Using the Software

Software for Agilent Technologies Vector Series Network Analyzers

Software Overview

The IntuiLink Vector Series Network Analyzer (VNA) software offers a set of connectivity tools that enable you to quickly and easily move data from your vector series network analyzers to your PC. Whether you are an experienced programmer or would prefer not to program at all, the IntuiLink software is designed to give you a high-level of instrument control using software applications that you are probably already using on your PC.

For the Non-Programmer — A Simple Toolbar Add-In for Excel and Word

The IntuiLink VNA software provides an easy-to-use toolbar that enables you to connect to your network analyzer from either Microsoft® Excel® or Microsoft® Word®. Once connected, you can perform simple trace data capture and instrument display image transfers directly into your spreadsheet or document. You can save the data and images in spreadsheets, graphs, or image files for use in all Microsoft® Office® products, including PowerPoint and Microsoft Project. This is a real time-saver when creating presentations, staff reports, and regulatory reports.

In both Word and Excel, the toolbar lets you save settings from the network analyzer. You can then restore those settings to the network analyzer. In this way, you can replicate frequently-used measurements and cut down on test time.

The toolbar also lets you set up a series of automatic "snapshots" of your data. When you use the **Repeated Measurement** feature, you can capture data from the network analyzer at intervals of your choice, providing a history of measurement data.

Once installed, the toolbar is automatically loaded and operates just like any other toolbar in these applications. Use the **Tools** menu to add or remove the toolbar from the application. The Excel toolbar is shown below, followed by a brief description of each toolbar button.

NOTE: To get started with the toolbar, you will need to open Excel or Word. The toolbar will automatically load when you open the application.

About Agilent VNA Displays the software version number and a list of the supported network analyzer models.

Connect to Network Analyzer Configures the I/O connection to the network analyzer.

Capture/Restore Settings Captures the network analyzer settings and stores them in the document or worksheet, or to an external file. Restores the saved settings to the network analyzer. Allows you to edit the name of saved states or delete saved states.

Get Data Uploads data from the network analyzer to the active worksheet in Excel. Also allows you to obtain repeated measurements.

Stop Repeated Measurements Stops gathering repeated measurement data from the network analyzer.

Get Screen Image Gets an image of the network analyzer's display and places it in the active worksheet or document.

Save S2P Data Gets SxP data from the network analyzer and saves it in an S1P, S2P, or S3P text file for use with device-simulation software packages.

 Toolbar Help Provides step-by-step explanations to help you learn to use the toolbar.

For the Programmer — A Powerful Automation Server

For more sophisticated programming, an ActiveX™ Automation Server is provided with IntuiLink software to make it easy to program your network analyzer using common programming environments such as Visual Basic®.

To help you become familiar with the structure and operation of the Automation Server, we have included a help file. To access this help file, navigate to:

Start | Programs | Agilent IntuiLink | VNA | Agilent IntuiLink VNA

Automation Help

See Also

Installation

Troubleshooting


Connect to Network Analyzer

The IntuiLink software makes it easy to establish an interface connection between your network analyzer and your PC. Whether you are connecting to the network analyzer using an HP-IB (GPIB) port or an RS-232 (COM) port, IntuiLink does the work for you.

Simply select an interface address, press the **Identify Instrument(s)** button and IntuiLink determines which instruments are connected to your PC. The Connect button establishes a connection to a selected instrument. When you are connected, the icon in the toolbar has a green background, as shown above. The box shows the connection status (in the figure below, Not Connected).
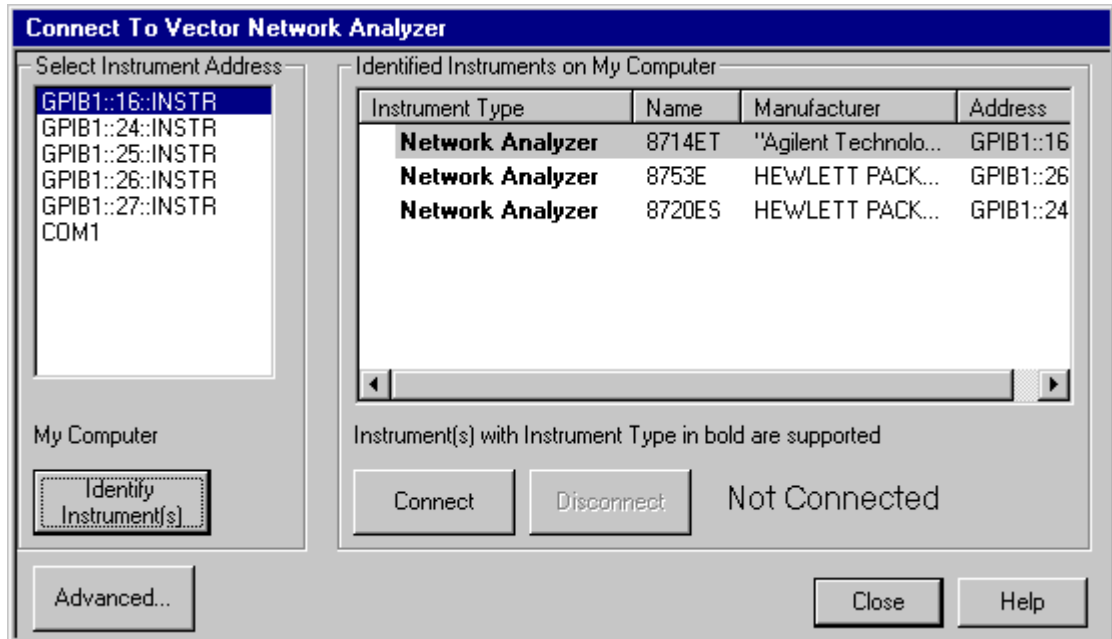

