Agilent N9051A Pulse Measurement Software

Getting Started Guide

Agilent Technologies

Notices

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Contents

Contents

1 Introduction to Pulse Measurement Software

The N9051A Pulse Measurement Software provides easy-to-use time-oriented measurements of Pulsed RF or Microwave signals in spectrum analyzers. It automatically finds pulse edges in time, and then measures parameters such as rise time, fall time, pulse width, PRI (interval), PRF, duty cycle, peak-to-average ratio and several others. Algorithms determine pulse characteristics according to methods from IEEE standard 181.

Parameters are listed in a table for each pulse, up to 1000 pulses.

It also includes time display with zoom, units' conversion, trace math, and markers. Graphs for PDF, CDF, and CCDF are also available.

The vertical axis is calibrated in dBm, Watts, or Volts. Compared to solutions based on diode detectors or oscilloscopes, the amplitude values are trustworthy to within ~ 1 dB.

It is designed to support the Agilent PSA and X-Series signal analyzers (to 50 GHz center frequencies and 80 MHz bandwidth), *plus* Agilent 8000-, 80000-, and 9000- series Infiniium oscilloscopes for even wider bandwidths.

It can be installed *in* an EXA or MXA signal analyzer, and appears in the "MODE" menu and cooperates with mode switching mechanisms.

2   Installation and Licensing

The Agilent N9051A Pulse Measurement Software ("Pulse" or "Pulse software") characterizes pulsed-RF signals in the time-domain, using a signal analyzer (spectrum analyzer) or oscilloscope. Please refer to the User's Reference for detailed description of features.

This section describes how to install the N9051A Pulse Measurement Software onto a computer, license it, and configure/connect it to the front-end instrument. There are several possible system configurations, and the procedures vary accordingly, so please follow instructions carefully. A single installation package provides all the necessary software.

The Pulse Measurement Software installation includes three elements. All of them are required; however, if your destination PC *already* has an element installed, you have the option to skip that step. The elements are:

- Agilent 89601A Vector Signal Analyzer (VSA) software components

NOTE   This installation does not provide the full capabilities of the VSA software, so it is not necessary to purchase or license the full operating version of the VSA. However, if you already have a licensed version of VSA installed, you must carefully consider the impact this has on the installation of Pulse Measurement Software. Version 9.00 and above is required to run Pulse software. Refer to for more information.

- Agilent IO Libraries
- Pulse Measurement Software

The installation is delivered on both CD-ROM and USB memory stick media. If installing on a PC, you can use either media. If installing into an instrument, the USB memory stick is preferred.

Installation Procedure Overview

1. **Plan your installation:** Refer to "1. System Configurations" on page 9 to review procedures and compatibility notes, especially in the lists of system configurations. Determine exactly which configuration applies to your situation. Select whether to install in a PC or inside an instrument. Verify that you have all the needed equipment, parts, and procedures for installation. If any instrument needs to be upgraded, do that first.

2. Run the Autoplay Installer, refer to "2. Run the Autoplay Installer " on page 17 (Autoplay.exe should run automatically).

3. Run the 89601 VSA Software Check / Install program, refer to "3. Check / Install the 89601 VSA " on page 17. The installer checks for a pre-existing installation of *Agilent 89601 VSA*. If VSA is already present, the installer determines the revision and compatibility level with Pulse Measurement Software. You will be provided with instructions. If VSA is not present, the VSA installer will start.

4. Towards the end of the VSA install, you have the opportunity to install the *Agilent IO Libraries* in the "Hardware Support" menu. This is required in most cases. Refer to "4. Check / Install the Agilent IO Libraries " on page 19 for complete instructions.

5. At the end of VSA installation, you may be prompted to re-boot. Close all programs, and restart the PC. As the PC restarts, the VSA install will complete automatically, if needed. Then start the Pulse installer *again* to continue the installation (Autoplay.exe will run automatically if the CD or USB memory stick is removed and reinserted). Refer to "5. Re-start the PC and Autoplay Installer " on page 20 for complete instructions.

6. Install the Pulse Measurement Software. (This step includes Agilent Licensing components.) Refer to "6. Installing N9051A Pulse Measurement Software " on page 20 for complete instructions.

7. Connect the instrument to the host PC, and verify a connection to the instrument using the Agilent Connection Expert utility. Refer to "7. Configure IO Interfaces & Establish Connection to Instrument " on page 21 for complete instructions.

8. License the software. Locate your "Certificate of Entitlement", and follow the instructions to "redeem" it for a license, and install the license into the host PC. Refer to "8. License the Software" on page 22 for complete instructions.

9. Finally, start the Pulse Measurement Software, and verify that it communicates with VSA, and that VSA communicates with instrument. Refer to "9. Starting Pulse Measurement Software & Verifying Installation " on page 24.

1. System Configurations

There are many different system configurations. These are presented below:

"System Configurations: PC Requirements" on page 9.

"System Configurations: Instrument Hardware" on page 11.

"System Configurations: IO Interfaces" on page 15.

"System Configurations: 89601A VSA Software and Agilent IO Libraries " on page 16.

System Configurations: PC Requirements

The Pulse Measurement Software is installed and "node-locked" to a single PC (computer). It is not possible to move the Pulse Measurement Software to a *different* PC after the first installation. *Please plan accordingly.*

The destination PC must satisfy the following minimum requirements. These support both Pulse Measurement Software and underlying VSA software.

• Intel Pentium or AMD-K6 CPU, 600 MHz minimum (2 GHz recommended)

• 512 Mbytes RAM minimum (1 Gbyte recommended)

• 4 Mbytes Video RAM (16 Mbytes recommended)

• Paging File Size 256 Mbytes minimum

- 500 Mbytes available space on hard disk drive

- CD-ROM drive or USB port for installation media

- I/O port suitable for control of instrument (see below)

- Microsoft Windows XP Professional

NOTE   Microsoft Vista is not yet supported by the Pulse Measurement Software licensing component (even though VSA and Agilent IO Libraries are compatible).

NOTE   In the case of Agilent X-Series Signal Analyzers, the internal CPUs of these instruments meet the requirements.

System Configurations: Instrument Hardware

The following instruments are supported. The option information for each instrument is usually found under the "System" key.

