

Keysight N9051A Pulse Measurement Software

Software Version 2.2

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Getting
Started Guide

Notices

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1 Introduction to Pulse Measurement Software

The N9051A Pulse Measurement Software provides easy-to-use, time measurements of Pulsed RF or Microwave signals in Agilent spectrum analyzers, oscilloscopes, or remotely using a LAN connection to either instrument. It automatically finds pulse edges in time, and then measures parameters such as rise time, fall time, pulse width, PRI, 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 1050 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 160 MHz bandwidth).

It can be installed *in* a CXA, EXA, MXA, or PXA signal analyzer, and appears in the “MODE” menu and cooperates with mode switching mechanisms.

2 Installation and Licensing

This section describes the installation of the N9051A Pulse Measurement Software onto a computer or Windows XP-based Agilent spectrum analyzer or oscilloscope, as well as how to license, configure and connect it. 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.

For X-Series signal analyzers (CXA N9000A, EXA N9010A, MXA N9020A, and PXA N9030A), beginning with instrument software version A.04.00, the Pulse Measurement Software is pre-installed on the instrument's disk drive. You can skip to [Section 8. License the Software on page 21](#).

The Pulse Measurement Software installation includes three elements.

- Agilent 89601A Vector Signal Analyzer (VSA) software components
- Agilent IO Libraries
- Pulse Measurement Software itself

All of them are required; however, if your destination PC *already* has an element installed, you have the option to skip that step.

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 is the minimum version required to run Pulse software, a higher version may be required to support specific instruments. Refer to [Section 3. Check / Install the 89601 VSA on page 16](#).

The installation is delivered on DVD only.

Installation Procedure Overview

1. **Plan your installation:** Refer to [Section 1. System Configurations on page 9](#) to review procedures and compatibility notes, especially in the lists of system configurations. Determine 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 [Section 2. Run the Autoplay Installer on page 16](#).
3. Run the 89601 VSA Software Check / Install program, refer to [Section 3. Check / Install the 89601 VSA on page 16](#). 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 [Section 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. Then start the Pulse installer *again* to continue the installation (Autoplay.exe will run automatically if the DVD is removed and reinserted). Refer to [Section 5. Re-start the PC and Autoplay Installer on page 19](#) for complete instructions.
6. Install the Pulse Measurement Software. (This step includes Agilent Licensing components.) Refer to [Section 6. Installing N9051A Pulse Measurement Software on page 19](#) 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 [Section 7. Configure IO Interfaces and Establish Connection to Instrument on page 20](#) 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 [Section 8. License the Software on page 21](#) 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 [Section 9. Starting Pulse Measurement Software and Verifying Installation on page 23](#).

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 14.](#)

[System Configurations: 89601A VSA Software and Agilent IO Libraries on page 15.](#)

System Configurations: PC Requirements

The Pulse Measurement Software is installed and “node-locked” to a single PC. 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)

1. System Configurations

- 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
- DVD drive for installation media
- I/O port suitable for control of instrument (see below)
- Microsoft Windows XP Professional, Windows Vista (with Pulse software version 1.5.0.0 or above), or Windows 7.

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 <i>on PC</i>	CXA N9000A EXA N9010A MXA N9020A PXA N9030A	@ any frequency option * B25 (25 MHz), or * B40 (40 MHz), or * B1X (160 MHz)	LAN (only)	[1] [2] [4]

Installation and Licensing
1. System Configurations

Instrument Family	Model Numbers	Options @ = Required * = Recommended # = Not Compatible	IO (see below)	Notes
X-Series Signal Analyzers, with VSA and Pulse Measurement Software running <i>inside</i>	CXA N9000A EXA N9010A MXA N9020A PXA N9030A	same as above	LAN, GPIB, internal	[1] [2] [4]

Notes:

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.

[1] The X-Series XSA firmware revision must be A.01.64 and higher to be compatible with VSA revision 9.00 and higher. This requirement holds regardless of whether Pulse and VSA are running internally or externally.

[2] 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 on the following page.

The following HW product families and configurations are not compatible and not supported by the Pulse Measurement Software (even if supported by VSA): E4406, VXI systems and 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”).

[3] The Agilent X-Series signal analyzers CXA N9000A and PXA N9030A require VSA revision 11.20 and higher.