Capture/Restore Network Analyzer Settings

IntuiLink VNA gives you the ability to store the current network analyzer settings, including the calibration settings, with the document or worksheet, or to a file on your PC. You can restore settings to the network analyzer from either the PC file or from the stored settings within the document or worksheet. The network analyzer settings saved to a PC file are stored in a binary format (.sta file extension).
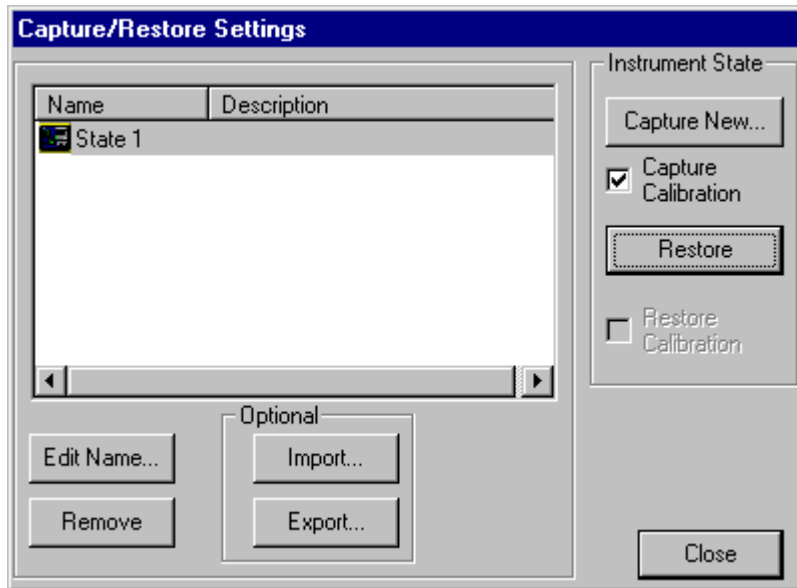
Get Data

One of the most powerful features of IntuiLink VNA is the ability to capture trace data from the network analyzer and place it in an Excel worksheet. The data is placed in rows and columns on the spreadsheet. The trace data for the measurement channel that is active on the instrument or selected in the dialog box will be inserted in the format that it is displayed on the instrument.
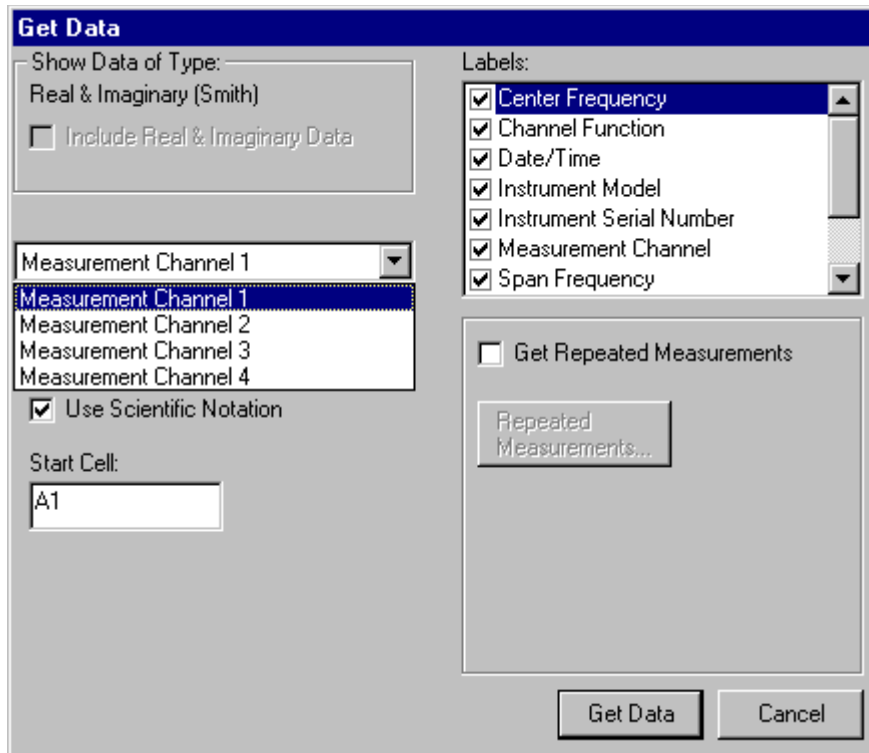
For example, if the measurement channel is displaying a polar representation of the trace the data will be real and imaginary pairs, each in a respective column. Comparatively, if the measurement channel is displaying a log magnitude representation, the data will be inserted as a single column. By default, a simple Excel graph of the data is also created and inserted into your document.