Instrument Family	Model Numbers	Options @ = Required * = Recommended # = Not Compatible	IO (see below)	Notes
PSA signal analyzer	E4440A 26 GHz E4443A 6.7 GHz E4445A 13.2 GHz E4446A 44 GHz E4447A 43 GHz E4448A 50 GHz	@ B7J * 122 (80 MHz) or * 140 (40 MHz) * 111 (USB)	GPIB, USB, LAN [3]	
X-Series Signal Analyzers, with VSA and Pulse Measurement Software running *on PC*	MXA N9020A EXA N9010A	@ any frequency option * B25 (25 MHz)	LAN (only)	[1] [2]

Instrument Family	Model Numbers	Options @ = Required * = Recommended # = Not Compatible	IO (see below)	Notes
X-Series Signal Analyzers, with VSA and Pulse Measurement Software running *inside*	MXA N9020A EXA N9010A	same as above	n/a	[1] [2]
Infiniium 8000-series oscilloscopes	DSO8064A MSO8064A DSO8104A MSA8104A	*080, 160, 320, 640	LAN, GPIB	

Instrument Family	Model Numbers	Options @ = Required * = Recommended # = Not Compatible	IO (see below)	Notes
Infiniium 80000-series oscilloscopes	DSO80204B 2 GHz DSO80304B 3 GHz DSO80404B 4 GHz DSO80604B 6 GHz DSO81004B 10 GHz DSO81204B 12 GHz DSO81304B 13 GHz *'A versions of above also supported* *"DSA" & "VSA" bundles also supported*	@ 001	LAN, GPIB, Internal (SW can be run directly on the operating system of oscilloscope, but may see slow performance)	

Instrument Family	Model Numbers	Options @ = Required * = Recommended # = Not Compatible	IO (see below)	Notes
Infiniium 90000-series high-performance real-time oscilloscopes	DSO90254A 2.5 GHz DSO90404A 4 GHz DSO90604A 6 GHz DSO90804A 8 GHz DSO91204A 12 GHz DSO91304A 13 GHz *"DSA" bundles also supported*	* 20M, 50M, 100, 200, 500, 01G	LAN, Internal (SW can run directly on XP operating system of oscilloscope)	

Notes:

[1] The Agilent X-Series Signal Analyzers (MXA N9020A and EXA N9010A) can work with Pulse Measurement Software installed on an *external PC* (over LAN), or with Pulse Measurement Software installed on the *internal CPU.* If installed *internally,* there is no need for an IO interface.

NOTE   A mouse and keyboard, plugged into the USB ports of an MXA or EXA, are required to operate the Pulse Measurement Software, since it does not use front panel keys of the instrument.

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[2] The X-Series signal analyzer revision must be rev A.01.64 and above to be compatible with VSA revision 9.00 and above. This requirement holds regardless of whether Pulse and VSA are running internally or externally.

[3] The LAN of the PSA family is 10 base-T; the use of GPIB or USB is recommended to improve measurement time. When "GPIB" is shown as a compatible instrument interface, this can be direct GPIB, or GPIB using USB/GPIB interface, or GPIB using LAN/GPIB gateway. See details below.

The following HW product families & configurations are specifically not compatible and not supported by the Pulse Measurement Software (even if supported by VSA): E4406, VXI systems & IEEE 1394 "FireWire" interfaces, N4010, Acqiris family digitizers, N82xx family of Synthetic Instruments, Infiniium 54000-, 50000-, 6000-, 6000L-, or 7000-Series oscilloscopes, any logic analyzers, and all software simulations (ADS, "Connected Solutions", SimuLink, "streaming" interface, "dynamic links").

System Configurations: IO Interfaces

The following IO interfaces are generally supported:

- LAN (as part of a shared network)

- LAN (in a "private" connection, with a "cross-over cable")

- GPIB via E5810 LAN/GPIB gateway (LAN to PC, GPIB to instrument)

- GPIB via 82357A/B USB/GPIB interface (USB to PC, GPIB to instrument)

- GPIB via 82350B GPIB (PCI) card

- USB

Not every instrument supports every interface, and some interfaces have restricted functionality. Refer to VSA installation procedures for details.

Most GPIB cards from National Instruments are also supported. See VSA literature for details.

If you have a choice, use the *fastest* IO interface possible. Avoid LANs with busy network traffic, and use GPIB or USB with a PSA.

System Configurations: 89601A VSA Software and Agilent IO Libraries

The Pulse Measurement Software requires an installation of the 89601A VSA Software. The VSA must be installed on the same CPU as Pulse Measurement Software. Specifically, you can not run Pulse on an external PC combined with VSA on the internal CPU of an instrument.

89601 VSA version 9.00 or greater is required.

If you have a previously installed /licensed copy of Agilent 89601 VSA on the destination PC, please read "3. Check / Install the 89601 VSA " on page 17 carefully to understand the impact and your options.

The VSA requires an installation of the Agilent IO Libraries. A compatible version of Agilent IO Libraries is included with the VSA installation package.

If installing the Pulse Measurement Software inside X-Series signal analyzer, the VSA is preinstalled by the factory. However, if the VSA is a revision prior to 9.00, please upgrade the firmware of the X-Series to version A.01.64 or greater from www.agilent.com/find/mxa ; a compatible version of IO Libraries will be installed with it. VSA must be upgraded separately. To verify the version in the X-Series, you can either:

• With X-Series firmware running, press Mode, and select VSA; using a mouse, click Help >> About to read the version number.   ... or ...

• Click Start >> Control Panel >> Add or Remove Programs. After the list is populated, find "Agilent 89600", then click the message "Click here for support info", and find the version number.

In some cases, the IO libraries from National Instruments are supported. Agilent recommends using Agilent IO Libraries – even if using an NI GPIB card. However, if you need to use NI drivers, please refer to the VSA Installation manuals for details.

2. Run the Autoplay Installer

"Administrator" privileges are required to install new software. If needed, log off (Windows Taskbar Start -> Log-Off), and log back on as "Administrator". If installing inside the X-Series signal snalyzer, the default factory Administrator log-in password is "agilent4u".

The installation package is located on both the CD-ROM (typically used for PCs), and the USB memory device (typically used for instruments). In most cases, simply loading the CD-ROM or USB stick will cause the Autoplay.exe installer to run automatically.

If not, please locate the file (using Windows Explorer) and double-click.

3. Check / Install the 89601 VSA

Elements of Agilent 89601A Vector Signal Analyzer ("VSA") Software are required to be installed prior to using the Pulse Measurement Software. The installer will first look for a VSA installation and check the revision date for compatibility, then recommend one of the following:

| Element Found	Recommendation
No VSA Found	The Pulse installer did not find any previous installation of 89601A VSA. Click "Install VSA Software" to continue with the VSA installation.

