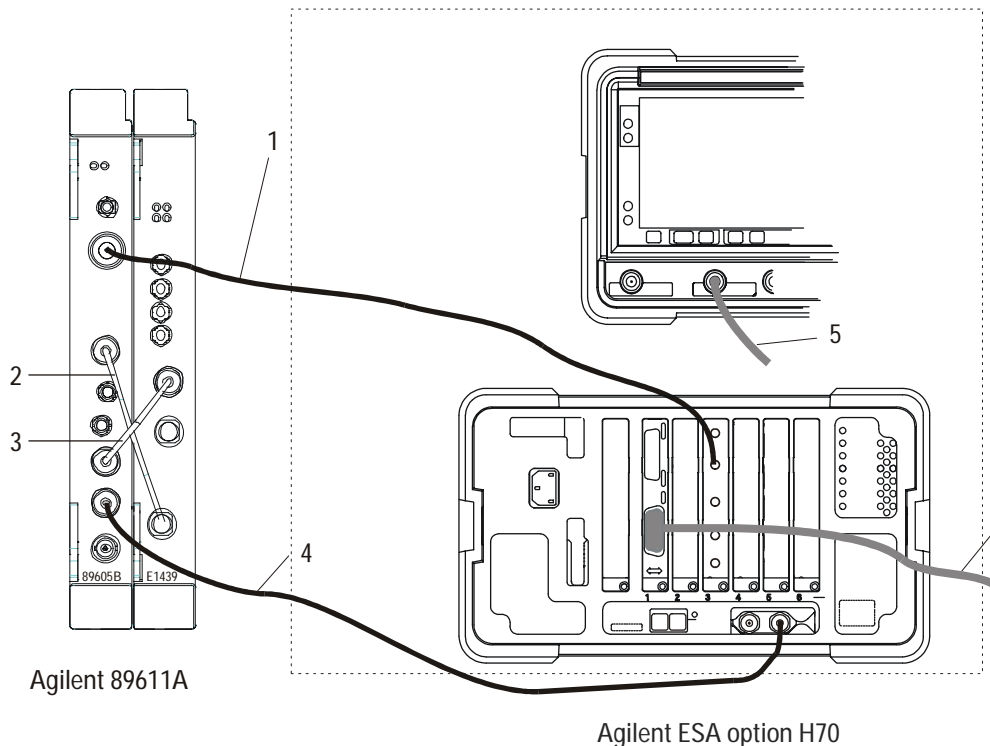
	Description	Connection	Part number
1	SMA-SMA cable with a type N-SMA adapter	from PSA 70 MHz IF output to 89605 <i>Ch 1 Input</i>	8121-0790 (cable) 1250-1250 (adapter)
2	black BNC-BNC cable (215 mm)	from 89605 <i>To ADC Analog In</i> to E1439 <i>Analog In</i>	8121-0132
3	black BNC-BNC cable (215 mm)	from 89605 <i>10 MHz Ref Out</i> to E1439 <i>Ext Clock/Ref</i>	8121-0132
4	BNC-BNC cable	from 89605 <i>10 MHz Ref Out</i> to PSA <i>Ext Ref In</i> (or from PSA <i>10 MHz Ref Out</i> to 89605 <i>Ext Ref In</i>)	user supplied
5	varies	PSA RF input	user supplied
6	LAN or GPIB cable	LAN or GPIB connector to PC (not both)	varies

After you have installed and configured the IEEE-1394 interface in your PC, you must connect the IEEE 1394 interface cable between the PC and one of the E8491 module IEEE ports.

Continue with [step 2 b](#) on [page 20](#).

Cable connections, 89611 with ESA Option H70

This configuration replaces the VXI tuner module with an Agilent ESA option H70.



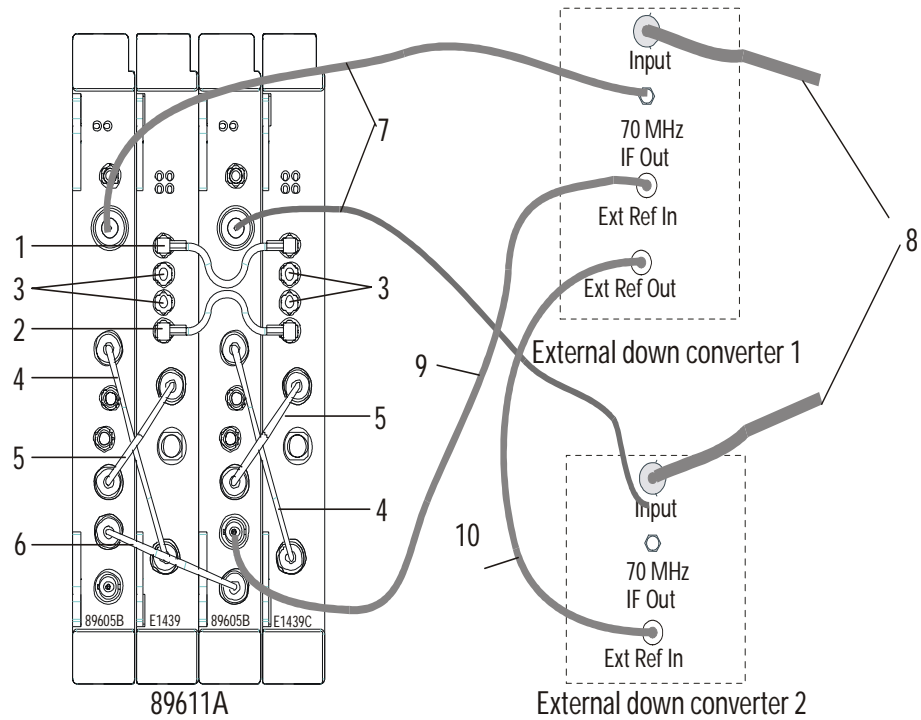
Note that the cards may be installed in a different order in the slots, so the GPIB connector and the 70 MHz Out connector may be in different locations on the rear panel.

	Description	Connection	Part number
1	SMA-SMA cable with a type N-SMA adapter	from ESA 70 MHz IF output to 89605 <i>Ch 1 Input</i>	8121-0790 (cable) 1250-1250 (adapter)
2	black BNC-BNC cable (215 mm)	from 89605 <i>To ADC Analog In</i> to E1439 <i>Analog In</i>	8121-0132
3	black BNC-BNC cable (215 mm)	from 89605 <i>10 MHz Ref Out</i> to E1439 <i>Ext Clock/Ref</i>	8121-0132
4	BNC-BNC cable	from 89605 <i>10 MHz Ref Out</i> to ESA <i>Ext Ref In</i> (or from ESA <i>10 MHz Ref Out</i> to 89605 <i>Ext Ref In</i>)	user supplied
5	varies	ESA RF input	user supplied
6	GPIB cable	ESA GPIB connector to PC	varies

After you have installed and configured the IEEE-1394 interface in your PC, you must connect the IEEE 1394 interface cable between the PC and one of the E8491 module IEEE ports.

Continue with [step 2 b on page 20](#).

Cable connections, two-channel 89611



Note

If you use external trigger, you must connect the trigger signal to the channel 1 ADC (E1439) trigger input.

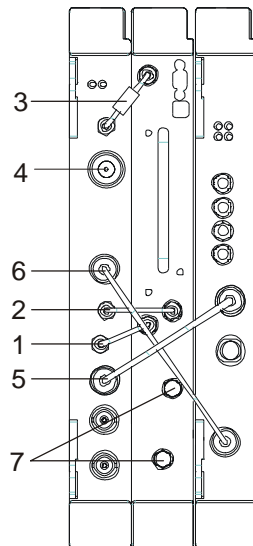
The interconnections for the 10 MHz reference signals can be different, but you must ensure that all the hardware is referenced to one signal.

	Description	Connection	Part number
1	orange SMB-SMB cable (100 mm)	E1439 #1 Clock to E1439 #2 Clock	03585-61603
2	orange SMB-SMB cable (100 mm)	E1439 #1 Sync to E1439 #2 Sync	03585-61603
3	50 ohm SMB term (Qty 4)	Unused E1438 Clock & Sync connectors	1250-0676
4	black BNC-BNC cable (215 mm)	89605 To ADC Analog In to E1439 Analog In	8121-0132
5	black BNC-BNC cable (215 mm)	from 89605 10 MHz Ref Out to E1439 Ext Clock/Ref	8121-0132
6	black BNC-BNC cable (215 mm)	from 89605 1 10 MHz Ref Out to 89605 2 Ext Ref In	8121-0132
7	varies	external down converter 70 MHz IF Out to 89605 Ch 1 Input	user supplied
8	varies	input to down converter	user supplied
9	varies	from 89605 #2 10 MHz Ref Out to external down converter #1 Ext Ref In	user supplied
10	varies	from external down converter #1 10 MHz Ref Out to external down converter #2 Ext Ref In	user supplied

After you have installed and configured the IEEE-1394 interface in your PC, you must connect the IEEE 1394 interface cable between the PC and one of the E8491 module IEEE ports.

Continue with **step 2 b** on **page 20**.

Cable connections, 89640



	Description	Connection	Part number
1	semi-rigid SMA cable	89605 10 MHz Ext Ref Out to E2730 10 MHz Ext Ref	for 89605B, 89605-61693 for 89605A, 89605-61691
2	semi-rigid SMA cable	E2730 70 MHz IF Out to 89605 From 70 MHz IF Out	89605-61691
3	semi-rigid SMA cable	89605 To RF In to E2730 RF In	89605-61692
4	N-to-BNC adapter	89605 Ch 1 Input (user signal)	1250-0780
5	black BNC-BNC cable (215 mm)	89605 10 MHz Ref Out to E1439 Ext Clock/Ref	8121-0132
6	black BNC-BNC cable (215 mm)	89605 To ADC Analog In to E1439 Analog In	8121-0132
7	coax SMA cap	E2730 1st LO In/Out and 2nd LO In/Out	1250-0590

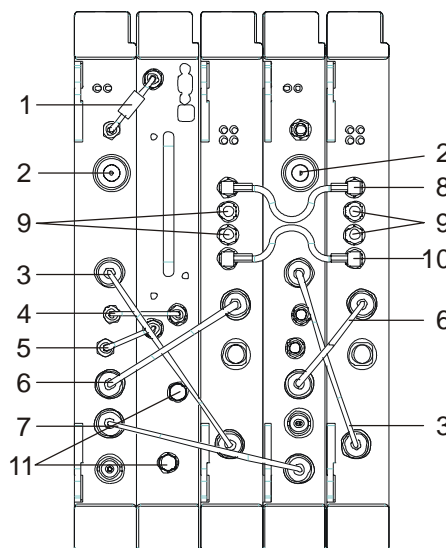
Note

It is important that you use the semi-rigid SMA cables shipped with the analyzer. Using other cables could degrade measurement accuracy.

After you have installed and configured the IEEE-1394 interface in your PC, you must connect the IEEE 1394 interface cable between the PC and one of the E8491 module IEEE ports.

Continue with [step 2 b](#) on [page 20](#).

Cable connections, 89640 with second IF/baseband channel



Note If you use external trigger, you must connect the trigger signal to the channel 1 ADC (E1439) trigger input.

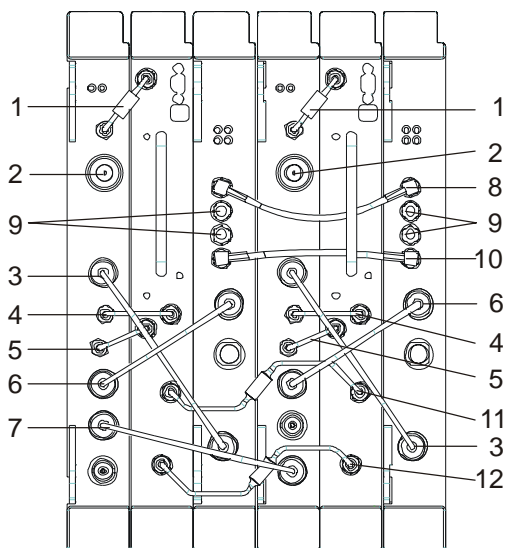
It is important that you use the semi-rigid SMA cables shipped with the analyzer. Using other cables could degrade measurement accuracy.

	Description	Connection	Part number
1	semi-rigid SMA cable	89605 <i>To RF In</i> to E2730 <i>RF In</i>	89605-61692
2	N-to-BNC adapter	89605 <i>Ch 1 Input</i> (user signal)	1250-0780
3	black BNC-BNC cable (215 mm)	89605 <i>To ADC Analog In</i> to E1439 <i>Analog In</i>	8121-0132
4	semi-rigid SMA cable	E2730 <i>70 MHz IF Out</i> to 89605 <i>From 70 MHz IF Out</i>	89605-61691
5	semi-rigid SMA cable	89605 <i>10 MHz Ext Ref Out</i> to E2730 <i>10 MHz Ext Ref</i>	for 89605B, 89605-61693 for 89605A, 89605-61691
6	black BNC-BNC cable (215 mm)	89605 <i>10 MHz Ref Out</i> to E1439 <i>Ext Clock/Ref</i>	8121-0132
7	black BNC-BNC cable (215 mm)	89605-1 <i>10 MHz Ext Ref Out</i> to 89605-2 <i>Ext Ref In</i>	8121-0132
8	orange SMB-SMB cable (100 mm)	E1439 #1 <i>Clock</i> to E1439 #2 <i>Clock</i>	03585-61603
9	50 ohm SMB term (Qty 4)	Unused E1438 <i>Clock & Sync</i> connectors	1250-0676
10	orange SMB-SMB cable (100 mm)	E1439 #1 <i>Sync</i> to E1439 #2 <i>Sync</i>	03585-61603
11	coax SMA cap	E2730 <i>1st LO In/Out</i> and <i>2nd LO In/Out</i>	1250-0590

After you have installed and configured the IEEE-1394 interface in your PC, you must connect the IEEE 1394 interface cable between the PC and one of the E8491 module IEEE ports.

Continue with [step 2 b](#) on [page 20](#).

Cable connections, 89640 with second RF channel



Note

If you use external trigger, you must connect the trigger signal to the channel 1 ADC (E1439) trigger input.

It is important that you use the semi-rigid SMA cables shipped with the analyzer. Using other cables could degrade measurement accuracy.

	Description	Connection	Part number
1	semi-rigid SMA cable	89605 To RF In to E2730 RF In	89605-61692
2	N-to-BNC adapter	89605 Ch 1 Input (user signal)	1250-0780
3	black BNC-BNC cable (215 mm)	89605 To ADC Analog In to E1439 Analog In	8121-0132
4	semi-rigid SMA cable	E2730 70 MHz IF Out to 89605 From 70 MHz IF Out	89605-61691
5	semi-rigid SMA cable	89605 10 MHz Ext Ref Out to E2730 10 MHz Ext Ref	for 89605B, 89605-61693 for 89605A, 89605-61691
6	black BNC-BNC cable (215 mm)	89605 10 MHz Ref Out to E1439 Ext Clock/Ref	8121-0132
7	black BNC-BNC cable (215 mm)	89605-1 10 MHz Ext Ref Out to 89605-2 Ext Ref In	8121-0132
8	orange SMB-SMB cable (100 mm)	E1439 #1 Clock to E1439 #2 Clock	03585-61603
9	50 ohm SMB term (Qty 4)	Unused E1438 Clock & Sync connectors	1250-0676
10	orange SMB-SMB cable (100 mm)	E1439 #1 Sync to E1439 #2 Sync	03585-61603
11	semi-rigid SMA cable	E2730 #1 2nd LO In/Out to E2730 #2 2nd LO In/Out	89605-61696
12	semi-rigid SMA cable	E2730 #1 1st LO In/Out to E2730 #2 1st LO In/Out	89605-61696

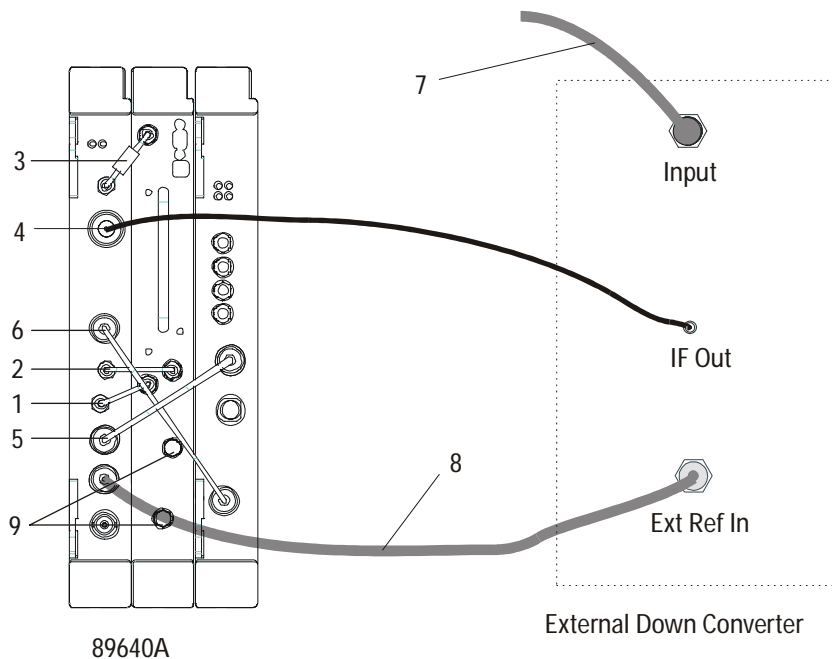
After you have installed and configured the IEEE-1394 interface in your PC, you must connect the IEEE 1394 interface cable between the PC and one of the E8491 module IEEE ports.

Caution

If you reconfigure a 2-RF-channel 89640 to a single-channel configuration, you must connect coax SMA caps (Agilent part number 1250-0590) to the IF connectors on the E7230 module.

Continue with [step 2 b](#) on [page 20](#).

Cable connections, 89640 with external down converter



	Description	Connection	Part number
1	semi-rigid SMA cable	89605 10 MHz Ext Ref Out to E2730 10 MHz Ext Ref	for 89605A, 89605-61691 for 89605B, 89605-61693
2	semi-rigid SMA cable	E2730 70 MHz IF Out to 89605 From 70 MHz IF Out	89605-61691
3	semi-rigid SMA cable	89605 To RF In to E2730 RF In	89605-61692
4	varies	external down converter IF Out to 89605 Ch1 Input	varies
5	black BNC-BNC cable (215 mm)	89605 10 MHz Ref Out to E1439 Ext Clock/Ref	8121-0132
6	black BNC-BNC cable (215 mm)	89605 To ADC Analog In to E1439 Analog In	8121-0132
7	varies	input to external down converter	varies
8	BNC-BNC cable	89605 10 MHz Ext Ref Out to external down converter Ext Ref In	varies
9	coax SMA cap	E2730 1st LO In/Out and 2nd LO In/Out	1250-0590

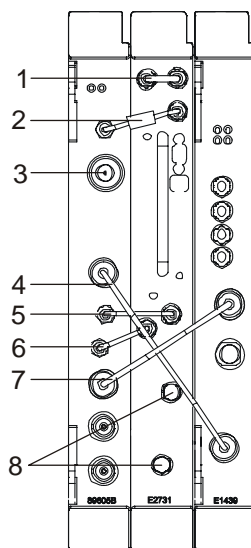
Note

It is important that you use the semi-rigid SMA cables shipped with the analyzer. Using other cables could degrade measurement accuracy.

After you have installed and configured the IEEE-1394 interface in your PC, you must connect the IEEE 1394 interface cable between the PC and one of the E8491 module IEEE ports.

Continue with [step 2 b](#) on [page 20](#).

Cable connections, 89641



Note

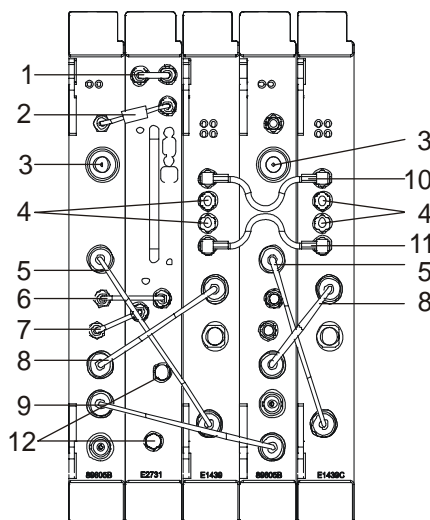
It is important that you use the semi-rigid SMA cables shipped with the analyzer. Using other cables could degrade measurement accuracy.

	Description	Connection	Part number
1	semi-rigid SMA cable	E2731 <i>FE RF Out</i> to E2731 <i>2.7GHz RF In</i>	E2731-61601
2	semi-rigid SMA cable	89605 <i>To RF In</i> to E2731 <i>6 GHz In</i>	89605-61694
3	N-to-BNC adapter	89605 <i>Ch 1 Input</i> (user signal)	1250-0780
4	black BNC-BNC cable (215 mm)	89605 <i>To ADC Analog In</i> to E1439 <i>Analog In</i>	8121-0132
5	semi-rigid SMA cable	E2731 <i>70 MHz IF Out</i> to 89605 <i>From 70 MHz IF Out</i>	89605-61691
6	semi-rigid SMA cable	89605B <i>10 MHz Ext Ref Out</i> to E2731 <i>10 MHz Ext Ref</i>	for 89605B, 89605-61693 for 89605A, 89605-61691
7	black BNC-BNC cable (215 mm)	89605 <i>10 MHz Ref Out</i> to E1439 <i>Ext Clock/Ref</i>	8121-0132
8	coax SMA cap	E2731 <i>1st LO In/Out</i> and <i>2nd LO In/Out</i>	1250-0590

After you have installed and configured the IEEE-1394 interface in your PC, you must connect the IEEE 1394 interface cable between the PC and one of the E8491 module IEEE ports.

Continue with [step 2 b](#) on [page 20](#).

Cable connections, 89641 with second IF/baseband channel



Note

If you use external trigger, you must connect the trigger signal to the channel 1 ADC (E1439) trigger input.

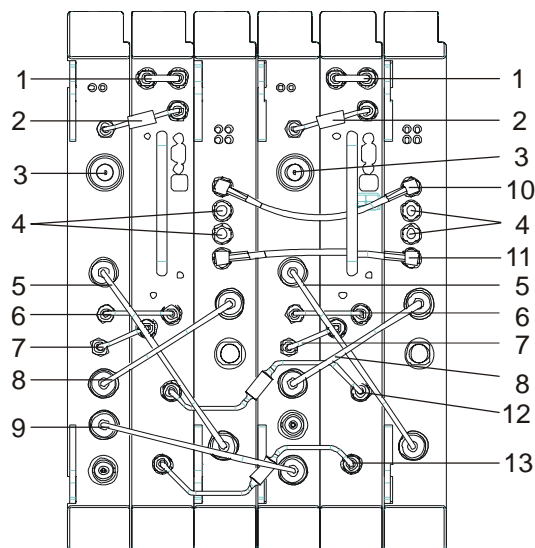
It is important that you use the semi-rigid SMA cables shipped with the analyzer. Using other cables could degrade measurement accuracy.

	Description	Connection	Part number
1	semi-rigid SMA cable	E2731 FE RF Out to E2731 2.7GHz RF In	E2731-61601
2	semi-rigid SMA cable	89605 To RF In to E2731 6 GHz In	89605-61694
3	N-to-BNC adapter	89605 Ch 1 Input (user signal)	1250-0780
4	50 ohm SMB term (Qty 4)	Unused E1439 Clock & Sync connectors	1250-0676
5	black BNC-BNC cable (215 mm)	89605 To ADC Analog In to E1439 Analog In	8121-0132
6	semi-rigid SMA cable	E2731 70 MHz IF Out to 89605 From 70 MHz IF Out	89605-61691
7	semi-rigid SMA cable	89605 10 MHz Ext Ref Out to E2731 10 MHz Ext Ref	for 89605B, 89605-61693 for 89605A, 89605-61691
8	black BNC-BNC cable (215 mm)	89605 10 MHz Ref Out to E1439 Ext Clock/Ref	8121-0132
9	black BNC-BNC cable (215 mm)	89605 #1 10 MHz Ref Out to 89605 #2 Ext Ref In	8121-0132
10	orange SMB-SMB cable (100 mm)	E1438 #1 Clock to E1438 #2 Clock	03585-61603
11	orange SMB-SMB cable (100 mm)	E1438 #1 Sync to E1438 #2 Sync	03585-61603
12	coax SMA cap	E2731 1st LO In/Out and 2nd LO In/Out	1250-0590

After you have installed and configured the IEEE-1394 interface in your PC, you must connect the IEEE 1394 interface cable between the PC and one of the E8491 module IEEE ports.

Continue with [step 2 b on page 20](#).