Click on the link below for an explanation of how the data points are calculated and to see a sample of data captured in Excel.

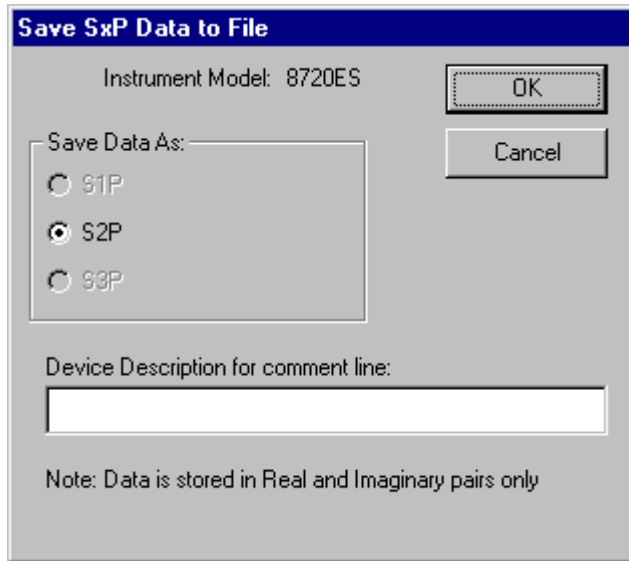>> Click here to see a sample from Excel and to understand how data points are plotted.

See Also

Start Repeated Measurements

S2P Get S2P Data

This button allows you to save the S-parameters of the device under test (DUT) to a standard S1P, S2P, S3P file (format depends data availability in the instrument). This information can then be imported to device-simulation software packages such as eeSof, etc.

Save SxP Data to File

Instrument Model: 8720ES

OK

Cancel

Save Data As:
- ◯ S1P
- ⦿ S2P
- ◯ S3P

Device Description for comment line:

Note: Data is stored in Real and Imaginary pairs only

Get Screen Image

For documentation purposes, you may want to capture a "snapshot" of the network analyzer display. With IntuiLink, it just takes a few seconds to insert the image into your Excel or Word document. You can also save the image directly to a file (.bmp, .gif, .wmf, .jpeg, .emf, and .tif formats).

Get Screen Image

Get Screen Image and ...

- ⦿ Place in Active Sheet at Cursor
- ◯ Save to File

OK

Cancel
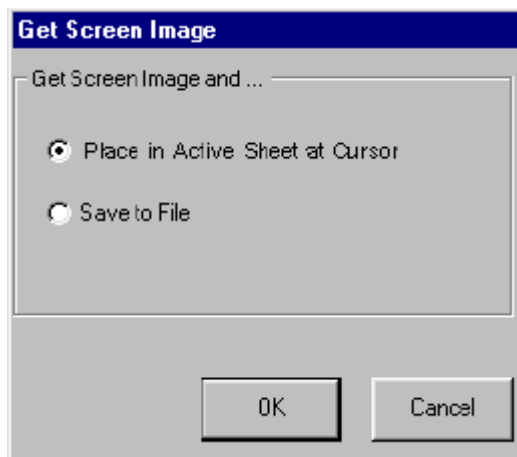
 Click here to see a sample.

Start Repeated Measurements

The IntuiLink VNA Excel toolbar gives you the ability to capture measurement data from the network analyzer at intervals that you specify. You can specify a start time for data capture, and either the intervals or the number of times that you want data captured.

The tab on the worksheet displays a time stamp of when the data was captured. The status bar shows the progress of the repeated measurements.