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 computer or instrument as Pulse Measurement Software. Specifically, you cannot 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. A version greater than 9.00 is required for specific instruments. However, the VSA version **cannot** be any higher than 12.xx.

If you have a previously installed /licensed copy of Agilent 89601 VSA on the destination PC, please read [Section 3. Check / Install the 89601 VSA on page 16](#) 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 pre-installed 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. Please make sure your instrument has revision 1.64 or greater and VSA 9.0 and greater.

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. Please refer to the VSA Installation manual for questions regarding NI drivers.

2. Run the Autoplay Installer

Administrator privileges are required to install new software. If needed, log off (**Windows, Start, Log Off**), and log in as an administrator. On Agilent X-Series analyzers, the administrator username is **Administrator** and the password is **agilent4u**.

The installation package is located on the DVD. In most cases, simply loading the DVD will cause the autorun.inf installer to run automatically.

If the installer does not run automatically locate the file PulseInstaller.exe (using Windows Explorer) and double-click on it.

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
<p>VSA Found, But Rev 7.20 or Below</p>	<p>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:</p> <ul style="list-style-type: none"> • Click CANCEL to install Pulse on a different PC or instrument. • Click CANCEL to 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. • Click CANCEL to exit and uninstall Agilent 89600 Series Software using the Add or Remove Programs utility under Control Panel, then re-start this installer. <p>WARNING: Any existing licenses allowing you to use 8960x software will not permit independent operation of VSA with the version installed by Pulse.</p> <ul style="list-style-type: none"> • Click OK to continue with the upgrade to version 12.xx. <p>WARNING: If you choose OK, any existing licenses allowing you to use 8960x software will not permit independent operation of VSA with the version installed by Pulse.</p>
<p>VSA Found, Rev 8.00</p>	<p>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:</p> <ul style="list-style-type: none"> • Click CANCEL to exit and install Pulse on a different PC or instrument. • Click OK to continue with the upgrade to version 12.xx. <p>WARNING: If you choose OK, any existing licenses allowing you to use 8960x software will not permit independent operation of VSA with the version installed by Pulse.</p>

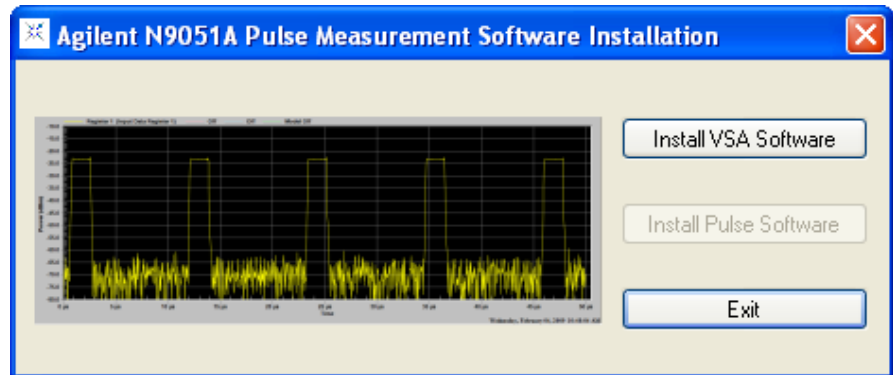
3. Check / Install the 89601 VSA

Element Found	Recommendation
VSA Found, Rev 9.00 or greater	<p>The Pulse installer found an installation of 89601A VSA. However, it is less than revision 12.xx. Please confirm compatibility with your hardware before proceeding. You can either:</p> <ul style="list-style-type: none"> • Click YES to continue with the upgrade to version 12.xx. <p>WARNING: If you choose YES, any existing licenses allowing you to use 89601A software will not permit independent operation of VSA with the version installed by Pulse.</p> <ul style="list-style-type: none"> • Click NO to continue the installation WITHOUT upgrading the “Agilent 89600 Series Software”. • Click CANCEL to exit and install Pulse on a different PC or instrument, or 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.

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 [Section 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 [Section 6. Installing N9051A Pulse Measurement Software on page 19.](#)
- 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.

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 before re-starting the PC. Let the PC boot up, and let the VSA install complete automatically.

Re-start the Pulse Measurement Software installer using the same instructions as in [Section 2. Run the Autoplay Installer on page 16](#). 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 [Chapter 4 , “Troubleshooting ,” on page 39](#) for more information.