Cable connections, 89641 with second RF channel



Note

If you use external trigger, you must connect the trigger signal to the channel 1 ADC (E1439) trigger input.

It is important that you use the semi-rigid SMA cables shipped with the analyzer. Using other cables could degrade measurement accuracy.

	Description	Connection	Part number
1	semi-rigid SMA cable	E2731 <i>FE RF Out</i> to E2731 <i>2.7GHz RF In</i>	E2731-61601
2	semi-rigid SMA cable	89605 <i>To RF In</i> to E2731 <i>6 GHz In</i>	89605-61694
3	N-to-BNC adapter	89605 <i>Ch 1 Input</i> (user signal)	1250-0780
4	50 ohm SMB term (Qty 4)	Unused E1439 <i>Clock & Sync</i> connectors	1250-0676
5	black BNC-BNC cable (215 mm)	89605 <i>To ADC Analog In</i> to E1439 <i>Analog In</i>	8121-0132
6	semi-rigid SMA cable	E2731 <i>70 MHz IF Out</i> to 89605 <i>From 70 MHz IF Out</i>	89605-61691
7	semi-rigid SMA cable	89605 <i>10 MHz Ext Ref Out</i> to E2731 <i>10 MHz Ext Ref</i>	for 89605B, 89605-61693 for 89605A, 89605-61691
8	black BNC-BNC cable (215 mm)	89605 <i>10 MHz Ref Out</i> to E1439 <i>Ext Clock/Ref</i>	8121-0132
9	black BNC-BNC cable (215 mm)	89605 #1 <i>10 MHz Ref Out</i> to 89605 #2 <i>Ext Ref In</i>	8121-0132
10	orange SMB-SMB cable (100 mm)	E1438 #1 <i>Clock</i> to E1438 #2 <i>Clock</i>	03585-61603
11	orange SMB-SMB cable (100 mm)	E1438 #1 <i>Sync</i> to E1438 #2 <i>Sync</i>	03585-61603
12	semi-rigid SMA cable	E2731 #1 <i>2nd LO In/Out</i> to E2731 #2 <i>2nd LO In/Out</i>	89605-61696
13	semi-rigid SMA cable	E2731 #1 <i>1st LO In/Out</i> to E2731 #2 <i>1st LO In/Out</i>	89605-61696

After you have installed and configured the IEEE-1394 interface in your PC, you must connect the IEEE 1394 interface cable between the PC and one of the E8491 module IEEE ports.

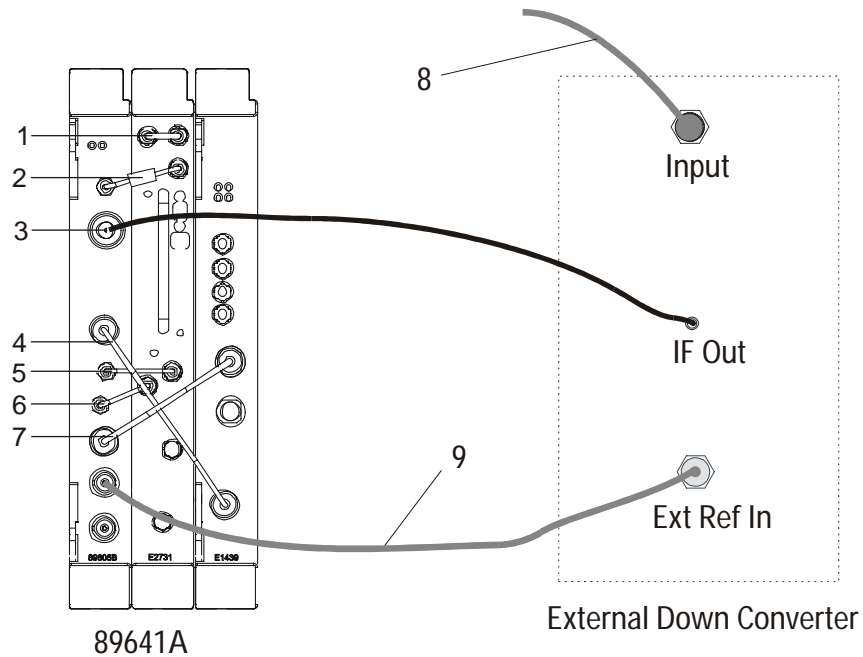
Setting Up VXI Hardware
Connect front panel cables

Caution

If you reconfigure a 2-RF-channel 89641 to a single-channel configuration, you must connect coax SMA caps (Agilent part number 1250-0590) to the IF connectors on the E7231 module.

Continue with [step 2 b on page 20](#).

Cable connections, 89641 with external down converter



	Description	Connection	Part number
1	semi-rigid SMA cable	E2731 FE RF Out to E2731 2.7 GHz In	E2731-61601
2	semi-rigid SMA cable	89605 To RF In to E2731 RF In	89605-61692
3	varies	external down converter IF Out to 89605 Ch1 Input	varies
4	black BNC-BNC cable (215 mm)	89605 To ADC Analog In to E1439 Analog In	8121-0132
5	semi-rigid SMA cable	E2731 70 MHz IF Out to 89605 From 70 MHz IF Out	89605-61691
6	semi-rigid SMA cable	89605 10 MHz Ext Ref Out to E2731 10 MHz Ext Ref	for 89605A, 89605-61691 for 89605B, 89605-61693
7	black BNC-BNC cable (215 mm)	89605 10 MHz Ref Out to E1439 Ext Clock/Ref	8121-0132
8	varies	input to external down converter	varies
9	BNC-BNC cable	89605 10 MHz Ext Ref Out to external down converter Ext Ref In	varies
9	coax SMA cap	E2731 1st LO In/Out and 2nd LO In/Out	1250-0590

Note

It is important that you use the semi-rigid SMA cables shipped with the analyzer. Using other cables could degrade measurement accuracy.

After you have installed and configured the IEEE-1394 interface in your PC, you must connect the IEEE 1394 interface cable between the PC and one of the E8491 module IEEE ports.

Continue with [step 2 b](#) on [page 20](#).

Setting Up VXI Hardware
Connect front panel cables

4 **Installing Agilent IEEE 1394 Interfaces in Computers**

Introduction

This chapter includes instructions on installing the IEEE 1394 to VXI interface card in your computer. See the “Installation Overview” chapter ([page 20](#)) to learn which procedures you must perform to install your Agilent 89600-series product.

For instructions on installing the Agilent IEEE 1394 Host Adapter in your desktop computer, go to [page 79](#).

For instructions on installing the Agilent IEEE 1394 PCMCIA Cardbus in your laptop computer, go to [page 85](#).

If your system includes a VXI embedded computer, skip this chapter and continue with [step 3 b on page 21](#).

Install the Agilent IEEE 1394 host adapter in your computer

The IEEE 1394 adapter shipped as Option 001 to the E8491 is an OHCI-compatible PCI-to-IEEE 1394 Host Adapter. You must install the following components:

- Host adapter card ([step 1](#) through [step 7](#))
- 8-wire power splitter cable between the adapter and the computer's internal power supply ([step 6](#))
- Gray 4.5 meter interface cable between the computer and the VXI mainframe

Caution

Refer to your computer's documentation for specific instructions about the installation of PCI adapters.

Note

If your personal computer (PC) currently has a Solectron OHCI403 PCI-to-IEEE 1394 host adapter, a later version OHCI0-compatible PCI-to-IEEE 1394 host adapter, or a built-in IEEE 1394 port, continue with [step 3 b](#) on [page 21](#).

Installing Agilent IEEE 1394 Interfaces in Computers
Install the Agilent IEEE 1394 host adapter in your computer

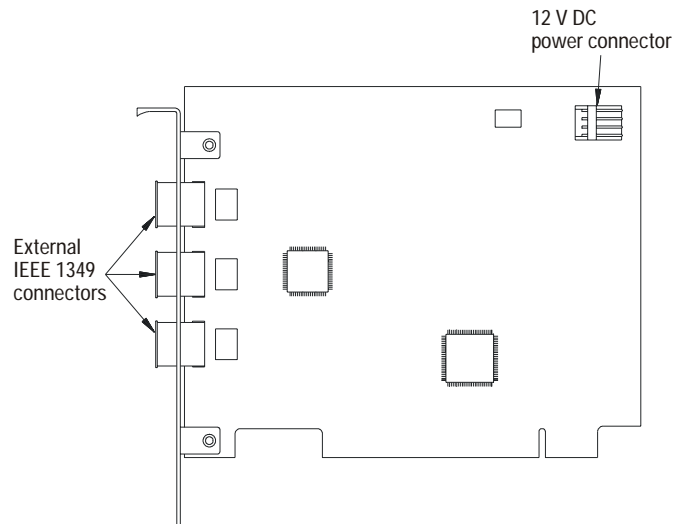


Figure 4-1 Layout of a Typical OHCI-Compatible PCI-to-IEEE Host Adapter.

WARNING Shut down, turn off and disconnect the power to your computer and to any peripheral devices before installing the host adapter.

AVERTISSEMENT Il faut éteindre et déconnecter l'alimentation de votre ordinateur et tout autre périphériques avant d'installer l'adaptateur IEEE 1394.

WARNUNG Bevor der Host Adapter installiert wird, muß der Computer heruntergefahren und ausgeschaltet werden, sowie der Computer und alle Peripheriegeräte vom Stromnetz getrennt werden.

注意 ホストアダプターをインストールする前に、コンピューターとすべての周辺機器の電源を切ってください。

Caution To protect circuits from static discharge, observe anti-static techniques whenever handling the Agilent 89600-series VXI modules.

1. Remove the computer chassis cover to expose the expansion slots and external access covers.

2. Locate an unused, unobstructed PCI bus expansion slot (Figure 4-2) that supports bus mastering. (PCI slots are usually white or ivory.) See your computer documentation to determine if the PCI slot supports bus mastering.

Caution

It is very important that the slot supports bus mastering. If it does not, you will be unable to install the IO libraries that are necessary for communication between the computer and the VXI hardware.

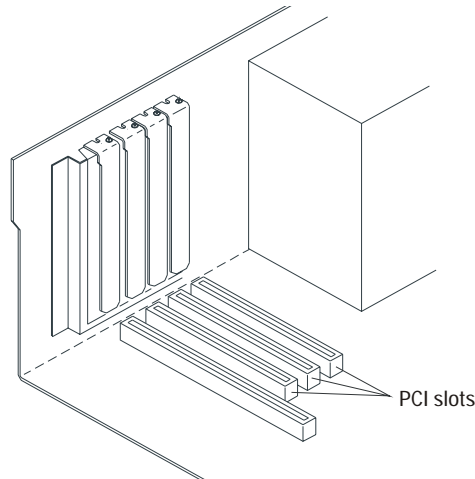


Figure 4-2 Locating a PCI bus Expansion Slot.

Note

Many computer PCI systems have one pair of ISA and PCI slots close to each other. This saves space and allows you to install either an ISA card or a PCI card in the slot pair.

Installing Agilent IEEE 1394 Interfaces in Computers
Install the Agilent IEEE 1394 host adapter in your computer

3. Remove the corresponding expansion slot cover from the computer chassis (Figure 4-3).

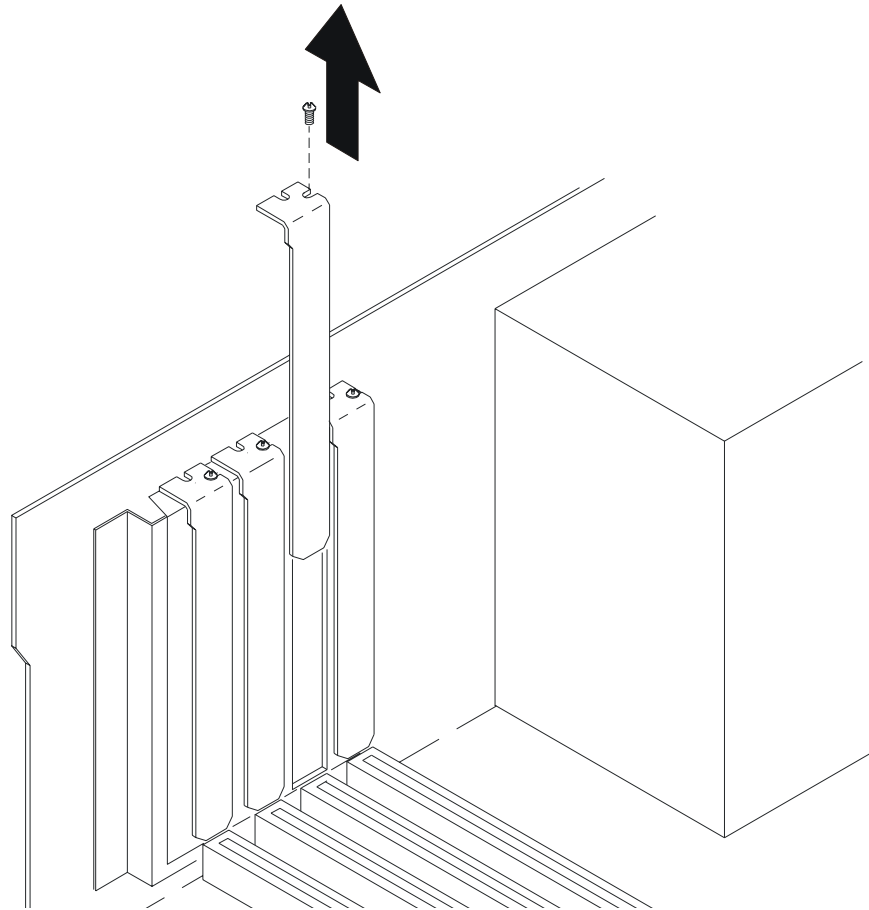


Figure 4-3 Removing the PC Expansion Slot Cover.

4. Align the bus contacts on the bottom of the host adapter with the PCI bus slot. Carefully, but firmly, press the adapter into the slot (Figure 4-4).

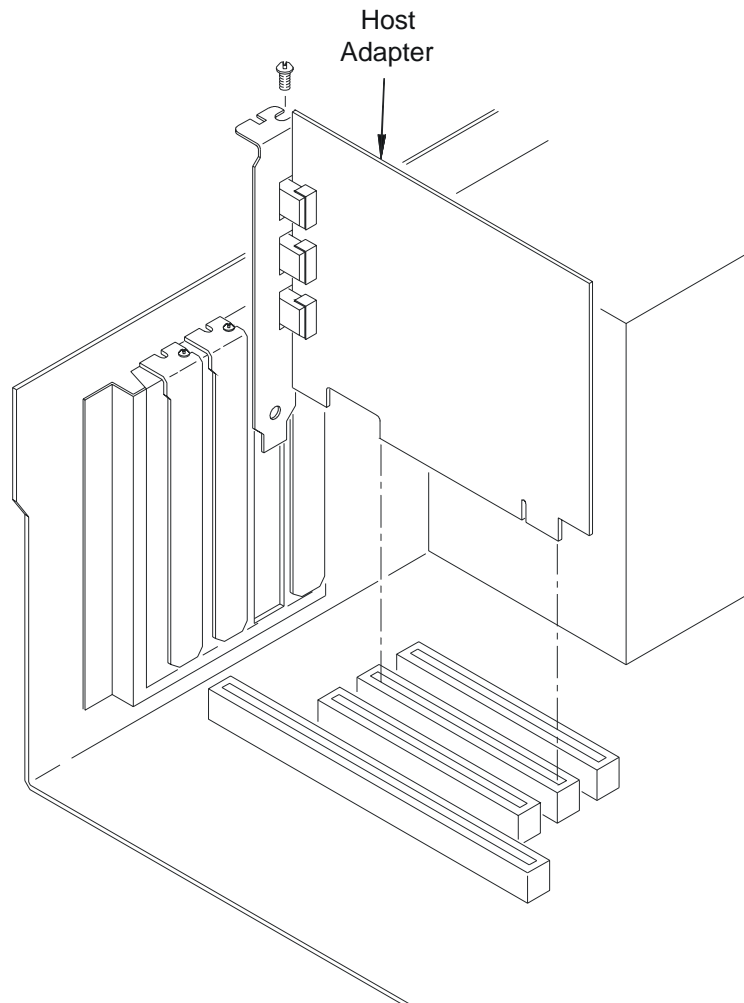


Figure 4-4 Installing the Host Adapter.

5. Secure the host adapter bracket to the computer chassis with the screw from the expansion slot cover removed in step 3.

Installing Agilent IEEE 1394 Interfaces in Computers
Install the Agilent IEEE 1394 host adapter in your computer

6. Connect the power splitter cable between the adapter and the PC as shown in [Figure 4-5](#). (Your computer may already contain a power cable you can connect to the PCI card. If this is the case, connect that cable and do not use the cable that was shipped with the 1394 PCI card.)

The tab on the smaller connector goes away from the PC board. You may need to disconnect the cable from the power supply to one of the disk drives and insert the splitter cable. You can then connect the disk drive to the splitter cable. If you need more information, refer to your computer's documentation on installing PCI cards.

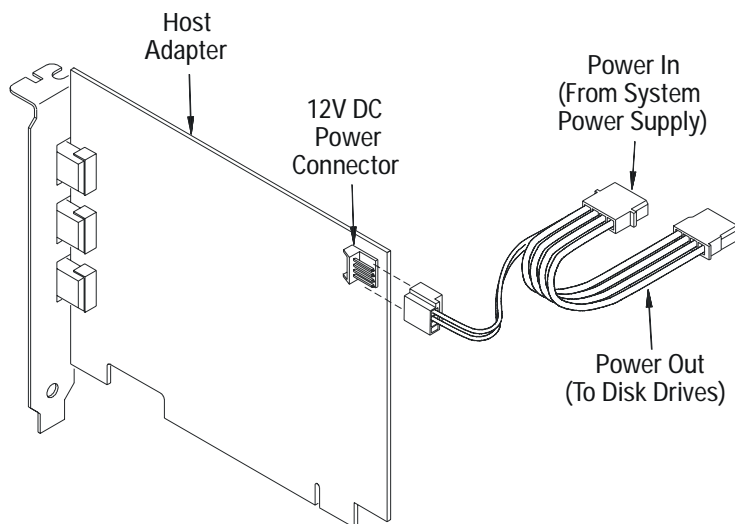


Figure 4-5

Connecting the Power Cable Between the PC and the Host Adapter.

7. If you need to install a GPIB or LAN interface in your PC, continue with [step 3 b](#) on [page 21](#).

Otherwise, replace the computer cover. Reconnect the power cord and any other accessories you disconnected, then continue with [step 3 b](#) on [page 21](#).

If you encounter problems installing the driver, examine the files on the Installation CD-ROM in the `iolibs\readme` directory for troubleshooting information.

Install the Agilent IEEE 1394 PCMCIA cardbus in your computer

Note

For a list of supported IEEE 1394 interfaces, see <http://www.agilent.com/find/iolib> or contact your local Test and Measurement Call Center or sales office.

You must have set up Windows 2000 on your laptop, installed 89600 software ([page 24](#)), and setup your VXI measurement hardware ([page 40](#)) before installing the IEEE 1394 card. Follow these steps:

1. Shut down or turn off the computer.
2. Plug in the IEEE 1394 card, following the instructions that came with the card.
3. Go to the next page.

Install drivers for IEEE 1394 and E8491

Before following these steps, be sure that your VXI hardware is installed, the mainframe is connected to your computer, and the mainframe is on.

1. If the Found New Hardware Wizard appears and prompts you to install the driver for an “OHCI Compliant IEEE 1394 Host Controller”, you must get and install the drivers for this card from the Windows 2000 CD that came with your computer (or from the CD that came with the IEEE Host Controller).

Note

These drivers may already be installed on your computer, and in that case, the Found New Hardware Wizard for this device will not appear.

2. If the Found New Hardware Wizard does not prompt you to install a driver for the 8491, click **Start > Settings > Control Panel > Add/Remove Programs**. If the E8491 is listed, the driver has already been installed.
3. If the Found New Hardware Wizard prompts you to install a driver for the 8491, you can install this driver from the 89600 Installation CD. Click **Next**.
4. In the next dialog box, select **Search** for suitable driver. Click **Next**.
5. In the next dialog box, select **CD-ROM**. Insert the 89600 Installation CD in the CD drive. Click **Next**. The wizard searches for the driver and configures the hardware.

Note

The file you need from the CD-ROM is `iolib\Windows 2000\1394ipt.inf`.

6. If the 89600 Installation Manager window appears, close it. Return to the Found New Hardware Wizard and Click **Finish**.

If you encounter problems installing the driver, examine the files on the Installation CD-ROM in the `iolib\readme` directory for troubleshooting information.

Continue with [step 3 b on page 21](#).

5 **Installing GPIB and LAN Interface Cards**

Introduction

This chapter includes general instructions for installing GPIB and LAN interface cards in your computer and connecting instruments to your computer.

Desktop computers require a PCI High-Performance GPIB card. Laptop computers require a GPIB Interface for PCMCIA. For a list of supported models, see the *89600 Series Vector Signal Analyzers Configuration Guide* on the 89600 web page at <http://www.agilent.com/find/89600>.

For a GPIB interface on a desktop computer, go to [page 89](#).

For a GPIB interface on a laptop computer, go to [page 90](#).

For a LAN interface, go to [page 91](#).

For a LAN-to-GPIB gateway, go to [page 92](#).

GPIB on a desktop PC

If the GPIB interface card has not been installed in your PC, install it now, following the instructions that came with the card. If you need to install other interface cards, do not put the cover back on your computer until you have installed those cards.

Note

If you control other GPIB instruments or devices from this computer, see [page 174](#) for information on excluding those devices from the 89600 identification process.

If you will also be communicating with instruments via LAN, continue on [page 91](#). Otherwise, continue with [step 3 c](#) on [page 21](#).

GPIB on a laptop PC

If the GPIB PCMCIA interface card has not been installed in your PC, install it now, following the instructions that came with the card. For a National Instruments GPIB card, be sure to install the NI 488.2 software first, then reboot your computer and install the interface card.

Note

If you control other GPIB instruments or devices from this computer, see [page 174](#) for information on excluding those devices from the 89600 identification process.

If you will also be communicating with instruments via LAN, continue on [page 91](#). Otherwise, continue with [step 3 c](#) on [page 21](#).

LAN

If the LAN interface is not already installed in your computer, install it now, following the instructions that came with the interface.

Note

If your computer and the instrument are connected to a building LAN, you may need to check with your network administrator to verify that the IP addresses for your computer and the instrument meet requirements.

Continue with [step 3 c on page 21](#).

LAN-to-GPIB gateway

1. Connect the lan cable to the E2050 and a GPIB cable from the E2050 to your GPIB instrument. Connect power to the E2050.
2. Do not configure the E2050. You will be instructed to do this later.

Continue with [step 3 c on page 21](#).

6 **Configuring IO Interfaces**

Introduction

This chapter includes instructions for configuring your computer to communicate with hardware via IEEE-1394, LAN, or GP-IB interfaces. See chapter 1, “Installation Overview” ([page 20](#)) to learn which procedures you must perform to install your Agilent 89600 series product.

Note

Do not configure more than one interface to point to a single instrument, either from a single computer or from multiple computers. For example, if your instrument is on a LAN, do not point to it from two computers simultaneously.

If your measurement is an Agilent Infiniium oscilloscope, skip this chapter and follow the instructions in [Chapter 7, “Configuring Infiniium Scopes.”](#)

For IEEE-1394 to VXI interface, start on [page 95](#).

For LAN interface, start on [page 98](#).

For LAN/GPIB gateway (portal) interface, start on [page 105](#).

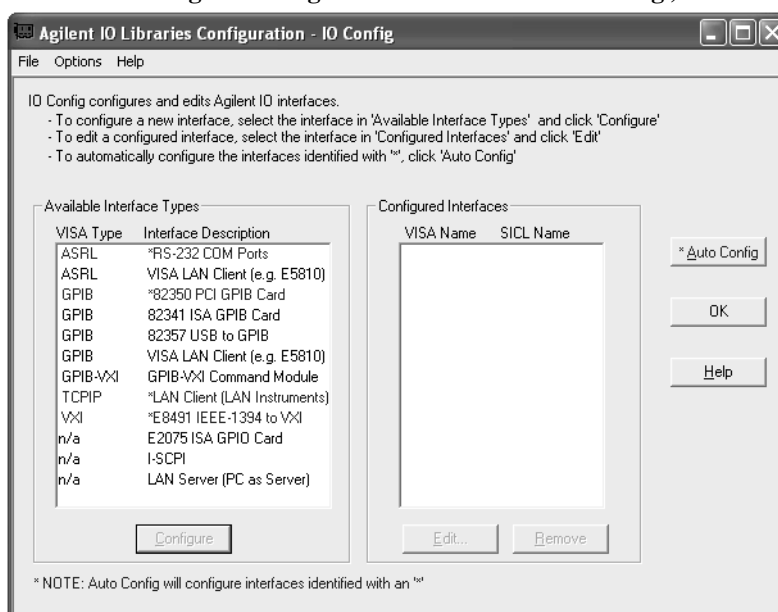
For USB/GPIB interface, start on [page 108](#).