Element Found	Recommendation
VSA Found, But Rev 7.20 or Below	The Pulse installer found an installation of 89601A VSA. However, it is revision 7.20 or earlier, and is not compatible with Pulse Measurement Software. You can either: (a) exit and install Pulse on a different PC or instrument; or (b) exit, uninstall "Agilent 89600 Series Software" using the "Add or Remove Programs" utility under "Control Panel", then re-start this installer. Warning: If you choose (b), any existing licenses allowing you to use 8960x software will not permit independent operation of VSA with the version installed by Pulse. (c) exit and transfer the existing 89601A license to a different PC. After transferring the license, uninstall "Agilent 89600 Series Software" using the "Add or Remove Programs" utility under "Control Panel", then re-start this installer.
VSA Found, Rev 8.00	The Pulse installer found an installation of 89601A VSA. However, it is revision 8.00 and is not compatible with Pulse Measurement Software. You can either: (a) exit and install Pulse on a different PC or instrument; or (b) continue with the *upgrade* to VSA version 9.00. Warning: If you choose (b) any existing licenses allowing you to use 8960x software will not permit independent operation of VSA with the version installed by Pulse. (c) exit and transfer the existing 89601A license to a different PC. After transferring the license, uninstall "Agilent 89600 Series Software" using the "Add or Remove Programs" utility under "Control Panel", then re-start this installer.
VSA Found, Rev 9.00 or greater	The Pulse installer found an installation of 89601 VSA, and the revision is verified to be compatible with Pulse Measurement Software. The installation will skip VSA and continue with the rest of the installation.

If you see a message box, read it carefully, and decide what you want to do. Then click OK.

Back at the main installer window, you have three alternatives:

- If the "Install VSA Software" button is enabled, and you want to install or upgrade VSA, then click this button. Please read and accept the license terms, use all destination defaults (for example: drive and path) and select install "89600 VSA". You do not need to install 89604, 89607, or floating license services. Continue to "4. Check / Install the Agilent IO Libraries " on page 19.

- If the "Install VSA Software" button is disabled, then you already have a compatible VSA installation. Jump to "6. Installing N9051A Pulse Measurement Software " on page 20.

- Click "Exit" to abandon the install process completely.
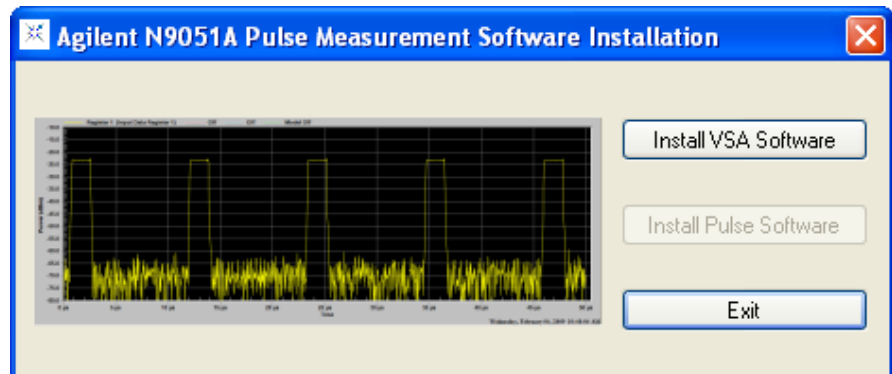
4. Check / Install the Agilent IO Libraries

Towards the end of the VSA installation, you will be given the opportunity to install the "Agilent IO Libraries" in the "Hardware Support" menu. This is a necessary component of the installation.

There are only a few circumstances where you would omit this step:

- the PC already has a compatible version of Agilent IO Libraries installed;

- you plan to use the National Instruments IO drivers (please see detailed instructions in the VSA Installation procedures);

- you never intend to control hardware with the Pulse Measurement Software (i.e. use files only) .

5. Re-start the PC and Autoplay Installer

At this point, the VSA installation will likely require you to re-boot the system. If so, exit all other programs, then Shut Down and/or Re-start the PC. Let the PC boot up, and let the VSA install complete (automatic).
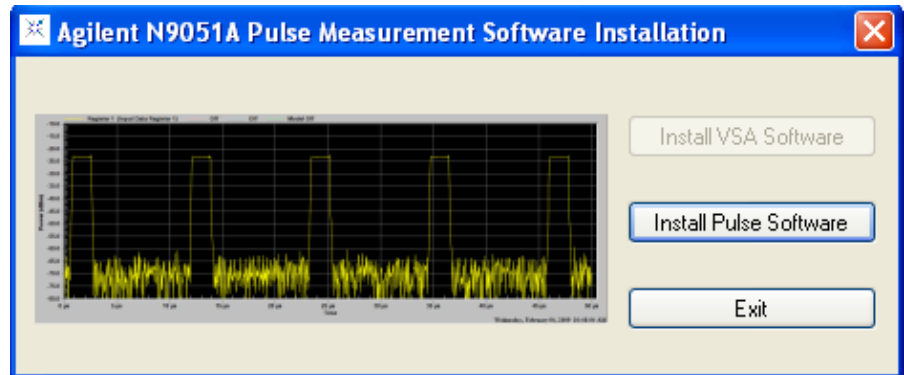
Then re-start the Pulse Measurement Software installer again, using the same instructions as in "2. Run the Autoplay Installer " on page 17. It will again check for a compatible installation of VSA; if found, you will get an appropriate message, and can continue to the next step. If not, refer to the "Troubleshooting " on page 39 for more information.

6. Installing N9051A Pulse Measurement Software

You are at this step only if the installer has verified a compatible installation of 89601 VSA and IO Libraries.

Click "Install Pulse Software". The installer checks for a compatible installation of Agilent License Service. This service already exists in most instruments but will need to be installed for most PCs. The installer will also check for, and delete, an old version of Pulse Measurement Software, if it is in the same directory path as the current install. (If not, remove it yourself by clicking on Start >> Control Panel >> Add or Remove Programs; then find "Agilent N9051A Pulse Measurement Software" in the list, click on it (to highlight), then click "Remove".)

A dialog box indicates progress of the installation. When complete, a file "readme.rtf" will be displayed that may contain recent changes and/or special alerts; please open and review this file.

Do not start or run the Pulse Measurement Software yet.

7. Configure IO Interfaces & Establish Connection to Instrument

For your system configuration (see section "1. System Configurations" on page 9, review your IO interface possibilities, and select the IO configuration you plan to use. The Pulse Measurement Software must transfer large amounts of data, so try to use the fastest interface available; see "Notes" in "System Configurations: Instrument Hardware" on page 11, where the table of compatible instruments is located.

