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Connection Manager

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Intel@ Math Kernel Library, <http://www.intel.com/software/products/mkl>

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Getting Started with Connection Manager

This section introduces the Connection Manager and explains how to configure the server IO, access the client's user interface, connect instruments, and customize and save the Connection Manager configuration.

Overview

Connection Manager is the ADS implementation of Agilent Technologies *Connected Solutions*.

Connected Solutions encompasses the integration of ADS software and specific Agilent instruments (signal generators and signal analyzers) into a solution that enables new design and verification capabilities. It combines simulation and measurement, and allows the seamless sharing of signals, measurements, algorithms, and data between the simulation and measurement domains.

Using Connection Manager, you can:

- access and control instruments from ADS dialogs
- measure devices and construct ADS datasets from the measurement data
- create simulation models based on measured data
- use real-time instrument-generated stimulus and measurement during simulations

Connection Manager consists of two parts:

- **Connection Manager Server**

Connection Manager server provides dynamic access and control of remote instruments and IO diagnostics.

Refer to *Connection Manager Server* (connectmui) for more information.

Note

One critical customer issue is that certain newer Dell Precision PCs have a problem with their "Bluetooth Stack for Windows by Toshiba" that conflicts with installing the Connection Manager Server.

- When the CM Server is installed on such PCs, the PC will crash and will require a reimage of the PC.
- This is a problem inherent with the Toshiba driver.
- The work around to use the "Agilent Connection Manager" is to uninstall the "Bluetooth Stack for Windows by Toshiba".
- Although the Bluetooth Stack for Windows by Toshiba is uninstalled, XP still provides a Bluetooth capability. So, the Bluetooth is still there.

- **Connection Manager Client**

The Connection Manager client provides the interface between ADS and the Connection Manager server's functionality and extensibility. The client allows the ADS user to dynamically manage data, configure the server, control input and output, and make device measurements.

Refer to *Connection Manager Client* (connectmui) for more information.

Configuring the Server IO on the PC

Prior to using Connection Manager for the first time, you must configure the IO on the server workstation.

This section provides instructions for automatically configuring common LAN and GPIB interfaces, and for manually configuring other interfaces such as LAN/GPIB gateways. [To Configure Common LAN or GPIB Interfaces](#) provides simplified instructions to configure a common LAN or GPIB interface.

To manually configure an available interface (for example, the Agilent E5810A LAN/GPIB gateway), see [To Manually Configure Other Interfaces](#).

Using the Agilent IO Libraries Version M versus Agilent IO Libraries Suite

The Connection Manager supports the latest version of the IO Libraries, the Agilent IO Libraries *Suite*. If you have installed the IO Libraries Suite before installing the Connection Manager server, the server installer will not overwrite that installation with an old version of the IO Libraries (otherwise, it would install the older version by default).

The CM client window will recognize the new version and display the status information accordingly. The diagnostics will recognize the new IO Libraries version, although the new version identifies itself in the registry with an unusual version string. If the Agilent IO Libraries Suite is not previously installed or the existing installation is insufficient for the CM's needs, the CM server installation will continue to install the Agilent IO Libraries Version M (version M.01.01.04).

Note
For systems configured with the ADS 2004A CM server, the server will provide instrument IO using the new IO Libraries Suite. However, the ADS 2004A CM server window will display a red status in the server's *Required Conditions* field due to a change in the Agilent IO Library registry name. Starting with the Agilent IO Libraries Suite 14 release, the Windows Registry naming structure was changed from previous IO Libraries version alpha-numeric format (M.01.01.04) to a numeric format (78.0.7202.1), resulting in the false red status.