See Also
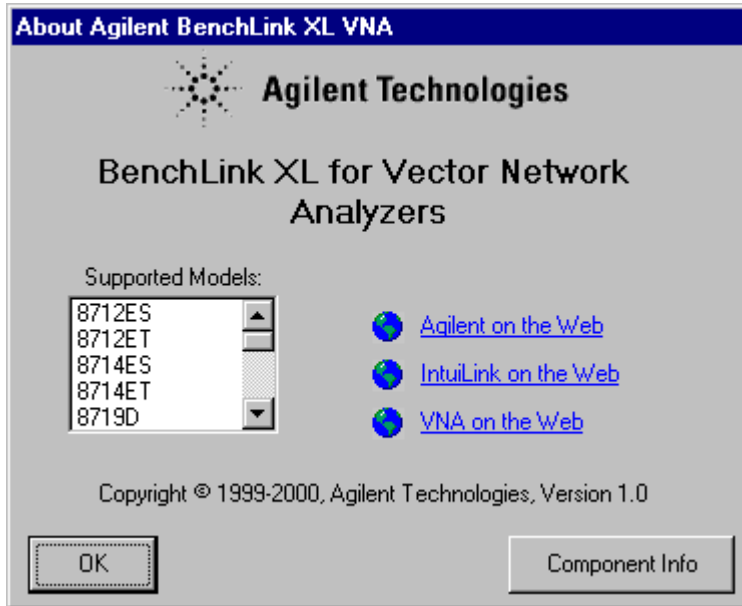
Stop Repeated Measurements

Stop Repeated Measurements
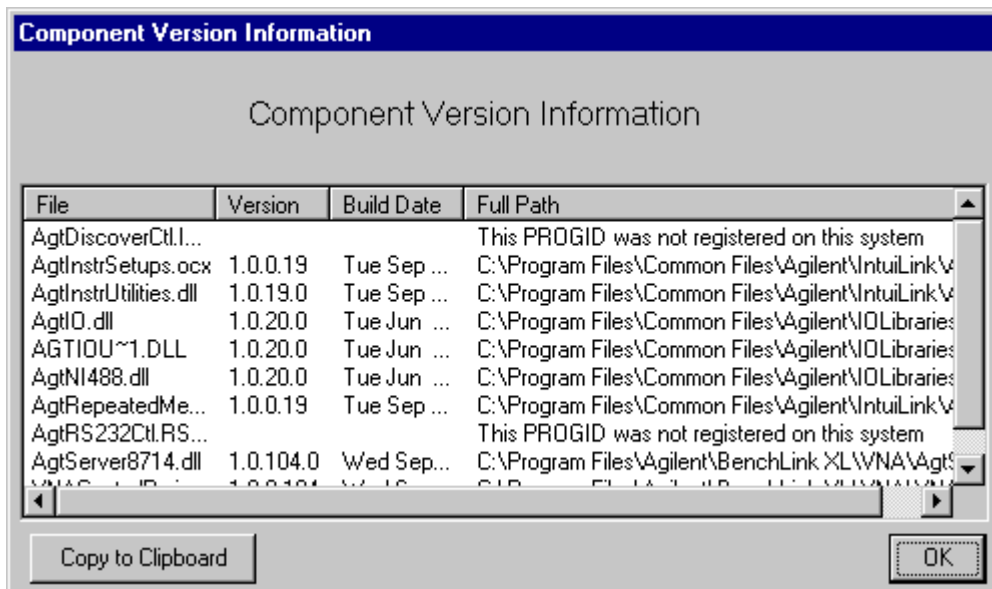
To stop gathering data, press this button. If this button is unavailable, then there are no repeated measurements being taken.

☀ Agilent VNA   About Network Analyzer Toolbar

The **About** dialog box displays the version number of the network analyzer toolbar and lists the supported network analyzer models. It also provides links to relevant Agilent Web sites.

About Agilent BenchLink XL VNA

☀ **Agilent Technologies**

BenchLink XL for Vector Network Analyzers

Supported Models:

```
8712ES
8712ET
8714ES
8714ET
8719D
```

🌐 Agilent on the Web

🌐 IntuiLink on the Web

🌐 VNA on the Web

Copyright © 1999-2000, Agilent Technologies, Version 1.0

[OK]   [Component Info]

This box includes a **Component Info** button, which lists the versions of the components of the software.

Component Version Information

Component Version Information

File	Version	Build Date	Full Path
AgtDiscoverCtl.I...			This PROGID was not registered on this system
AgtInstrSetups.ocx	1.0.0.19	Tue Sep ...	C:\Program Files\Common Files\Agilent\IntuiLink\\
AgtInstrUtilities.dll	1.0.19.0	Tue Sep ...	C:\Program Files\Common Files\Agilent\IntuiLink\\
AgtIO.dll	1.0.20.0	Tue Jun ...	C:\Program Files\Common Files\Agilent\IOLibraries
AGTIOU~1.DLL	1.0.20.0	Tue Jun ...	C:\Program Files\Common Files\Agilent\IOLibraries
AgtNI488.dll	1.0.20.0	Tue Jun ...	C:\Program Files\Common Files\Agilent\IOLibraries
AgtRepeatedMe...	1.0.0.19	Tue Sep ...	C:\Program Files\Common Files\Agilent\IntuiLink\\
AgtRS232Ctl.RS...			This PROGID was not registered on this system
AgtServer8714.dll	1.0.104.0	Wed Sep...	C:\Program Files\Agilent\BenchLink XL\VNA\Agt\

[Copy to Clipboard]   [OK]

Toolbar Help

Like most PC applications, a help system is included with the IntuiLink software to assist you with the operation of the toolbar. Click on the help icon to view the help system.

Note

In Excel, you must dock the toolbar when displaying the help window. Otherwise, the toolbar may disappear.

Installation

Minimum System Requirements

Operating System

Windows® 95, Windows® 98, Windows® 2000 or Windows NT® 4.0, Service Pack 4

Hardware

Pentium PC, 200 MHz or greater

32 MB RAM (64 MB recommended)

20 MB free disk space (40 MB recommended)

Environments Supported

Applications

Microsoft Office, Service Release 2 to support:

Microsoft Excel 97

Microsoft Word 97

Microsoft Office 2000 to support:

Microsoft Excel 2000

Microsoft Word 2000

Software Development

Visual Basic 6.0

HP VEE 5.0 or greater

Installing IntuiLink Software

You can install the IntuiLink software from the CD-ROM included with your network analyzer's interface module or you can download the software from the Agilent Web site (accessible from the About box). Software updates and future releases will also be available from this web site.