If possible, please connect only one (1) instrument to the PC at a time.

Refer to the 89600 VSA installation guide, and follow the procedure under "Configuring IO Interfaces" which applies to your configuration.

Typically, this entails turning on the instrument to be used, allowing it to initialize, and connecting the instrument IO port to the PC via the appropriate cable. Then, verify the link with Agilent Connection Expert.

The Agilent IO Libraries Suite – which was installed earlier, and is required for Pulse operation – includes a utility called "Agilent Connection Expert". Right-click the "Agilent IO Control" icon (contains the letters "IO") in the task tray (The task tray is a cluster of small icons, usually located at the lower-right corner of your Microsoft Windows display.), and then left-click "Agilent Connection Expert". Close the welcome screen. In the middle column, find a "tree" of IO ports and instruments. You will want to verify that both the IO path and the instrument to be used are OK as indicated by a green circle with a white checkmark inside it. "Drill down" the tree to see the instruments, if needed. Click "Refresh" .

Above is a summary for simple configurations that verify easily. If you can not verify communication using "Connection Expert", refer to "Troubleshooting " on page 39 of this manual, or the "Diagnostics" chapter of the 89600 Installation Guide and locate the appropriate "Troubleshooting" procedure.

If connecting to an X-Series analyzer, with Pulse & VSA running on an external PC, and you have installed security software (for example: anti-virus or internet security) in the instrument, it may be necessary to disable the firewall features. If communication with the X-Series is unsuccessful try temporarily disabling firewalls on both the PC and X-Series to see if this corrects the problem.

Please do not attempt to start/run the Pulse Measurement Software until instrument communication has been established and verified in Agilent Connection Expert. .

8. License the Software

A "licensing" technology is used to enable authorized customers to use Agilent software. The Pulse Measurement Software's license key is "fixed" (or "node-locked") – meaning that a single installation is valid in a particular PC (or instrument) that you choose. The Pulse license is also "perpetual" – meaning it is valid indefinitely (not time-limited).
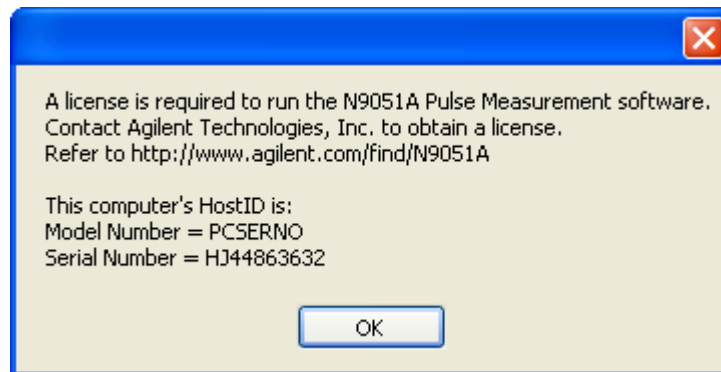
NOTE	It is not necessary to license the Agilent 89601 VSA to run the Pulse Measurement Software; the Pulse Measurement Software enables the VSA features it needs.

When Agilent ships a copy of Pulse Measurement Software against a valid order, we include an "Entitlement Certificate" which can be "redeemed" for a license key for one installation. Follow the instructions that accompany the certificate to obtain your license key.

In order to use the license activation website, you will need the following information:

• Your order number and certificate number from the top of the Entitlement Certificate.

• The model number and serial number displayed by the software of the host computer or X-Series instrument.

The model and serial numbers will appear in a warning dialog if the Pulse Measurement Software is started without a valid license:

A license is required to run the N9051A Pulse Measurement software.
Contact Agilent Technologies, Inc. to obtain a license.
Refer to http://www.agilent.com/find/N9051A

This computer's HostID is:
Model Number = PCSERNO
Serial Number = HJ44863632

OK

To enable the product you must request a license key from:

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

Be extremely careful to transfer and enter information accurately. Double-check each field carefully before redemption. If a mistake is made, the license issued will not work, and the certificate will no longer be valid to generate another license!

The license key is easily installed using a USB memory device. Copy the license file to the USB memory device at the root level, and then plug into the destination PC or X-Series instrument where Pulse and VSA have been installed. The license key will be installed automatically.

You will see this message pointing to the blue license key icon when you have successfully installed your license.:
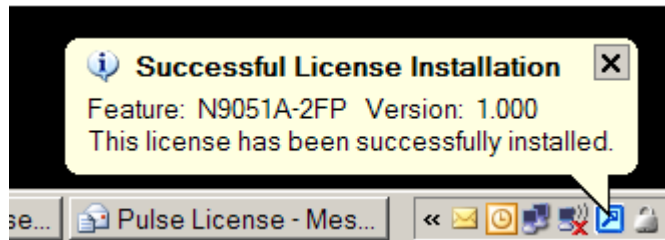
9. Starting Pulse Measurement Software & Verifying Installation

Make sure the system is powered on and connected properly, was verified using "Connection Expert" as described in "7. Configure IO Interfaces & Establish Connection to Instrument " on page 21, and is licensed as described in "8. License the Software" on page 22.

If a copy of VSA is already running, Pulse will discover it and use it – along with the instrument HW that VSA previously discovered. If this is not the result you want, close down all copies of VSA.

If installed on a PC, double-click N9051A Pulse Measurement Software icon on Windows desktop.

If installed into MXA or EXA, make sure the "X" base application is running. Press "Mode" key (on "X" front panel), then "Pulse" from the list of softkeys. You may need to press "More" to see successive pages of applications. You will be warned that a USB mouse and keyboard (plugged

into the MXA or EXA) is required to control the Pulse Measurement Software. Click "OK" if you have these connected and want to proceed.

The Pulse Measurement Software will load & start VSA. The VSA will locate instrument HW and connect to it. Please wait for this process to complete. If simulated data is selected, click [utility] [hardware configuration] de-select simulated hardware and select hardware ADC1.

Pulse initializes to default settings, continuous acquisitions, and free-run trigger. The "Program Status" and "VSA Status" line at the bottom of the Pulse window should be cycling through the acquiring, updating, and idle states. A yellow trace should be visible, even if noisy or unstable. (You may need to click Autoscale.) If the VSA fails to find compatible hardware, it will supply a default "demo" waveform from a file to the Pulse application. Pulse will display "Hardware Not Found", but also update a wavy trace waveform that is not really from an instrument. This indicates that Pulse and VSA are running successfully, but that VSA failed to connect to the instrument.

