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Agilent 16800 Series Portable Logic Analyzers

Installation/Quick Start Guide



Agilent Technologies

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16800 Series Logic Analyzers—At a Glance

The Agilent Technologies 16800 Series logic analyzers are portable logic analyzers that range from 34 to 204 logic acquisition channels and 48 pattern generator channels, depending on the model.

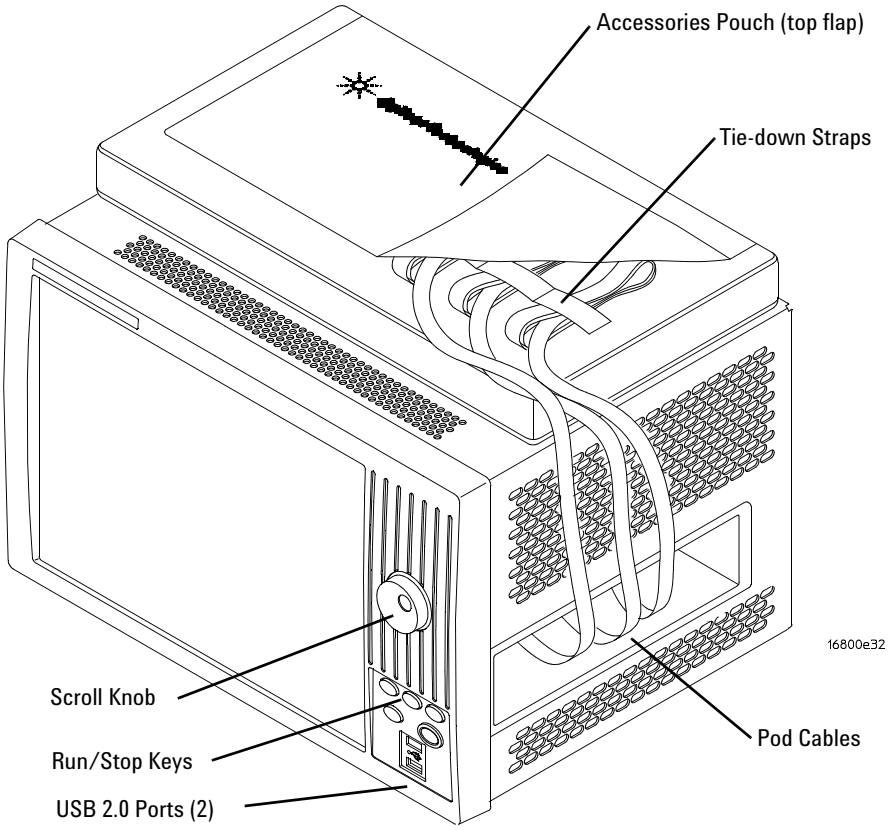


Table 1 Model comparisons

Agilent model number	16801A	16802A	16803A	16804A	16806A	16821A	16822A	16823A
Logic acquisition channels	34	68	102	136	204	34	68	102
Pattern generator channels	0	0	0	0	0	48	48	48

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Features, Logic Acquisition

- 1 M to 32 M memory depth per channel (depending on memory option), software upgradeable.
- 250 MHz or 500 Mb/s maximum state data rate (depending on state speed option), software upgradeable. The 500 Mb/s maximum state data rate option is available on the 68-channel and above logic analyzer models.
- 1 GHz, 64 M deep timing analysis on half channels.
- *Eye finder* (automatic threshold and sample position setup) feature.
- 4 GHz timing zoom with 64 K memory depth.

Features, Mainframe

- Built-in 15 inch TFT color LCD display, 1,024 x 768 (XGA) resolution. Touch screen with 16800A Option 103.
- 80 GB hard disk drive (or external hard drive 16800A Option 109).
- 10/100 Base-T LAN port.
- USB 2.0 ports (six total, two on front, four on back).
- One PCI expansion slot.
- One PCI Express x1 expansion slot.
- Windows® XP Professional operating system.
- *Agilent Logic Analyzer* application which takes the complexity out of making logic analyzer measurements. You can perform all operations directly from one window.

Features, Pattern Generator

- 24 channels at 300 MHz clock; 48 channels at 180 MHz clock.
- Memory Depth: 16,777,216 vectors in half-channel mode.
- Logic Level (data pods): 5 V TTL, 3-state TTL, 3-state TTL/CMOS, 3-state 1.8 V, 3-state 2.5 V, 3-state 3.3 V, ECL, 5 V PECL, 3.3 V LVPECL, and LVDS.
- Data Inputs: 3-bit pattern level sensing (clock pod).
- Clock Output: Synchronized to output data, delay of 7 ns in 14 steps (clock pod).

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- Clock Input: DC to 300 MHz (clock pod).
- Internal Clock Period: Programmable from 1 MHz to 300 MHz in 1 MHz steps.
- External Clock Period: DC to 300 MHz.
- External Clock Duty Cycle: 1.3 ns minimum high time.

Supplied Accessories

- PS2 mouse.
- PS2 keyboard.
- Accessory pouch and power cord.

  Snap the accessories pouch to the top of the 16800 Series logic analyzer. Use it to store probe leads, accessories, or manuals. Use the tie-down straps under the flap to conveniently hold pod cables not in use or during transport.

Optional Accessories

- Probes.

Front Panel

Refer to the online help in the logic analyzer for information on using the analyzer.

Rear Panel

Before you turn on the system, connect your mouse and keyboard to the 16800 Series logic analyzer rear panel. If a touch screen (Option 103) is not included, a connected mouse and keyboard are required for normal system use.

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In This Guide...

This guide describes how to set up, use, and update your 16800 Series logic analyzer. It also contains information on solving problems and additional safety information.

1 First-Time Set Up

This chapter describes the steps in setting up the logic analyzer for the first time.

2 Getting Started with the Logic Analyzer

This chapter describes some basic features of the logic analyzer and tells you where to find more information on using the logic analyzer.

3 Updating the Logic Analyzer

This chapter describes how to change your logic analyzer's network and Windows Firewall settings. It also describes how to get and install software updates.

4 Solving Problems

This chapter describes the logic analyzer's built-in self tests and recovering system software.

5 Safety Notices

This chapter contains additional safety information.

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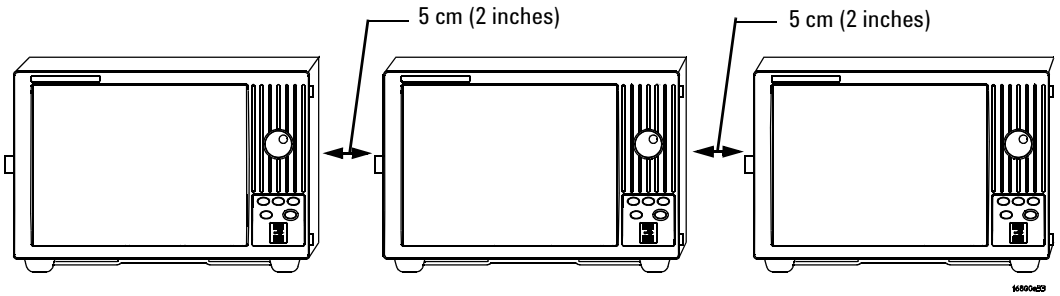
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Proper Cooling

Allow at least 5 cm (2 inches) of space between instruments for proper cooling.