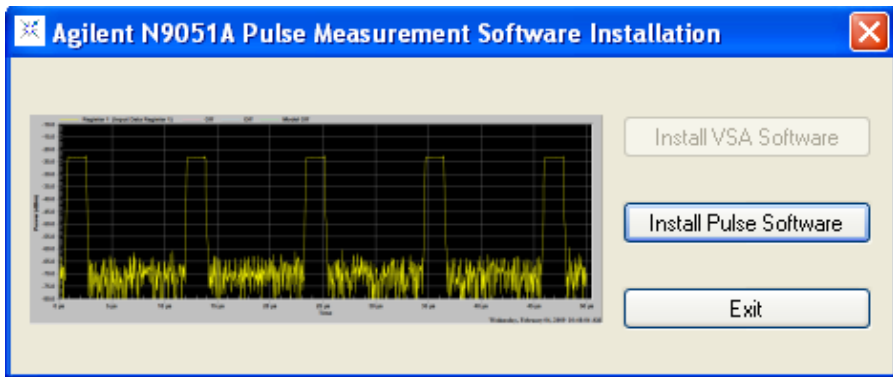
6. Installing N9051A Pulse Measurement Software

You are at this step only if the installer has verified a compatible installation

7. Configure IO Interfaces and Establish Connection to Instrument

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 and 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" in Chapter 2](#), 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 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**.

If you can not verify communication using **Connection Expert**, refer to the “Diagnostics” chapter of the 89600 Installation Guide and locate the appropriate “Troubleshooting” procedure.

If connecting to an X-Series analyzer, with Pulse and 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.

8. License the Software

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.

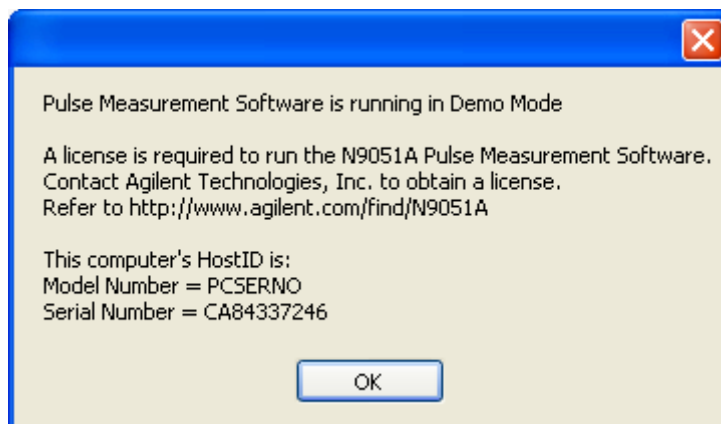
In order to use the license activation website, you will need the following information:

- 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.

NOTE

There are separate licenses for the base Pulse program (N9051A-2FP), Phase and Frequency option (N9051A-3FP), and the Extended Analysis option (N9051A-4FP). The licenses for the options must be installed for the options to become active.

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



9. Starting Pulse Measurement Software and Verifying Installation

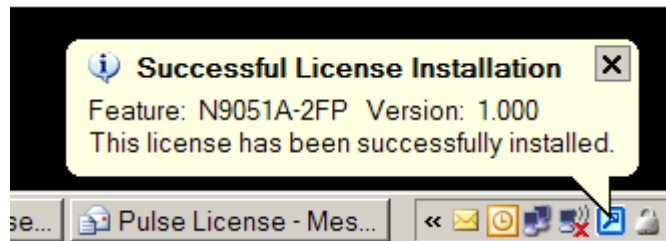
To enable the product you must request a license key from:

<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.:



If you do not have a valid license you can use the Pulse software in demo mode where you can playback a recording to perform pulse analysis. In demo mode you cannot connect to an instrument.

9. Starting Pulse Measurement Software and Verifying Installation

Make sure the system is powered on and connected properly, was verified using **Connection Expert** as described in [Section 7. Configure IO Interfaces and Establish Connection to Instrument on page 20](#), and is licensed as described in [Section 8. License the Software on page 21](#).

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.

9. Starting Pulse Measurement Software and Verifying Installation

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

If installed into MXA or EXA, make sure the “X” based 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 and start VSA. The VSA will locate instrument HW and connect to it. Please wait for this process to complete. If **simulated data** is shown, 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 acquisition, update, 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 then display **Hardware Not Found**, and also display a trace from a recording. 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 [Chapter 4](#), “**Troubleshooting**,” on page 39 of this manual.