If there are any difficulties, please refer to "Troubleshooting " on page 39 of this manual.

9. Starting Pulse Measurement Software & Verifying Installation

3   Making Measurements

The N9051A Pulse Measurement Software measures several parameters of pulses including rise time, fall time, pulse width, over shoot, droop, pulse period and much more. You are also able to display the raw data, average, minimum value, and maximum value in two windows.

This chapter shows you how to make basic measurements using the Pulse Measurement Software. The purpose is to familiarize you with operation and key features. Refer to the User's Reference for a complete description of all features.

Measurement 1: Recall Recorded Data and Display in Upper Window

The N9051A Pulse Measurement Software includes several prerecorded data sets. In this demonstration, a prerecorded Fourier pulse is loaded from the resident file and displayed in the upper window. With the "Auto Scale" function you can scale the pulse to fit the pulse in the "y" axis.

Function	Menu Clicks
Load prerecorded Fourier pulse from file.	Click File, Recall, Recorded Data. Click Fourier file and open.
Scale data to fit on upper display.	Right click mouse and select "Auto Scale".
Scale the X axis to have 4 or 5 pulses displayed.	Click "Freq/Time/Trigger" and move the slide to the right and click "Apply" and "OK".
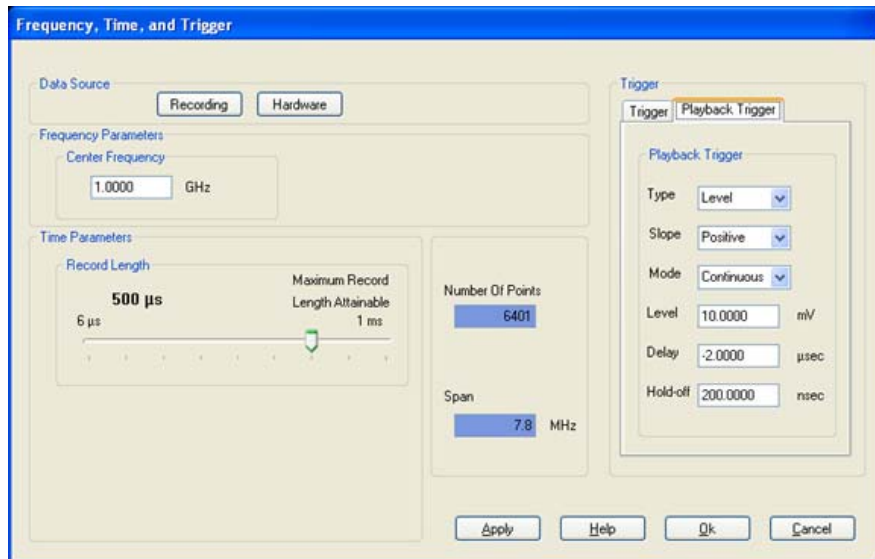
Select the record length and delay.

Measurement 2: Select the Analysis Parameters and Display

Select the parameters to be analyzed under the analysis selection section. Choose from a wide range of amplitude and time parameters. You can also choose all by using the "Select All" feature.

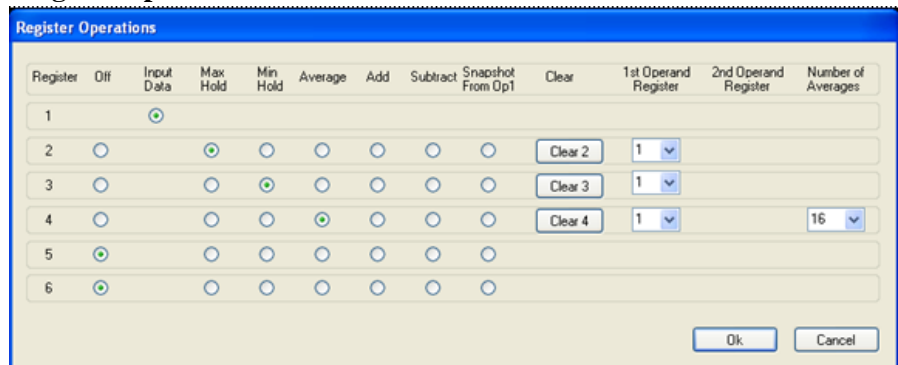| Function	Menu Clicks
Select the parameters to be displayed in the table below the window.	Click "Select Analysis" and "Select All". The register 1 radio button should be on.
Turn on probability distribution function and CCDF.	Click "PDF" and "CDF/CCDF" and "OK".
Display the parameter being analyzed.	Click "Pulse Measurement" tab in the lower pane.

Select the measurement to be analyzed.

Measurement 3: Add Average and Max Displays to the Upper Window

The Pulse Measurement Software gives you the flexibility to view up to three traces in one display. For example, you can view the raw data, average of the data, and maximum value of the data in one display.

Function	Menu Clicks
Place register 2 in average mode and register 3 in max mode	Click "Register Operations", in the register 2 row click the radio button for the average column and in the register 3 row click the max hold column. Click "OK".
Add register 2 and 3 in the upper display	Click "Display Options", in the "upper display" column check register 2 and 3, Click "OK". Note that the average and max hold registers are different colors and the Raw data is in yellow.

Register operations

Display Options

Dual display with average and max hold on upper and min hold in lower display.

Measurement 4: Place a Register in the Lower Display

The Pulse Measurement Software has two display windows: upper and lower. You can place up to three traces in the lower window. Each is designated with a different color as in the upper display.

Function	Menu Clicks
Place register 4 in Min hold	Click "Register Options", click the radio button in the register 4 row under the min hold column.
Place register 4 in the lower window	Click "display options" and check the box in the register 4 row under the "lower display".

Measurement 5: Place Marker and Reference Marker on Upper Display Average Trace

Pulse Measurement Software has the ability to place up to 10 markers in the display. These markers can be placed on any one of the traces displayed by clicking on the register of interest. A marker can be selected as the reference marker and all other markers displayed will be relative to the reference marker.

Function	Menu Clicks
Place a marker on the raw data	Click Marker 1 then move the mouse to the position you want to place the marker and click. Place the marker in the noise to best illustrate moving marker from register to register.
Move marker from raw data to average trace	Click "Register 2 (Average Register 1)" to move marker from Raw data trace to average trace register.
Place a reference marker on the average trace.	Double click a marker button on the right side of the display. The button turns red indicating a reference marker. Move the marker to the desired position and click. All other markers a relative to the reference marker.