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First-Time Set Up Considerations

The first time you turn on the logic analyzer, the Windows® Welcome session starts. Your logic analyzer configuration and the answers to the Windows Welcome questions are affected by how you choose to use the logic analyzer.

NOTE Use the Enter and arrow keys on the attached keyboard.

Determine Whether the Instrument will be Connected to the Network

NOTE If you plan to use COM automation to programmatically control a logic analyzer from a remote computer, be aware that the remote computer and the logic analyzer must both have the same kind of network membership; that is, they must both be members of a "Workgroup", or they must both be members of a "Domain". This is due to the security requirements of Distributed COM.

Standalone

You are going to use the logic analyzer as a standalone instrument (no LAN connection). Printing requires a printer attached to the logic analyzer, sharing files is done via USB flash drive or floppy disk.

Connected to a Network

If you require the ability to print, share files, remotely control the logic analyzer, etc. over the network, you need to either join a workgroup or domain.

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Get Network Setup Information

For networking, find out whether the network that your instrument will be connected to uses the Microsoft Workgroup model or Microsoft Domain model. In order for your instrument to perform tasks over the network (print, transfer files, etc.) your instrument must be configured appropriately for the networking model in use at your site.

Information you may require to complete your network configuration may include, but is not limited to:

- The Workgroup or Domain name.
- Methodology for assigning IP addresses at your site (for example, DHCP).
- Domain Name Service (DNS).

Other network information that may be readily available from your network administrator.

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Answering Windows Welcome Questions

Once you have determined how you want to use your logic analyzer and your network configuration, power up your logic analyzer and answer the Windows Welcome questions.

Table 2 Answering Windows Welcome Questions

	Standalone (No LAN)	Workgroup	Domain
Help protect your PC	N/A	Choose "Help protect my PC by turning on Automatic Updates now".	Choose "Help protect my PC by turning on Automatic Updates now".
What's your computer's name? (After answering, wait several minutes for next question to appear)	If your organization has a standard naming scheme, use that scheme. Otherwise, choose a descriptive name that follows the suggestions on the screen (less than 15 characters, etc.)		
What's your administrator password?	Agilent recommends entering an administrator password for administrator accounts. See page 17 for actions that require administrator accounts.		
Is this computer in a domain?	No (Is given WORKGROUP membership)	No (Is given WORKGROUP membership)	Yes Enter the domain name the logic analyzer will log onto.
Enter your domain settings.	N/A	N/A	Enter the name/password of a user who can add the logic analyzer to the domain.
Checking your Internet connectivity	Press 'Skip'	Wait for this to finish.	Wait for this to finish.
How will this computer connect to the Internet?	N/A	N/A	Choose the appropriate answer.
Setting up a high-speed connection?	N/A	N/A	Enter either the fixed IP/DNS assigned by your network administrator or select "Obtain Automatically".

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Table 2 Answering Windows Welcome Questions (continued)

	Standalone (No LAN)	Workgroup	Domain
(If LAN connected) Will this computer connect to the Internet directly, or through a network?	N/A	Choose "Yes, through a network" (Agilent does not support connecting to the internet through a modem directly connected to the logic analyzer.)	N/A
(If LAN is not connected) Windows unable to determine LAN connectivity.	N/A	You are told to set up LAN later.	N/A
Ready to register with Microsoft	Windows XP is already enabled to run on the logic analyzer. This registration is to allow Microsoft to contact you.		
Who will use this computer?	For All: Entering names here lets multiple users use the logic analyzer with administrator permissions. By default their passwords will be blank.		

If expected Windows Welcome questions do not appear

During first-time power-up, depending on the configuration of your network, some of the Windows Welcome questions that should appear, like “Is this computer in a domain?”, may not appear.

If this occurs, you need to change the logic analyzer’s network setup (after the first-time power up) using the normal Windows XP methods (see “Changing Network Settings” on page 34).

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Additional First-Time Setup Steps

Establishing an Administrator Account (recommended for standalone and networked instruments)

Agilent recommends that you set up an Administrator account for your logic analyzer. You have to be logged in to the Administrator account to do the following:

- Install most software (applies whether the instrument is networked or standalone).
- Change the workgroup.
- Perform "Windows Updates".
- Change firewall settings.

Protecting the Instrument's Operating System

Microsoft recommends the following three steps to ensure the instrument's PC is protected.

1. Use an internet firewall.
2. Get operating system updates.
3. Use up-to-date antivirus software.

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1 First-Time Set Up

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Probing

Probing is the key to effective and efficient use of logic analyzers. Agilent Technologies offers a wide variety of probing accessories that support general-purpose and application-specific measurement needs. We provide reliable, electrically and mechanically unobtrusive probes that make it easy to connect your Agilent logic analyzer to your system under test. For more information on Agilent probes:

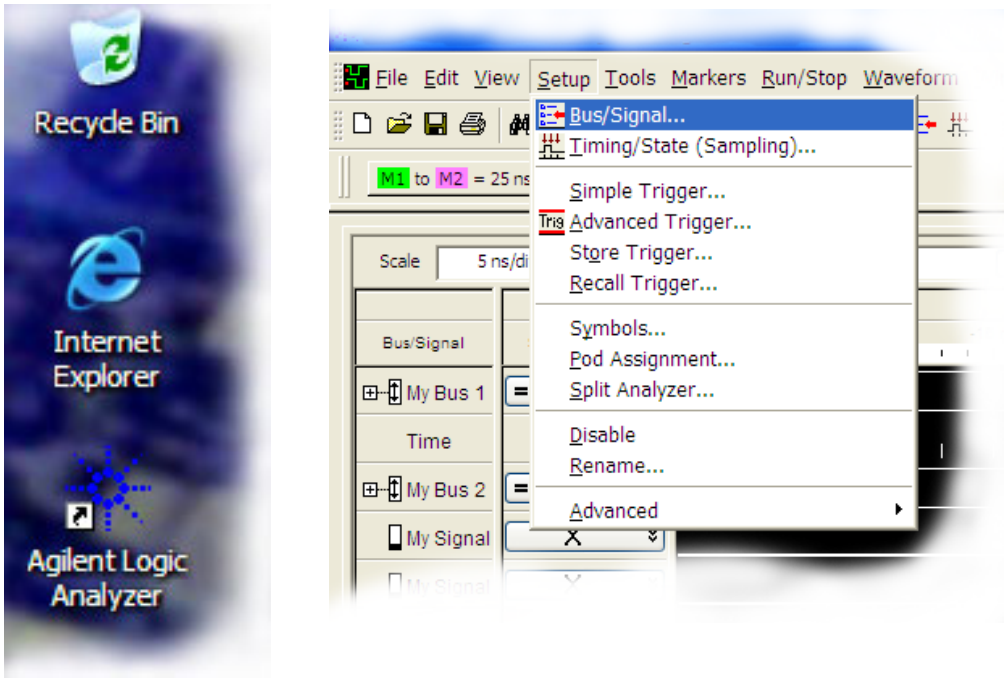
- See the quick reference card that came with your logic analyzer for an overview of probing solutions.
- Go to www.agilent.com/find/logic_analyzer_probes for the most up-to-date information on probe compatibility with a given logic analyzer and purchasing information.
- Go to www.agilent.com and search for *Probing Solutions for Logic Analysis Systems* (publication 5968-4632E) for a catalog of detailed probing information.