For GPIB interface, start on [page 109](#).

Configure VXI interface

For more information about VXI interfaces, see **Configuring VXI Interfaces** in the “Configuring IO Interfaces” chapter of the *Agilent IO Libraries Installation and Configuration Guide for Windows*. You can find the PDF of this manual at Program Files\Agilent\IO Libraries\Manuals\install.pdf.

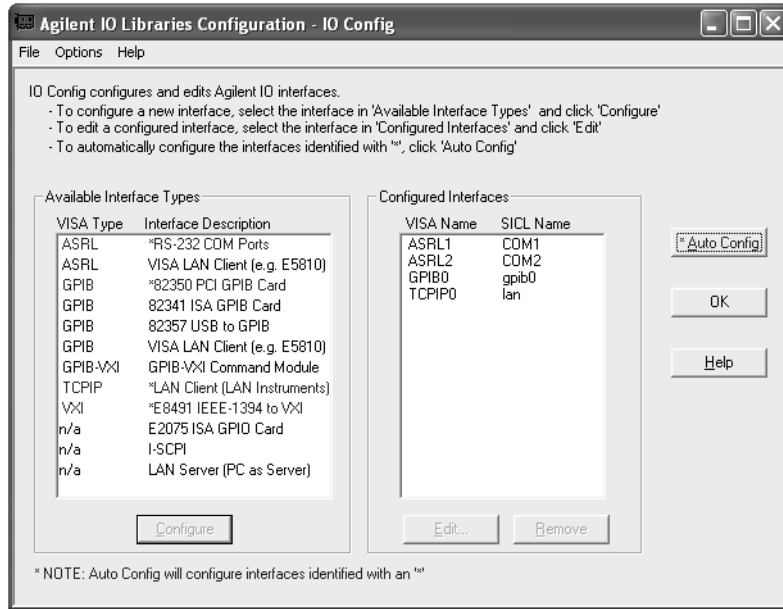
1. After you have installed the IEEE 1394 interface card in your PC, connect the IEEE 1394 cable from the computer to the E8491 module in the VXI mainframe. Power on the computer and the VXI mainframe.
2. Run IO Config:
 - a. Click the IO icon in the task bar, then click **Run IO Config**.
(Or click **Start > Programs > Agilent IO Libraries > IO Config**.)



Configuring IO Interfaces
 Configure VXI interface

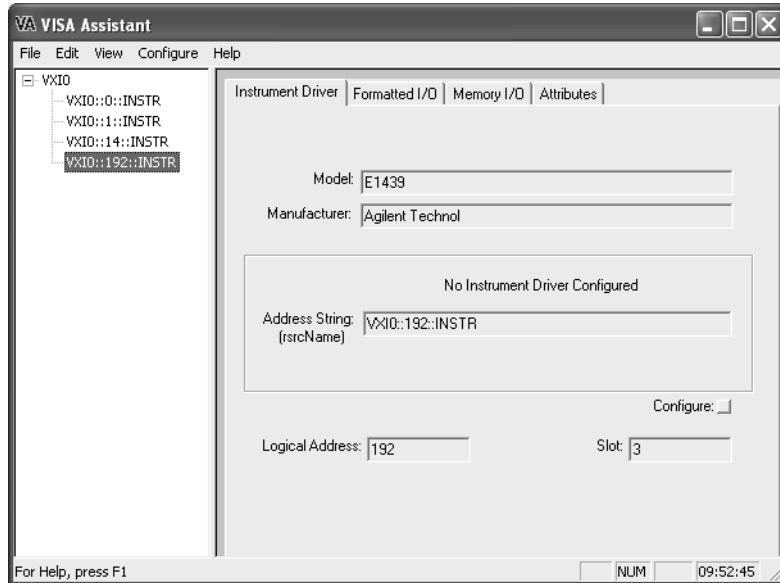
- b. Click **Auto Config**.

The Configured Interfaces list includes the VXI mainframe, as well as other IO interfaces on your PC. (This example includes a GPIB interface and a LAN interface, as well as the VXI interface).



3. If you want to verify that the computer recognized your VXI mainframe, run VISA Assistant:

- a. Click the **IO** icon in the task bar and **Run VISA Assistant**, or click **Start > Programs > Agilent IO Libraries > VISA Assistant**.



- b. VISA Assistant lists your VXI mainframe and the modules it contains. This example shows VXI mainframe VXI0, with 4 modules. The highlighted module is an Agilent E1439 in slot 3.

- c. Close VISA Assistant (click the **X** in the upper right corner).

If you will also be communicating with measurement via LAN, continue on [page 98](#).

If you will also be communicating with measurement via a LAN-to-GPIB portal, continue on [page 105](#).

If you will also be communicating with measurement via GPIB, continue on [page 109](#).

If you will not be using any other measurement hardware, continue with [step 5](#) on [page 22](#).

Configure LAN interface

Note

The purpose of this chapter is to guide you through the specific setup required to get your computer and instrument configured properly. For more detailed information on IO configuration, refer to the documentation for the IO libraries (click the IO icon, then click View Documentation).

If your measurement is an Agilent Infiniium oscilloscope, skip this chapter and follow the instructions in [Chapter 7, “Configuring Infiniium Scopes.”](#)

For more information about LAN interfaces, see **Configuring LAN Interfaces** in the “Configuring IO Interfaces” chapter of the *Agilent IO Libraries Installation and Configuration Guide for Windows*. You can find the PDF of this manual at Program Files\Agilent\IO Libraries\Manuals\install.pdf.

You must ensure that the IP addresses for your computer and measurement hardware are compatible, then configure the LAN interface. The IP address consists of 4 groups of numbers separated by periods (for example 192.192.192.25).

Follow these instructions to configure your LAN interface:

1. Set the IP address, using the appropriate set of instructions:
 - IP address for computer on Local Area network or IP address for computer cable ([page 99](#))
 - or*
 - IP address for computer with crossover cable ([page 100](#))
2. Run IO Config ([page 102](#))

IP address for computer on Local Area Network

1. If your computer is connected to a Local Area Network, have your network administrator assign an IP address for your hardware that will work with your computer. (The network administrator can also tell you if you need to set Subnet Masks.)

- a. Set the IP address for the measurement hardware.

For the E4406 or the PSA, press **System > Config IO > IP address**, type the new address using the number keypad, and press **Enter**.

- b. Click in the Subnet Mask box.

For the E4406 only, if the IP address begins with “10.”, set the subnet mask to “255.0.0.0”. If the E4406 IP address begins with anything other than “10.”, set the subnet mask to “255.255.0.0”. (Press **System > Config I/O > Subnet Mask**, type the new address using the number keypad, and press **Enter**.)

For all other instruments, accept the default numbers that appear for the subnet mask.

Click **OK** and close all dialog boxes.

- c. If you are prompted to reboot your computer, do so now.
2. Be sure that both the instrument and your computer are connected to the LAN.
3. Cycle power on the measurement hardware (such as the E4406 or PSA).
4. Continue with Run IO Config on [page 102](#).

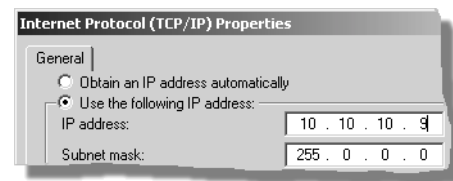
IP address for computer with crossover cable

1. If your computer is not on a Local Area Network and you will be connecting directly to the hardware using a crossover cable, perform these steps:
 - a. Determine the IP address for your computer. Click **Start > Run**. Type `cmd` and click **OK**. At the DOS prompt, type `ipconfig` and press **Enter**. If an IP address is not listed, or if the address is 0.0.0.0, go to [step d](#). If a non-zero IP address is listed, leave it and continue with [step b](#).
 - b. Set the IP address on the hardware so that the first 3 sections of the IP address are the same as for the computer, and the last section is 1 greater than that for the computer. (For example, if the computer IP address is 192.192.192.25, set the hardware IP address to 192.192.192.26.)

To change the E4406A or PSA IP address, press **System > Config I/O > IP address**, type the new address using the number keypad, and press **Enter**.

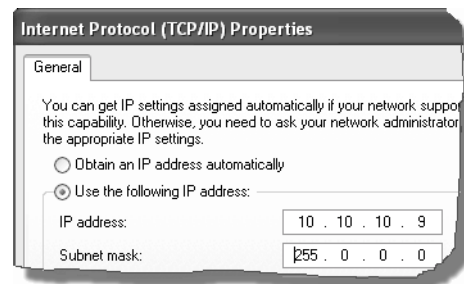
- c. Continue with [step e](#).
- d. Find the IP address for the hardware (for the E4406 or PSA, press **System > Config I/O > IP address**). Set the IP address for the computer so that the first 3 sections are the same as for the hardware, and the last section is 1 lower than for the hardware. (For example, if the hardware IP address is 10.10.10.10, set the computer address to 10.10.10.9.)

For Windows 2000, right click **My Network Places**, click **Properties**, right click **Local Area Network**, click **Properties > Internet Protocol (TCP/IP) > Properties > Use the following IP address**.



or

For Windows XP, right click **My Network Places**, click **Properties**, right click **Local Area Connection**, click **Properties**, click **Internet Protocol (TCP/IP) > Properties > Use the following IP address**.



Type the address in the box, using periods (.) to separate the sections.

- e. Click in the Subnet Mask box.

For the E4406 only, if the IP address begins with “10.”, set the subnet mask to “255.0.0.0”. If the E4406 IP address begins with anything other than “10.”, set the subnet mask to “255.255.0.0”. (Press **System > Config I/O > Subnet Mask**, type the new address using the number keypad, and press **Enter**.)

For all other instruments, accept the default numbers that appear for the subnet mask.

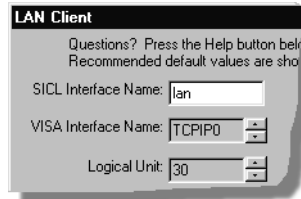
Click **OK** and close all dialog boxes.

- f. If you are prompted to reboot your computer, do so now.

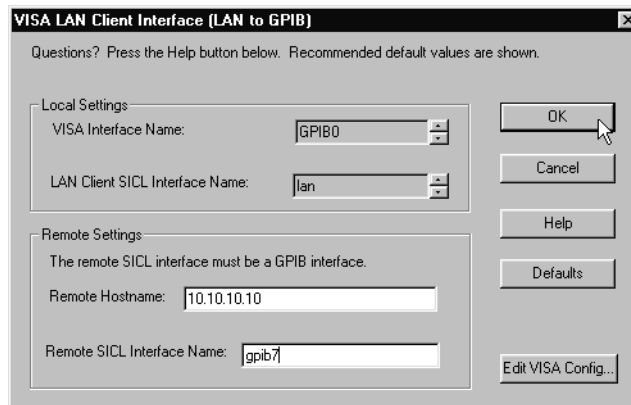
2. Connect the crossover cable between the computer and the instrument.
3. Cycle power on the measurement hardware (such as the E4406 or PSA).
4. Continue with Run IO Config on the next page.

Run IO Config

1. Run the Agilent IO Libraries IO Configuration tool.
Click the IO icon in the task bar (see right), then click **Run IO Config**.
(Or click **Start > Programs > Agilent IO Libraries > IO Config**.)
2. Setup the LAN Client.
 - a. Click **LAN Client > Configure**.
 - b. Leave the default selections in the LAN Client dialogue box.
 - c. Remember the name in the SICL Interface Name box.



- d. Click **OK**.
3. For ESG and PSG sources you will control via LAN interface, go to [step 5](#). For all other instruments, continue with [step 4](#).
4. Setup the VISA LAN Client.
 - a. Click **VISA LAN Client > Configure**.

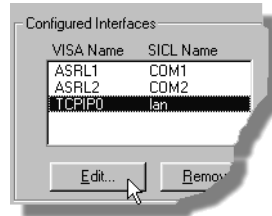


- b. Enter the instrument host name or IP address in the Remote Hostname box. If you are using a crossover cable, you must use the IP address.
(To find the host name and the IP address for the E4406 or the PSA, press **System > Config I/O**.)

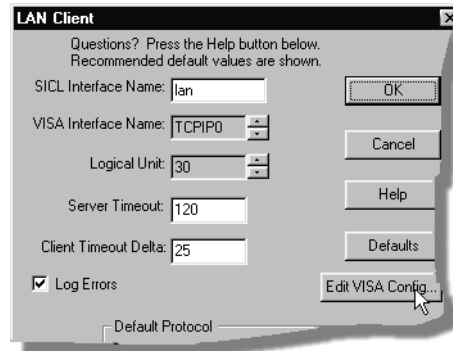
Note

If you have problems, see your LAN system administrator about internet protocol (IP) addresses. Your LAN system administrator can also tell you if you must set the gateway address and subnet mask.

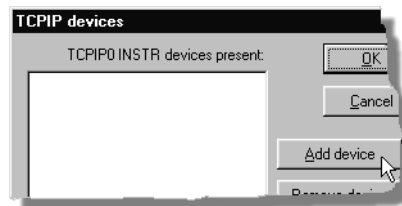
- c. Set the Remote SICL Interface Name to **gpib7**. (This must be gpib7, not hpib7.)
 - d. Confirm that the entry in the SICL LAN Interface box matches the SICL Interface Name that you noted in [step 2](#).
 - e. Remember the VISA Interface Name.
 - f. Click **OK > OK**.
 - g. Continue with [step 6](#).
5. For ESG and PSG sources with LAN connections, configure the TCPIP connection.
- a. In the Configured Interfaces list, click **TCPIP0 lan**.



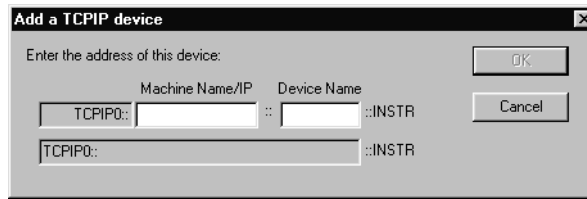
- b. Click **Edit**.



- c. Click **Edit VISA Config...**



- d. Click **Add device**.



- e. In the Machine Name/IP text box, type the IP address or Host Name for the ESG or PSG.
To find the IP address for the ESG or PSG, press **Utility > GPIB/RS-232/LAN > LAN Setup**.
- f. Click **OK > OK > OK > OK** to close the dialog boxes.
6. Run VISA Assistant to confirm that the instrument shows up in the list of instruments.
 - a. Click the IO icon or **Start > Programs > Agilent IO Libraries > VISA Assistant**. The instrument should show up as something like <VISA Interface Name>::18::INSTR. (The VISA Interface Name will be something like GPIB0.) If the instrument does not show up, verify that cables are connected and power is turned on. Then repeat [step 1](#) through [step 4](#), and run VISA assistant again.
 - b. Close VISA Assistant.

Note

If you setup a lan connection, then turn off or disconnect the hardware, the 89600 looks for the hardware when started. This slows down startup. To speed up startup, use IO config to remove the lan setup.

If you will also be communicating with measurement via a LAN-to-GPIB portal, continue on [page 105](#).

If you will also be communicating with measurement via GPIB, continue on [page 109](#).

If you will not be using any other measurement hardware, continue with [step 5](#) on [page 22](#).

Configure HP E5810 LAN/GPIB Gateway interface

If your measurement is an Agilent Infiniium oscilloscope, skip this chapter and follow the instructions in [Chapter 7, “Configuring Infiniium Scopes.”](#)

To setup and use the E5810 with Microsoft Windows, you must have Internet Explorer 4.0 or higher or Netscape 4.7 or higher.

For details on setting up the E5810, you can download a *Getting Started Guide* for the E5810 from the Agilent web site. Go to www.agilent.com and search for E5810A. Select the E5810A from the list of Products, and click Manuals, Guides and Service Notes near the bottom of the page. Click the Getting Started Guide to open a PDF file on your PC.

Important

Before making network connections, contact your Information Technology (IT) department for policies concerning user connections, IP address, etc.

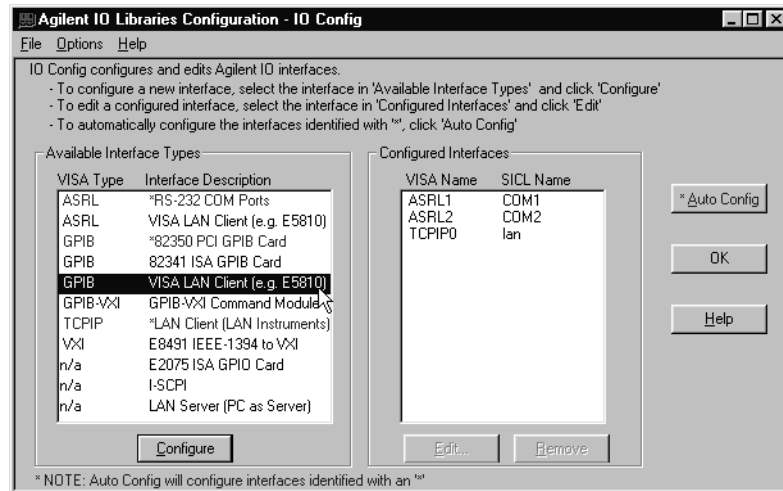
1. Connect the E5810 to the network and to instruments.
2. Plug in and power on the E5810 and any GPIB instruments. The IP address should be displayed in the display. If the address does not appear, see Troubleshooting Information in the *E5810 Getting Started Guide*.
3. Configure the E5810
 - a. Display the E5810 Welcome Page. In your Web browser, type ‘<http://<IP address>>’, where <IP address> is the current E5830A IP address (such as 169.254.58.10) shown on the E5810 display. Press **Enter**.
 - b. Take note of the GPIB SICL Interface Name (something like “gpib0”). You will need to use this name in a later step.
 - c. If you need to change any configuration information, such as the IP address, click *View & Modify Configuration*. (The default password is E5810.) After making changes, click **Save** and then **Reboot E5810** to make changes effective.
4. Verify communication from the E5810.
 - a. From the E5810 Welcome page, click **Find & Query Instruments**. (The default password is E5810.)
 - b. Click **Find**.
 - c. In the list of SICL Addresses, highlight the instrument you want to query.
 - d. Click **IDN?** The identification information for the information appears in the right pane.
5. Run the Agilent IO Libraries IO Configuration tool.

Click the IO icon in the task bar then click **Run IO Config**, or click **Start > Programs > Agilent IO Libraries > IO Config**.

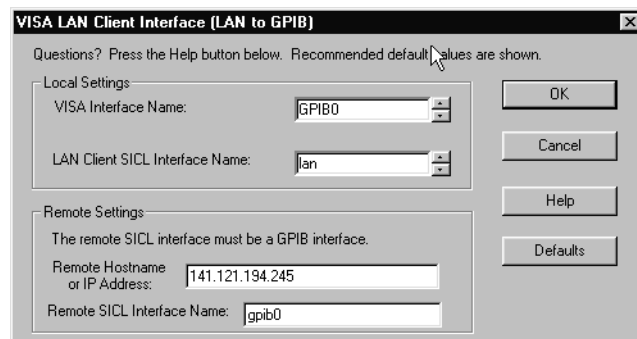
Configuring IO Interfaces

Configure HP E5810 LAN/GPIB Gateway interface

6. Setup the LAN Client. For more information about LAN Client interfaces, see **Configuring VISA LAN Client Interfaces** in the “Configuring IO Interfaces” chapter of the *Agilent IO Libraries Installation and Configuration Guide for Windows*. You can find the PDF of this manual at Program Files\Agilent\IO Libraries\Manuals\install.pdf.
 - a. Under “Available Interface Type,” click **GPIB VISA LAN Client**) > **Configure**.



7. In the “Remote Hostname or IP Address” box, type the IP address from the E5810 display.



8. In the “Remote SICL Interface Name” box, type the GPIB SICL Interface Name you noted in step 3b.
9. Click **OK** > **OK** to close the dialog boxes.

10. Run VISA Assistant to confirm that the instrument shows up in the list of instruments.
 - a. Click the IO icon or **Start > Programs > Agilent IO Libraries > VISA Assistant**. The instrument should show up as something like <VISA Interface Name>::19::INSTR.
 - b. Close VISA Assistant.
11. If the instrument is not listed, try the following steps.
 - a. Verify that the cables are correctly connected between the PC, the E5810, and the hardware.
 - b. Cycle power on the hardware.
 - c. Then run VISA assistant again ([step 10](#)).

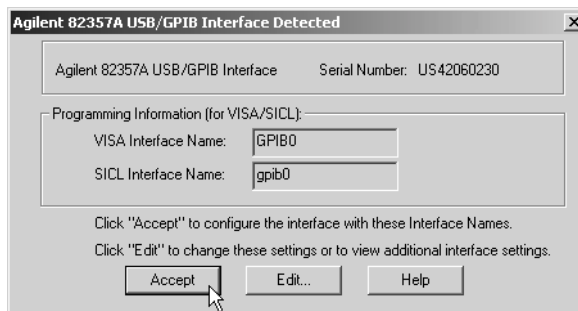
Continue with [step 5](#) on [page 22](#).

Configure USB/GPIB Interface

If your measurement is an Agilent Infiniium oscilloscope, skip this chapter and follow the instructions in [Chapter 7, “Configuring Infiniium Scopes.”](#)

For details on setting up the 82357A USB/GPIB Interface, you can download a *Getting Started Guide* for the Agilent web site. Go to www.agilent.com and search for 82357A. Select the 82357A from the list of Products, and click Manuals, Guides and Service Notes near the bottom of the page. Click the Getting Started Guide to open a PDF file on your PC. For even more information, click the User’s Guide.

1. Plug the 82357A USB cable into a USB port on your PC. Do not connect to your GPIB instrument at this time.
2. Observe the 3 LEDs on the E8237A. Initially, only the red FAIL LED should be on. After the Found New Hardware Wizard runs, all 3 LEDs should be ON. If any LED is off after 20 seconds, stop and refer to the *82357A USB/GPIB Interface for Windows User’s Guide* for information.
3. When the **Agilent 82357A USB/GPIB Interface Detected** dialog box appears, click **Accept**. (If you want to change any of the settings, refer to the 82357A documentation for instructions.)



4. Connect one or more instruments to the GPIB connector on the 82357A.
5. Run VISA Assistant to confirm that the instrument shows up in the list of instruments.
 - a. Click the IO icon or **Start > Programs > Agilent IO Libraries > VISA Assistant**. The instrument should show up as something like <VISA Interface Name>::19::INSTR.
 - b. Close VISA Assistant.
6. If you have problems, refer to the Troubleshooting chapter in the 82357A User’s Guide.

Continue with [step 5 on page 22](#).

Configure GPIB interface

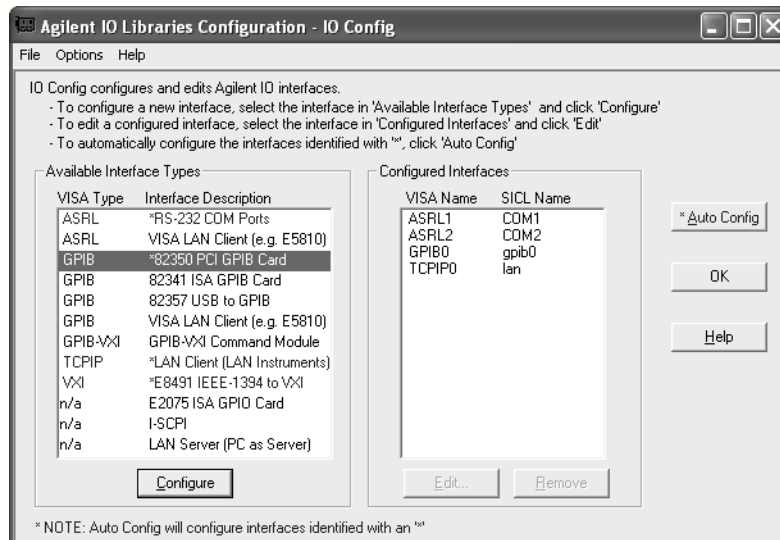
If your measurement is an Agilent Infiniium oscilloscope, skip this chapter and follow the instructions in [Chapter 7, “Configuring Infiniium Scopes.”](#)

Note

The purpose of this chapter is to guide you through the specific setup required to get your computer and instrument configured properly. For more detailed information on IO configuration, refer to the documentation for the IO libraries (click the IO icon, then click View Documentation).

For more information about GPIB interfaces, see **Configuring GPIB Interfaces** in the “Configuring IO Interfaces” chapter of the *Agilent IO Libraries Installation and Configuration Guide for Windows*. You can find the PDF of this manual at Program Files\Agilent\IO Libraries\Manuals\install.pdf.