3 Making Measurements

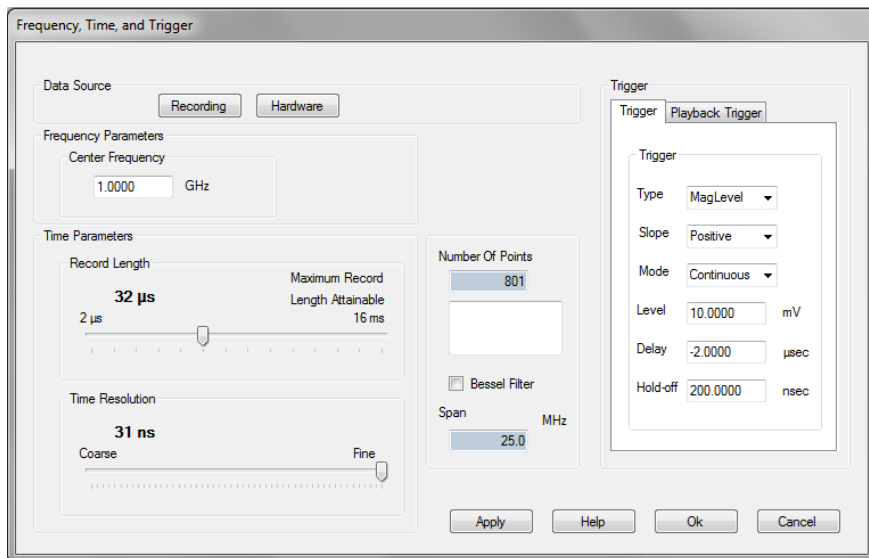
The N9051A Pulse Measurement Software measures several pulse parameters including rise time, fall time, pulse width, over-shoot, droop, pulse period and many more. You are also able to display the raw data, average, minimum value, and maximum value in two windows.

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 pre-recorded 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 Selections
Load prerecorded Fourier20N.sdf pulse from file.	Click File , Recall , Recording (Playback) . Click 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.

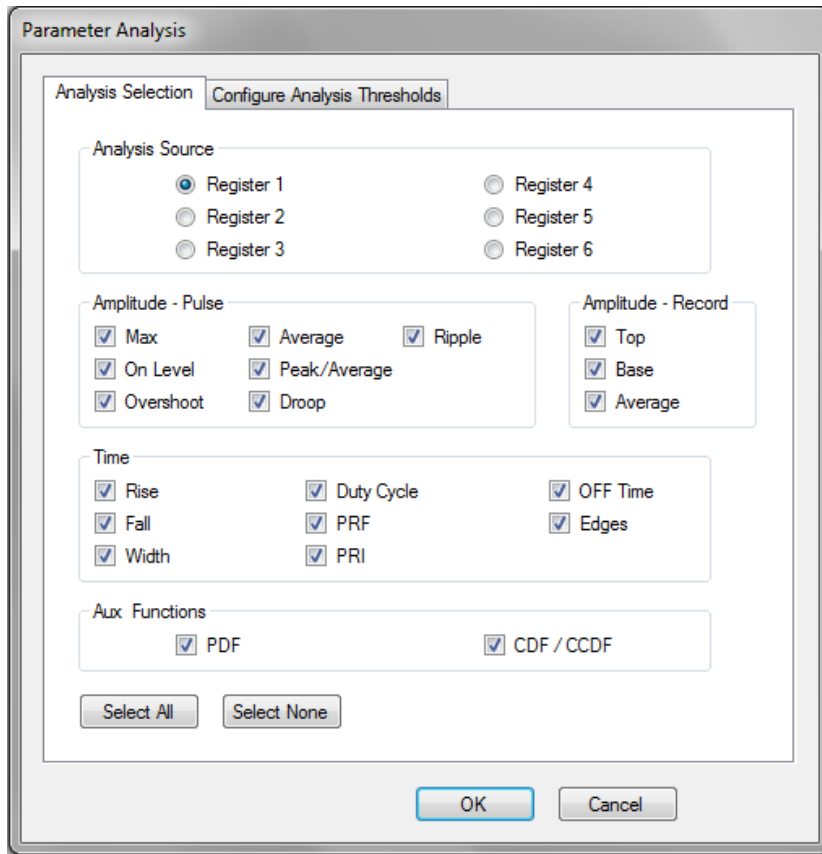
Measurement 2: Select the Analysis Parameters and Display

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.