To connect and set up a probe, follow the instructions in the *User's Guide* that came with the probe.

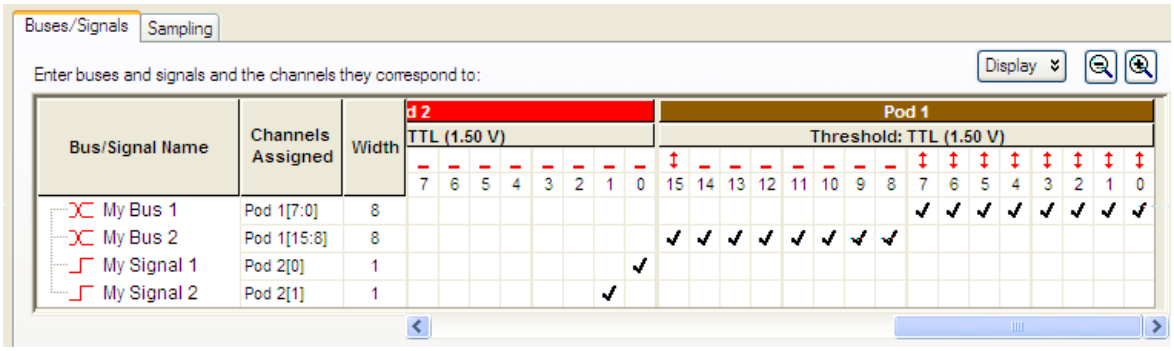
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Making a Measurement

1 Start up the logic analyzer, connect to your target system, and select **Setup>Bus/Signal**.

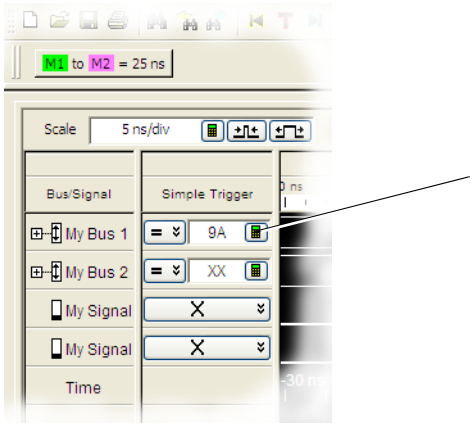


2 Assign buses and signals and click OK.

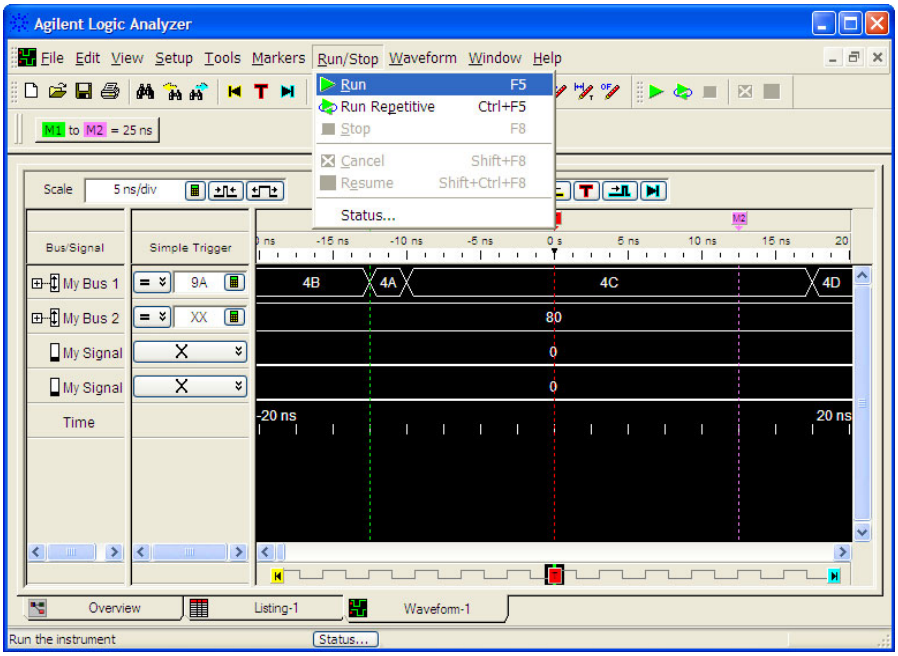


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3 Enter a trigger value.



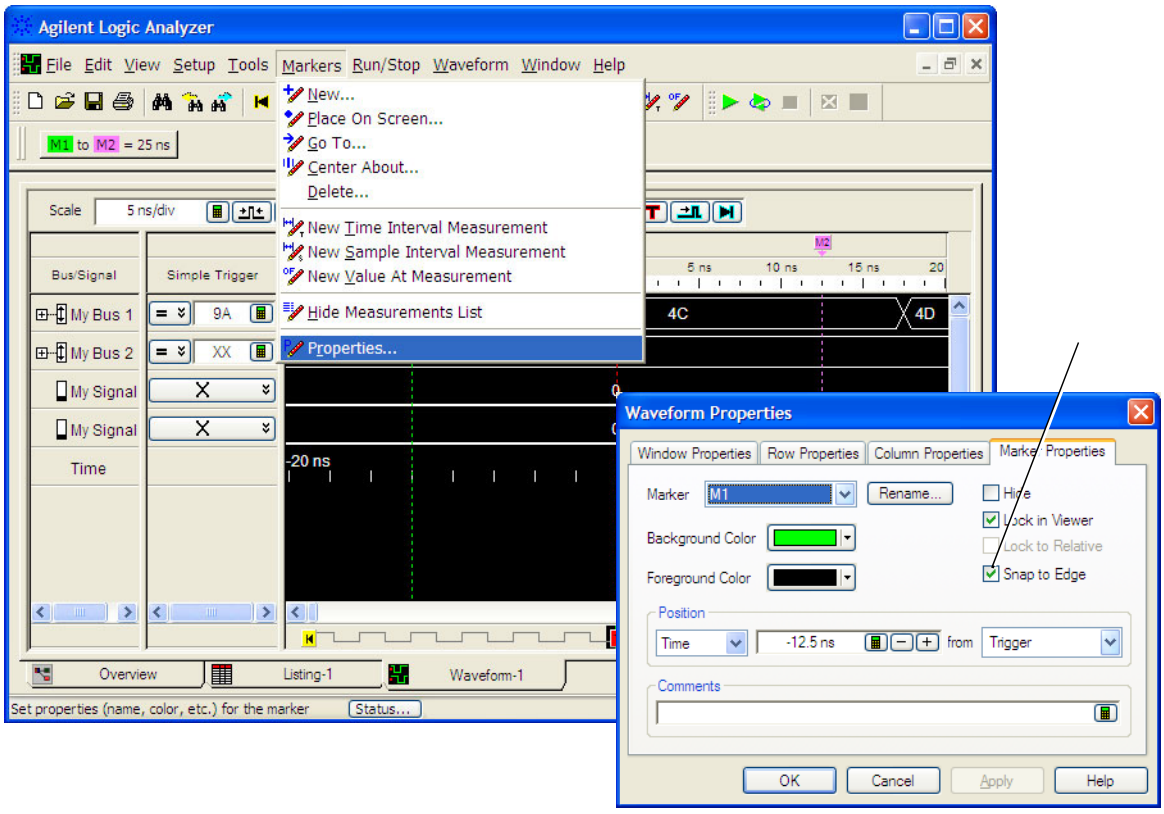
4 Acquire and view data.