Measurement 5: Place Marker and Reference Marker on Upper Display Average Trace
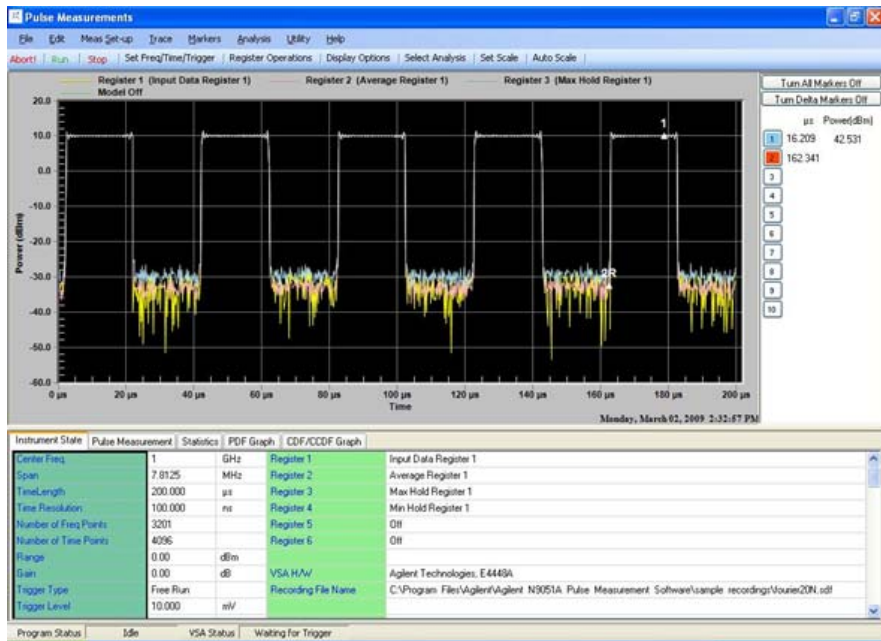
Measurement 6: Marker Functions - Zoom in on Trace For a Closer Look Then Return

You can zoom in on any portion of a signal or signals for a closer look. Simply form a box around the area of interest and release the mouse.

Function	Menu Clicks
Zoom in on a signal.	Move the cursor to the signal of interest, click and form a box around the signal and release the mouse button. The display will zoom in on the signal.
Return to full screen.	Right click the mouse and select "Zoom all the way out".
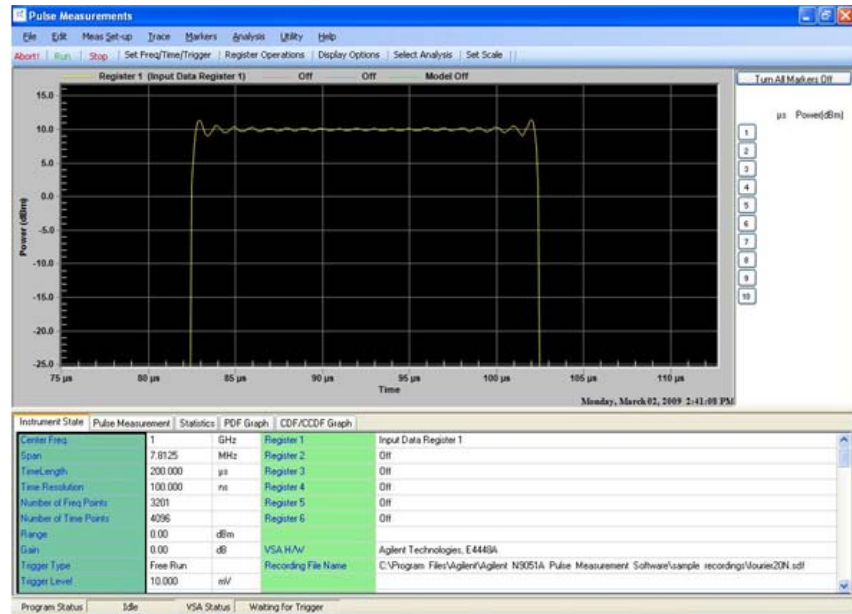
Zoom in on a signal for a closer look.

Measurement 6: Marker Functions - Zoom in on Trace For a Closer Look Then Return

4   Troubleshooting

The Troubleshooting information is provided in several forms to help you isolate and solve problems you may encounter while making measurements.

Problems with Installation

If the installer does not run automatically, then open the CD-ROM or USB memory stick using File Explorer, navigate to the top of the install package, and manually double-click "autoplay.exe".

The installer will normally over-write an older version of the software. However, it may be necessary to manually remove a previous version of Pulse Measurement Software. Click **Start > Control Panel > Add** or **Remove Software**. Wait until the list of currently installed programs is populated. Scroll down the list until you find "Agilent N9051A Pulse Measurement Software" and click on it; then click "Remove".

Problems with Licenses

If symptoms or errors messages indicate a problem with the license server, your computer may have a high CPU loading during startup, this can be due to anti-virus checking, Windows update running, or other periodic startup processing. Let these operations finish, then reboot your computer again or start the Agilent License Service manually. To start manually, open the Windows Services control and click **Start**:

Click **Start > Control Panel**+**Administrative Tools > Services**, select Agilent License Service, then click Start:
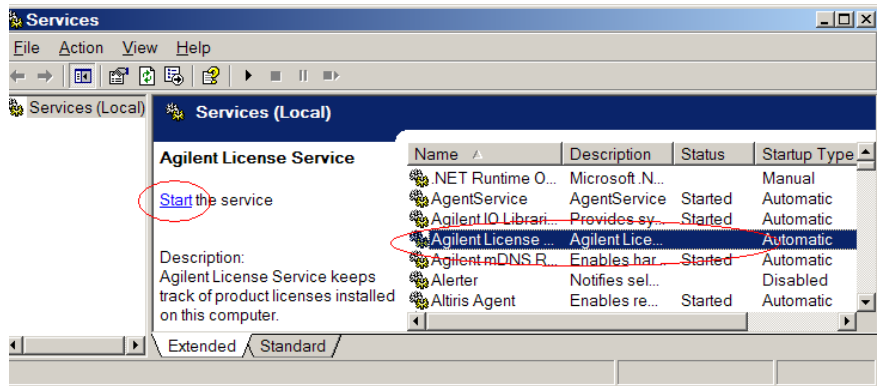
Problems Licensing Pulse Measurement Software

If you need to restore a valid license after a PC or instrument failure, replacement license files can be obtained from http://www.agilent.com/find/softwarelicense.

If you made an error entering data while redeeming your license, or lost your Certificate of Entitlement contact your Agilent Call Center, or visit the Technical Support website at http://www.agilent.com/find/assist.