Making Measurements

Measurement 2: Select the Analysis Parameters and Display



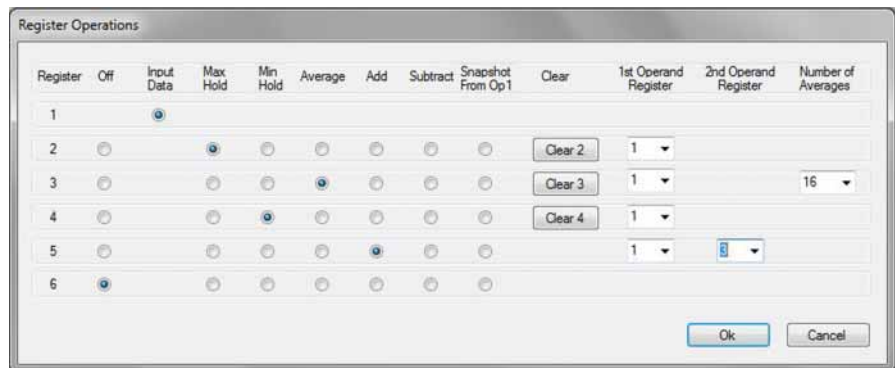
Select the measurement to be analyzed.

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

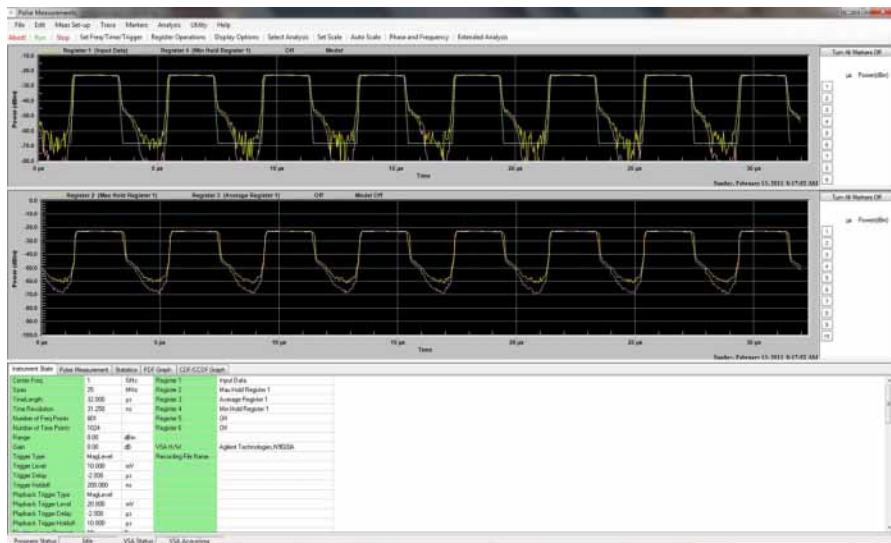
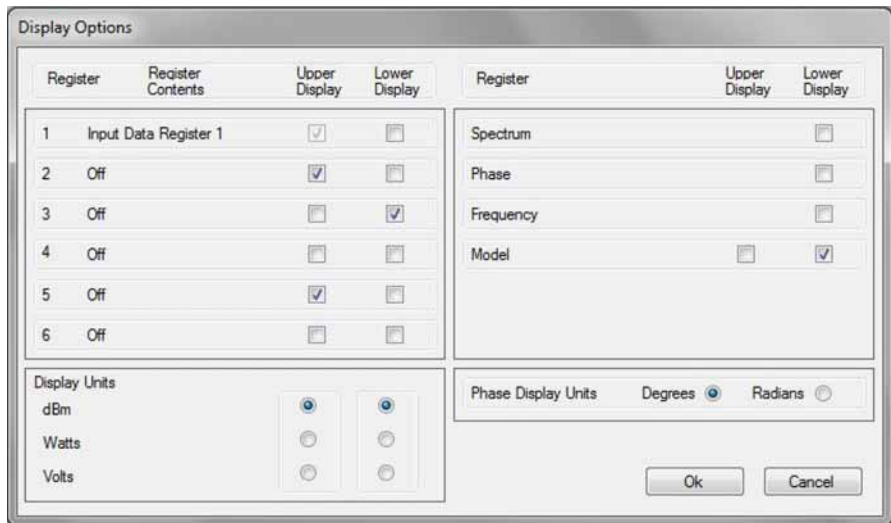


Making Measurements

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

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 .