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Snap to Edge Markers

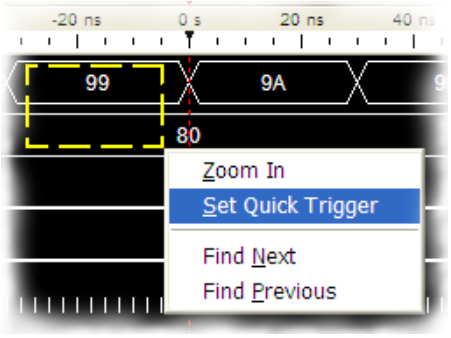
You can set the markers to jump to the nearest edge of a waveform. A yellow target will show which edge the marker will jump to.



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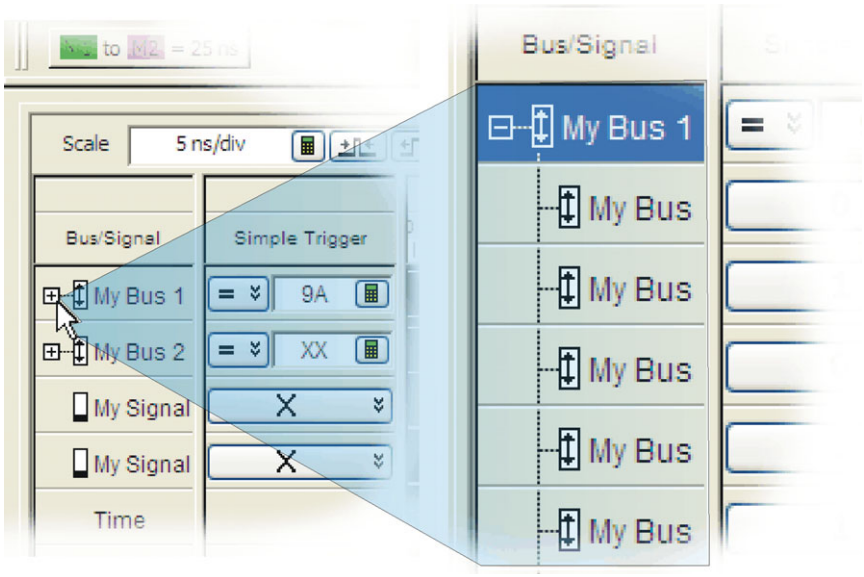
Left-Click Menus

Drag a box around parts of the data. When you release the mouse button, a menu appears.



Tree Structure Bus/Signal Names

Show individual signals in buses by clicking on the + to expand.



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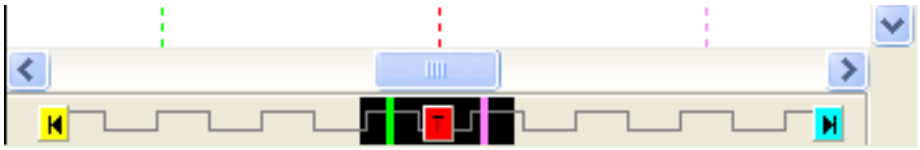
Offline Analysis

Install the *Agilent Logic Analyzer* application on another Windows XP or Windows 2000 computer and you can analyze data without the 16800 Series logic analyzer.

1. Follow the instructions in "Software Installation and Upgrades" on page 40 to load the 16800 Series logic analyzer software on your PC.
2. Acquire a trace with the logic analyzer.
3. Save a configuration file with data.
4. Copy the file to the PC being used for offline analysis.
5. From the *Agilent Logic Analyzer* application software on your PC, open the configuration file.

Marker Overview

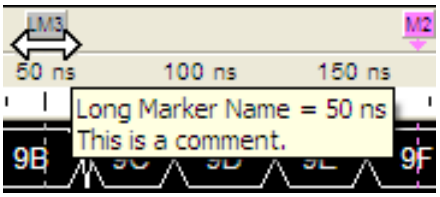
The marker overview display shows marker locations within the data and the part of data currently being displayed.

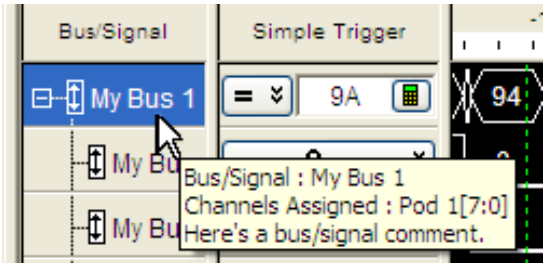


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Tool Tips

Pause the cursor over a tool Icon and a “Tool Tip Window” will appear.