To Configure Common LAN or GPIB Interfaces

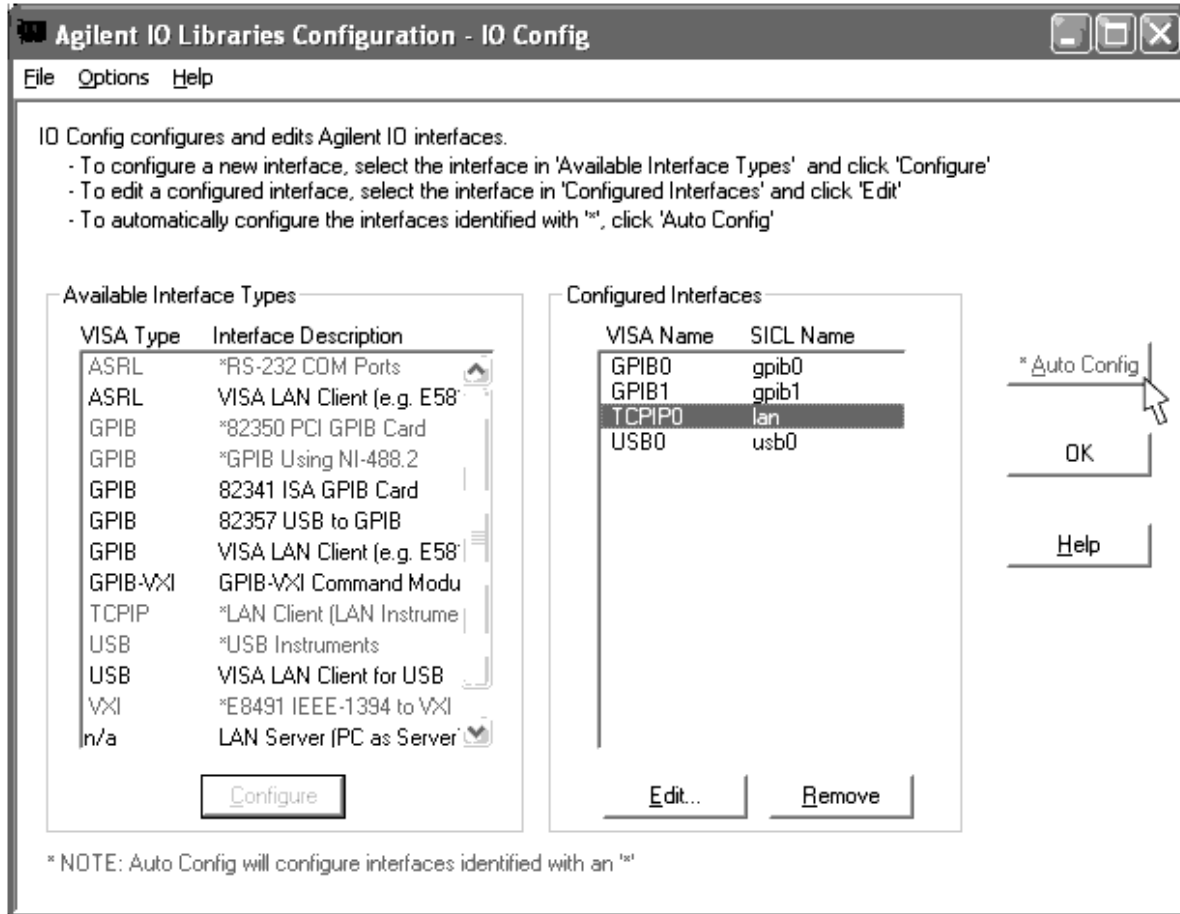
Follow the instructions in this section to auto-configure the IO and connect instruments to the server using a LAN or GPIB interface.

1. In the server's Windows system tray, select **IO > Run IO Config**.
This opens the *IO Config* dialog. The *Available Interface Types* group box lists the IO

types supported by the Agilent IO Libraries. List entries with an asterisk (*) can be automatically configured in step 2.

- To automatically configure common LAN and GPIB interfaces in the *IO Config* dialog, select **Auto Config**.

Auto-configured interfaces appear in the *Configured Interfaces* group box, as shown.