For more information on using the IntuiLink server with Visual Basic, refer to the help file included with the server. You need to have an Agilent or National Instruments GP-IB card installed with drivers unless you will be using the RS-232 (COM) ports only on your PC.

See Also

Minimum System Requirements

Supported Instruments

Supported Instruments

Network Analyzer Models Supported

Model 8712ES/ET

Model 8714ES/ET

Model 8719D/ES/ET

Model 8720D/ES/ET

Model 8722D/ES/ET

Model 8753D/E/ES/ET

Complimentary Start-Up Assistance

Terms and Conditions

Agilent Technologies will provide Start-Up Assistance at no charge to resolve questions relating to the installation, operation, and use of this software product. Start-Up Assistance is available to help you install the software on your PC, establish communication with a compatible instrument, and answer questions relating to the functionality of the software components provided by Agilent Technologies. Start-Up Assistance does not support requests to modify or enhance the functionality of the software. For services not covered by Start-Up Assistance, you may be referred to fee-based services for advanced assistance.

Agilent Technologies will make reasonable efforts to respond to each customer request for Start-Up Assistance within two working days, but is under no obligation to respond within a prescribed time frame. Requests for Start-Up Assistance are handled in the order in which they were received. Agilent Technologies will make reasonable efforts to solve customer problems, but cannot guarantee success.

Agilent Technologies reserves the right to terminate Start-Up Assistance at any time without notice.

Contacting Agilent Technologies for Technical Support

To find the address and phone number of your nearest support representative, visit the Agilent Web site accessible from the About box, and follow the links to support.

Troubleshooting

Troubleshooting

Following are some potential problems that you could encounter when using IntuiLink.

Click on an item below for information about that topic.

Instrument Address is Not Listed

Can't Connect/Lost Connection to the Network Analyzer

Problems with Captured Data/Screen Image

Toolbar Disappeared/Does Not Function

Enabling DCOM Server Interface in Windows NT 4.0 and Windows 2000

The IntuiLink software is designed to provide easy access to the instrument through a layered design. Included in this design is the use of Component Object Model (COM) interfaces between layers. Some of these interfaces can be made accessible from a remote machine via Distributed COM (DCOM). DCOM is a technology that is supported on all Windows platforms beginning with the service releases of Windows 95. Full implementation of DCOM is really only available on the Windows NT and Windows 2000 platforms due to the lack of security features in Windows 95/98. Because of this, the server portion of IntuiLink VNA can provide remote access only when running on the Windows NT/2000 platforms, while the client portion can be run on Windows 95, 98, NT 4.0, and 2000.

Each LAN is unique and has unique security requirements, thus you must determine and perform the security configuration of the DCOM interface used by the server portion of IntuiLink. Administrative privileges are required to perform these steps. Contact your system or network administrator before making any changes. The following steps are provided as a guideline for doing the configuration:

1. Launch *DCOMCnfg* by using **Start|Run**. In the **Open**: box, type DCOMCnfg and click **OK**.

2. In the **Distributed COM Configuration Properties** (**DCOMCnfg**) dialog box, select the *Agilent IO Manager* and click **Properties**.

3. Select the **Security** tab and select the **Use custom access permissions** radio button

4. Click **Edit**.

5.   Click **Add** to add a user or group of users to whom you will grant access to the I/O configuration on that machine. You can also select individuals or groups of users to deny access to. Make sure that you have an entry for the "SYSTEM" user. Add it if necessary.

6.   Click **OK** when all of the user permissions for access have been configured.

7.   Select the **Use custom launch permissions** radio button, and then click **Edit**.

8.   Select the users to whom you would like to grant or deny the ability to launch the I/O Manager server. Typically you should allow at least the people that have access permissions. Do not remove launch permissions for "INTERACTIVE", "SYSTEM", or "<hostname>\Administrators".

9.   Click **OK** when finished to return to the **Agilent IO Manager Properties** dialog box.

10. Click **OK** to return to the **Distributed COM Configuration Properties** dialog box.

11. If you will be programming applications that use the Agilent IntuiLink EZ COM interface, repeat the steps above for the **Agilent EZ** listed in the **DCOMCnfg** dialog box.

Connecting to Remote DCOM Servers

To connect the IntuiLink VNA toolbar to a remote server you must specify which server to use. The following are the necessary steps to establish the connection:

1.   Make sure that the server has been configured using the guidelines described above.

2.   On the client machine, start Microsoft Word or Excel, and click **Connect** on the IntuiLink toolbar.

3.   In the **Connect** dialog box, click **Advanced**. The **Advanced** dialog box appears

4.   In the **Hosts** field, type in the name or IP address of the remote server.

5.   Click **OK** to return to the **Connect** dialog box. The list of instruments available for connection will now be the instruments connected to the remote server. You may select any of these for identification and, if appropriate, connection.