NOTE

The Spectrum, phase, and frequency are only displayed in the lower window. When selected, spectrum, phase, or frequency are displayed by themselves rather than with other data due to different units in the display axes.

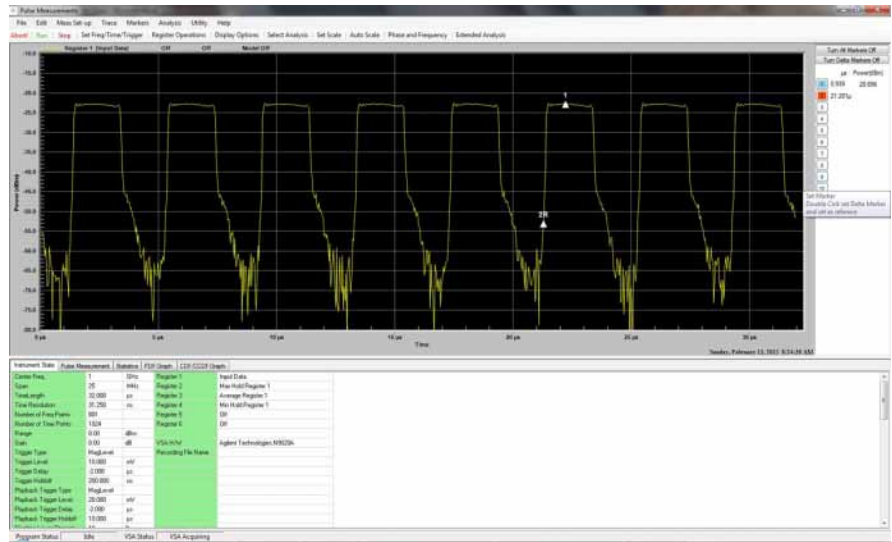
Measurement 5: Place Marker and Reference Marker on Upper Display Average Trace

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 are relative to the reference marker.

Making Measurements

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



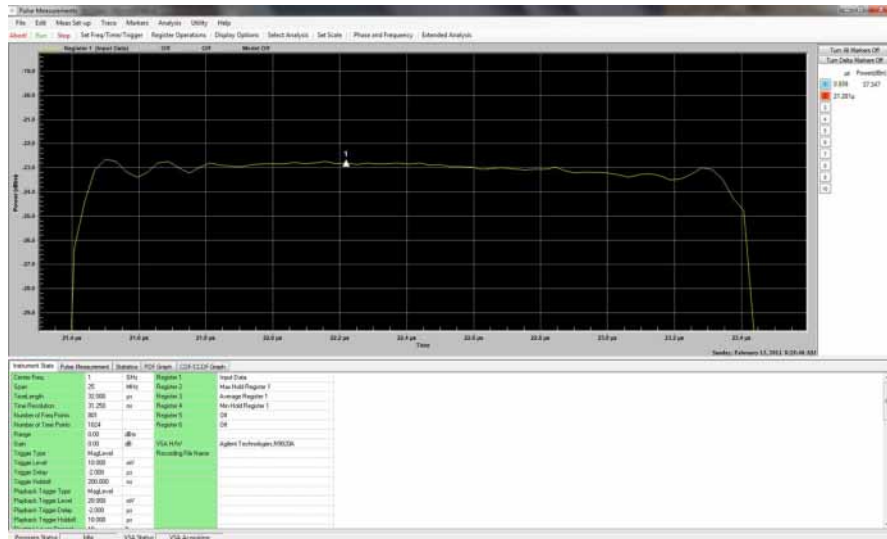
Making Measurements

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

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 .