If you encounter a problem

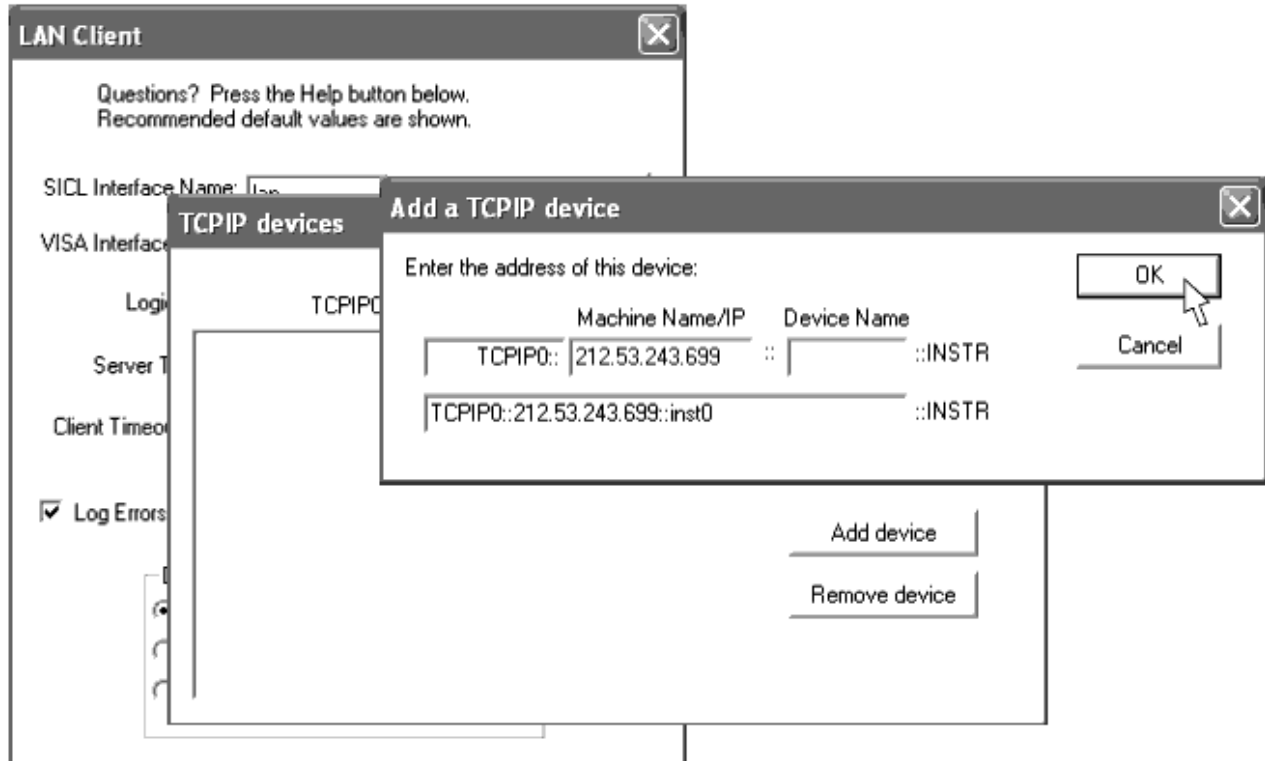
For GPIB interfaces, ensure that the GPIB interface is installed/connected to the server. For LAN interfaces, the IO auto-configuration routine creates a TCPIP network tunnel and displays TCPIP lan in the Configured Interfaces group box. The routine creates only one TCPIP interface regardless of how many LAN cards are installed on the server workstation. Follow the steps in [To Connect Instruments to the Server through the LAN](#) to complete the LAN interface configuration.