Note:

Only the Agilent IO Manager DCOM interface configuration is required to enable the Microsoft Word and Excel toolbar add-ins to access remote servers.

Instrument Address is Not Listed

If the instrument address that you want to connect to is not listed in the **Select Instrument Address** list in the **Connect** box, check the following:

- Did you choose to connect to a network analyzer on your computer or on a remote computer? Look at the label above the **Identify Instruments** button. It will list either "My Computer" or the name or IP address of a remote host. If it does not show the host that you want to connect to, press the **Advanced** button. Then follow the instructions in Connect to a network analyzer on a remote host.
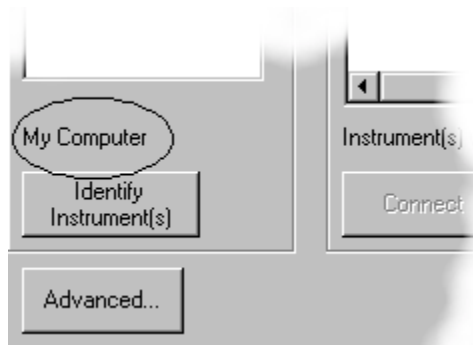
- If you are listing addresses for the desired computer (either My Computer or a remote computer), you need to verify that the instrument is present at the specified address on that computer. Use the **Configure I/O** tool, which is part of the **HP I_O Libraries**, to configure or verify the I/O address. Once you have configured the address, close the **Connect** box, then re-open it and try again.

- If you are using both the Agilent (HP) I/O Libraries and the National Instruments (NI) I/O drivers (specifically if you are using the HP I/O Libraries for creating a LAN client and the NI drivers for a local NI GPIB card) there may be conflicts when trying to identify instruments. Each set of libraries/drivers will assign GPIB addresses independently. For example, an Agilent LAN client may be set up on GPIB0 in the Agilent (HP) I/O Libraries, but the NI driver has set up the local NI GPIB card as GPIB0. When the IntuiLink software is started and an attempt to identify the instrument located at GPIB0 is made, the software will not recognize *any* instrument. To remedy this situation, manually change the GPIB address(es) in either the HP I/O Libraries or the NI driver so that none are the same.

    To do this in the HP I/O Libraries:

1. Open the HP I/O Libraries Control and choose **Run I/O Config** (or open the **HP I_O Libraries** menu item from the **Start** menu and choose **I_O Config**).

2. In the **I/O Config** dialog, highlight the conflicting address in the **Configured Interfaces** section, then click the **Edit** button.

3. In the **Edit** dialog box, find the VISA Interface Name and, using the up/down arrows, change the address number for the interface.

4. After a satisfactory number has been chosen, click **OK** to close the **Edit** dialog. You should see the new GPIB address in the **Configured Interfaces** section. If not, return to step 2 and chose another setting.

5. Click **OK** to close the **I/O Config** dialog.

    IntuiLink VNA should now be able to correctly identify the instrument connected at the non-conflicting GPIB address.

Can't Connect/Lost Connection to the Network Analyzer

There are three categories of problems relating to connections to the network analyzer. Click on the topic below that most closely resembles the problem you are experiencing.

Connection problems to a local instrument

Problems with Captured Data/Screen Image

Data is Not What You Expected

If the measurement data that you captured from the network analyzer is not what you expected, check the following:

- Are the settings on the instrument control panel set to capture the kind of data that you want? Reset the display on the network analyzer and try again.

- Are you connected to the network analyzer from which you want to collect data? To verify, press the **Connect** icon on the toolbar. In the **Connect** dialog box, look in the **Identified Instruments** list for the network analyzer with the **Connect** icon next to it.

- Because of Excel limitations, Smith charts cannot be accurately represented, as the background reticule cannot be plotted. If you want the background reticule, use the Get Screen Image feature.

- In Excel, charts with no data points less that 0,0, always start at 0,0 regardless of the actual starting data point. If you want the chart to accurately represent the network analyzer screen, use the Get Screen Image feature.

Screen Image is Not What You Expected

If the screen image that you captured from the network analyzer is not what you expected, check the following:

- Are the settings on the instrument control panel set to display the kind of data that you want? Reset the network analyzer and try again.

- Are you connected to the network analyzer from which you want to collect data? To verify, press the **Connect** icon on the toolbar. In the **Connect** dialog box, look in the **Identified Instruments** list for the network analyzer with the **Connect** icon next to it.

Can't Capture Images

If you are having trouble getting the image of your network analyzer and receive an error message similar to "Premature end of data for IEEE 488.2 binary block" it might be a problem with your PC configuration. Check the following:

- Are you using Windows 95 or Windows 98 on a CPU that is 300 MHz or slower?

- Are you are using an RS-232 connection?

- Is the serial port on the network analyzer's serial port set to 115,200 baud?

If all of the above are true, try the following:

- Change the RS-232 baud rate to 57,600 or 38,400.