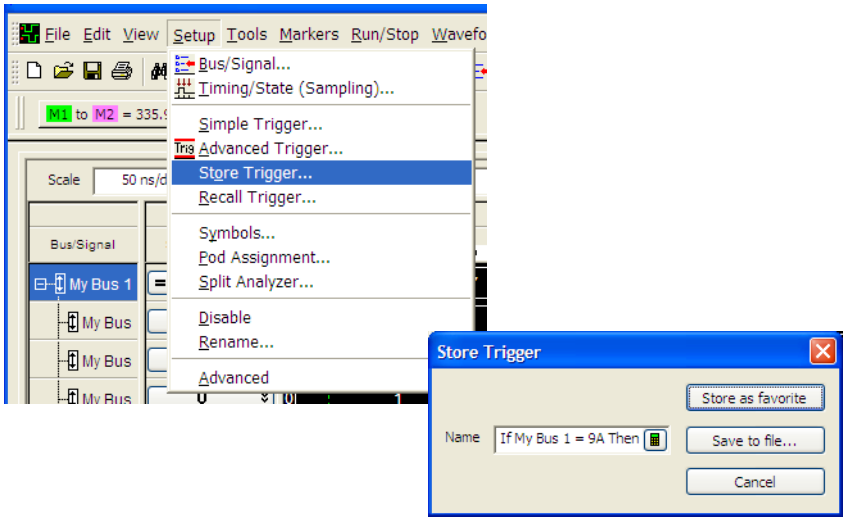


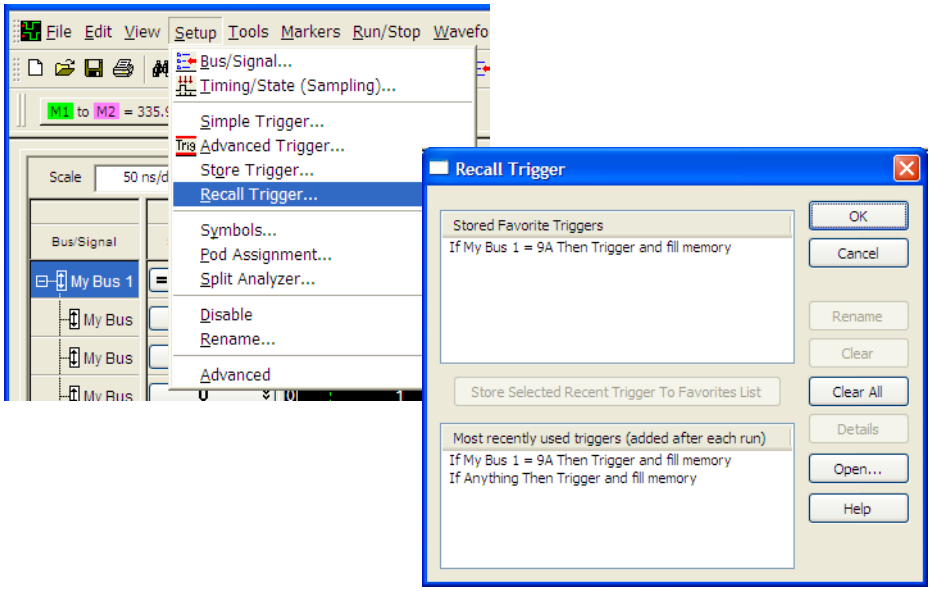


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Trigger History

Save and recall trigger settings.





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To power off the system

You can power off the logic analyzer using Windows Shutdown or a short press of the power button.

NOTE When powering off the logic analyzer, wait until the fans stop turning (about 15 seconds) before turning the logic analyzer back on. This ensures that internal circuitry restarts in a known state.

Using the Windows Shutdown

On the logic analyzer desktop click **Start>Shut Down** or if you are running remote desktop, click **Start>Settings>Windows Security>Shut Down**. This:

- Closes all programs that are running.
- Writes all data to the disk.
- Turns off the power supply.
- If the system is unplugged while it is off and then plugged back in, the system will not power on until the power button is pressed.

Using a Short Press of the Power Button

Pressing the power button on the logic analyzer for a short time (less than 2 seconds):

- Closes all programs that are running.
- Writes all data to the disk.
- Turns off the power supply.

If the power button on the Remote Desktop is depressed for a short time (less than 2 seconds or so), a message on the logic analyzer screen (not on the remote desktop) will pop up asking if you really want to power down. Clicking the 'yes' button results in the above events. Clicking 'no' will prevent the shutdown. Not answering the dialog box (clicking neither "Yes" nor "No") will have no effect. Further short presses on the power button will have no effect.

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Using a Long Press of the Power Button

CAUTION Only use a long press of the power button when the logic analyzer is unresponsive to Windows Shutdown or a short press of the power button.

Pressing the power button for more than 4 seconds will power the system down abruptly:

- Programs that are running will not be shut down. Any data that has not been written to the disk will be lost.
- Turns off the power supply.
- If the system is unplugged while it is off and then plugged back in, the system will not power on until the power button is pressed

Unplugging the Power Cord or Power Loss

CAUTION Only unplug the power cord when the logic analyzer is unresponsive to all other methods for powering off the system.

Unplugging power or a power loss is similar to the long press of the power button with one exception:

- When the system is plugged back in, it will power up and boot into Windows.

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Specifications and Characteristics

The following electrical and operating characteristics are not specifications, but are typical operating characteristics for the Agilent 16800 Series logic analyzers.

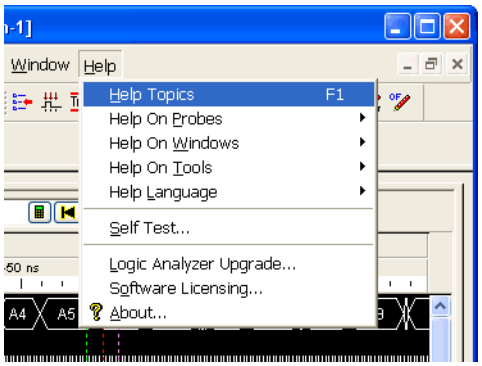
Electrical Characteristics	
Power Requirements	16801A, 16802A, and 16803A: 115/230 Vac +/- 20%, 48-66Hz, 615W Max. 16804A, 16806A, 16821A, 16822A, and 16823A: 115/230 Vac +/- 20%, 48-66Hz, 775W Max. CAT II (Line voltage in appliance and to wall outlet). Pollution degree 2.

Environmental Characteristics (Operating)	
Temperature	Instrument: 0° to + 50° C (+32° to +122° F). Probes/cables: 0° to + 65° C (+32° to +149° F).
Altitude	3,000 m (10,000 ft).
Humidity	Relative humidity 8 to 80% at 40° C (104° F). Avoid sudden, extreme temperature changes which could cause condensation on the circuit board. For indoor use only.