To Connect Instruments to the Server through the LAN

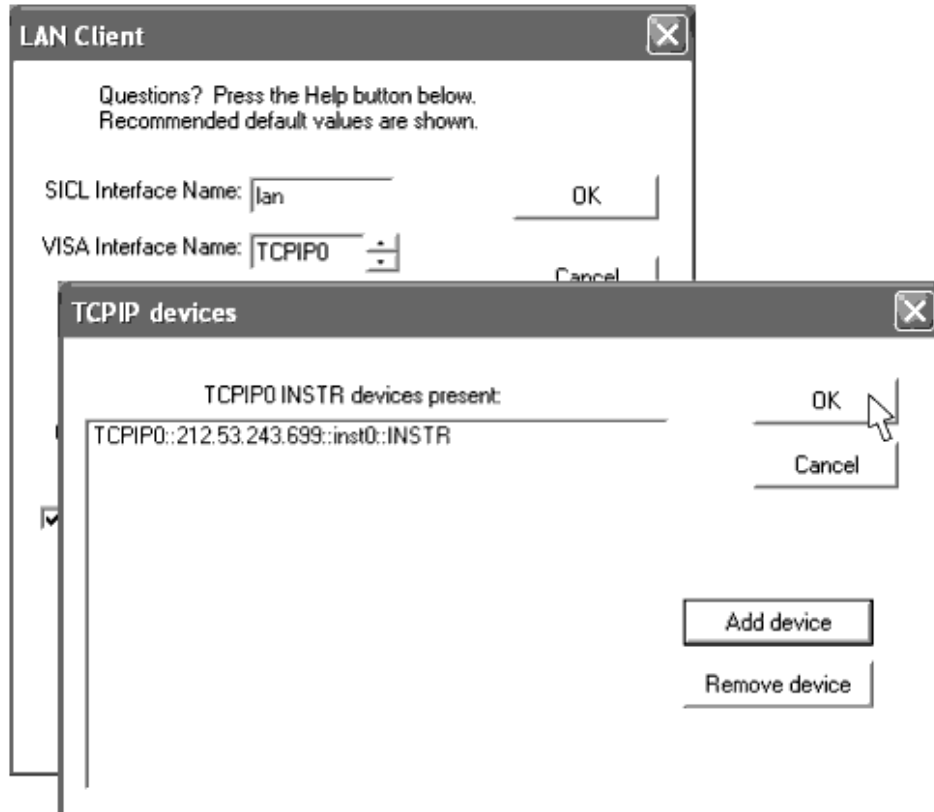
Unlike GPIB interfaces where instruments communicate directly with the server via an exclusive bus, the Agilent IO libraries do not dynamically discover instruments connected to the server via LAN. You must manually add LAN devices to the server IO.

To add LAN devices, complete the following steps.

1. In the *IO Config* dialog, highlight **TCPIP0** in the *Configured Interface* group box and click **Edit** .
2. In the *LAN Client* dialog, click **Edit VISA Config** .
3. In the *TCPIP devices* dialog, click **Add device** .
4. In the *Add a TCPIP device* dialog **Machine Name/IP** field, enter the IP address of the instrument you would like to connect to the server and click **OK** .



5. In the *TCPIP devices* dialog, click **OK** .



6. In the *LAN Client* dialog, click **OK** .
7. In the *IO Config* dialog, click **OK** .

If you encounter a problem

Ensure the following conditions are met:

- The server is connected to the LAN.
- The instrument is connected to the LAN.
- The instrument line power is switched on.
- The LAN is operational.

To start the Connection Manager client, see [Accessing the Client From a Schematic Page.](#)