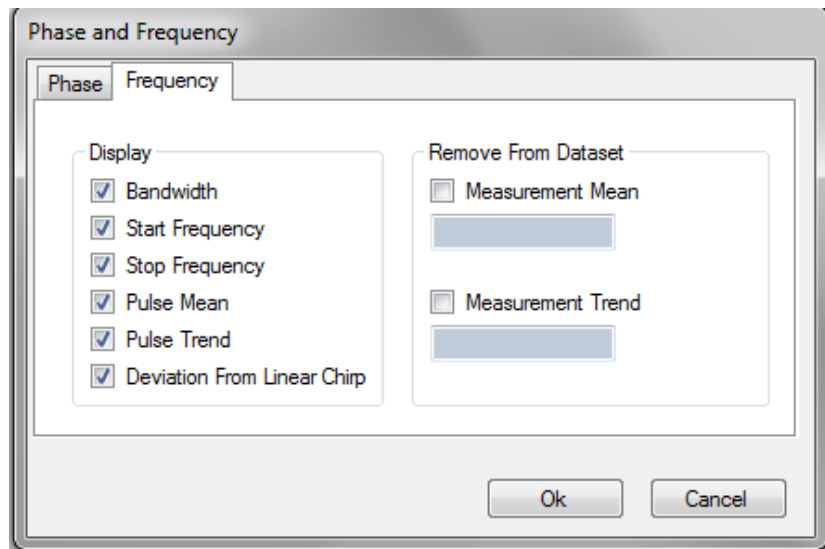
Zoom in on a signal for a closer look.

Measurement 7: Measure Start Frequency, Stop Frequency, and Bandwidth of a Chirp (Requires N9051A-3FP License)

Measurement 7: Measure Start Frequency, Stop Frequency, and Bandwidth of a Chirp (Requires N9051A-3FP License)

You can display the start frequency, stop frequency, and bandwidth of a pulse(s) by selecting the Phase and Frequency button in the main toolbar and selecting the desired display options.

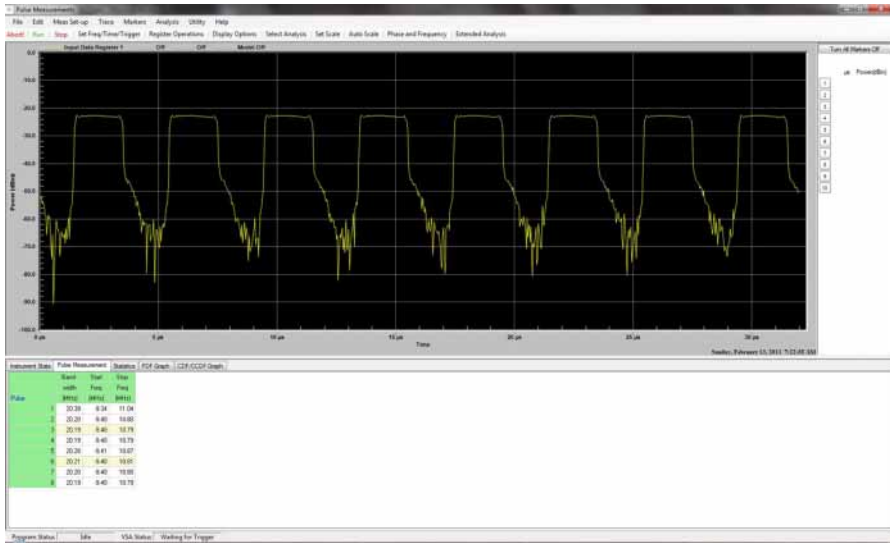
Function	Menu Clicks
Display Phase and Frequency Dialog	Click Phase and Frequency in the main toolbar.
Specify frequency parameters.	Click on the Frequency tab.
Select individual parameters to be displayed.	Click the Bandwidth , Start Frequency , and Stop Frequency checkboxes as shown below.



Making Measurements

Measurement 7: Measure Start Frequency, Stop Frequency, and Bandwidth of a Chirp (Requires N9051A-3FP License)

The selected parameters are displayed in the table below the graph.



Measurement 8: Extended Analysis (Requires N9051A-4FP License)

You can display statistical information about a parameter over multiple measurements by selecting the Extended Analysis button in the main toolbar and selecting the desired options.

Function	Menu Clicks
Display Extended Analysis Dialog	Click on the Extended Analysis button in the main toolbar.
Select a parameter to display.	Click on the drop-down box arrow and select a parameter to display (e.g. ampl:On Level).
Start recording data.	Click on the Start button. The button label will change to Stop and turn red.
Stop recording data.	Click on the Stop button. The button label will change to Start and turn green. Statistical data are available in the table below the graph.