1. If you are configuring a GPIB connection for measurement hardware that is currently configured as a LAN connection on this computer, you must first remove the LAN configuration. Then cycle power on the hardware before continuing with the GPIB configuration.
2. Connect your GPIB instruments to the GPIB interface in the computer. Power on the PC and the instruments.
3. Configure IO.
 - a. Click the **IO** icon in the task bar and **Run IO Config**, or click **Start > Programs > Agilent IO Libraries > IO Config**.



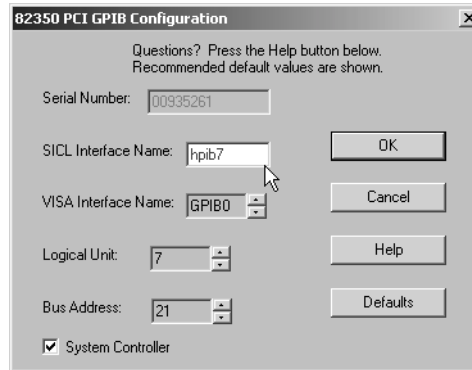
- b. Look at the list in the Available Interface Types column. If your GPIB interface is listed in blue and has an asterisk (*) next to it, click **Auto Config**. Continue with [step 4 on page 110](#).

Configuring IO Interfaces

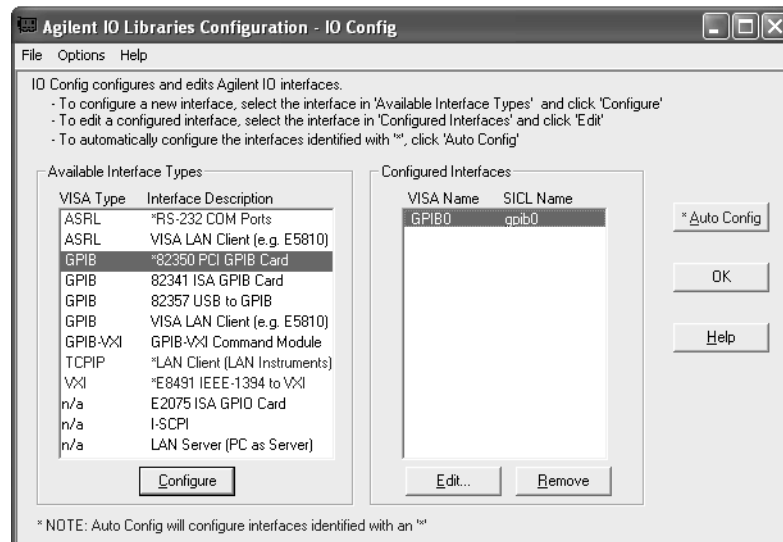
Configure GPIB interface

- c. If your GPIB interface does not have an asterisk (*) next to it, you must configure it yourself. Click the entry that corresponds to your GPIB interface (“82350 PCI GPIB” in this example), then click **Configure**.

(For the NI PCMCIA GPIB interface in a laptop, the interface is “SICL on NI GPIB.”)

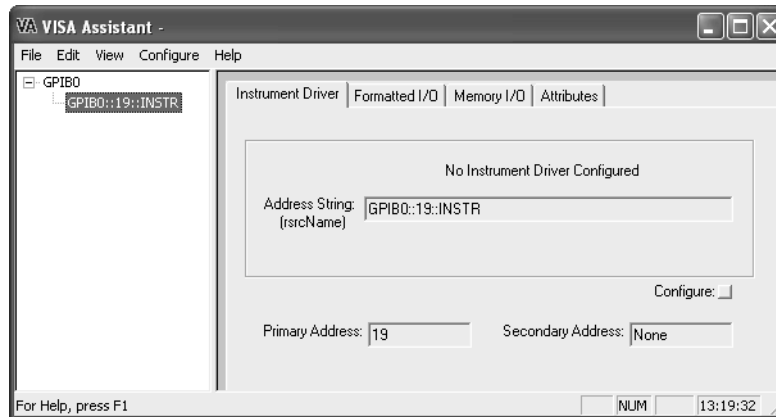


- d. Accept all the defaults, click **OK**.



- e. Click **OK**.
4. If you want to verify that the computer recognized your GPIB instrument, run VISA Assistant.

- a. Click the **IO** icon in the task bar and **Run VISA Assistant**, or click **Start > Programs > Agilent IO Libraries > VISA Assistant**.



- b. VISA Assistant should list your GPIB instrument. In this example, the instrument GPIB address is 19.
- c. Close VISA Assistant (click the **X** in the upper right corner).

Continue with [step 5 on page 22](#).

7 **Configuring Infiniium Scopes**

Introduction

This chapter includes information for configuring Agilent Infiniium scopes for use with 89600 software.

Before configuring your scope, be sure you have installed the 89600 software on your PC.

For any connection type, there are up to four possible steps:

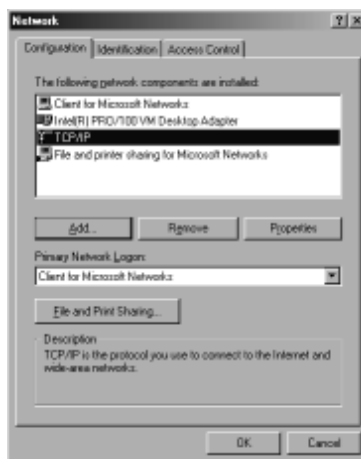
1. Configure Infiniium Networking
2. Configure PC Networking
3. Configure Agilent IO Config Software
4. Verify the VISA Interface

See the following table to determine which sections you need to read based on your connection type. Check with your network administrator to determine your network type.

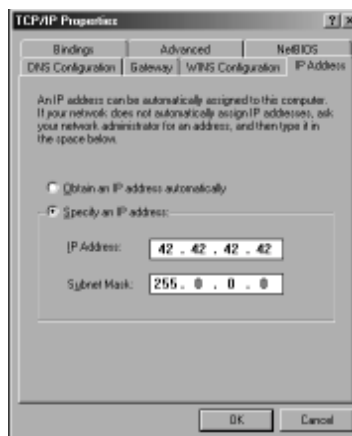
Connection Type	Infiniium Networking	PC Networking	PC Agilent IO Config Software
GPIB to GPIB	N/A	N/A	Configuring PC Agilent IO Config Software for GPIB connection.
USB to GPIB	N/A	N/A	Configuring PC Agilent IO Config Software for GPIB connection.
LAN/GPIB Gateway	N/A	N/A	Configuring PC Agilent IO Config Software for LAN connection.
LAN using a crossover cable	Configuring Infiniium Networking for Crossover Cable Network	Configuring PC Networking for a Crossover Cable Network	Configuring PC Agilent IO Config Software for LAN connection.
LAN with DHCP	Configuring Infiniium Networking for DHCP Network	N/A	Configuring PC Agilent IO Config Software for LAN connection.
LAN without DHCP	Configuring Infiniium Networking for non-DHCP Network	N/A	Configuring PC Agilent IO Config Software for LAN connection.

Configuring Windows 98 Infinium Networking for non-DHCP Network

1. You will need an IP Address, Gateway Address and a Subnet Mask from your Network Administrator.
2. From the Infinium File menu, go to the Network submenu, then select **Properties**.

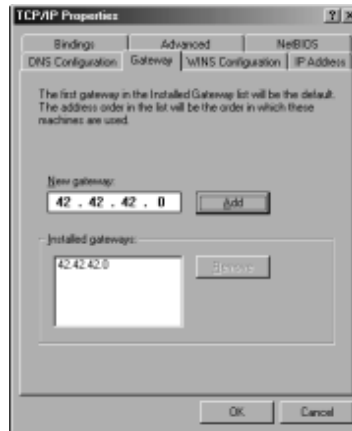


3. In the Network Properties dialog box, select **TCP/IP**, then click **Properties**.



4. Select **Specify an IP address**.
5. Enter the IP Address and Subnet Mask provided by your Network Administrator in the “IP Address” tab page.

6. Go to the Gateway tab page. Enter the Gateway address then Click **Add**.



7. Click **OK** in the TCP/IP Properties dialog box .
8. Click **OK** in the Network Properties dialog box. Windows 98 will prompt you to reboot the Infiniium. Click **Yes**.
9. After the Infiniium reboots, the instrument is ready for GPIB control over the LAN interface. Go to [“Configuring PC Agilent IO Config for LAN connection”](#) on page 126.

Configuring Windows XP Infiniium Networking for non-DHCP Network

1. You will need an IP Address, Gateway Address and a Subnet Mask from your Network Administrator.
2. On your Infiniium, quit the Scope application if it is running.
3. Open the Control Panel. Open the Network Connections control panel applet. If you are in Category view, click Network and Internet Connections. Then select Network Connection control panel icon.
4. Right-click **Local Area Connection**. Select **Properties** from the popup menu.



5. Select **Internet Protocol (TCP/IP)**. Click **Properties**.



6. Select **Use the following IP address:**.
7. Enter the IP Address, Subnet mask, and Default gateway address provided by your Network Administrator.

8. Click **OK** in the Internet Protocol (TCP/IP) Properties dialog box.
9. Click **OK** in the Local Area Connection Properties dialog box. Windows will prompt you to reboot your Infiniium. Click **Yes**.
10. After the Infiniium reboots, the instrument is ready for GPIB control over the LAN interface. Go to [“Configuring PC Agilent IO Config for LAN connection” on page 126](#).

Configuring Windows Infiniium Networking for DHCP Network

If your network provider uses DHCP, Windows 98 or Windows XP will automatically retrieve a dynamic IP Address from the DHCP server. No configuration for the Infiniium is necessary. Go to the “Configuring Agilent IO Config for LAN Connection” section.

Configuring Windows 98 Infiniium Networking for Crossover Cable Network

1. You will need to create IP Addresses for both the Infiniium and your PC. Both addresses must have the first 3 sections the same. For example, the PC IP address can be 42.42.42.43 and the Infiniium IP address 42.42.42.42.
2. From the Infiniium File menu, go to the Network submenu, then select **Properties**.
3. In the Network Properties dialog box, select **TCP/IP**, then click **Properties**.
4. Select **Specify an IP address**.
5. Type the IP Address for the Infiniium you created in step 1. (42.42.42.42 in this example)
6. Type a subnet mask of 255.0.0.0.
7. Click **OK** in the TCP/IP Properties dialog box.
8. Click **OK** in the Network Properties dialog box. Windows 98 will prompt you to reboot the Infiniium. Click **Yes**.
9. After the Infiniium reboots, the instrument is ready for GPIB control over the LAN interface. Now go to [“Configuring PC Networking for a Crossover Cable Network” on page 123](#).

Configuring Windows XP Infinium Networking for a Crossover Cable

1. You will need to create IP Addresses for both the Infinium and your PC. Both addresses must have the first 3 sections the same. For example, the PC IP address can be 42.42.42.43 and the Infinium IP address 42.42.42.42.
2. On your Infinium, quit the Scope application if it is running.
3. Open the Control Panel. Open the Network Connections control panel applet. If you are in Category view, click **Network and Internet Connections**. Then select Network Connection control panel icon.
4. Right-click **Local Area Connection**. Select **Properties** from the popup menu.



5. Select **Internet Protocol (TCP/IP)**. Click Properties.

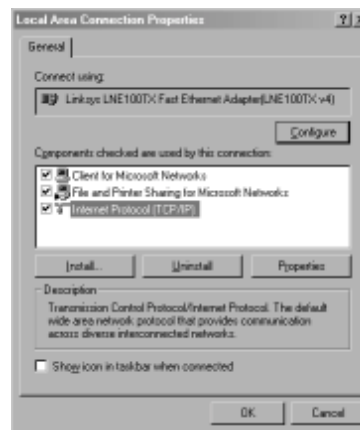


6. Select **Use the following IP address:**.

7. Type the IP Address for the Infiniium you created in step 1. (42.42.42.42 in this example).
8. Type a subnet mask of 255.0.0.0.
9. Click **OK** in the Internet Protocol (TCP/IP) Properties dialog box.
10. Click **OK** in the Local Area Connection Properties dialog box. Windows will prompt you to reboot your Infiniium. Click **Yes**.
11. After the Infiniium reboots, the instrument is ready for GPIB control over the LAN interface. Now go to [“Configuring PC Networking for a Crossover Cable Network” on page 123](#).

Configuring PC Networking for a Crossover Cable Network

1. On your PC, open the Control Panel. For Windows XP, lick **Network and Internet Connections**. For Windows 2000, click **Network and Dial-up Connections**.
2. Click **Network Connections**.
3. Right-click your network adapter. Select **Properties** from the popup menu.
4. Select **Internet Protocol (TCP/IP)**. Click **Properties**.



5. Select **Use the following IP address:**.



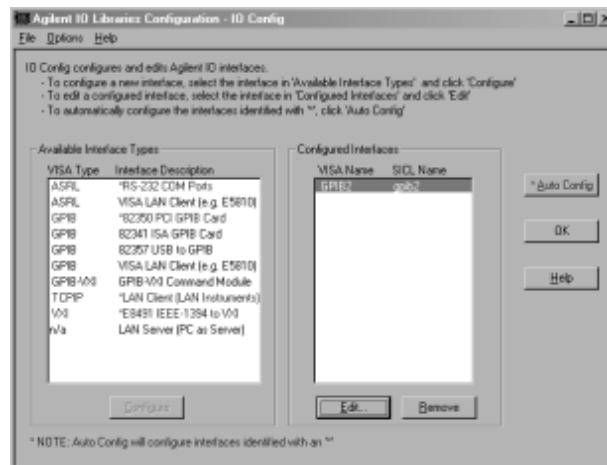
6. Type the IP Address for the PC you created in step 1 of [“Configuring Windows 98 Infinium Networking for Crossover Cable Network”](#) on page 120 or [“Configuring Windows XP Infinium Networking for a Crossover Cable”](#) on page 121. (This example uses 42.42.42.43.)
7. Type a subnet mask of 255.0.0.0.

8. Click **OK** in the Internet Protocol (TCP/IP) Properties dialog box.
9. Click **OK** or **Close** in the Local Area Connection Properties dialog box. Windows will prompt you to reboot your PC. Click **Yes**.
10. After your PC reboots, the PC is ready for setting up the Agilent IO Config software. Go to [“Configuring PC Agilent IO Config for LAN connection”](#) on page 126.

Configuring PC Agilent IO Config for GPIB connection

The 89601A Software will automatically install the Agilent IO Libraries on your PC if they are not already installed. These instructions assume that your computer has a GPIB card installed and operable.

1. Run IO Config on the PC where the Agilent 89601A Software is installed.



2. Verify that the GPIB PCI card (82350) or the USB Adapter (82357) are in the Configured Interfaces list. To view the interface properties and interface type, select the interface then click **Edit...** If the device is missing, select it in the Available Interface Types list and click **Configure > OK**.

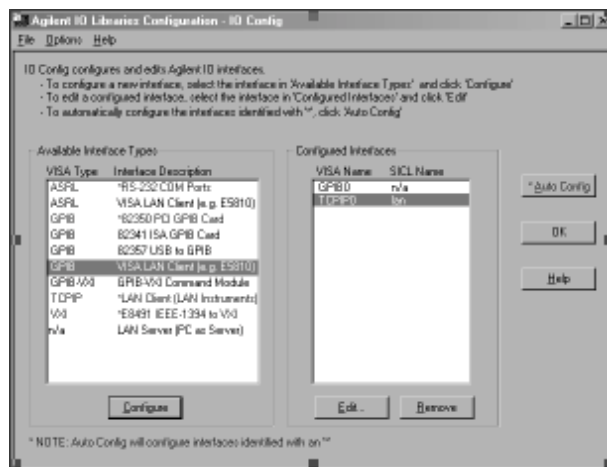


3. Click **OK** to exit the IO Config application.
4. Go to “[Verifying Instrument Connection](#)” on page 128.

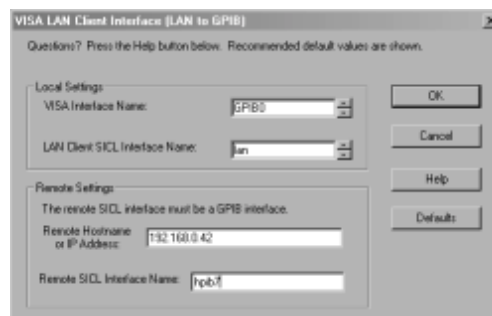
Configuring PC Agilent IO Config for LAN connection

The 89601A Software will automatically install the Agilent IO Libraries on your PC if they are not already installed.

1. Run IO Config on the PC where the Agilent 89601A Software is installed.



2. Select **VISA LAN Client** in the “Available Interface Types” list. Click **Configure**.

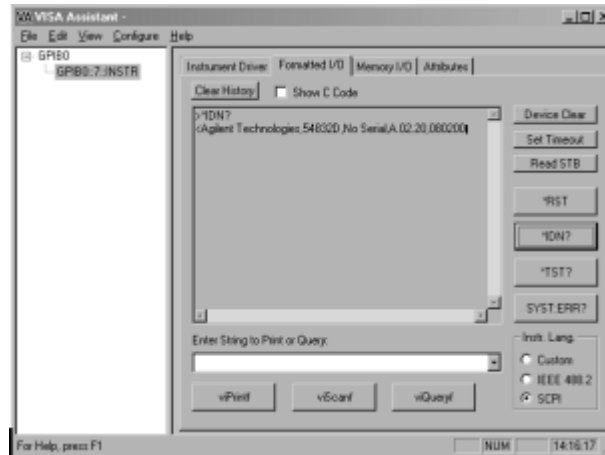


3. In the “Hostname:” field, type the IP address of your Infiniium or LAN/GPIB Gateway. You can find the IP address in the GPIB Setup dialog box on your Infiniium. The GPIB Setup dialog is located in the Utilities menu.
4. In the “Remote SICL Interface Name” field, type hpib7 for Infiniium. If using an E5810 LAN/GPIB Gateway enter “gpib0”.
5. Click **OK** to exit the interface configuration dialog. IO Config will automatically add the TCPIP0 interface to the Configured Interfaces list in addition to the VISA LAN Client if it has not already been added previously.

6. Click **OK** to exit the IO Config application.
7. Go to [“Verifying Instrument Connection”](#) on page 128.

Verifying Instrument Connection

1. Run VISA Assistant program on the PC where the Agilent 89601A Software is installed.



2. If VISA Assistant does not find any devices, check all connections and verify the Infiniium instrument is running. Try running VISA Assistant again.
3. Select the interface you configured in the “Configuring your Agilent IO Config for your PC” step.
4. Select **Formatted I/O tab**.
5. Select **SCPI**.
6. Click ***IDN?**. The center text box should display the Infiniium GPIB identity string. The VISA interface between your PC and Infiniium is working and the Agilent 89601A Software is ready to be used.
7. Close VISA Assistant.
8. If you are unable to correctly identify an Infiniium in VISA Assistant, verify that the scope application is running in the Infiniium, and verify your connections and Agilent IO Config setup.

8 **Installing a Node-Locked License**

Introduction

This chapter documents installing and setting up a node-locked license for your 89600 analyzer. This allows you to run the 89600 software only on this PC. You can move the license to another PC, but then you cannot run the software on this PC.

If you purchased a network or floating license for your 89600 software, installation instructions are in [Chapter 9, “Setting Up a Floating License Server,”](#) or [Chapter 10, “Setting Up a Floating License Client.”](#)

Start the analyzer

Start the analyzer by double-clicking the appropriate icon on your desktop or by clicking **Start > (All) Programs > Agilent 89600 VSA > Spectrum Analyzer** or **Vector Signal Analyzer**, **Start > (All) Programs > Agilent Distortion Suite > Distortion Suite**, or **Start > (All) Programs > Agilent WLAN Test > WLAN Test**.

You must accept a trial license or install a permanent license (authorization) before you can run the applications. See instructions on the next page. You can also transfer a license from another computer ([page 139](#)).

Note

If your analyzer includes measurement hardware and the analyzer does not find it, see “To troubleshoot an IO configuration problem,” [page 169](#).

License your software

When you first run your application, you will be prompted to license (or authorize) your software. You must obtain and install a valid software Site Key (a unique hexadecimal code) to permanently enable the 89600-series software on your computer.

- The license for the 89600 software includes both the Vector Signal Analyzer and the Spectrum Analyzer applications, as well as the 89607 WLAN Test application.
- The license for 89604 includes only the Distortion Suite application. If you did not purchase the 89600 software, you cannot access the Vector Signal Analyzer or Spectrum Analyzer applications independent of Distortion Suite.
- The license for 89607 includes only the Distortion Suite application. If you did not purchase the 89600 software, you cannot access the Vector Signal Analyzer or Spectrum Analyzer applications independent of WLAN Test.
- If you purchased both 89604 Distortion Suite and an 89600 analyzer, you must license both applications.

The Trial License enables all software options for the analyzer for fourteen days. When you install the permanent Site Key (license), only the options you purchased will be enabled.

Caution

When you accept the trial license, you can run your analyzer without the Site Key for fourteen days. You must install the Site Key before the trial license expires, or you will have to obtain a new Site Key and the analyzer will stop working.

You do not need to accept the trial license if you will be transferring in a license from another computer rather than obtaining a new license. For instructions on transferring in a license, see [page 139](#).

Continue with “Obtaining a Site Key” on the next page.

Obtain a site key (license)

Follow these steps to obtain your software Site Key:

Find the materials and information you need:

1. Locate the Site Key Request Form in one of these ways:
 - a. (*Preferred*) Go to the 89600Web page at www.agilent.com/find/89600 and click **Request Site Key** near the bottom of the page. You can paste or type in your Site Code, complete the rest of the form, and submit your request.
 - b. Locate the printed Site Key Request Form. This sheet of paper is in the Installation Materials envelope shipped with your analyzer. You can fill in the requested information and return the form by fax.
2. Collect the *License Certificates* for all copies of the 89600 software and each software option that you purchased. The License Certificates are printed on gray parchment and are shipped in the Installation Materials envelope.

Note

If you are installing a software update, you need an Update Certificate rather than a License Certificate. One Upgrade Certificate covers all the software and options installed on one computer.

3. Obtain the site code for your computer. The site code is a 30-character hexadecimal code created by the 89600 installation process to identify your computer. Each computer has a different site code. There are two ways to find the site code:

If you are starting the analyzer for the first time and have not already accepted a trial license, follow these steps:

- a. Start the analyzer by double clicking the icon or by clicking **Start > (All) Programs > Agilent 89600 VSA > Spectrum Analyzer** or **Vector Signal Analyzer** or **Start > (All) Programs > Agilent Distortion Suite > Distortion Suite**. (If you installed measurement hardware and get an error message saying that the analyzer cannot find VXI hardware, see the Diagnostics Chapter section on troubleshooting installation problems, [page 164](#).)
- b. When a dialog box asks if you want to obtain authorization, click **Yes**.

Installing a Node-Locked License

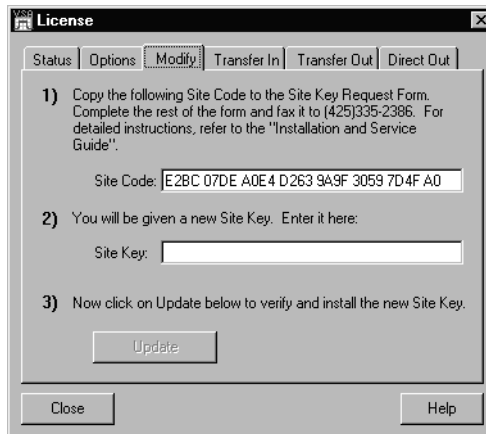
License your software

- c. Click the **New License** tab in the Authorization dialog box.
- d. Click **Generate Site Code**. The Site Code appears in the Site Code box. This also accepts a trial license, so that you can operate the analyzer for 14 days while you obtain and install your permanent license.
Be sure to obtain and install your Site Key within 14 days. At the end of the 14-day trial period, the trial license expires, and your Site Code changes. If you have not installed your Site Key before this happens, you must obtain a new Site Key.

If you previously accepted a trial license, follow these steps:

- a. Start the analyzer by double clicking the icon or by clicking **Start > (All) Programs > Agilent 89600 VSA > Spectrum Analyzer** or **Vector Signal Analyzer** or **Start > (All) Programs > Agilent Distortion Suite > Distortion Suite**.
- b. Click **Utilities > License > Modify**.
The Site Code is displayed in the Site Code box.

Note that you cannot use the site code displayed in the following figure. You must enter the site code for your computer, which is unique.



Caution

Be sure to obtain and install your Site Key within 14 days. At the end of the 14-day trial period, the trial license expires, and your Site Code changes. If you have not installed your Site Key before this happens, you must obtain a new Site Key. When the trial license expires, you cannot run the software until you install the correct Site Key.