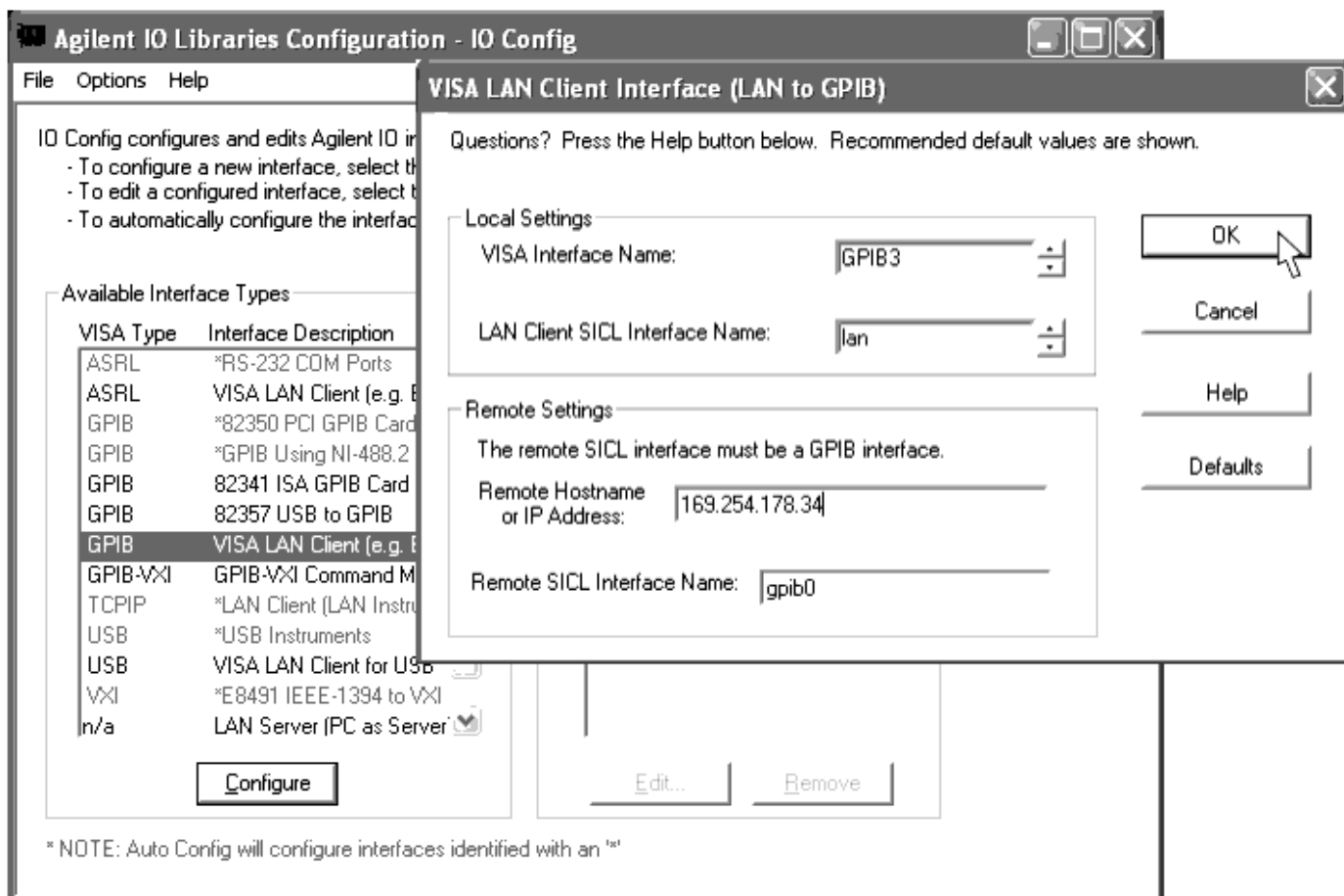
To Manually Configure Other Interfaces

This section explains how to manually configure an IO that cannot be auto-configured by the Agilent IO Library. This section explains how to configure a LAN/GPIB gateway, such as the Agilent E5810A. Follow the screen prompts to manually configure your installed interface.

Follow the instructions in this section to manually configure a LAN/GPIB gateway.

1. In the Windows system tray, select **IO > Run IO Config** .
2. In the *Available Interface Types* group box, highlight **VISA LAN Client Interface**

- (E5810A)** and click **Configure** .
3. In the *VISA LAN Client Interface (LAN to GPIB)* dialog *Local Settings* group box, use the scroll box to choose a VISA Interface Name.
 4. In the *Remote Settings* group box, enter the hostname or IP address of the LAN/GPIB gateway.
 5. In the *Remote Settings* group box, enter the SICL interface name assigned to the LAN/GPIB gateway (or other network interface device) and click **OK** .
During the process of configuring the LAN/GPIB gateway, you must assign a SICL interface name to the device. You must enter the same SICL interface name in the Remote SICL Interface Name data entry field.