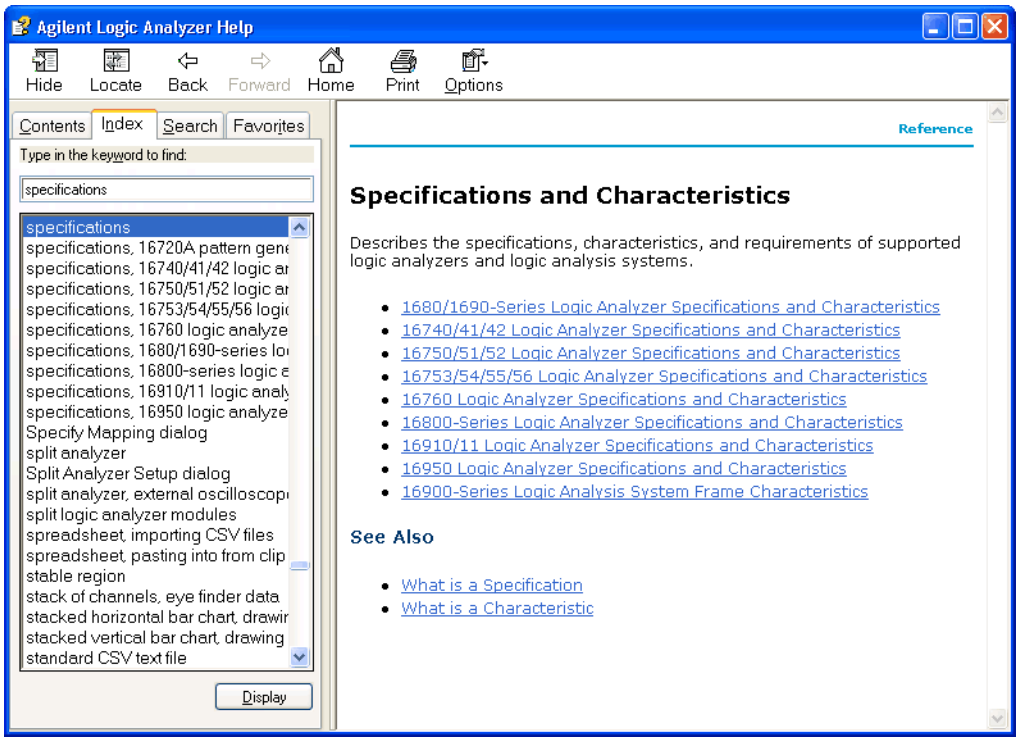
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More specifications and characteristics for your instrument and measurement modules are in the on-line help. To find them go to:

1 Click **Help>Help Topics**.



2 Click **Reference**; then, click **Specifications and Characteristics**.



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Changing Network Settings

To make network changes after the first-time power up:

- To change from a workgroup to a domain or vice versa, click **Start** then right-click on **My Computer** and select **Properties**. Select the Computer Name tab and click **Change**.
- To change network connection properties, click **Start>Control Panel>Network Connections**. Select the connection you want to change and click **Change settings of this connection**.

For more information on changing network settings, refer to the Windows XP online help.

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Changing Windows Firewall Settings

When 16800 Series logic analyzers are shipped from the factory, the Windows Firewall is enabled and set up with the exceptions required by the logic analyzer.

To give other applications/ports access through the firewall

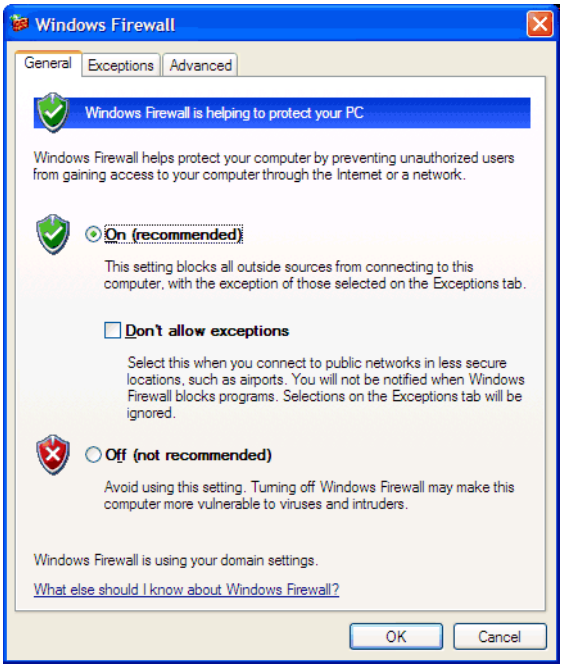
For example, you may need to change firewall settings in order to:

- Use NetOp to remotely control the logic analyzer.
- Use RealVNC to remotely control the logic analyzer.

To change firewall settings to give other applications/ports access:

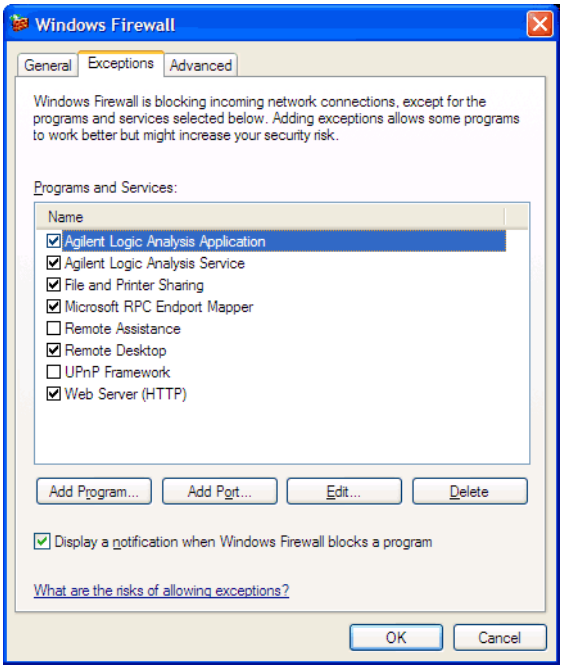
1 From the Windows Start menu, choose **Start>Control Panel**.

2 In the Control Panel window, open **Windows Firewall**.



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3 In the Windows Firewall dialog, click the **Exceptions** tab.



4 In the Exceptions tab, if the program or service is listed, check its box to enable it; otherwise, click **Add Program...** to give unlisted applications permission to penetrate the firewall, or click **Add Port...** to give unlisted ports access through the firewall.

Refer to the application's documentation for information on port numbers or other firewall setup information.

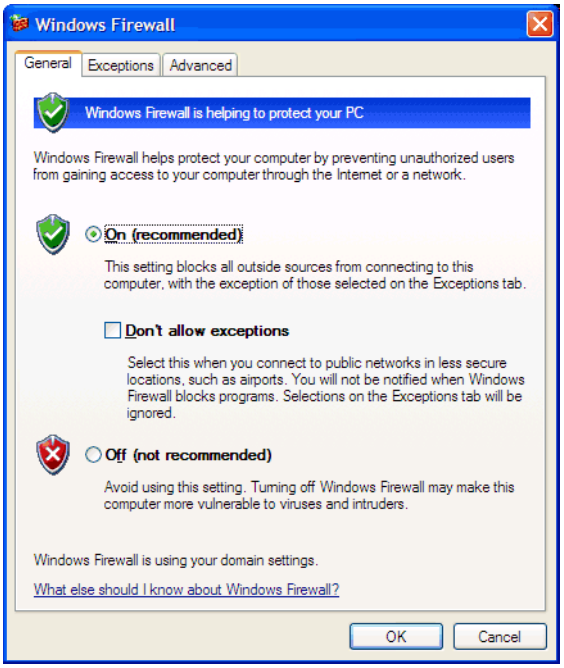
NOTE Note that there are separate Windows Firewall profiles: Domain for when the computer has domain membership, and Standard for when the computer has workgroup membership. If you change the type of membership, any changes you made to the Windows Firewall settings will have to be made again.