Complete the Site Key Request Form:

1. Copy the site code onto the *Site Key Request Form*. The site code contains 30 hexadecimal characters (digits 0 through 9 and letters A through F). The code is not case sensitive, and spaces are optional. (You can copy and paste the site code into the Web or ASCII text version of the Site Key Request Form.)
2. (optional) Fill in the Customer's Computer ID. This is the name or code that you use to identify the computer. It might be the name of the person who uses the computer (such as "John Doe's PC"), or it might be an identifier that your company has assigned to the computer (such as "lab214").

The Customer's Computer Name is optional and is included for your convenience. If you provide the information, we include it in any correspondence we send to you. This is useful for you if you are installing licenses on more than one computer, so you can identify which license file goes on which computer.

3. Below the Site Code, list the License Certificate Number for each piece of software and software option you installed on that computer. You can get this number from the gray parchment *License Certificate* that was shipped with the analyzer.

If you are installing a software update, list one Update Certificate Number. It covers all software options enabled on the computer.

Note

If you ordered software for more than one computer, use separate tables to list the site code and license certificate numbers for each computer. You can photocopy the form or copy the e-mail form.

4. Fill in the customer name and address information on the *Site Key Request Form*. The fields marked with an asterisk (*) must be completed.
5. Return the *Site Key Request Form* to Agilent Technologies using one of these methods:
 - a. Submit the form from the Web page.
 - b. e-mail the requested information to 89600_SWL@agilent.com. Your Site Key will be sent via e-mail to the address you specify on the request form.
 - c. If you do not have access to e-mail, send the Site Key Request Form via fax to (425) 356-6250. Your Site Key will be returned by fax to the number you provided on the form.
6. Close the Authorization or License window.

Install a site key

When you receive your Site Key, install it on the computer.

Caution

Be sure to install your Site Key before your trial license expires. If the trial license expires, the Site Code for your computer changes and you must obtain a new Site Key.

If your Trial License is still active, follow these steps:

1. Start the analyzer by double clicking the icon or by clicking **Start > (All) Programs > Agilent 89600 VSA > Spectrum Analyzer** or **Vector Signal Analyzer** or **Start > (All) Programs > Agilent Distortion Suite > Distortion Suite**.
2. Click **Utilities > License > Modify**.
3. Copy and paste the Site Key in the space provided and click **Update**. (The Site Key is a hexadecimal number, containing only the numerals 0 through 9 and letters A through F. The Site Key is not case sensitive, and spaces are optional.) If you received your Site Key via fax, you must type the 26-character Site Key in the space.

Caution

If your trial license has expired, the Site Code for your computer has changed and you must obtain a new Site Key. The Site Key you just received will not work.

You can now run your Agilent 89600-series software permanently on this computer only. If you want to move the software to another computer, follow the instructions for “Transferring a License” under the “Licensing” topic in the application Online Help.

When you install the Site Key, the site code for your computer changes. In addition to identifying your computer, the site code also identifies which Agilent 89600-series software is installed and enabled on your computer

Transfer a license from another computer

Via floppy disk

The Transfer In and Transfer Out tabs of the License dialog box provide the mechanism to transfer a single license from one computer to another, using a floppy disk. To begin such a transfer, the software must be installed on two different computers, and at least one valid license installed. Once these preconditions exist, take the following steps to transfer the license:

1. Perform the following steps on the target computer (the computer to which you want to move the license):
 - a. Start the analyzer by double clicking on the icon or by clicking **Start > (All) Programs > Agilent 89600 VSA > Spectrum Analyzer** or **Vector Signal Analyzer** or **Start > (All) Programs > Agilent Distortion Suite > Distortion Suite**.
 - b. During startup, no license is detected, so the software asks if you wish to obtain a license. Click **Yes**.
 - c. In the Authorization dialog box, click **Transfer In** and **Register Transfer**.
 - d. Enter the path to your floppy disk drive and click **OK**. The register transfer function writes a license imprint file to the drive whose path you supply.
2. Remove the floppy disk and insert it in the source computer (the computer that currently has the license).
3. Perform the following steps at the source computer,
 - a. Start the analyzer.
 - b. Click **Utilities > License > Transfer Out**.
 - c. Provide the path to the location of the floppy disk and click **OK**. The licensing software moves the license to the imprint file on the floppy disk. At this time, the license on the source computer is discontinued, or decremented by one in the case of multiple licenses.

Caution

Do not lose the floppy disk--it now contains your license for the 89600 analyzer. If you lose the disk you lose your license.

4. Return the floppy disk to the target computer.
5. Perform the following steps at the target computer:
 - a. If the Authorization dialog box is still open, go to the next step. Otherwise, start the analyzer. In the Invalid Authorization question box, click **Yes**.
 - b. In the Authorization dialog box, click the **Transfer In** tab, then the **Transfer In** button.
 - c. Provide the path to the location of the license (the floppy disk) and click **OK**.

The software is now enabled on the target computer.

Via network drive

A license can never be shared - that is, it must always be assigned to a particular computer. In those rare cases when two computers on the same network need to run the software sequentially or alternately, the Direct Out license transfer can provide a kind of sharing without the need to carry floppy disks from one system to another.

To “share” a license, follow these steps:

Install the software on both computers

1. Obtain a license for one of the computers in the usual way and install the license.
2. When you want to run the application on the other computer, click **Utilities > License** on the licensed (source) computer and click **Direct Out**.
3. A dialog box will open asking you for the path to the license destination directory on shared network drive. Type or browse to it and click OK. This transfers the license to the destination computer and disables the license on the source computer.

Now when you open the application on the destination computer, the licensing software recognizes that the license has been transferred. The application will no longer open on the source computer.

9 **Setting Up a Floating License Server**

Floating License Overview

Use the information in this chapter to set up a floating license server for the 89600 Series Software. You must set up the license server and your 89600 license (.lic) file before you can run any of the 89600 Series Software that require floating licenses.

The FLEXlm floating licenses require a server computer, to manage license control, and client computers, those on which you obtain a license from the server and run the 89600 series software. (The server and client can be the same PC.)

These are the basic steps for setting up your FLEXlm server. The steps are described in detail in the rest of this chapter.

Note

If you will not be running 89600 software on this PC (that is, this PC is only a server), you only need to install 89600 License Support and not any other part of the 89600 software.

1. Install 89600 License Support, [page 143](#).
2. Obtain a Floating License File, [page 146](#)
 - a. Read Host ID
 - b. Submit request form
3. Install Floating License File, [page 148](#)
 - a. Place Floating License File
 - b. Enter hostname (optional)
 - c. Start FLEXlm

Redundant license servers

If you will be setting up redundant license servers, see the instructions on [page 151](#).

Setting up client PCs

To set up FLEXlm on your client PC (the computer where you will run the 89600 software), see [Chapter 10, “Setting Up a Floating License Client.”](#)

Adding license files

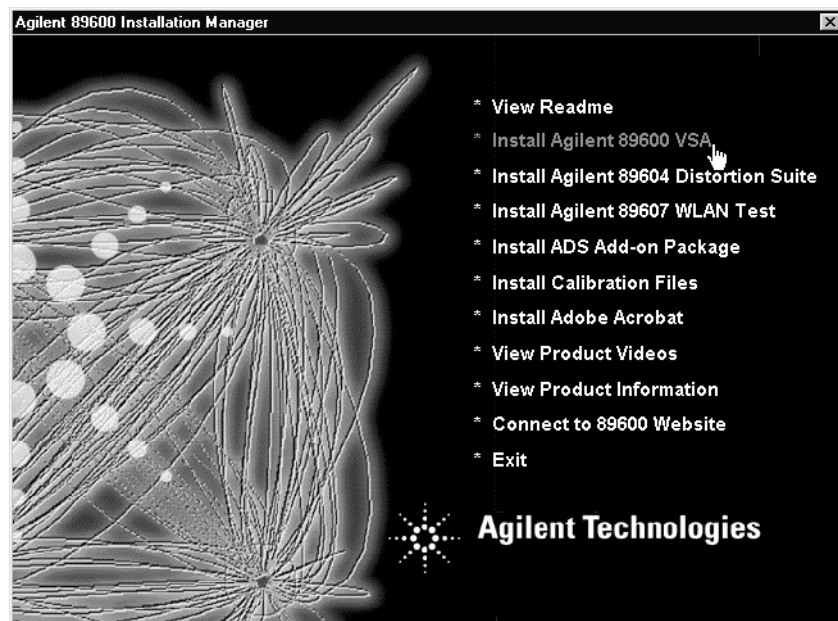
If you are adding licenses to an existing server, see [page 153](#).

Installing Floating License Support

The 89600 Series Software uses Macrovision's Flexible License Manager (FLEXlm) software for all floating software security configurations. The 89600 setup program installs the FLEXlm software at `%SystemRoot%\vsa\licenses\bin`, where `%SystemRoot%` is typically `c:\WINDOWS`.

Installing floating license support does the following:

- Creates the `%SystemRoot%\vsa\licenses` folder to contain your License File(s).
 - Installs the FLEXlm libraries in the `%SystemRoot%\vsa\licenses\bin` folder.
 - Installs the license daemon in the `%SystemRoot%\vsa\licenses\vendors` folder.
 - Installs help files in the `%SystemRoot%\vsa\licenses\util` folder
 - Installs tools and batch files in the `%SystemRoot%\vsa\licenses\help` folder
1. Insert the Agilent 89600 Series Software installation CD-ROM.
 2. If the installation utility does not start automatically, click **Start > Run**, and type:
`drive:\autoplay.exe`
where *drive* represents the drive containing the installation CD-ROM.
Click **OK**.
 3. In the Installation Manager Window, click **Install Agilent 89600 VSA**.



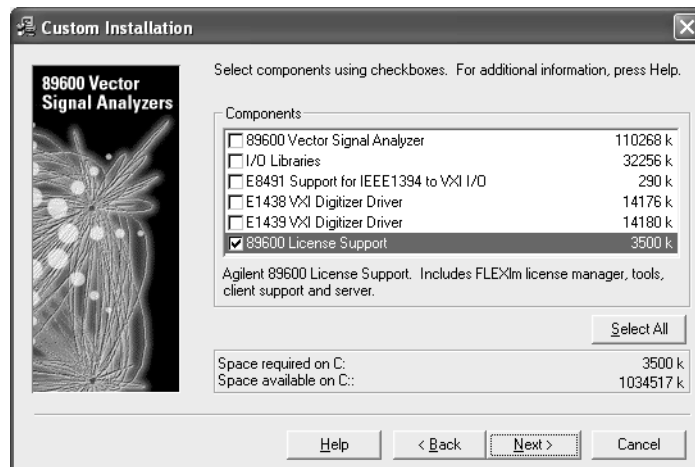
Setting Up a Floating License Server

Installing Floating License Support

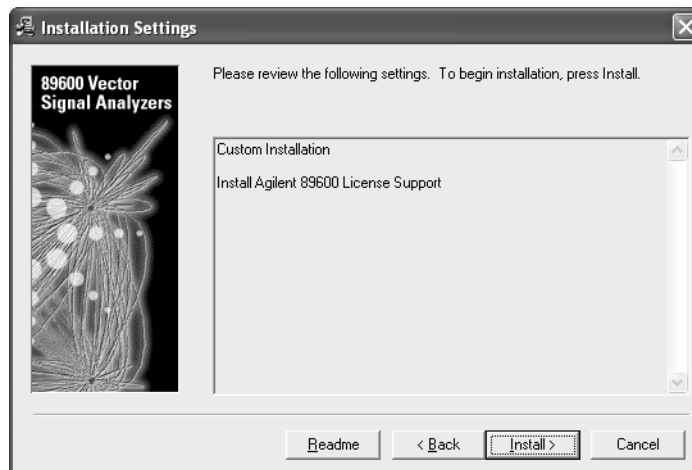
4. When the Welcome window opens, click **Next** to close it.
5. Read the license agreement and warranty terms. Click **Yes** to accept the terms and continue installation. Click **No** if you do not accept the terms. If you click No, you will not be able to install the license support.
6. In the Installation Options window, select **Custom Installation**. Click **Next**.



7. In the Custom Installation window, check the **89600 License Support** check box. Click **Next**.



8. In the Installation Settings window, click **Install**.



9. Reboot if requested.
10. After installation is complete, click **Finish**, **OK**, or **Exit** to close all the installation windows.
11. Continue with “Obtaining your License File” on [page 146](#).

Obtaining your Floating License File

Before performing these steps, you must have installed the 89600 License Support as described on [page 143](#).

Find the materials and information you need:

1. Locate the *Floating License File Request Form* in one of these ways:
 - a. (*Preferred*) Go to the 89600 Web page at www.agilent.com/find/89600 and click **Request Floating License File**. You can paste or type in your Host ID, complete the rest of the form, and submit your request.
 - b. Locate the printed *Floating License File Request Form*. This sheet of paper is in the Read Me First envelope shipped with your software. You can fill in the requested information and return the form by fax.
2. Collect the *License Certificates* for all copies of the 89600 software and each software option that you purchased. The License Certificates are printed on gray parchment and are shipped in the Read Me First envelope.

Note

If you are installing a software update, you need Update Certificates rather than License Certificates.

3. Obtain the Host ID for your computer.
 - a. Click **Start > (All) Programs > Agilent 89600 License Support > Server > Host ID**.

Note

If more than one Host ID is listed, use the first one from the list.

- b. Copy the line displayed in the Notepad window or print the file. This is the Host ID that you will need to obtain a License File .
- c. Paste or write the Host ID in the space provided in the License File Request Form.
- d. Close the Notepad window.

Complete the License File Request Form:

1. Copy the Host ID (from [step 3](#) on the previous page) onto the *Floating License File Request Form*. (You can copy and paste the Host ID into the Web version of the License File Request Form.)
2. (optional) Fill in the Customer's Computer Name. This is the name or code that you use to identify the computer. It might be the name of the person who uses the computer (such as "John Doe's PC"), or it might be an identifier that your company has assigned to the computer (such as "lab214").

The Customer's Computer Name is optional and is included for your convenience. If you provide the information, we include it in any correspondence we send to you. This is useful for you if you are installing licenses on more than one computer, so you can identify which license file goes on which computer.

3. Below the Host ID, list the License Certificate Number for each piece of software you installed on that computer. You can get this number from the gray parchment *License Certificate* that was shipped with the software.

If you are installing a software update, list your Update Certificate Numbers rather than your License Certificate Numbers.

Note

If you are running 89600 software using several independent license servers, submit a separate License File Request for each license server. Each License Certificate can only be used once, and is intended to provide a license file for a single server. If you need to allocate the licenses within a License Certificate across multiple servers, please make a special note of this in your request.

4. Fill in the customer name and address information on the *Floating License File Request Form*. The fields marked with an asterisk (*) must be completed.
5. Return the *Floating License File Request Form* to Agilent Technologies using one of the following methods. Your License File will be sent to you by e-mail or fax, depending on whether you provided a fax number or e-mail address on the request form.
 - a. Submit the form from the Web page (www.agilent.com/find/89600).
 - or*
 - b. Submit the requested information via e-mail to 89600_SWL@agilent.com.
 - or*
 - c. If you do not have access to e-mail, send the *Floating License File Request Form* via fax to (425) 356-6250.

Installing your Floating License File

When you receive your license (.lic) file, you must install it on the server PC.

If your licenses will be served by a central server, have your system administrator install the license (.lic) file on the license server computer.

1. If you receive your license file via e-mail, open the message in e-mail.
 - a. Click **Start > (All) Programs > Agilent 89600 License Support > Server > License Files Directory**. This opens an Explorer window in the `%SystemRoot%\vsa\licenses` directory.
 - b. Drag the license file from the e-mail message and drop it in the licenses directory.
2. If you receive your license file via fax, you must type the file and save it under the name specified in the fax. The file must go in the directory described in the previous step.
3. If you are adding a license file to a previously-installed license server, go to [“Adding License \(.lic\) Files” on page 153](#).
If you are setting up a redundant license server, go to [“Setting up Redundant License Servers” on page 151](#).
Otherwise, continue with [“Starting Your License Server” on page 149](#).

Starting Your License Server

1. Start FLEXlm by clicking **Start > (All) Programs > Agilent 89600 License Support > Server > License Server Install**.
 - a. When the Install License Server window appears, press any key on the keyboard.



```
Install License Server
. Install and start the FLEXlm license server for the 89600 Series Software
. on this computer as service "FLEXlm License Manager 89600".
.
Press any key to continue . . .
. Install service "FLEXlm License Manager 89600".
.
FLEXlm License Manager is successfully installed
as one of your Windows Services. Some handy tips:

* The FLEXlm License Manager will be automatically started
every time your system is booted.

* The FLEXlm service log file is lmgrd.log in your NT system
directory.

* To remove FLEXlm License Manager, type 'installs -r'

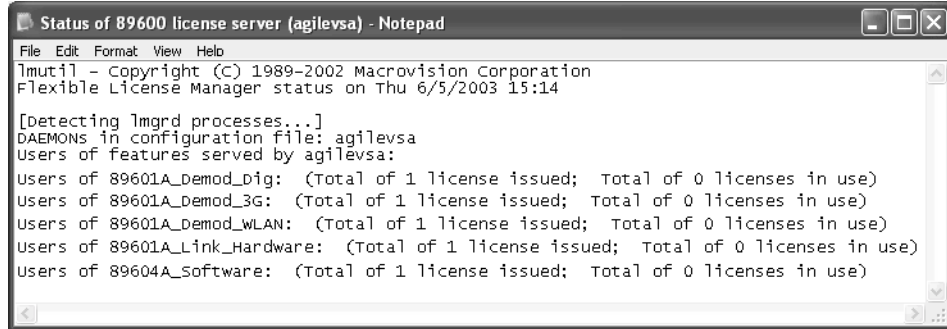
*****
The permissions of one of the files that you just installed seems
to have the correct settings.
. Start service "FLEXlm License Manager 89600".
The FLEXlm License Manager 89600 service is starting.
The FLEXlm License Manager 89600 service was started successfully.
. Finished.
Press any key to continue . . . _
```

- b. When the installation is finished and reads “Finished. Press any key to continue . . .”, press any key on the keyboard.

Setting Up a Floating License Server
Starting Your License Server

2. Verify that the license server is working.
 - a. Click **Start > (All) Programs > Agilent 89600 License Support > Server > License Server Status**.

The window should look something like this.



When you install the server, if no license files are found, then the file empty.lic is installed in the vsa\license directory. This file does not enable any licenses. It merely allows the FLEXlm license program to work properly.

- b. Close the window.
3. Inform your clients of the computer name or names and port number (if required) for the server PC.

To find the computer name, click **Start > (All) Programs > Agilent 89600 License Support > LMTOOLS > System Settings**. The computer name is listed in the Computer/Hostname box.

Clients must add an environment variable called AGILEVSA_LICENSE_FILE. The value for the variable is the computer name and, optionally, the port number, in this form:

@mike (if the computer name is “mike” and no port number is required).

2110@mike (if the computer name is “mike” and a port number of 2110 is required).

You need to specify a port only if it is specified on the SERVER line of the license file or files and it is not in the range of 27000 to 27009. The following table shows the possible formats for the variable value.

Single server, no port number assigned	@mike
Single server, port number assigned	2100@mike
Redundant server no port number assigned	@mike;@mike2;@mike3
Redundant server port number assigned	2100@mike2110;@mike2;2120@mike3

Note

The 89600 Series Software must be installed on each client PC. Rather than installing the software from individual CDs, you can copy the CD to a shared drive. Then clients can run autoplay.exe from the shared drive to install the software on their PCs.

Setting up Redundant License Servers

FLEXlm lets you set up a redundant license server configuration. This involves configuring three license servers with one of the three servers functioning as the master server. If the master server goes down, one of the other two servers becomes the new master server, and the licenses remain available on the network.

Note

Setting up redundant servers requires extra system administration and is not recommended unless you absolutely need it.

To set up redundant license servers, use the same FLEXlm procedures on all three servers. All three servers must be up and running before your licenses are available.

Follow these steps on all three servers:

1. Install the 89600 License Support on all three computers (see [page 143](#)).
2. Obtain your floating license file ([page 146](#)). You must provide the host ID for all three computers.
3. Install your license file as instructed on [page 148](#), with the following exceptions:
 - a. Using an ASCII editor, change the default hostname settings in your license (.lic) file to the actual hostnames of your license servers. The license servers are the machines that will serve the licenses on the network, and whose ethernet addresses appears on the SERVER lines:

```
SERVER <hostname1> <hostid1> <tcp_port>  
SERVER <hostname2> <hostid2> <tcp_port>  
SERVER <hostname3> <hostid3> <tcp_port>
```

To find the hostname and hostid, click **Start > (All) Programs > Agilent 89600 License Support > LMTOOLS > System Settings**. The computer name is listed in the Computer/Hostname box. The hostid is listed in the Ethernet Address box.

<tcp_port> is the port number for the server, such as “2100”

For these examples, one SERVER line would read:

```
SERVER mike1 0060b05768ee 2100
```

Important

Be sure the hostname and hostid in the same line (such as “hostname1” and “hostid1”) are for the same computer.

You must also specify a TCP port number for license requests. The license file includes a default port number. If this conflicts with other FLEXlm licenses on your server, change the port number.

Setting Up a Floating License Server

Setting up Redundant License Servers

- b. Save the license file.
- c. Copy the license file to the licenses directory on each of the other two server PCs.
4. Start the license server on each of the PCs. See [“Starting Your License Server”](#) on page 149.
5. Verify that the license servers are installed properly. Click **Start > (All) Programs > Agilent 89600 License Support > LMTOOLS > Server Status > Perform Status Enquiry**.

The status should include 3 lines similar to these:

```
vsa: license server UP v8.3
vsa2: license server UP (MASTER) v8.3
vsaxp: license server UP v8.3
```

In this example, the hostnames of the three servers are vsa, vsa2, and vsaxp.

All three servers should be listed as UP, and only one server should be indicated as MASTER.

Adding License (.lic) Files

If you have been running FLEXlm and receive updated License Files from Agilent, you can add the new licenses to the FLEXlm environment as follows:

1. Install the new file, following the instructions in [“Installing your Floating License File” on page 148](#).
2. On the server, click **Start > (All) Programs > Agilent 89600 License Support > Server > License Server Refresh**. This causes the *lmgrd* on the primary server to re-read the license (.lic) files and update all of the other *lmgrd* processes on the network.
3. After you have done this, you can verify that the license servers have received the new license information by clicking **Start > (All) Programs > Agilent 89600 License Support > Server > License Server Status**.

If this does not work, you may need to stop and restart the license servers on your network:

1. Click **Start > (All) Programs > Agilent 89600 License Support > Server > License Server Uninstall**.
2. When instructed to “Press any key to continue,” do so.
3. Click **Start > (All) Programs > Agilent 89600 License Support > Server > License Server Install**.
4. When instructed to “Press any key to continue,” do so.

Managing Multiple Application License Servers on One Computer

When you are running multiple FLEXlm-licensed applications, the recommended configuration is to run multiple license servers, each running one *lmgrd* and accessing one or more license (.lic) files. This allows you to keep the other application's licensing separate from the 89600 licensing.

1. Each *lmgrd* will use a different TCP/IP port. If you specify port numbers in your License File(s), then each license server (*lmgrd*) must use a different port number as specified on the SERVER lines of the license (.lic) files. You can use a standard text editor to change the port number in each license (.lic) file.
2. You must make sure that you are using a compatible version of *lmgrd* when you start it up for a particular license (.lic) file.

When you have license (.lic) files for two different FLEXlm-licensed products, the products may ship with the different versions of FLEXlm. FLEXlm is designed to handle this situation.

If you install an application that provides a newer version of FLEXlm than was installed for your 89600 program, the easiest way to ensure compatibility is to copy three files from the newer version into the directory `%SystemRoot%\vsa\licenses\bin`. The files you should copy are *lmgrd.exe*, *lmtools.exe*, and *lmutil.exe*.

To determine the version of FLEXlm currently in use by the 89600 license, click Start > (All) Programs > Agilent 89600 License Support > Server > FLEXlm Version.

If the version of FLEXlm you install with your 89600 program is newer than FLEXlm versions installed for other applications, see the documentation for those applications to determine what you need to do.

Removing 8600 License Support

If you have a node-locked 89600 license installed or have accepted a trial 89600 license, then you install 89600 License Support on that PC, you “hide” the other licenses. To use either the trial license or node-locked license, you must remove 89600 License Support as follows:

1. Click Start > Control Panel > Add or Remove Programs.
2. Select 89600 License Support and click Change/Remove.
3. Select Automatic and click Next.
4. Click Finish.
5. When the removal is finished, close all the Control Panel dialog boxes and windows.

Now you can run your 89600 software with the node-locked or trial license. When your trial license expires, you must reinstall 89600 License Support and install your license file before you can run the 89600 software.