Making Measurements

Measurement 8: Extended Analysis (Requires N9051A-4FP License)

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 DVD 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**.

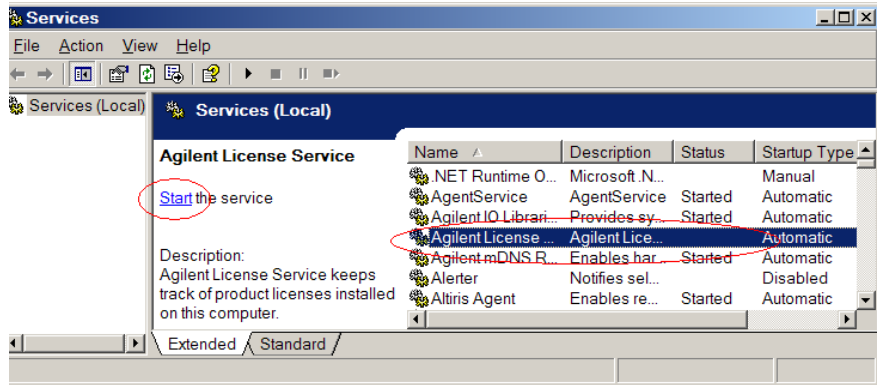
When both 89601A and 89601B are installed, only one of them can be assigned to the COM interface. “A” is assigned by default, and is required for N9051A. If “B” is assigned, Pulse will stall indefinitely when it tries to load the VSA software at start-up. To correct this, run a small program called **RegisterVSA.COM.exe** found in the path **ProgramFiles\Agilent\89600...** Run the program, select **89601A**, and click **Register**. You may need Administrator privileges to do this.

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**:

Troubleshooting Problems with Licenses

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. However, purchasing Pulse Measurement Software does not entitle the user to directly access the Agilent 89601A VSA by itself. If you wish to do this, you must purchase a license from Agilent.

If the installation of the 9051A Pulse Measurement software causes a previously-licensed version of the 89601A VSA software to malfunction, contact Agilent for support.

Problems with the N9051A Pulse Application “Disappearing”

Unlike most “X” apps, the N9051A is a separate Windows program running in its own process. This means that its “window” may be accidentally sent to the background (behind the “X” SA window) or minimized (to the Taskbar), and so be invisible even though it is loaded and ready to run. As with many Windows programs you can use **[Alt][Tab]** (press the two buttons together) to view loaded programs and select one to display in the foreground. Even when running inside the “X” -family of signal analyzers you can use the **[Alt]** and **[Tab]** keys to accomplish this.

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.

- Ensure your license is valid. Without a license, the software is running in demo mode and connection to an instrument is not possible. Check the license status using the **Utility Menu** and select **Pulse License Status**.
- 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 verify that the connection is valid. This is signified by a green circle. If IO libraries cannot connect to the instrument, verify the IP address of the instrument and that it’s connected to the LAN. Try clicking **Change Properties** on the right side of the IO Libraries window and selecting ***IDN Query**. Test the

connection and click **OK**.

- 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. 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 the **Processes** tab. Check to see if there is an “orphan” copy of the 89601 VSA program running (which 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_ddmmyyy_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 **Abort!** followed by **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. 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

This 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

This 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.

Troubleshooting

Status Indicators

- Starting VSA = VSA program 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. This can be resolved by either increasing the input range under the Meas Set-up menu, by adjusting the signal level, or by adding attenuation to the signal path.

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 it can 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 are 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 (which could happen if the program was not closed properly). If there is a copy running, terminate the process. Then restart the Pulse program.

Troubleshooting
Other Error Messages

Error Messages	Explanation
Cannot connect to VSA.	<p>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.</p> <p>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).</p> <p>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.</p>
Hardware Not Found – Using Simulated Data	<p>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.</p> <p>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.</p> <p>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.</p>

Error Messages	Explanation
<p>Could not configure 89600 VSA.</p> <p>Unable to create 89600 VSA object.</p> <p>Unable to Start VSA.</p>	<p>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 DVD.</p> <p>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.</p>
<p>Waiting for Trigger.</p>	<p>Check to be sure the triggering conditions have been met. Be sure there are pulses of proper magnitude at the input.</p> <p>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.</p>

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 choose 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 **Test and Measurement**, then click **Select a Country**.
Click **Contact Us** 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>