Problems Licensing the Agilent 89601 VSA Software

Remember: The Agilent N9051A Pulse Measurement Software installs a portion of the Agilent 89601A VSA software, and uses it to control instruments and collect data from them. But, purchasing Pulse Measurement Software does not entitle the user to directly access the Agilent 89601A VSA stand-alone. If you are attempting to do this, a separate license must be purchased from Agilent.

If you have already purchased a valid license for Agilent 89601A VSA, and it used to run successfully, but then does not after installing Pulse Measurement Software, this may have been caused by removing, replacing, or updating the version of VSA that existed originally. The new VSA may no longer match the licenses you held previously. Contact Agilent for support.

Problems Connecting to Hardware or Controlling Instruments

If symptoms or error messages indicate that Pulse software cannot find and control instrument hardware, try the following. More information can be found in the "Installation" section, and the Help for the Agilent Connection Expert. The ultimate resources for all configurations and IO types is the "Installation" procedures for the Agilent 89601A VSA software, and related web pages.

- Make sure the instrument is plugged in, turned on, and has completed the power-up initialization process.

- Press PRESET on the instrument. If it won't preset, then cycle instrument power.

- Make sure the instrument is connected to the controller PC via one of the supported IO interfaces (typically one or more of the following: GPIB (IEEE–488), LAN, or USB). If controlling an MXA or EXA from an external PC, the connection must be LAN.

- Start the Agilent Connection Expert by right-clicking on the "IO" icon in the Microsoft Windows task tray, then clicking on Agilent Connection Expert. Close the welcome screen. In the middle column, look for the IO connection type you plan to use for this instrument, and see if a green circle with white check-mark is next to it. If not, either right-click and "Refresh This Interface", or click "Refresh All". If not successful, refer to documentation for Agilent IO Libraries for further info. If OK, then double-click the IO name to "drill down" to instruments. Again, look for a green circle with white checkmark.

- Exit the Pulse software, then re-start it.

- If the instrument is still not recognized, click **Utility > Hardware Configuration ...** to open a VSA dialog. The dialog may not appear "on top" of Pulse. If so, it must be selected from the task bar. See if the "Simulate Hardware" checkbox is checked; if so, *un-check* it. Now review the list of instruments under the "ADC 1" tab, and see if your instrument is there. If not checked, then click to check-mark that instrument. Then click OK to exit the dialog, and then click Run in the main toolbar.

- If the VSA hardware still does not appear in the Hardware Configuration dialog, open the Windows Task Manager (**ctrl**+**alt**+**del**), and click processes. Check to see if there is an "orphan" copy of the 89601 VSA program running (this could happen if the program was not closed properly). If there is a copy running, terminate the process. Then restart the Pulse program and try selecting the hardware again.

NOTE   If you could not previously verify instrument communication using "Connection Expert", then exit the Pulse Measurement Software and follow the procedures under "Diagnostics" in the 89600 VSA Installation Guide. *Use the following procedures only if Connection Expert verifies instrument communication successfully, but running the Pulse Measurement Software fails to control the instrument.*

If the software indicates that a HW instrument other than the intended one was found and connected, click the Utility menu and select "Hardware Configuration", then select the desired HW instrument.

In case of serious problems, Pulse writes a log file that may help with troubleshooting. It is typically found at C:\Program Files\Agilent 9051A Pulse Measurement Software\bin) and named Pulse_ddmmyyyy_hhmmssxxx.log, where ddmmyy is day, month, year, and hhmmssxxx is hours, minutes, seconds, milliseconds at the time of log file creation.

Problems While Running the Program

At start-up, be sure to wait long enough for Pulse Measurement Software to start and initialize, then launch the VSA and let it initialize, then connect to the instrument and set it up. These steps typically take approximately one full minute, possibly more (depending on computer, instrument, and IO path).

If any error messages are shown, look for troubleshooting help related to that message elsewhere in this section.

Look in the bottom-left corner of the display for activity in the "Program Status" and "VSA Status" fields. If these are "frozen", try clicking on Abort! and Run; check for Continuous acquisition mode (under Meas Set-up); and check that Trigger set-up (part of Set Freq / Time / Trigger dialog, under Meas Set-up) is Free Run (or, if not, that trigger conditions specified are being met).

If the "Program Status" and "VSA Status" indicate repetitive acquisitions are taking place, but there is no trace visible on the screen, check that the display scaling matches the expected amplitude level. Adjust the Scale factor (under Trace), or try clicking "AutoScale" several times.

If "Waiting for Trigger" message appears, then the system is set up to wait for a trigger condition, but that condition is not yet satisfied. Double-check the settings for Trigger (under Meas Set-up then Set Freq/Time/Trigger).

NOTE	An RF signal which is continuously on, as well as a signal that is continuously off, will not contain an edge transition that crosses the trigger threshold (for Level trigger).

Pulsed signals often have very a low duty cycle; for example, the signal is off most of the time. Therefore, if using "Free Run" trigger (without a trigger setting to "catch" the infrequent pulses), the trace may display noise most of the time.

If trace is being updated, but bears no resemblance to the actual signal being measured, it may be that VSA could not find the instrument, and is automatically providing default data from a VSA file. Refer to "Problems Connecting to Hardware or Controlling Instruments " on page 41.

Status Indicators

The Pulse Measurement Software provides status indicators that inform you of a condition that may affect the measurement and needs your attention.

Program Status

Describes the status of the Pulse Measurement Software program.

- Idle = waiting for another program (probably VSA) to perform a function

- Transferring Data = moving data from the VSA program to Pulse Measurement Software

- Updating Graph = drawing traces

- Reading File, Saving File, Loading File = accessing the file system

- Presetting = program is re-initializing

- Waiting for VSA = Pulse Measurement Software is waiting for VSA to complete an operation and respond; usually occurs at start-up, preset, and with other time-consuming operations

VSA Status

Describes the status of the VSA.

- VSA Idle = VSA is standing by, waiting for commands from Pulse Measurement Software.

- Acquiring = VSA is collecting or processing data from instrument.

- Waiting for Trigger = trigger selected (not free run), but trigger conditions not met yet. You may need to change trigger type, or adjust trigger conditions, to get a measurement to trigger.

- Measurement Aborting = VSA has been commanded to abort current measurement.

- Measurement Aborted = VSA has aborted measurement.

- VSA Stop Measurement = VSA has been stopped.

- Starting VSA = VSA progrsm is initializing.

- Connecting to VSA = Pulse program is establishing or re-establishing control of the VSA.