Tools and Batch Files

The FLEXlm support includes several batch files to simplify setting up and checking your licenses. You can run these batch files by clicking **Start > (All) Programs > Agilent 89600 License Support** and either **Server** or **LMTOOLS**.

FLEXlm Version	Run this file to check which versions of FLEXlm and 89600 License Support are used for the 89600 license manager.
Host ID	<p>Run this file to display the host ID of this computer. If the list includes more than one line, use the host ID from the first line.</p> <p>If you are setting up redundant servers (see page 151), you must provide the host ID of all three servers. If more than one host ID is listed for a server, use the first host ID listed.</p>
License Files Directory	Run this file to open an explorer window in the licenses directory.
License Server Install	Run this file to install FLEXlm as a service and start FLEXlm.
License Server Refresh	Run this file after you have installed a new license file or modified an existing license file. This forces a currently running FLEXlm server to reread the license files.
License Server Status	Run this file to display the number of licenses available and used.
License Server Uninstall	Run this file to shut down FLEXlm and remove FLEXlm as a service.
LMTOOLS	This file provides a shortcut to the LMTOOLS utility. LMTOOLS is a graphical user interface to the FLEXlm license manager tools. For details on using the tools, see the FLEXlm end user document, click Start > (All) Programs > Agilent 89600 License Support > Help > FLEXlm Ed Users Guide .

10 Setting Up a Floating License Client

Floating License Overview

The 89600 Series Software uses Macrovision's Flexible License Manager (FLEXlm) software for floating (network) software security configurations. When you run the 89600 Series Software setup program, the FLEXlm software is installed at `%SystemRoot%\vsa\licenses\bin` where `%SystemRoot%` is typically `c:\WINDOWS`.

The FLEXlm floating licenses require a server computer, to manage license control, and client computers, those on which you obtain a license from the server and run the 89600 series software.

This chapter covers setting up FLEXlm licensing on a client PC:

1. Install 89600 Series Software and license support as instructed in [Chapter 2, "Installing 89600 Software."](#)
2. Set system environment variable (see [page 159](#)).
3. Start the 89600 software (see [page 161](#)).

Note

If you install 89600 License Support on a PC that also has a node-locked or trial license, you will not be able to use the node-locked or trial license unless you use Add/Remove Programs to remove 89600 License Support.

Setting the System Environment Variable

To run 89600 Series Software and check out a license from the license server, you must set the `AGILEVSA_LICENSE_FILE` environment variable.

The environment variable specifies the name of the license server computer (or computers) from which you will get a license to run 89600 software. You specify a name for the environment variable (`AGILEVSA_LICENSE_FILE`) and assign a value. The value is the license computer name and, optionally, the TCP port number assigned. Your license administrator will provide you with the computer name and, if required, the port number.

Follow these instructions to set the environment variable.

1. Get the name of the server computer (or computers) from your license administrator.
2. For Windows XP, click **Start > Control Panel > Performance and Maintenance > System > Advanced > Environment Variables**.

For Windows 2000, click **Start > Settings > Control Panel > System > Advanced > Environment Variables**.

3. Add a new variable named `AGILEVSA_LICENSE_FILE` that points to the license server computer.
 - a. Click **New** under the User variables or System variables list.

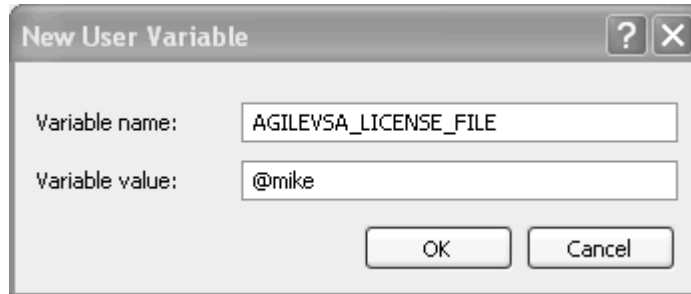
Note

You can enter the `AGILEVSA_LICENSE_FILE` environment variable either as a user variable or as a system variable. The user variable affects only the currently logged-in user; the system variable affects all users.

Setting Up a Floating License Client

Setting the System Environment Variable

- b. In the Variable name box, type `AGILEVSA_LICENSE_FILE`
- c. In the Variable value box, type `@` and the name of the server computer (mike, in this example). Your license administrator can provide you with this information.



- d. Click **OK, OK, OK**, and close the Control Panel window.

Important

The `AGILEVSA_LICENSE_FILE` environment variable takes precedence over any `LM_LICENSE_FILE` settings you might have set up for other applications that use FLEXlm licensing. `AGILEVSA_LICENSE_FILE` is searched first for a valid license before `LM_LICENSE_FILE`. As a result, using the `AGILEVSA_LICENSE_FILE` variable will isolate your 89600 Series Software license configurations from other applications that use the `LM_LICENSE_FILE` variable.

Starting the 89600 software

Start the application by double-clicking the appropriate icon on your desktop or by using the Start menu:

**Start > (All) Programs > Agilent 89600 VSA > Spectrum Analyzer
or Vector Signal Analyzer**

Start > (All) Programs > Agilent Distortion Suite > Distortion Suite

Start > (All) Programs > Agilent WLAN Test > WLAN Test.

Setting Up a Floating License Client
Starting the 89600 software

11 **Diagnostics**

Introduction

This chapter includes procedures for troubleshooting and isolating hardware problems.

Note

There may be more troubleshooting information available online. In the Agilent 89600 window, click **Help > Roadmap > Troubleshooting**.

Before you run any diagnostics on VXI analyzers, check the front-panel cable connections:

Analyzer configuration	Cable connections
1-channel 89610A	page 59
2-channel 89610A	page 60
1-channel 89611A	page 62
2-channel 89611A	page 65
1-channel 89640A	page 66
89640A, second IF/BB channel	page 67
2-RF-channel 89640A	page 68
1-channel 89641A	page 71
89641A second IF/BB channel	page 72
2-RF-channel 89641A	page 73

If your analyzer includes VXI hardware and when you start the software you get a message saying the hardware wasn't found (or if "Simulated Hardware" is displayed on the trace grid):

- Troubleshoot a VXI IO problem, [page 169](#).
- Troubleshoot Installation problems, [page 168](#).
- Troubleshoot an IEEE-1394 interface problem, [page 170](#)

If you have other problems and you suspect one of the following modules, do the troubleshooting for that module first:

- E1438 ADC module, [page 175](#)
- E1439 ADC module, [page 176](#)
- E2730 or E2731 RF Tuner module, [page 177](#)

If you have no idea which module is causing the problem, troubleshoot the signal path:

- 2.7 GHz RF signal path, [page 178](#)
- 6.0 GHz RF signal path, [page 180](#)
- 0 to 36 MHz baseband signal path, [page 182](#)
- 70 MHz IF signal path, [page 183](#)
- 0 to 40 MHz signal path, [page 185](#)

If your analyzer uses non-VXI measurement hardware and when you start the software you get a message saying the hardware wasn't found (or if "Simulated Hardware" is displayed on the trace grid," go to [page 172](#).

If other instruments or devices connected to the same computer reset or experience errors when you start an 89600 analyzer, go to [page 174](#).

Recommended Test Equipment

Instrument	Equipment Specifications	Recommended Model
Digital Signal Generator	Input/Output Impedance: 50 Ω Frequency: 500 kHz to 3 GHz Amplitude range: -40 to +16 dBm Amplitude resolution: 0.1 dB Harmonic level: <-30 dBc Spurious: <-90 dBc, <40 MHz Spurious: <-78 dBc, <2.56 GHz SWR: <1.5 Frequency Reference Out: 10 MHz Amplitude: ~7 dBm SSB Phase Noise: <-140 dBc/Hz at 100,1 k, 10MHz offsets RF: 1 GHz SSB Phase Noise: ≤-109 dBc/Hz at 20 kHz ≤-122 dBc/Hz at 100 kHz offset External Reference Input	E4433B
Spectrum Analyzer	Frequency 3 to 7 GHz Amplitude Range -20 to +15 dBm	E4407B
Power Meter	Dual Channel Absolute Accuracy: ±0.5% Power Reference Accuracy: ±0.9%	E4419B Alternate: E4419A
Power Sensor (2)	Frequency Range: 10 MHz to 6 GHz Amplitude Range: -30 to +20 dBm SWR (varies): ≤1.1 10 MHz to 2 GHz ≤1.15 2GHz to 6 GHz	E9301A

Troubleshooting a VXI mainframe failure

Using the mainframe service guide, verify that all power supplies and fan(s) are operational.

Troubleshooting a VXI installation problem

When you first start either Vector Signal Analyzer or Spectrum Analyzer application, if you get a message saying that the analyzer cannot find VXI hardware, there may have been a problem in installing the PCI card in your computer.

1. It is very important that you upgrade the PC BIOS to the latest version your PC manufacturer provides whether your PC is new or old. Upgrading to the latest version of BIOS will eliminate those bugs fixed by the new BIOS. A BIOS upgrade and a video driver upgrade may be required to fix PCI-related problems even on a new PC.
2. You may also need to upgrade the drivers for other PCI devices in the PC (video, IDE, LAN, SCSI, sound, modem, etc.).
3. Verify that the power supply splitter cable is connected between the PC power supply and the PCI card.
4. Make sure the PCI BIOS is correctly configured. New PCs have a BIOS flag that usually reads “Plug&Play OS” or “running Windows 95”. This flag must be set to NO for Windows 2000.
5. The E8491B requires installation of the PCI-to-IEEE 1394 host adapter in a bus-mastering PCI slot. Consult your PC’s user manual to determine which slots are bus-mastering (it is possible that all slots are bus-mastering).
6. In addition to the above, you may need to move the E8491B to separate IRQ line in the PC. PCI allows up to four devices sharing an IRQ line. However, this doesn’t always work, and you may need to have one IRQ per card. Moving the IRQ is not easy, and whether it can be done will depend on the details of the BIOS implementation of your PC.
7. Go to Control Panel, Devices and change the Startup mode for the wn1394 to “System”. This will start the 1394 PCI card driver sooner and may prevent problems.

If you suspect such a problem, refer to “Troubleshooting Installation Problems” in the Agilent IEEE 1394 PC Link to VXI *Configuration and User’s Guide* (c:\Vxi\IO libraries\manuals\e8491.pdf). You can also find the guide at the Agilent Technologies Web site. Go to <http://www.tm.agilent.com>, click on **Services and Support**, then **Technical Support** under Test and Measurement, and **On-Line Manuals Search**. Type E8491B in the box and click **SEARCH**.

For more information on troubleshooting an IEEE-1394 problem, see the following file on your computer: c:\Vxi\IO Libraries\Readme\trouble\e8491.htm. (If you installed the Agilent IO libraries in a directory other than the default, you must use that path to find this file.)

You may also need to refer to your computer’s documentation on PCI cards.

Troubleshooting a VXI IO configuration problem

If the 89600 software can't find VXI measurement hardware

If you replace the E8491 card in the mainframe or connect a different VXI mainframe to your computer, the 89600 software will not be able to find the hardware. The PCI interface in the computer looks for the specific E8491 card that was previously connected and can't find it.

1. If you are running Vector Signal Analyzer or Spectrum Analyzer, close the application.
2. Click **Start > Programs > Agilent IO Libraries > IO Config**.
3. In the right column, select **VXI** in list and click **Remove**.
4. In the left column, select **E8491 IEEE 1394 to VXI**, then click **Configure > OK**.
5. If E8491 IEEE to VXI is not listed, you may need to install a driver for the E8491. See instructions on the next page. Now the 89600 software should find the hardware. If not, see the following site for more E8491 troubleshooting information:
http://ftp.agilent.com/pub/mpusup/pc/iop/E8491B_Troubleshooting.html

Troubleshooting an IEEE-1394 interface failure

If you are running Vector Signal Analyzer or Spectrum Analyzer, close the application.

1. Verify that Agilent IO Libraries Control is running.

If this program is running, the icon shown to the right will appear in the task bar. If the icon is there, go to step 2.



If the icon is not there, reinstall the IO libraries from the 89600 Installation CD as follows:

- a. Insert the 89600 Installation CD ROM.
 - b. If the installation utility does not start automatically, click **Start > Run**, and type `drive:\setup.exe`
 - c. where *drive* represents the drive containing the setup CD-ROM.
 - d. Click **Next** in the Welcome window and **Yes** in the Software License and Warranty window.
 - e. In the Installation Options window, select **Custom Installation** from the pull-down list and click **Next**.
 - f. In the Custom Installation Window, click **VISA/SICL IO Libraries** in the upper list. Click **VISA/SICL Libraries** and **E8491 IEEE 1394 Driver** in the lower list. Click **Next**.
 - g. In the Installation Settings Window, click **Install**.
2. If the Agilent IO Libraries Control is running, verify that the version is L.02.01 or greater.
 - a. Click the IO Libraries Control icon (shown above).
 - b. Click **About Agilent IO Libraries Control**.

If the version is lower than L.02.01, reinstall the IO libraries as instructed in [step 1](#).

3. Verify that the IEEE-1394 drivers are loaded and running.
 - a. Click **Start > Settings > Control Panel**. Double Click on the icon labeled **Devices**. Look near the bottom of the list for wn1394.
 - b. If wn1394 is not present then the IEEE-1394 drivers were not loaded properly. Reload the IO libraries as instructed in [step 1](#).

If wn1394 is on the list but does not show a status of started, then the PCI interface card is most likely faulty.
4. Verify the E8491B slot zero VXI controller card.
 - a. Click on the Agilent IO Libraries Control icon and click **Edit VXI Resource Manager**, then click the **Run** button.
 - b. If an error is reported, click **Start > Programs > IO Libraries > IO Config**. If IO config is unable to find the E8491B, then the E8491B is most likely faulty.

Troubleshooting a LAN interface problem

If the 89600 software cannot find your measurement hardware, the problem may be in the LAN interface.

Verify that you have specified the correct ADC.

1. Click **Utilities > Hardware**.
2. If your measurement hardware is not included in the list for ADC1, continue with “Troubleshoot the LAN interface.”
3. If your measurement hardware is included in the list for ADC1, click to highlight it.
4. Make sure that the **Default Hardware** and **Simulate Hardware** checkboxes are cleared.
5. Click **OK**.
6. If the analyzer still does not use your hardware, continue with “Troubleshoot the LAN interface.”

Troubleshoot the LAN interface

1. Close all 89600 applications. To verify that all applications are closed, run Task Manager.
 - a. Right click an empty space in the task bar, or press Alt-Ctrl-Delete.
 - b. Click **Task Manager ... > Applications**.
 - c. If there are any “AgtVSAVector” or “AgtVSAScalar” applications listed, highlight them and click **End Task**.
 - d. Click the **Processes** tab.
 - e. If there are any “VSAVEC*.EXE” or “VSASCA*.EXE” processes in the list, highlight them and click **End Task**.
2. Confirm that your PC can communicate with the instrument.
 - a. Open a Command Prompt window: for Windows2000, click **Start > Programs > Accessories > Command Prompt**; for Windows XP, click **Start > All Programs > Accessories > Command Prompt**.
 - b. Type **ping hostname** and press Enter, where hostname is the IP address or hostname for the instrument. (For instructions on finding the IP address or hostname, see [page 100](#).)

If you are successful, continue with [step 3](#). If you are not successful, continue with the next step.

- c. Make sure that the PC is on and the LAN cable is connected to the PC and the instrument.

- d. If you are connecting directly from the PC to the instrument, verify that you are using a crossover LAN cable.
 - e. Cycle power on the instrument.
 - f. Verify that the subnet mask is set appropriately. For detailed instructions, see [page 100](#).
3. Confirm that VISA Assistant can find and communicate with the LAN instrument. Following the instructions in [step 10](#) on [page 107](#).
4. After you have confirmed that VISA Assistant can find the instrument, verify that VISA Assistant can send a SCPI query (if the instrument supports SCPI).
 - a. Restart VISA Assistant if necessary.
 - b. Click the instrument VISA address on the left side of the VISA Assistant dialog box.
 - c. Click the **Formatted I/O** tab, the **SCPI** radio button in the lower right corner, and the **IDN?** button.
 - d. If there is an error or an incorrect response, try sending a device clear first. Click the **Device Clear** button. If this does not help, cycle power on the instrument and try [step c](#) again.
5. Start an 89600 application. Look for any error dialog boxes at startup stating that the instrument does not have the proper options or firmware.
6. Verify that the instrument is in the ADC 1 list under **Utilities > Hardware**.

Troubleshooting interference with other devices or instruments

When you start an 89600 analyzer, the software attempts to identify other instruments and devices connected to the computer. This can cause the following problems:

- Instruments and devices get reset when you start the 89600 analyzer even if the instrument/device is not controlled by 89600.
- Errors occur on instruments or devices not controlled by 89600 when you start the 89600 analyzer.

To eliminate these problems, you can instruct the 89600 software to exclude specific devices from the identification process. To do this, edit the file “VsaVisaTemplate.txt” in the directory “C:\Program Files\Agilent\89600 VSA”. List the addresses of the devices you want to exclude, then save the file as “VsaVisaConfig.txt”.

Troubleshooting an E1438 ADC module

Verify the E1438 module using the self test in the front panel.

1. If you have either the Vector Signal Analyzer or Spectrum Analyzer running, close the application.
2. Click **Start > Programs > Vxipnp > Age1438 > E1438 Front Panel**.
3. If the factory default address has been changed you must enter it into the dialog box that will be presented.

There are two ways to find the E1438 address:

- a. Click on the Agilent IO Libraries Control icon and click **Edit VXI Resource Manager**, highlight Add/delete symbolic names of VXI devices, and click **RM Output**. The LADD column in the VXI device table lists the logical address for each module.
- b. Open the Vector Signal Analyzer or Spectrum Analyzer, click **Utilities > Hardware**, and the ADC tab for the module. The logical address is listed in the first column with the VXI mainframe number.
- c. On the menu bar of the front panel program select **Control > Self Test**.

If errors are reported, then the E1438 module is faulty.

Repeat this procedure for a second E1438 if necessary.

The E1438 front panel test always looks for a module at logical address 192. If it finds one, it automatically opens the soft front panel for that module. To test another E1438 module, power-off the mainframe and pull the module with address 192 out of the mainframe (you don't have to remove the module completely--just slide it forward an inch or so). Repeat steps 1-3 above.

Troubleshooting an E1439 ADC module

Verify the E1439 module using the self test in the front panel.

1. If you have either the Vector Signal Analyzer or Spectrum Analyzer running, close the application.
2. Click **Start > Programs > Vxipnp > Age1439 > E1439 Front Panel**.
3. If the factory default address has been changed you must enter it into the dialog box that will be presented.

There are two ways to find the E1439 address:

- a. Click on the Agilent IO Libraries Control icon and click **Edit VXI Resource Manager**, highlight Add/delete symbolic names of VXI devices, and click **RM Output**. The LADD column in the VXI device table lists the logical address for each module.
 - b. Open the Vector Signal Analyzer or Spectrum Analyzer, click **Utilities, Hardware**, and the ADC tab for the module. The logical address is listed in the first column with the VXI mainframe number.
4. On the menu bar of the front panel program select **Control > Self Test**.

If errors are reported, then the E1439 module is faulty.

Repeat this procedure for a second E1439 if necessary.

The E1439 front panel test always looks for a module at logical address 194. If it finds one, it automatically opens the soft front panel for that module. To test another E1439 module, power-off the mainframe and pull the module with address 194 out of the mainframe (you don't have to remove the module completely--just slide it forward an inch or so). Repeat steps 1-3 above.

Troubleshooting the E2730/E2731 module

You can use VISA Assistant to isolate problems to the E2730/E2731 module.

1. If you have either the Vector Signal Analyzer or Spectrum Analyzer running, close the application.
2. Start VISA Assistant by clicking **Start > Programs > Vxipnp > VISA Assistant**.
3. Under VXIO, locate the E273xA module's address. You can determine what the address is by running the 89600 analyzer, then clicking **Utilities > Hardware > Down Converter**. The address is listed in the first column, and the slot number in the second column.
4. Click on the E273xA's address under VXIO in VISA Assistant. Then click the **Formatted IO** tab. From this tab you can query the module to identify problems.
 - a. If the red LED on the E273xA front panel is lit, type **CDE?** in the query box at the bottom of the tab and click **viQueryf**. (CDE? reads the module's current device Error Register contents.) If the response ends in 32768, the 10 MHz Reference signal is probably not connected properly. Check the semi-rigid cable from the 10 MHz Ref Out connector on the 89605 module to the 10 MHz Ext Ref connector on the E273xA module. Tighten the connectors, and the red LED should turn off. If the query returns any number other than 32768 or 00000, the E273xA module is most likely faulty.
 - b. If the red LED on the E273xA front panel flickers or turns on and off, type **DDE?** in the query box and click **viQueryf**. (DDE? reads the module's latched error status. Reading this register clears it until the fault reoccurs.) If the query returns 32768, check the 10 MHz Ref connections as described in the previous paragraph. If the query returns any number other than 32768 or 00000, the E273xA module is most likely faulty.
5. Repeat for a second E2730/E2731 module if necessary.

Troubleshooting the 2.7 GHz RF signal path

The following procedures direct you through inserting a signal at various points in the analyzer's signal path to isolate problems to a specific module. Perform the steps in the order listed.

This test requires a signal generator. (See “Recommended Test Equipment” on page 166.)

1. Set up the analyzer as follows:
 - a. If it is not already running, start the Vector Signal Analyzer by double clicking the icon or clicking **Start > Programs > Agilent 89600 VSA > Vector Signal Analyzer**.
 - b. Click **File > Preset > Preset Setup**.
 - c. Click **Utilities > Calibration**, and clear the **Apply Corrections to Data** checkbox.
 - d. Click **MeasSetup > Frequency Bands > 36 MHz – 2.7 GHz**.
 - e. Disconnect the BNC cable from the E1439 “Analog In” connector and connect a signal generator to E1439 Analog Input.
 - f. Set the signal generator for 70 MHz, –10 dBm output.
 - g. Set the analyzer's marker to peak by right clicking on the spectrum trace and clicking **↑Peak**.
The marker reading should be 20 dBm ± 1.5 dB
 - h. Verify the other settings in the following table.

Input Range	Signal Generator Level	Marker Level
+20 dBm	–10 dBm	+20 dBm ± 1.5 dB
–35 dBm	–20 dBm	–40 dBm ± 1.5 dB
–40 dBm	–20 dBm	–40 dBm ± 1.5 dB
–45 dBm	–20 dBm	–40 dBm ± 1.5 dB

If any of the readings are incorrect, the E1439 module is most likely faulty.

2. Reconnect the BNC cable to the E1439 “Analog In” and disconnect the SMA cable from the 89605 “From 70 MHz IF Out” connector. Connect the signal generator output to 89605 “From 70 MHz IF Out”.
 - a. Set the marker to peak by right clicking on the spectrum trace and clicking **↑Peak**.
 - b. The marker reading should be –40 dBm ± 1.5 dB.

If this reading is incorrect, the 89605 module is most likely faulty.

3. Set the signal generator to 1 GHz, –40 dBm.

- a. Reconnect the SMA cable to the 89605 “From 70 MHz IF Out” connector. Disconnect the SMA cable from the E2730 “RF IN” connector. Connect the signal generator output to the E2730 “RF In” connector.
- b. Set the marker to peak by right clicking on the spectrum trace and clicking **↑Peak**.
- c. The marker reading should be $-40 \text{ dBm} \pm 3.5 \text{ dB}$
- d. Change the signal generator and 89600 center frequency to 950 MHz.
- e. Set the marker to peak by right clicking on the spectrum trace and clicking **↑Peak**.
- f. The marker reading should be $-40 \text{ dBm} \pm 3.5 \text{ dB}$.

If either reading is incorrect, the E2730 module is most likely faulty. If this module is channel 2 in a 2-channel analyzer, see [“Verifying Channel 1 LO outputs in a 2-channel RF system” on page 187](#).

4. Set the signal generator to 1 GHz, -30 dBm . Set the 89600 center frequency to 16 Hz.
 - a. Reconnect the SMA cable to E2730 “RF In” connector. Connect the signal generator output to the 89605 Ch1 Input connector.
 - b. Set the marker to peak by right clicking on the spectrum trace and clicking **↑Peak**.
 - c. Change the analyzer input range and the signal generator output level in 5 dB steps, verifying the marker readings in the following table.