Toolbar Disappeared or Does Not Function

Following are some reasons that the IntuiLink toolbar might disappear or not function as expected.

- If you do not have the toolbar docked while working in Excel, and you open the online help, the toolbar may disappear. This behavior is particular to Excel. You should dock the toolbar if you want it to be visible while using the online help.

- If you clicked the **X** in the upper right corner of the toolbar, the toolbar will close in the same way that a dialog box will close. To re-open the toolbar, go to the **View** menu in the application, select **Toolbars**, and put a checkmark next to the toolbar.

- You might have unloaded the toolbar for this instance of your application. If so, go to the **Tools** menu, select **Add-Ins** (Excel) or **Templates and Add-Ins** (Word) and place a checkmark next to the VNA item.

- In Excel, when you double-click in a cell for editing, or when your cursor is in the formula bar, the toolbar and the Excel **Tools** menu are disabled. This behavior is particular to Excel and occurs with different Add-in products. There is no work-around to this problem.

- Microsoft Windows 95 systems, and other systems with power management features, may encounter problems when an instrument is connected and the computer switches to the power-save mode. When the computer is re-activated, the instrument connection may be lost or corrupted, resulting in a loss of the toolbar functionality. In this case, you must close the Excel worksheet or the Word document, restart the application, and reconnect to the instrument using the toolbar. To avoid this problem, turn off the power management features when using the toolbar.

How Data is Plotted in Excel

By default, the data that is transferred from the network analyzer is plotted using basic plotting mechanisms available in Excel. These simple plots provide a quick check to verify that the data that was transferred to the spreadsheet represents what is displayed on the instrument screen. Complex graticules, such as the Smith Chart, are not available in Excel, but the shape of the plot will approximate the one displayed on the instrument.

|	A	B	C	D	E	F	G	H	I	J
1	Frequency (Hz)	Real	Imaginary	Center Frequency (Hz)						
2	1.02E+08	2.86E-01	-8.24E-01	1.98E+08						
3	1.02E+08	2.84E-01	-8.30E-01							
4	1.02E+08	2.83E-01	-8.36E-01	Channel Function						
5	1.02E+08	2.79E-01	-8.43E-01	S22						
6	1.02E+08	2.75E-01	-8.48E-01							
7	1.03E+08	2.74E-01	-8.54E-01	Date/Time						
8	1.03E+08	2.75E-01	-8.60E-01	6/27/00 10:15						
9	1.03E+08	2.70E-01	-8.65E-01							
10	1.03E+08	2.66E-01	-8.72E-01	Instrument Model						
11	1.03E+08	2.63E-01	-8.76E-01	8720ES						
12	1.03E+08	2.62E-01	-8.84E-01							
13	1.03E+08	2.64E-01	-8.90E-01	Instrument Serial Num						
14	1.03E+08	2.65E-01	-8.96E-01	US39172037						
15	1.04E+08	2.60E-01	-9.00E-01							
16	1.04E+08	2.57E-01	-9.09E-01	Measurement Chan						
17	1.04E+08	2.55E-01	-9.14E-01	Channel 4						
18	1.04E+08	2.60E-01	-9.18E-01							
19	1.04E+08	2.57E-01	-9.25E-01	Span Frequency (H						
20	1.04E+08	2.60E-01	-9.31E-01	1.92E+08						
21	1.04E+08	2.56E-01	-9.40E-01							
22	1.04E+08	2.53E-01	-9.44E-01	Start Frequency (Hz)						
23	1.05E+08	2.51E-01	-9.49E-01	1.02E+08						
24	1.05E+08	2.51E-01	-9.59E-01							
25	1.05E+08	2.51E-01	-9.66E-01	Stop Frequency (Hz)						
26	1.05E+08	2.53E-01	-9.69E-01	2.94E+08						
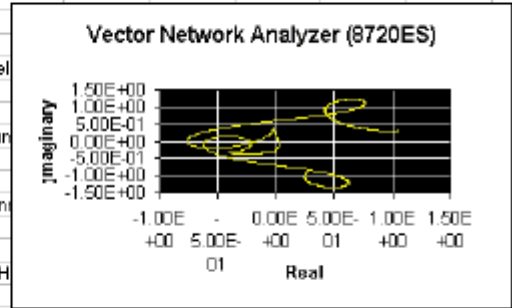
When collecting repeated measurements, each new measurement collection is displayed in a new Excel worksheet. The worksheet is named the same as the time of the measurements, and a time stamp is placed on the tab for the worksheet. Note that the timestamp is based on the time at the PC, not the time at the network analyzer (if there is a difference). There is a limit of 500 worksheets per workbook. In Excel 97, the limit is 62 worksheets per workbook.

Because of limitations in Excel graphs, if you want a true picture of the network analyzer data, use the Get Screen Image feature of IntuiLink.