- VSA disconnecting = Pulse program is relinquishing control of the VSA (normally seen when using the X-Series analyzer and selecting a different mode).

Other Indicators

- VSA Loading = Pulse Measurement Software has started an instance of VSA, and it is initializing.

- Input Overload! = RF input power to instrument is too high for current input range, causing distortion or ADC clipping in the analysis hardware. Increase the Input Range, under the Meas Set-up menu. Or, adjust the signal level, or add attenuation to the signal path. This indicator will go away when the overload condition is corrected, so long as acquisitions are taking place.

NOTE	This message can occur when the VSA is reading Simulated Data (for example: no hardware connection). If so, ignore the overload error.

- AutoRange In Progress = system is attempting to automatically adjust the range (attenuation) of the RF input path. This process requires successive acquisitions, so must be invoked only if in Continuous mode, and must be repetitively triggered by satisfying any trigger conditions selected (unless trigger mode is Free Run).

- Presetting = the system is presetting to the initial (startup) state.

- Calibration in Progress = instrument is being self-calibrated and self-aligned. Be patient – this can take some time!

- Insufficient data points in recording for measurement! = data is being played from a recording (file), but the length of the file is too short for the measurement conditions requested.

- Hardware Problem = instrument has reported an error condition not covered by the above.

Other Error Messages

Pulse Measurement Software provides you with other messages (usually in a dialog box) to indicate error conditions and help you diagnose or solve the problem.

Startup

The following error message may occur during the Pulse Measurement Software startup. Error messages are shown in an error dialog box.

Error Messages	Explanation
Please install the Agilent IO Libraries before running Pulse.	Pulse does not recognize the IO libraries. Check that they are correctly installed.
Please install the Agilent 89600 VSA version 9.00 or later software before running Pulse.	Pulse did not find a supported installation of the 89600A VSA software. Install a supported version (9.00 or later) of the 89600A software.
A copy of Pulse is already open. Please check your system tray (notification area).	Open the Windows Task Manager (**ctrl**+**alt**+**del**), and click processes. Check to see if there is an "orphan" copy of Pulse running (this could happen if the program was not closed properly). If there is a copy running, terminate the process. Then restart the Pulse program.
Cannot connect to VSA.	If you cannot connect to the hardware, first check the Connection Expert in the Agilent IO Libraries to be sure the hardware is recognized. Refer to the Agilent IO Libraries help to troubleshoot connectivity problems.
	Once the hardware can be accessed, go to the Hardware configuration menu and select the hardware and check the default configuration check box. If this does not remedy the problem, refer to the 89600 series help file troubleshooting section (usually found in C:\Program Files\Agilent\89600 VSA).

Error Messages	Explanation
Hardware Not Found – Using Simulated Data	Indicates that VSA did not establish a successful connection to measurement hardware, and is providing VSAsimulated data instead. You may see the "INPUT OVERLOAD!" message; it can be ignored under this condition.
	If you want to use Pulse with measuring instrument hardware, please see "Notes" in "System Configurations: Instrument Hardware" on page 11, where the table of compatible instruments is located.
	Note: This signal is not simulated pulses; if you wish to demonstrate Pulse Measurement Software without hardware, please use one of the files under File Open.
Could not configure 89600 VSA. Unable to create 89600 VSA object. Unable to Start VSA.	This error message shows when the Pulse Measurement Software and Agilent 89600 VSA software versions do not match. To correct this problem, install both applications from the same Agilent Technologies software program CD.
	This error can also occur if the VSA hardware is already in use by another application, or another copy of the Pulse Measurement Software is already using the hardware.
Waiting for Trigger.	Check to be sure the triggering conditions have been met. Be sure there are pulses of proper magnitude at the input.
	If using external triggering, be sure cabling is properly connected and configured. A scope may be useful in determining if the trigger signal is present at the input.

Measurements

This troubleshooting table includes problems you may encounter in making measurements and possible solutions.

PROBLEM	Possible Cause/Solution
Measurements fail, and input signal power is greater than range, but the Overload indicator is blank.	If a measurement result fails due to significant distortion present in the input signal, the input signal may be causing an overload condition in the measurement hardware. In some cases the overload indicator may not display this condition.
Overload indicator.	This indicates that the input signal level exceeds the input range setting of the VSA. You need to either increase the range setting, or reduce the signal level at the analyzer input.
Parameter {NAME} is significantly different than the instrument setting.	This error may appear if you change parameters from the 89600 GUI while in "View VSA" mode. This error may also appear if an operation was aborted or failed before completion. Once this error occurs, the application state is assumed to be unknown, and will require a restart of the Pulse Measurement Software.
"Recording is too short" measurement error.	This error may appear when you use recordings of signals for measurements. The measurements restrict the recordings from wrapping around during a measurement acquisition. If the recording is not long enough to accommodate the entire measurement, the measurement may abort with the error message shown here. This may occur because the recording does not contain enough points to accommodate the time record length requested. Adjusting these parameters to match the signal content of the recording should solve the problem if valid signal is present in the recording. Other possible problems include an incorrect Trigger Level setting or incorrect Center Frequency setting.

PROBLEM	Possible Cause/Solution
Help file not found	Check to be sure that the .PDF help files are present in the Doc subdirectory where the Pulse Measurement Software was installed (usually C:\Program Files\Agilent\Agilent N9051A Pulse Measurement Software) The help file is in ..\ Agilent N9051A Pulse Measurement Software\Doc. If you get a message saying that a ".HLP" file cannot be found, browse to the location where you installed the 89600 software (usually C:\Program Files\Agilent\89600 VSA). The help file is in ..\Agilent\89600 VSA\Help.
Autoscale doesn't work. Autoscale has no effect.	Autoscale has no effect if the display is currently in "zoom" scaling. Instead, right-click anywhere on the display in question, and then select "Zoom All the Way Out".
Trace from a "register" doesn't show up.	After a register has been defined or loaded (in the Register Operations dialog), it must still be displayed (via the Display Options dialog).
Pulse Measurement tab is blank. Statistics tab is blank. PDF Graph tab is blank. CDF/CCDF Graph is blank.	All of these tabs remain blank if the appropriate analysis feature is not turned on. Click Analysis >> Select Analysis ... then chose the analysis features you wish to see.

Contacting Agilent

Agilent on the Web

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

http://www.agilent.com

Click the Test & Measurement link then click Select a Country.
Click the Contact Us link for contact information.

Questions or Comments on the Documentation

The latest documentation can be found on our Web site,
http://www.agilent.com/find/N9051A