Input Range	Signal Generator Level	Marker Level
-30 dBm	-30 dBm	$-30 \text{ dBm} \pm 3.5 \text{ dB}$
-25 dBm	-25 dBm	$-25 \text{ dBm} \pm 3.5 \text{ dB}$
-20 dBm	-20 dBm	$-20 \text{ dBm} \pm 3.5 \text{ dB}$
-15 dBm	-15 dBm	$-15 \text{ dBm} \pm 3.5 \text{ dB}$
-10 dBm	-10 dBm	$-10 \text{ dBm} \pm 3.5 \text{ dB}$
-5 dBm	-5 dBm	$-5 \text{ dBm} \pm 3.5 \text{ dB}$
0 dBm	0 dBm	$0 \text{ dBm} \pm 3.5 \text{ dB}$
$+5 \text{ dBm}$	$+5 \text{ dBm}$	$+5 \text{ dBm} \pm 3.5 \text{ dB}$
$+10 \text{ dBm}$	$+10 \text{ dBm}$	$+10 \text{ dBm} \pm 3.5 \text{ dB}$
$+15 \text{ dBm}$	$+15 \text{ dBm}$	$+15 \text{ dBm} \pm 3.5 \text{ dB}$
$+20 \text{ dBm}$	$+20 \text{ dBm}$	$+20 \text{ dBm} \pm 3.5 \text{ dB}$

If any of these readings are incorrect, the 89605 module is most likely faulty.

5. Repeat steps 1 through 4 for a second channel if required.

Troubleshooting the 6.0 GHz RF signal path

The following procedures direct you through inserting a signal at various points in the analyzer's signal path to isolate problems to a specific module. Perform the steps in the order listed.

This test requires a signal generator. (See “Recommended Test Equipment” on page 166.)

1. Set up the analyzer as follows:
 - a. If it is not already running, start the Vector Signal Analyzer by double clicking the icon or clicking **Start > Programs > Agilent 89600 VSA > Vector Signal Analyzer**.
 - b. Click **File > Preset > Preset Setup**.
 - c. Click **Utilities > Calibration**, and clear the **Apply Corrections to Data** checkbox.
 - d. Click **MeasSetup > Frequency Bands > 36 MHz – 6 GHz**.
 - e. Disconnect the BNC cable from the E1439 “Analog In” connector and connect a signal generator to E1439 Analog Input.
 - f. Set the signal generator for 70 MHz, –10 dBm output.
 - g. Set the analyzer's marker to peak by right clicking on the spectrum trace and clicking **↑Peak**.
The marker reading should be 20 dBm ± 1.5 dB
 - h. Verify the other settings in the following table.

Input Range	Signal Generator Level	Marker Level
+20 dBm	–10 dBm	+20 dBm ± 1.5 dB
–35 dBm	–20 dBm	–40 dBm ± 1.5 dB
–40 dBm	–20 dBm	–40 dBm ± 1.5 dB
–45 dBm	–20 dBm	–40 dBm ± 1.5 dB

If any of the readings are incorrect, the E1439 module is most likely faulty.

2. Reconnect the BNC cable to the E1439 “Analog In” and disconnect the SMA cable from the 89605 “From 70 MHz IF Out” connector. Connect the signal generator output to 89605 “From 70 MHz IF Out”.
 - a. Set the marker to peak by right clicking on the spectrum trace and clicking **↑Peak**.
 - b. The marker reading should be –40 dBm ± 1.5 dB.

If this reading is incorrect, the 89605 module is most likely faulty.

3. Set the signal generator to 1 GHz, –40 dBm.

- a. Reconnect the SMA cable to the 89605 “From 70 MHz IF Out” connector. Disconnect the SMA cable from the E2731 “6 GHz IN” connector. Connect the signal generator output to the E2731 “6 GHz IN” connector.
- b. Set the marker to peak by right clicking on the spectrum trace and clicking **↑Peak**.
- c. The marker reading should be $-40 \text{ dBm} \pm 4.5 \text{ dB}$
- d. Change the signal generator and 89600 center frequency to the frequencies in the table and repeat steps b and c.

Frequency
950 MHz
3.5 GHz
4.0 Ghz
4.5 Ghz
5.5 Ghz

If any of these readings are incorrect, the E2731 module is most likely faulty. If this module is channel 2 in a 2-channel analyzer, see [“Verifying Channel 1 LO outputs in a 2-channel RF system” on page 187](#).

4. Set the signal generator to 1 GHz, -30 dBm . Set the 89600 center frequency to 16 Hz.
 - a. Reconnect the SMA cable to E2731 “6 GHz In” connector. Connect the signal generator output to the 89605 Ch1 Input connector.
 - b. Set the marker to peak by right clicking on the spectrum trace and clicking **↑Peak**.
 - c. Change the analyzer input range and the signal generator output level in 5 dB steps, verifying the marker readings in the following table.

Input Range	Signal Generator Level	Marker Level
-30 dBm	-30 dBm	$-30 \text{ dBm} \pm 5 \text{ dB}$
-25 dBm	-25 dBm	$-25 \text{ dBm} \pm 5 \text{ dB}$
-20 dBm	-20 dBm	$-20 \text{ dBm} \pm 5 \text{ dB}$
-15 dBm	-15 dBm	$-15 \text{ dBm} \pm 5 \text{ dB}$
-10 dBm	-10 dBm	$-10 \text{ dBm} \pm 5 \text{ dB}$
-5 dBm	-5 dBm	$-5 \text{ dBm} \pm 5 \text{ dB}$
0 dBm	0 dBm	$0 \text{ dBm} \pm 5 \text{ dB}$
$+5 \text{ dBm}$	$+5 \text{ dBm}$	$+5 \text{ dBm} \pm 5 \text{ dB}$
$+10 \text{ dBm}$	$+10 \text{ dBm}$	$+10 \text{ dBm} \pm 5 \text{ dB}$
$+15 \text{ dBm}$	$+15 \text{ dBm}$	$+15 \text{ dBm} \pm 5 \text{ dB}$
$+20 \text{ dBm}$	$+20 \text{ dBm}$	$+20 \text{ dBm} \pm 5 \text{ dB}$

If any of these readings are incorrect, the 89605 module is most likely faulty.

5. Repeat steps 1-4 for channel 2 if required.

Troubleshooting the 0 to 36 MHz baseband signal path

Perform the following procedures in the order listed to troubleshoot the 89640 baseband signal path.

This test requires a signal generator. (See “Recommended Test Equipment” on page 166.)

1. Set up the 896xxA as follows:
 - a. If it is not already running, start the Vector Signal Analyzer by double clicking the icon or clicking **Start > Programs > Agilent 89600 VSA > Vector Signal Analyzer**.
 - b. Click **File > Preset > Preset Setup**.
 - c. Click **Utilities > Calibration**, and clear the **Apply Corrections to Data** checkbox.
 - d. Click **MeasSetup > Frequency Bands > 0 - 36 MHz**.
 - e. Disconnect the BNC cable from the E1439 “Analog In” connector and connect a signal generator to E1439 “Analog In.”
 - f. Set the signal generator for 20 MHz, -30 dBm output.
 - g. Set the marker to peak by right clicking on the spectrum trace and clicking **↑Peak**.
 - h. The marker reading should be $20 \text{ dBm} \pm 1.7 \text{ dB}$.
If this reading is incorrect, the E1439 module is most likely faulty.
2. Connect the signal generator output to 89605 “Ch 1 Input”.
 - a. Reconnect the BNC cable from 89605 “To ADC” to E1439 “Analog In.”
 - b. Set the center frequency to 20 MHz and the frequency span to 100 kHz.
 - c. Set the marker to peak by right clicking on the spectrum trace and clicking **↑Peak**.
 - d. The marker reading should be $-30 \text{ dBm} \pm 3.5 \text{ dB}$.
 - e. Change the 89640A input range in 5 dB steps while verifying that the marker reading at each step is $-30 \text{ dBm} \pm 3.5 \text{ dB}$.
If any of these readings are incorrect, the 89605 module is most likely faulty.
3. Repeat steps 1 and 2 for a second channel if required.

Troubleshooting the 70 MHz IF signal path

The following procedures direct you through inserting a signal at various points in the analyzer's signal path to isolate problems to a specific module. Perform the steps in the order listed.

This test requires a signal generator. (See [“Recommended Test Equipment”](#) on page 166.)

1. Set up the analyzer as follows:
 - a. If it is not already running, start the Vector Signal Analyzer by double clicking the icon or clicking **Start > Programs > Agilent 89600 VSA > Vector Signal Analyzer**.
 - b. Click **File > Preset > Preset Setup**.
 - c. Click **Utilities > Calibration**, and clear the **Apply Corrections to Data** checkbox.
 - d. Click **MeasSetup > Frequency Bands > 52 MHz – 88 MHz**.
 - e. Click **MeasSetup > Freq > Span**, and enter **100kHz**.
 - f. Click **Input > Range**, and enter **-45 dBm**.
 - g. Click **Control > Restart**.
 - h. Disconnect the BNC cable from the E1439 “Analog In” connector and connect a signal generator to E1439 Analog Input.
 - i. Set the signal generator for 70 MHz, -45 dBm output.
 - j. Set the 89600 marker to peak: right click on the spectrum trace and click **↑Peak**. The marker reading should be -39 dBm ± 1.5 dB
 - k. Click **Markers > Copy Marker to > Move Offset to Mkr**.
 - l. Change the Input Range in 5 dB increments from -45 dBm to -25 dBm. The Marker Level for all ranges should read 0 dB ± 0.5 dB.

If any of the readings are incorrect, the E1439 module is most likely faulty.
2. Reconnect the BNC cable to the E1439 “Analog In.” Connect the signal generator output to 89605 “Ch 1 Input”.
 - a. Set the marker to peak: right click on the spectrum trace and click **↑Peak**.
 - b. Click **Input > Range**, and enter **-25 dBm**.
 - c. Click **Markers > Copy Marker to > Move Offset to Mkr**.
 - d. Change the Input Range in 5 dB increments from -25 dBm to +20 dBm. The Marker Level for all ranges should read 0 dB ± 0.5 dB.

If any of these readings is incorrect, the 89605 module is most likely faulty.

For a two-channel IF analyzer, repeat this procedure for the second channel.

Troubleshooting the 0 to 40 MHz baseband signal path

Perform the following procedures in the order listed to troubleshoot the 89610A signal path.

This test requires a signal generator. (See “Recommended Test Equipment” on page 166.)

1. Set up the analyzer as follows:
 - a. If it is not already running, start the Vector Signal Analyzer by double clicking the icon or clicking **Start > Programs > Agilent 89600 VSA > Vector Signal Analyzer**.
 - b. Click **File > Preset > Preset Setup**.
 - c. Click **Utilities > Calibration**, and clear the **Apply Corrections to Data** checkbox.
 - d. Disconnect the BNC cable from the E1438 “Analog In” connector and connect a signal generator to E1438 “Analog In.”
 - e. Set the signal generator for 20 MHz, -31 dBm output.
 - f. Set the analyzer input range to -31 dBm.
 - g. Set the marker to peak by right clicking on the spectrum trace and clicking **↑Peak**.
 - h. The marker reading should be -31 dBm ± 1.7 dB.

If this reading is incorrect, the E1438 module is most likely faulty.

- i. Change the analyzer input range and the signal generator output level in 3 dB steps, verifying the marker readings in the table on the next page.

Input Range	Signal Generator Level	Marker Level
-31 dBm	-31 dBm	-31 dBm \pm 1.7 dB
-28 dBm	-28 dBm	-28 dBm \pm 1.7 dB
-25 dBm	-25 dBm	-25 dBm \pm 1.7 dB
-22 dBm	-22 dBm	-22 dBm \pm 1.7 dB
-19 dBm	-19 dBm	-19 dBm \pm 1.7 dB
-16 dBm	-16 dBm	-16 dBm \pm 1.7 dB
-13 dBm	-13 dBm	-13 dBm \pm 1.7 dB
-10 dBm	-10 dBm	-10 dBm \pm 1.7 dB
-7 dBm	-7 dBm	-7 dBm \pm 1.7 dB
-4 dBm	-4 dBm	-4 dBm \pm 1.7 dB
-1 dBm	-1 dBm	-1 dBm \pm 1.7 dB
+ 2 dBm	+ 2 dBm	+ 2 dBm \pm 1.7 dB
+5 dBm	+5 dBm	+5 dBm \pm 1.7 dB
+8 dBm	+8 dBm	+8 dBm \pm 1.7 dB
+11 dBm	+11 dBm	+11 dBm \pm 1.7 dB
+14 dBm	+14 dBm	+14 dBm \pm 1.7 dB
+17 dBm	+17 dBm	+17 dBm \pm 1.7 dB
+20 dBm	+20 dBm	+20 dBm \pm 1.7 dB

If any readings are incorrect, the E1438 module is most likely faulty.

For a two-channel 89610A, repeat this procedure for the second E1438.

2. Connect the signal generator output to 89606/B “Ch 1 Input”.
 - a. Reconnect the BNC cable from 89606/B “To ADC” to E1438 “Analog In.”
 - b. Set the signal generator to -31 dBm output level.
 - c. Set the analyzer center frequency to 20 MHz, frequency span to 100 kHz, and input range to -31 dBm.
 - d. Set the marker to peak by right clicking on the spectrum trace and clicking \uparrow Peak.
 - e. The marker reading should be -31 dBm \pm 1.7 dB.
 - f. Change the analyzer input range and the signal generator output level in 3 dB steps, verifying the marker readings in the table in above.

If any of these readings are incorrect the 89606/B module is most likely faulty.

Verifying Channel 1 LO outputs in a 2-channel RF system

Perform the following procedures to verify the channel 1 LO output on an E2730 or E2731 module in a 2-channel analyzer.

This test requires a spectrum analyzer and a power meter. (See “Recommended Test Equipment” on page 166.)

1st LO

1. Disconnect the cable connected to E273x 1st LO In/Out.
2. Connect Channel 1 1st LO In/Out to the spectrum analyzer RF Input.
3. If it is not already running, start the Vector Signal Analyzer by double clicking the icon or clicking **Start > Programs > Agilent 89600 VSA > Vector Signal Analyzer**.
4. Set up the 89600 Vector Signal Analyzer:
 - a. Click **File > Preset > Preset Setup**.
 - b. Click **Input > Channels > 2 Channels**.
5. Set up the spectrum analyzer:
 - a. Preset.
 - b. Set the reference level to 12 dBm.
 - c. Set the span to 100 MHz.
6. For each frequency listed below verify that the amplitude is <6.5 dBm. If the signal level is marginal, verify with a power meter.

89600 center frequency	Spectrum analyzer center frequency
36 MHz	3.8175 GHz
1 GHz	4.7825 GHz
2.7 GHz	6.4825 GHz

If any reading is incorrect then the E273x is most likely faulty.

2nd LO

1. Disconnect the cable connected to E273x 2nd LO In/Out.
2. Connect Channel 1 2nd LO In/Out to the spectrum analyzer RF Input.
3. If it is not already running, start the Vector Signal Analyzer by double clicking the icon or clicking **Start > Programs > Agilent 89600 VSA > Vector Signal Analyzer**.
4. Set up the 89600 Vector Signal Analyzer:

- a. Click **File > Preset > Preset Setup**.
 - b. Click **Input > Channels > 2 Channels**.
5. Set up the spectrum analyzer:
- a. Preset.
 - b. Set the reference level to 15 dBm.
 - c. Set the center frequency to 3.711 GHz.
 - d. Set the span to 5 MHz.
6. For each frequency listed below verify that the amplitude is <10.0 dBm. If the signal level is marginal, verify with a power meter.

89600 center frequency	Spectrum analyzer center frequency
252.4 MHz	3710 MHz
252.5 MHz	3712.5 MHz
254 MHz	3711 MHz

If any reading is incorrect then the E273x is most likely faulty.

Diagnostics

Verifying Channel 1 LO outputs in a 2-channel RF system

Introduction

This chapter contains block diagrams and circuit descriptions of the 89600 series VXI measurement hardware. This information is provided to help you understand system operation and identify and isolate problems to a specific module.

These products consist of VXI measurement hardware and Vector Signal Analysis (VSA) software running on a standard Windows 2000 or Windows XP workstation. The 89600 series includes four analyzer configurations with VXI measurement hardware:

- 89610 DC - 40 MHz Analyzer (with optional second input channel), [page 191](#)
- 89640 DC - 2.7 GHz Analyzer and 89641 DC - 6.0GHz Analyzer, [page 195](#)
- 89611 70 MHz IF Analyzer, [page 199](#)

Agilent 89610

The Agilent 89610 Vector Signal Analyzer VXI hardware includes the following VXI modules:

- Agilent E8491 Option 001 IEEE 1394 PC Link to VXI
- Agilent 89606 Input module
- Agilent E1438 ADC module
- Option 002, 102, 145, and 289 include a second E1438 module.

The module descriptions in this section apply to the block diagram on [page 192](#).

E8491 PC Link to VXI

The E8491 module provides the link between the computer and the VXI measurement hardware. No signal acquisition or processing happens in this module.

For detailed information on this module and the IEEE 1394 interface, refer to the Agilent E8491 IEEE 1394 PC Link to VXI *Configuration and User's Guide*. The PDF file for this guide is installed on your computer (C:\Program Files\Agilent\IO Libraries>manuals\e8491.pdf).

89606/B Input module

The 89606 Input module accepts the input signal and passes it to the E1438 ADC module.

During calibration, the input signal path is interrupted. The calibrator in the 89606 module inserts a calibration signal into the signal path to the E1438 ADC module. The calibration signal is taken from the 10 MHz reference and multiplied by 10 to match the E1438 sampling rate of 100 MSa per second. The E1438 ADC uses the same 10 MHz reference, so the calibration source is phase locked to the sample clock.

The 89606 also provides a 10 MHz reference signal to the Agilent E1438 module. An additional 10 MHz Ref output is available on the module front panel to connect to other instruments in your measurement setup.

For the 89606B only, you can connect a 10MHz or 13 MHz reference signal to the Ext Reference In connector.

Please note that use of this module outside the 89600 series analyzers is not supported at this time.

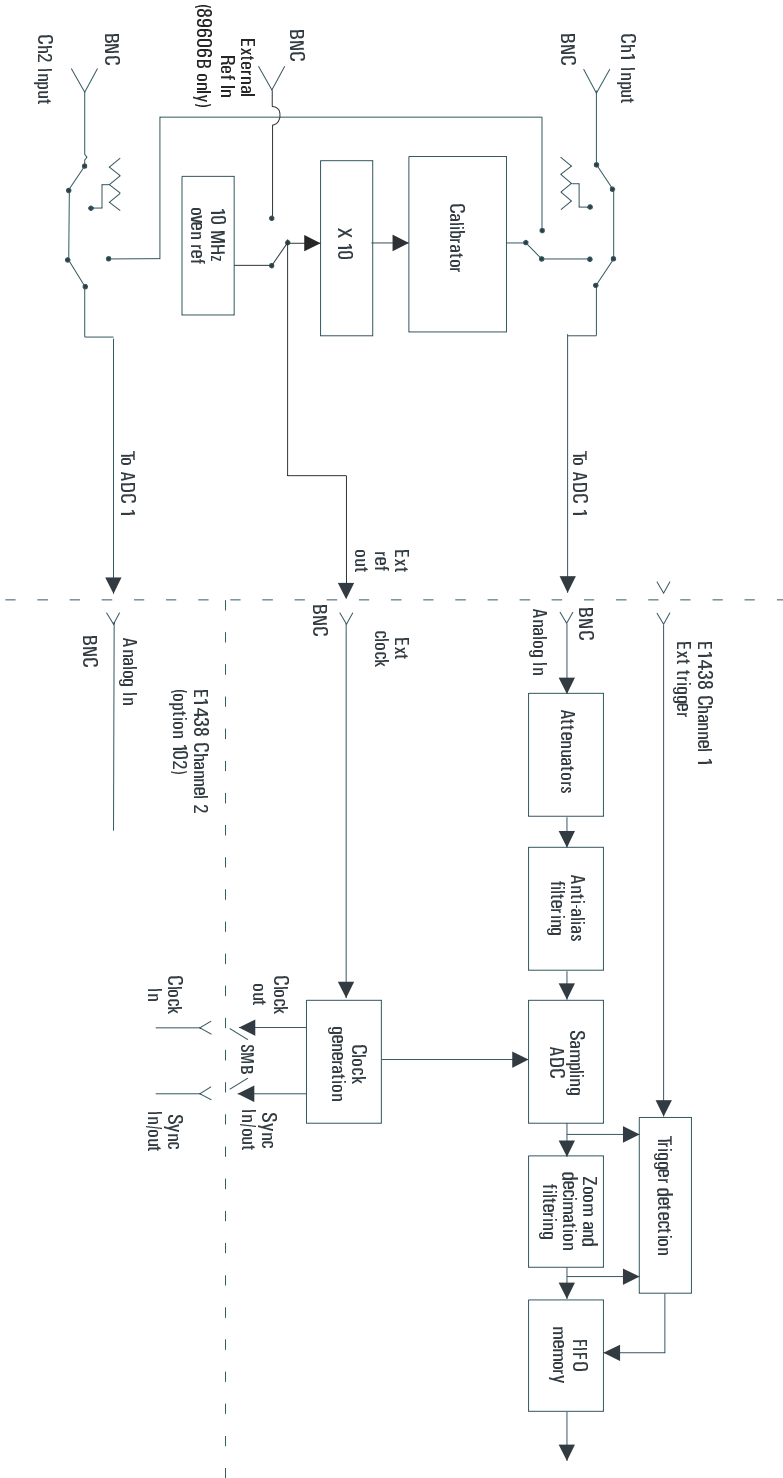


Figure 12-1

89610 block diagram

E1438 ADC module

All signal processing happens in the Agilent E1438A 100 MSa/s ADC + Filter + FIFO (attenuation, anti-alias filtering, etc.). Detailed information about this module is available in the E1438 User's Guide. A PDF file for this guide is installed on your computer (C:\Program Files\Visa\Winnt\age1438/help\AGE 1438_Users_Guide.pdf).

Triggering

For external trigger mode, a trigger signal must be supplied at the "Ext Trigger" connector on the front panel. This input is AC coupled with an impedance of 1 K ohm so any signal with a sharp rising or falling transition greater than 100 mV (i.e. TTL or ECL) can be used as an external trigger source. Minimum pulse width is 300 ns.

If your system includes two E1438 modules, you can use the external trigger connector on either module. The bi-directional Intermodule Sync connectors on the module front panels connect the trigger signal between the modules. This synchronizes the two modules so that they receive the trigger signal simultaneously.

Coupling

The input can be either AC or DC coupled. AC coupling allows the system to measure low level AC signals in the presence of a large DC offset.

Ranging

Attenuation is the first step in the E1438 module. The module provides 0 to 51 dB of attenuation in 3 dB steps, resulting in analyzer input ranges between -31 dBm and 20 dBm in 3 dB steps.

Anti-alias filtering

Since the normal ADC sample rate is 100 MHz, a complete representation of the input signal can be achieved only for bandwidths up to 50 MHz. Frequency components above 50 MHz can cause ambiguous results (aliasing).

The anti-alias filter attenuates these high frequency components to reduce aliasing. The anti-alias filter in the Agilent E1438 is flat to 40 MHz and rejects signals above 60 MHz by at least 90 dB. Thus the 0-40 MHz frequency range of the sampled signal is -90 dB alias free. The filter's transition band from 40 MHz to 60 MHz affects flatness and allow some aliasing in the sampled signal frequency range of 40 MHz to 50 MHz.

Analog-to-digital (ADC) signal conversion

The heart of the E1438 is a precision sampling ADC. The ADC samples the signal at a rate of up to 100 MSa/sec and converts the analog signal to a digital signal.

Zoom and decimation filtering

This section uses digital circuitry to allow programmable changes in the center frequency and signal bandwidth of the 89610 analyzer (zoom). Bandwidth is controlled by a chain of digital low-pass filters. Each of the filters reduces the bandwidth by a factor of 2 (decimation).

Memory

Digitized data is stored in memory in the E1438 module and read out after a block of data has been taken. The digitized data passes through the E8491 interface to the measurement software in the computer.

For information on how the signal is processed by the measurement software, see the online help for "System Block Diagram" under Tutorial, Theory of Operation.

Agilent 89640/89641

The Agilent 89640 Vector Signal Analyzer VXI hardware includes the following VXI modules:

- Agilent E8491 Option 001 IEEE 1394 PC Link to VXI
- Agilent 89605 Input module
- Agilent E1439 ADC module
- Agilent E2730 RF Tuner module
- optional second IF/baseband channel, including an additional E1439 and E2730 modules

The Agilent 89641 Vector Signal Analyzer VXI hardware includes the following VXI modules:

- Agilent E8491 Option 001 IEEE 1394 PC Link to VXI
- Agilent 89605 Input module
- Agilent E1439 ADC module
- Agilent E2731 RF Tuner module
- optional second IF/baseband channel, including an additional E1439 and E2731 modules

The module descriptions in this section apply to the 89640/889641 block diagram on [page 196](#). Your analyzer may include a second IF/baseband channel, which is not shown in the block diagram.