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To restore the logic analyzer firewall defaults

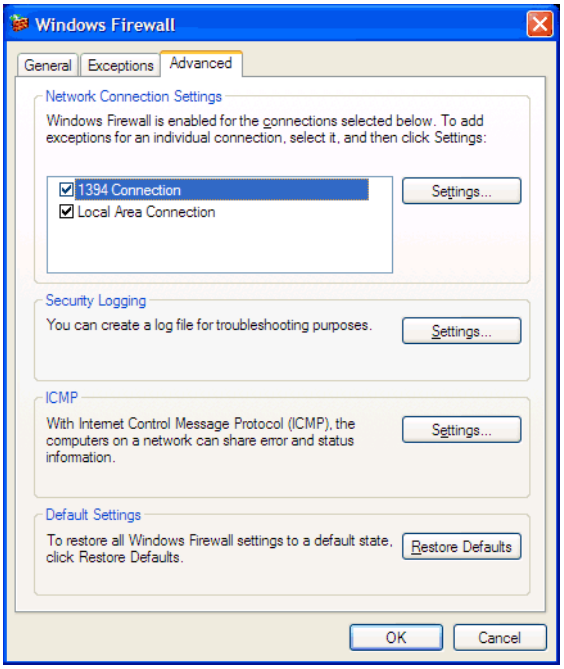
1 From the Windows Start menu, choose **Start>Control Panel**.

2 In the Control Panel window, open **Windows Firewall**.



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3 In the Windows Firewall dialog, click the **Advanced** tab.



4 In the Advanced tab, click **Restore Defaults** to restore the default Windows Firewall settings.

5 In the confirmation dialog, Click **Yes**.

6 Click **OK** to close the Windows Firewall dialog.

7 From the Windows Start menu, choose **Start>Run**; then, enter or select the file “C:\Program Files\Agilent Technologies\Logic Analyzer\agFirewSP2.wsf”, and click **OK**.

The logic analyzer firewall defaults enable the following exceptions:

- Agilent Logic Analysis Application program.
- Agilent Logic Analysis Service program.
- File and Printer Sharing.
- Microsoft RPC Endport Mapper TCP port.
- Remote Desktop service.
- Web Server (HTTP) port.

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The logic analyzer firewall defaults also enable the following ICMP (Internet Control Message Protocol) settings:

- Allow incoming echo request.
- Allow outgoing destination unreachable.
- Allow outgoing time exceeded.

NOTE Note that there are separate Windows Firewall profiles: Domain for when the computer has domain membership, and Standard for when the computer has workgroup membership. When you restore the logic analyzer firewall defaults, the defaults for both profiles are restored.

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Software Installation and Upgrades

Agilent Logic Analyzer Software

The Agilent 16800 Series logic analyzers are shipped with software already installed, including any licensed optional products that you may have purchased. The licensing process (described below) has been performed and the (*.lic) license file is in place.

To upgrade the logic analyzer software, attach a USB CD-ROM drive, insert a product CD, and click **INSTALL PRODUCTS>Install Logic Analyzer**. Note that newer versions of the Agilent Logic Analyzer software will automatically uninstall the previous version as a step in the upgrade. (User files in the "Documents and Settings" tree are not affected.)

To install the logic analyzer software onto your PC for offline processing, insert the product CD into your PC drive, click **INSTALL PRODUCTS>Install Logic Analyzer**.

Logic analyzer product software can be downloaded from the web at:

www.agilent.com/find/16900_SW_Download

Logic analyzer product CDs can be ordered from this web-site:

http://software.cos.agilent.com/LogicAnalyzerSW

To be notified when software upgrades are available for downloading from the web, please sign up for e-mail notifications at:

www.agilent.com/find/emailupdates

Optional Products

If applicable, follow the instructions on the entitlement certificate that came with your purchase to enable the optional tool.

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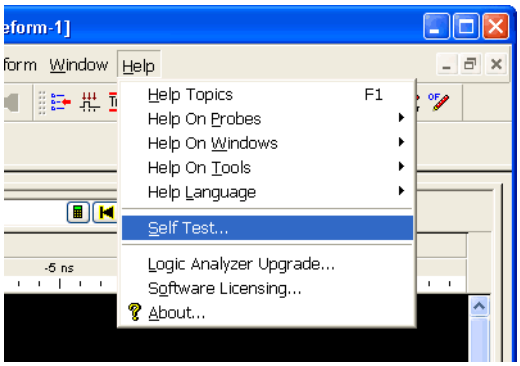
4 Solving Problems

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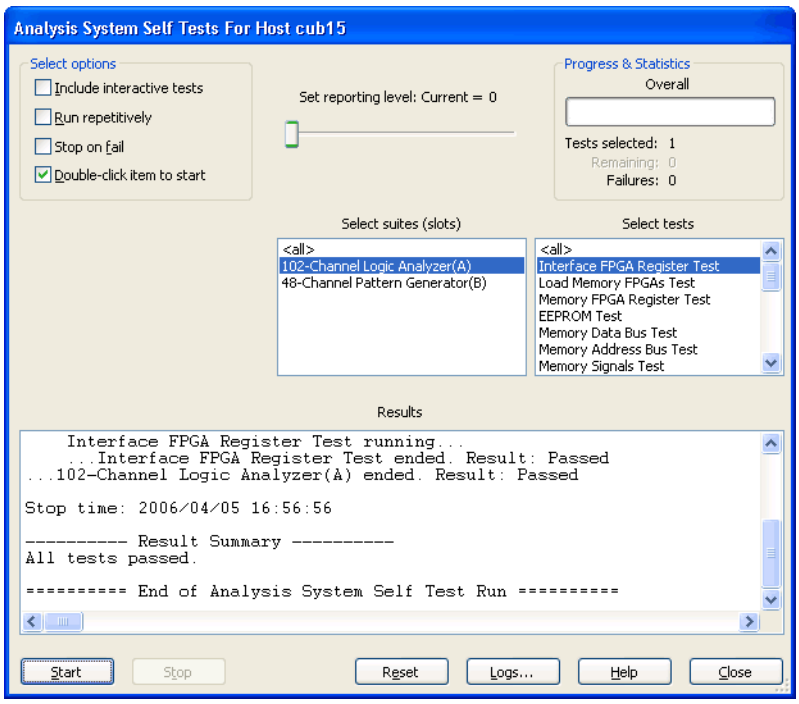
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Running Self-Tests

1 In the Agilent logic analyzer application, click **Help>Self Test**.



2 In the analysis system Self Test dialog, double click on the test you want to run.



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If the logic analyzer powers itself down

If the logic analyzer warns you it is powering down before it powers down, the dialog will describe the problem (such as a fan/overtemp problem). If the logic analyzer just powers down, it is likely a power supply problem.