Screen Image Captured from Network Analyzer

You can insert an image of the network analyzer screen into an Excel worksheet or a Word document.
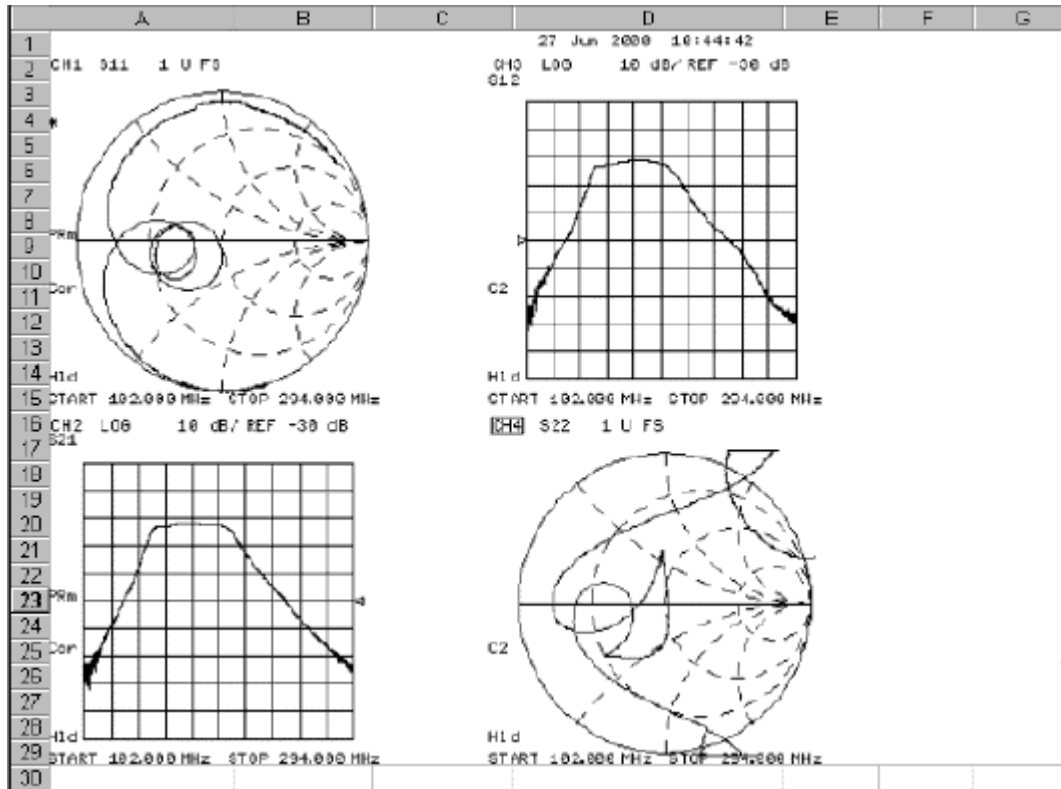
Connection Problems to a Local Instrument

If you are having problems connecting to a network analyzer connected to your computer, check the following:

- All the instruments present at the selected address are listed in the **Identified Instruments** list. Be sure you select an instrument labeled **Network Analyzer** before you press the **Connect** button.
- Are the cable connections to the network analyzer secure?
- Is the network analyzer turned on and functioning?
- Is the network analyzer a supported model? Click here for a list of supported network analyzers.
- Did you follow the instructions exactly in Connect to the network analyzer and verify communication?
- Is another device using the COM port that you are trying to use?
- If you are connecting via a COM port, do you have the baud settings for the port the same as those set on the network analyzer? Verify these settings and reconfigure the baud rate in the IntuiLink software (double-click on the COM port address to get the configuration dialog box).

Note:

> After you change the baud rate in IntuiLink to match the baud rate at the instrument, you need to power cycle the instrument before trying the connection again.

Connection Problems to a Remote Instrument

If you are trying to connect to an instrument on a remote host, check the following in addition to Connection Problems to a Local Instrument:

- Do you have communication with the remote host? Try PINGing the remote host and see if you get a response.
- Do you have permission to connect to the remote host? If you are not sure or need to be given permission, see your system administrator.
- Is the IntuiLink software installed on the remote host? It must be installed to connect via the software.
- Is another instance of IntuiLink VNA already connected to the address on the remote host?
- If you entered a name in the **Remote Host** field in the **Advanced** dialog box, try entering the IP address instead.
- Is there a problem with the LAN or any of its switches? Contact your network administrator to find out.
- If the remote host uses DCOM, see the section Enabling DCOM Server Interface in Windows NT 4.0 and Windows 2000.

Connection was Dropped

If you have lost the connection to the network analyzer:

- The IntuiLink VNA connection to a network analyzer is through the workbook where you made the initial connection. If you open a new workbook, you must establish a connection from the new workbook to the network analyzer.
- Microsoft Windows 95 systems and other systems with power management features may encounter problems when an instrument is connected and the computer switches to the power-save mode. When the computer is re-activated, the instrument connection may be lost or corrupted, resulting in a loss of the IntuiLink toolbar functionality. In this case, you must close the Excel worksheet or the Word document, restart the application, and reconnect to the instrument using the toolbar. To avoid this problem, turn off the power management features when using the IntuiLink toolbar.