E8491 PC Link to VXI

The E8491 module provides the link between the computer and the VXI measurement hardware. No signal acquisition or processing happens in this module.

For detailed information on this module and the IEEE 1394 interface, refer to the Agilent E8491 IEEE 1394 PC Link to VXI *Configuration and User's Guide*. The PDF file for this guide is installed on your computer (C:\Program Files\Agilent\IO Libraries>manuals\e8491.pdf).

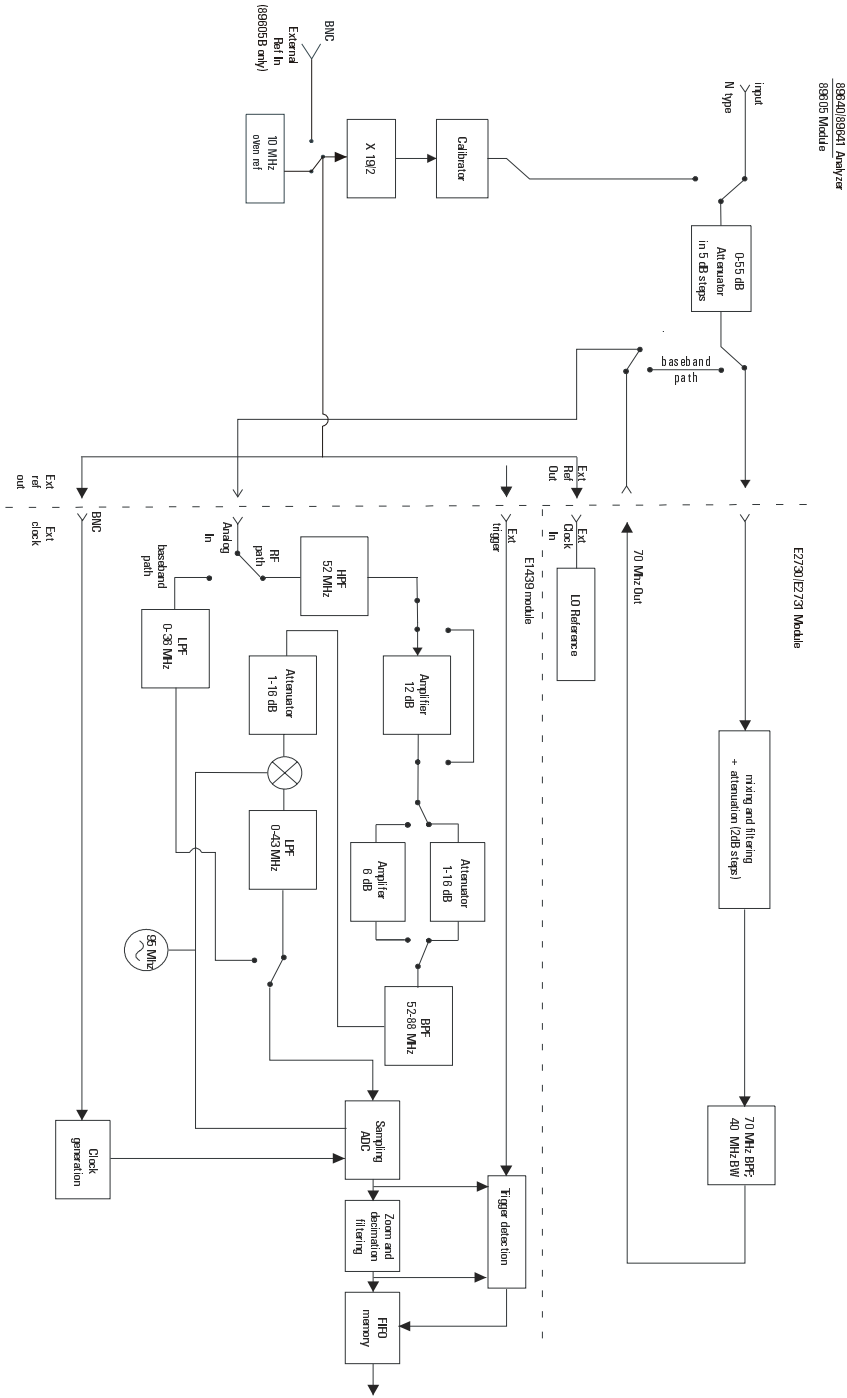


Figure 12-2

89640/89641 block diagram

89605 Input module

The 89605 Input module accepts the input signal and passes it through a 0-to-50 dB attenuator (5 dB steps). In baseband mode (0 to 36 MHz), the signal is routed directly to the E1439 module, by-passing the E2730/E2731 module. In RF mode (36 MHz to 2.7 GHz or 6 GHz), the signal is routed to the E2730/E2731 RF Tuner. The down-converted signal from the E2730/E2731 comes back to the 89605 and is routed to the E1439 module.

During calibration, the input signal path is interrupted. The calibrator in the 89605 module inserts a calibration signal into the signal path to the E1439 ADC module. The calibration signal is taken from the 10 MHz reference and multiplied by 19/2 to match the E1439 sampling rate of 95 MSa per second. The E1439 ADC uses the same 10 MHz reference, so the calibration source is phase locked to the sample clock.

The 89605 also provides a 10 MHz reference signal to the E2730/E2731 and E1439 modules. An additional 10 MHz Ref output is available on the module front panel to connect to other instruments in your measurement setup.

For the 89605B only, you can connect a 10MHz or 13 MHz reference signal to the Ext Reference In connector.

Please note that use of this module outside the 89600 series analyzers is not supported at this time.

E2730/E2731 RF Tuner module

The E2730 RF Tuner has a frequency tuning range of 20 to 2700 MHz in 1 kHz steps. The E2731 RF Tuner has a frequency tuning range of 20 to 6000 MHz. Each tuner converts the input signal in multiple stages of local oscillators, amplifiers, attenuators, and filters. The 70 MHz output has a bandwidth of 36 MHz, resulting in an output signal to the ADC between 52 MHz and 88 MHz.

Please note that use of these modules outside the 89600 series analyzers is not supported at this time.

E1439 ADC module

The input signal passes to the E1439 ADC module in one of two ways. If the input frequency band is 0 Hz to 36 MHz, the signal goes directly to the E1439 module. If the GHz for the 89641), the signal goes to the RF Tuner module to be downconverted. From the RF Tuner module, the signal goes back through the 89605 module to the Agilent E1439 95 MSa/s ADC + Filter + FIFO + 70 MHz IF Input module.

Detailed information about this module is available in the E1439 User's Guide. A PDF file for this guide is installed on your computer (C:\Program Files\Visa\Winnt\age1439\help\AGE 1439_Users_Guide.pdf).

Triggering

For external trigger mode, a trigger signal must be supplied at the "Ext Trigger" connector on the front panel. This input is AC coupled with an impedance of 1 K ohm so any signal with a sharp rising or falling transition greater than 100 mV (i.e. TTL or ECL) can be used as an external trigger source. Minimum pulse width is 300 ns.

Coupling

The input can be either AC or DC coupled. AC coupling allows the system to measure low level AC signals in the presence of a large DC offset.

Signal conditioning

In 0-36 MHz mode, the input signal goes through the lower path in the block diagram. In this mode, no attenuation occurs in the E1439 module.

In 36 MHz-2.7 GHz (or 6 GHz) mode, the input signal goes through the upper path in the block diagram. This path includes 0 to 32 dB of attenuation in 1 dB steps. The signal is band-pass filtered, mixed with 95 MHz, and low-pass filtered. This inverts and translates the frequency spectrum from 52-88 MHz at the input to 43-7 MHz at the ADC. The ADC samples the signal at a 95 MHz sample rate.

Analog-to-digital (ADC) signal conversion

The heart of the E1439 is a precision sampling ADC. The ADC samples the signal at a rate of up to 95 MSa/sec and converts the analog signal to a digital signal.

Memory

Digitized data is stored in memory in the E1439 module and read out after a block of data has been taken. The digitized data passes through the E8491 interface to the measurement software in the computer.

For information on how the signal is processed by the measurement software, see the online help for "System Block Diagram" under Tutorial, Theory of Operation.

Agilent 89611 70 MHz IF Analyzer

The Agilent 89610 Vector Signal Analyzer VXI hardware includes the following VXI modules:

- Agilent E8491 Option 001 IEEE 1394 PC Link to VXI
- Agilent 89605 Input module
- Agilent E1439 ADC module
- an optional second channel, including an additional 89605 and E1439 module

In addition, the 89611 requires an external down converter that provides a 70 MHz IF out signal. If you use an Agilent PSA option H70 as the down converter, the 89600 software controls the down converter. Otherwise, you must control the down converter separately from the 89600 interface.

The module descriptions in this section apply to the 89611 block diagram on [page 200](#). The block diagram does not include the optional second channel.

E8491 PC Link to VXI

The E8491 module provides the link between the computer and the VXI measurement hardware. No signal acquisition or processing happens in this module.

For detailed information on this module and the IEEE 1394 interface, refer to the Agilent E8491 IEEE 1394 PC Link to VXI *Configuration and User's Guide*. The PDF file for this guide is installed on your computer (C:\Program Files\Agilent\IO Libraries>manuals\e8491.pdf).

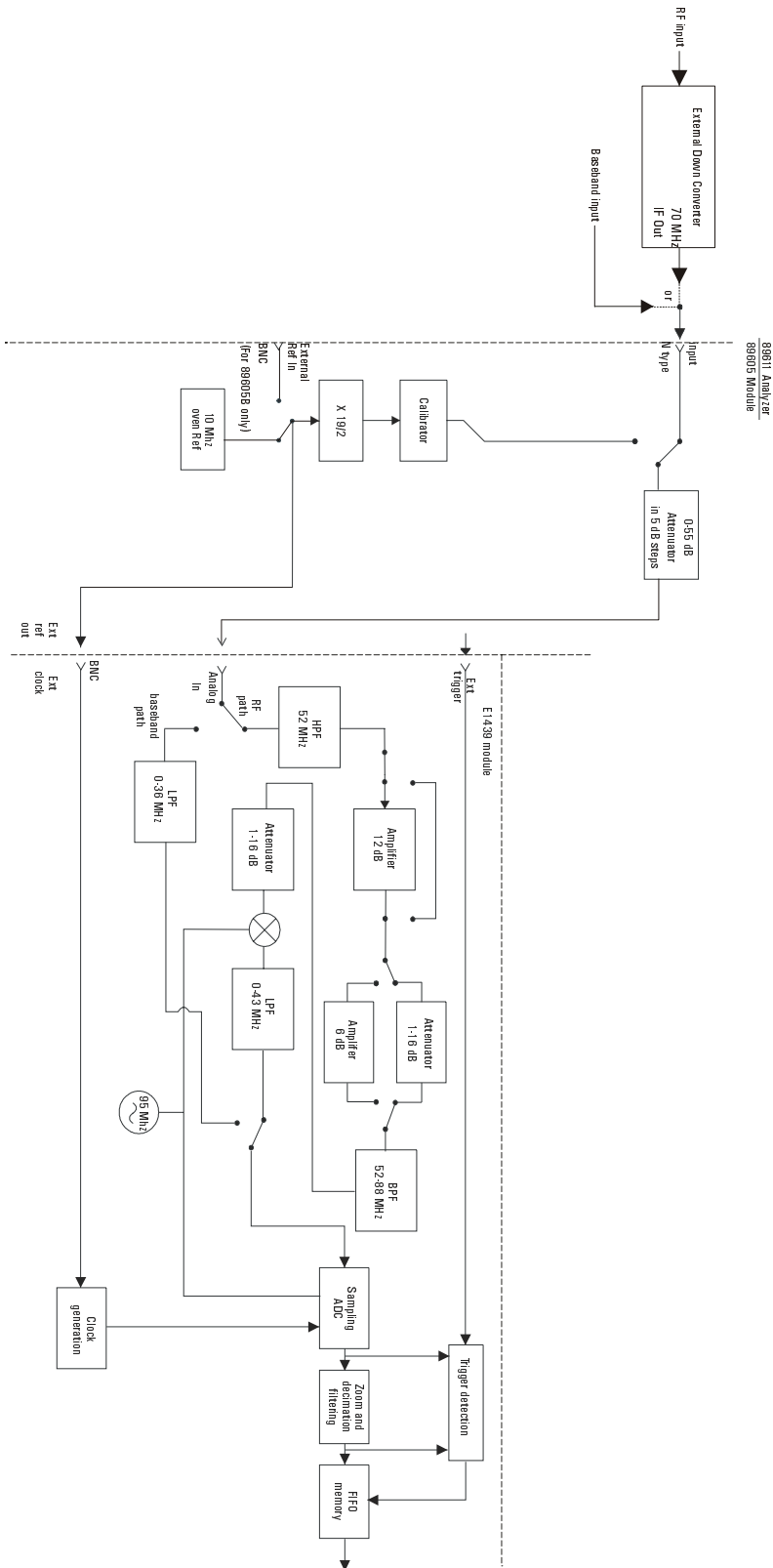


Figure 12-3

89611 block diagram

89605 Input module

The 89605 Input module accepts the baseband input signal and passes it through a 0-to-50 dB attenuator (5 dB steps). In baseband mode (0 to 36 MHz), the signal from the Ch 1 Input connector is routed to the E1439 module. For the upper frequency band (frequencies determined by the down converter used), the signal is routed from the “From 70 MHz IF Out” connector to the E1439 module (via the “To ADC Analog In” connector).

During calibration, the input signal path is interrupted. The calibrator in the 89605 module inserts a calibration signal into the signal path to the E1439 ADC module. The calibration signal is taken from the 10 MHz reference and multiplied by 19/2 to match the E1439 sampling rate of 95 MSa per second. The E1439 ADC uses the same 10 MHz reference, so the calibration source is phase locked to the sample clock.

The 89605 also provides a 10 MHz reference signal to the E1439 module. An additional 10 MHz Ref output is available on the module front panel to connect to other instruments in your measurement setup.

For the 89605B only, you can connect a 10MHz or 13 MHz reference signal to the Ext Reference In connector.

Please note that use of this module outside the 89600 series analyzers is not supported at this time.

E1439 ADC module

The input signal passes to the E1439 ADC module in one of two ways. If the input frequency band is 0 Hz to 36 MHz, the signal at the 89605 input is passed directly to the E1439 module. If the input frequency band is 20 MHz to 2.7 GHz, the signal comes from the external down converter through the 89605 module to the E1439 95 MSa/s ADC + Filter + FIFO + 70 MHz IF Input module.

Detailed information about this module is available in the E1439 User’s Guide. A PDF file for this guide is installed on your computer
(C:\Program Files\Visa\Winnt\age1439\help\AGE 1439_Users_Guide.pdf).

Triggering

For external trigger mode, a trigger signal must be supplied at the “Ext Trigger” connector on the front panel. This input is AC coupled with an impedance of 1 K ohm so any signal with a sharp rising or falling transition greater than 100 mV (i.e. TTL or ECL) can be used as an external trigger source. Minimum pulse width is 300 ns.

Coupling

The input can be either AC or DC coupled. AC coupling allows the system to measure low level AC signals in the presence of a large DC offset.

Signal conditioning

In 0-36 MHz mode, the input signal goes through the lower path in the block diagram. In this mode, no attenuation occurs in the E1439 module.

In 36 MHz-2.7 GHz mode, the input signal goes through the upper path in the block diagram. This path includes 0 to 32 dB of attenuation in 1 dB steps. The signal is band-pass filtered, mixed with 95 MHz, and low-pass filtered. This inverts and translates the frequency spectrum from 52-88 MHz at the input to 43-7 MHz at the ADC. The ADC samples the signal at a 95 MHz sample rate.

Analog-to-digital (ADC) signal conversion

The heart of the E1439 is a precision sampling ADC. The ADC samples the signal at a rate of up to 95 MSa/sec and converts the analog signal to a digital signal.

Memory

Digitized data is stored in memory in the E1439 module and read out after a block of data has been taken. The digitized data passes through the E8491 interface to the measurement software in the computer.

For information on how the signal is processed by the measurement software, see the online help for “System Block Diagram” under Tutorial, Theory of Operation.

13 **Replacing Assemblies**

This section provides information on obtaining replaceable parts for the Agilent 89600-series VXI modules.

Replaceable parts for VXI hardware

Note

This chapter contains information only for VXI measurement hardware modules. If your analyzer uses other measurement hardware, such as an Agilent E4406 or Agilent E4440, refer to the service document shipped with that product.

For VXI mainframes, refer to the mainframe documentation on replaceable parts.

For information on upgrading your analyzer or replacing parts, contact your local Agilent Technologies sales and service office. See the list of office locations and addresses in the back of this manual.

Ordering Information

To order Agilent parts in the U.S., call Agilent Technologies Support Parts at (877) 447-7278. Outside the U.S., please contact your local Agilent Technologies parts center.

See the following pages for replaceable parts lists:

System cables and connectors

- 89610A, [page 205](#)
- 89611A, [page 205](#)
- 89640A, [page 206](#)
- 89641A, [page 207](#)

Modules

- 89605, [page 207](#)
- 89606, [page 208](#)
- E1438, [page 208](#)
- E1439, [page 208](#)
- E2730, [page 208](#)
- E2731, [page 209](#)
- E8491B, [page 209](#)

Agilent 89610A

Cables, connectors, and terminations (see [page 59](#) and [page 60](#) for illustrations showing cable connections)

Part Number	Description	Qty
8121-0133	flex BNC (m) to BNC (m) cable 267 mm, black	1
8120-6237	flex BNC (m) to BNC (m) cable 172 mm, black	1

Additional cables and connectors for second input channel

Part Number	Description	Qty
8121-0132	BNC (m) to BNC (m) cable 215 mm, black	1
03585-61603	SMB (f) to SMB (f) cable, 100 mm, orange	2
1250-0676	50 ohm SMB termination	4

Agilent 89611A

Cables, connectors, and terminations (see [page 62](#), [page 63](#), and [page 65](#) for illustrations showing cable connections)

Double the quantities for 2-channel configurations

Part Number	Description	Qty
8121-0132	flex BNC (m) to BNC (m) cable 215 mm, black	2
1250-0780	N (m) to BNC (f) Adapter	1
8121-0790	SMA(m) to SMA(m) cable 1,219 mm	1
1250-1250	Type N(m) to SMA(f) adapter	1
1250-1700	BNC(m) to SMA(f) adapter	1
1250-0590	coax SMA cap	2

Additional cables and connectors for second input channel.

Part Number	Description	Qty
03585-61603	SMB (f) to SMB (f) cable, 100 mm, orange	2
8121-0132	flex BNC (m) to BNC (m) cable 215 mm, black	1
1250-0676	50 ohm SMB termination	4
1250-0590	coax SMA cap	2

Agilent 89640A

Cables, connectors, and terminations (see [page 66](#), [page 67](#), [page 68](#), and [page 70](#) for illustrations showing cable connections)

Double the quantities for 2-channel configurations

Part Number	Description	Qty
8121-0132	flex BNC (m) to BNC (m) cable 215 mm, black	2
1250-0780	N (m) to BNC (f) Adapter	1
89605-61691	SMA (m) to SMA (m) Semi-rigid cable	1-2*
89605-61692	SMA (m) to SMA (m) Semi-rigid cable with toroid	1
89605-61693	SMA (m) to SMA (m) Semi-rigid cable	0-1*
1250-0590	coax SMA cap	2

* With an 89605A, you need two 89605-61691 cables. With an 89605B, you need one 89605-61691 cable and one 89605-61693 cable.

Additional cables and connectors for second IF channel

Part Number	Description	Qty
03585-61603	SMB (f) to SMB (f) cable, 100 mm, orange	2
1250-0676	50 ohm SMB termination	4
8121-0132	flex BNC (m) to BNC (m) cable 215 mm, black	1

Additional cables and connectors for second RF channel

Part Number	Description	Qty
03585-61603	SMB (f) to SMB (f) cable, 100 mm, orange	2
1250-0676	50 ohm SMB termination	4
8121-0132	flex BNC (m) to BNC (m) cable 215 mm, black	1
89605-61696	semi-rigid SMA cable	2
1250-0590	coax SMA cap	2

Agilent 89641A

Cables, connectors, and terminations (see [page 71](#), [page 72](#), [page 73](#), and [page 75](#) for illustrations showing cable connections)

Double the quantities for 2-channel configurations

Part Number	Description	Qty
8121-0132	flex BNC (m) to BNC (m) cable 215 mm, black	2
1250-0780	N (m) to BNC (f) Adapter	1
89605-61691	SMA (m) to SMA (m) Semi-rigid cable	1-2*
89605-61694	SMA (m) to SMA (m) Semi-rigid cable with toroid	1
89605-61693	SMA (m) to SMA (m) Semi-rigid cable	0-1*
1250-0590	coax SMA cap	2

* With an 89605A, you need two 89605-61691 cables. With an 89605B, you need one 89605-61691 cable and one 89605-61693 cable.

Additional cables and connectors for second IF channel

Part Number	Description	Qty
03585-61603	SMB (f) to SMB (f) cable, 100 mm, orange	2
1250-0676	50 ohm SMB termination	4
8121-0132	flex BNC (m) to BNC (m) cable 215 mm, black	1

Additional cables and connectors for second RF channel

Part Number	Description	Qty
03585-61603	SMB (f) to SMB (f) cable, 100 mm, orange	2
1250-0676	50 ohm SMB termination	4
8121-0132	flex BNC (m) to BNC (m) cable 215 mm, black	1
89605-61696	semi-rigid SMA cable	2
1250-0590	coax SMA cap	2

89605 parts

Part Number	Description	Qty
89605-69201	Exchange 89605A module	1
89605-69211	Exchange 89605B module	1

89606 parts

Part Number	Description	Qty
89606-69201	Exchange 89606 module	1
89606-69211	Exchange 89606B module	1

E1438 parts

For information in installing SDRAM, see the “Replacing Assemblies” chapter in C:\Program Files\Visa\age1438\help\E1438_Users_Guide.pdf.

Part Number	Description	Qty
E1438-69202	Exchange E1438 module	1-2
1818-7901	ICM SDRAM 128 MB	0-2
1818-7889	ICM SDIMM 16 MB	0-2
1818-8606	IC SDRAM 64MX7	0-2

E1439 parts

For information in installing SDRAM, see the “Replacing Assemblies” chapter in C:\Program Files\Visa\age1439\help\E1439_Users_Guide.pdf

Part Number	Description	Qty
E1439-69202	Exchange E1439 module	1-2
1818-7901	ICM SDRAM 128 MB	0-2
1818-8606	IC SDRAM 64MX7	0-2
1818-7889	IC SDIMM 16 MB	0-2

E2730 parts

Part Number	Description	Qty
E2730-69201	Exchange E2730A module	1
TBD	Exchange E2730B module	1-2
1250-0590	coax SMA cap	2

E2731 parts

Part Number	Description	Qty
E2731-69201	Exchange E2731A module	1
TBD	Exchange E2731B module	1
E2731-61601	SMA (m) to SMA (m) Semi-rigid cable	1
1250-0590	coax SMA cap	2

E8491B parts

See E8941B service manual for installation instructions

Part Number	Description	Qty
E8491-66202	Module, Service Replaceable E8491B	1
8121-0078	E8491B to IEEE-1394/PCI card cable	1
E8491-61613	IEEE-1394/PCI card power adapter cable	1
E8491-66204	IEEE-1394/PCI Card	1

To transport a VXI module

Caution

The modules are static sensitive. Use the appropriate precautions when removing, handling, and installing to avoid damage.

- Package the module using the original factory packaging or packaging identical to the factory packaging.
- If returning the module to Agilent Technologies for service, attach a tag describing the following:
 - Type of service required
 - Return address
 - Model number
 - Full serial number

In any correspondence, refer to the module by model number and full serial number.

- Mark the container FRAGILE to ensure careful handling.
- If necessary to package the module in a container other than original packaging, observe the following (use of other packaging is not recommended):
 - Wrap the module in heavy paper or anti-static plastic.
 - Protect the front panel with cardboard.
 - Use a double-wall carton made of at least 200-pound test (32 ECT) material.
 - Cushion the module to prevent damage. For example, several layers of plastic bubble wrap is usually sufficient.

Caution

Do not use pellets in any shape as packing material for the module. The pellets do not adequately cushion the module and do not prevent the module from shifting in the carton. In addition, some pellets create static electricity which can damage electronic components.

To store a VXI module

Store modules in a clean, dry, and static free environment.

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Contact Agilent

By internet, phone, or fax, get assistance with all your test and measurement needs

Table 1: Contacting Agilent

Online assistance: www.agilent.com/find/assist

United States (tel) 1 800 452 4844	Latin America (tel) (305) 269 7500 (fax) (305) 269 7599	Canada (tel) 1 877 894 4414 (fax) (905) 282-6495	Europe (tel) (+31) 20 547 2323 (fax) (+31) 20 547 2390
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