If the Power LEDs do not come on

If the lights do not come on and if the system powers up momentarily when you plug it in, make sure the power button hasn't become jammed or stuck in the pushed in position.

If you get a registry error and the system won't boot

When powered off unexpectedly (for example, with a long press of the power button or a power loss), Windows XP may not flush all system information to disk and is vulnerable to problems. When you power back on you may get a "Registry Error" and the system won't boot. If this happens you will need to restore from the system install CD-ROM.

It is best to keep regular backups of your data and use proper power down procedures. If you have data that was not backed up that you need to try to save:

1. Physically remove the disk drive.
2. Mount it under another XP system.
3. Move the data to the boot disk until you can restore the operating system.

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If there are network connection problems

See the "Network Troubleshooting Guide" topic in the *Agilent Logic Analyzer* application's online help. Briefly:

- The Windows Firewall must be set to allow access to the "Agilent Logic Analysis" service in order use remote connections (see "To restore the logic analysis system firewall defaults" on page 89).
- The Windows Firewall must be set to respond to the following ICMP (Internet Control Message Protocol) requests in order to use remote connections:
  - Allow incoming echo requests.
  - Allow outgoing destination unreachable.
  - Allow outgoing time exceeded.

  (See "To restore the logic analysis system firewall defaults" on page 89.)
- The link activity light must be on; If these LEDs are not on, the LAN segment may be dead.
- If connecting two logic analysis systems directly together (that is, no hub or switch between them), make sure you are using a special cross-over cable.

If your IP address is in the same subnet as a working computer's (use "ipconfig /all | more" to view IP addresses on machine in question), it is possible that your network administrators have denied access to any resources if the computer is not in the domain. In this case, you need to add the computer (logic analysis system) to the domain.

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If there are touch screen problems

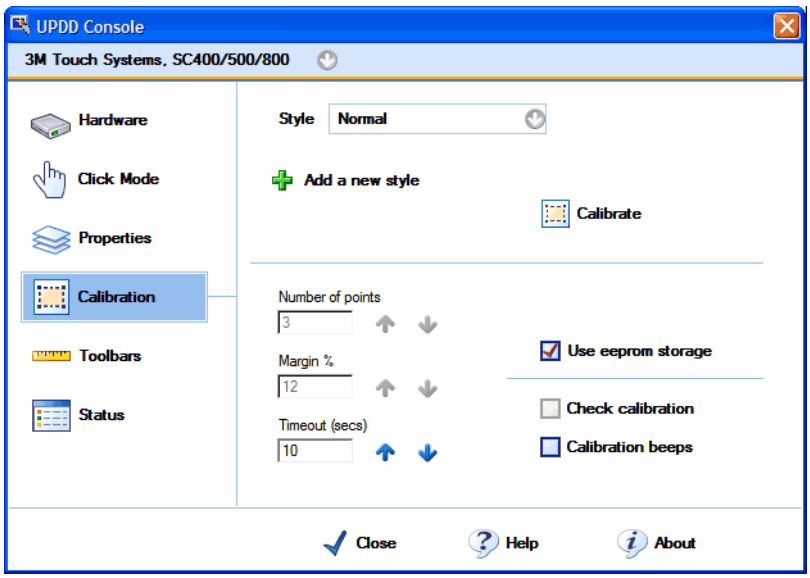
If you observe the following touch screen problems:

- If the Touch Off button on the instrument's front panel doesn't work.
- If there are problems with the right-click functionality on the touch screen.
- If the accuracy of touch locations is off.

You may be able to calibrate the touch screen to fix the problem:

1 From the Windows Start menu, choose **Start>All Programs>Agilent Logic Analyzer>Utilities>Touch Screen >Settings**.

2 In the UPDD Console dialog, select the Calibration settings area.



3 Make sure that **Number of points** is set to 3 and that **Use eeprom storage** is checked; then, click **Calibrate**.

If calibrating the touch screen doesn't fix the problem, see "Contacting Agilent Service/Support" on page 46.

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Using the System Recovery Software

Restoring your system software might be necessary for the following reasons:

- Hard drive failure.
- Virus in the system or unstable system.
- Intentional disk clean - for example if you are passing the system to another team or returning it to a rental company and you do not want any data left on it.

You need to have a keyboard, mouse, and USB DVD-ROM drive connected. Follow the instructions provided with the recovery DVD to restore your system software.

CAUTION Running the recovery disks will reformat your hard drive. All data files and programs will be overwritten. Save your data to a USB flash drive or to another computer before performing this procedure.

Contacting Agilent Service/Support

To locate a sales or service office near you, go to www.agilent.com/find/contactus.

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5 Safety Notices

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This apparatus has been designed and tested in accordance with IEC Publication 1010, Safety Requirements for Measuring Apparatus, and has been supplied in a safe condition. This is a Safety Class I instrument (provided with terminal for protective earthing). Before applying power, verify that the correct safety precautions are taken (see the following warnings). In addition, note the external markings on the instrument that are described under "Safety Symbols."

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Warnings

- Before turning on the instrument, you must connect the protective earth terminal of the instrument to the protective conductor of the (mains) power cord. The mains plug shall only be inserted in a socket outlet provided with a protective earth contact. You must not negate the protective action by using an extension cord (power cable) without a protective conductor (grounding). Grounding one conductor of a two-conductor outlet is not sufficient protection.
- 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.
- If you energize this instrument by an auto transformer (for voltage reduction or mains isolation), the common terminal must be connected to the earth terminal of the power source.
- Whenever it is likely that the ground protection is impaired, you must make the instrument inoperative and secure it against any unintended operation.
- Service instructions are for trained service personnel. To avoid dangerous electric shock, do not perform any service unless qualified to do so. Do not attempt internal service or adjustment unless another person, capable of rendering first aid and resuscitation, is present.
- Do not install substitute parts or perform any unauthorized modification to the instrument.
- Capacitors inside the instrument may retain a charge even if the instrument is disconnected from its source of supply.
- Do not operate the instrument in the presence of flammable gasses or fumes. Operation of any electrical instrument in such an environment constitutes a definite safety hazard.
- Do not use the instrument in a manner not specified by the manufacturer.
- To optimize your comfort and productivity, it is important that you set up your work area correctly and use your equipment properly. Refer to http://www.agilent.com/quality/Working_In_Comfort.pdf for set-up and use recommendations
- Position equipment so that it is not difficult to disconnect the power cord.

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To clean the instrument

If the instrument requires cleaning:

1. Remove power from the instrument.
2. Clean the external surfaces of the instrument with a soft cloth dampened with a mixture of mild detergent and water.
3. Make sure that the instrument is completely dry before reconnecting it to a power source.

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Safety Symbols



Instruction manual symbol: the product is marked with this symbol when it is necessary for you to refer to the instruction manual in order to protect against damage to the product.



Hazardous voltage symbol.



Earth terminal symbol: Used to indicate a circuit common connected to grounded chassis.

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