6. In the *VISA LAN Client Interface (LAN to GPIB)* dialog, click **OK** .
To exit the IO configuration without connecting instruments to the server, in the *IO Config* dialog click **OK** . To connect instruments to the server, follow the steps in [To Connect Instruments to the Server through the LAN.](#)

To start the Connection Manager client, see [Accessing the Client From a Schematic Page.](#)

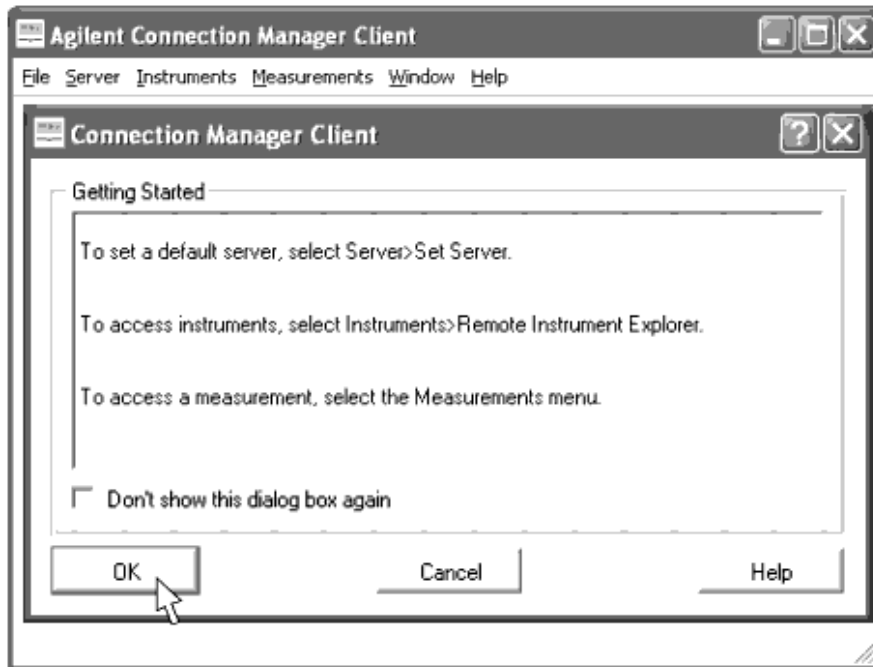
If you encounter a problem

Ensure the following conditions are met:

- The server is connected to the LAN.
- The LAN is operational.

Accessing the Client From a Schematic Page

1. From the ADS Main window *open* or *create* an ADS workspace.
2. From an ADS Schematic window, select **Tools** > **Connection Manager Client** This opens the *Connection Manager Client* main window. When the client starts, the *Getting Started* dialog is displayed, as shown.



3. To dismiss the *Getting Started* dialog, click **OK** . Selecting the *Don't show this dialog box again* checkbox prevents this dialog from appearing again.

Selecting a Server Workstation and Connection Port

The Connection Manager client requires TCP/IP network connectivity to a computer running the Connection Manager server.

To specify a machine as the Connection Manager server, follow these steps.

1. From the *Connection Manager Client* main window, select **Server** > **Set Server...** . This opens the *Set Server* dialog. Use this dialog to connect the client to a specific port on a specific server for the remainder of the client session. Values entered in the Server Host Configuration group box specify the workstation running the Connection Manager server.

UNIX and Linux Systems

PC Systems

2. Enter an IP address or a DNS (host) name in the upper data entry field and click **OK**

An IP address takes the form of a series of period-separated numeric entries representing a workstation, such as 162.156.24.58 .

Hint

You can find the IP address of a Windows workstation by typing the command `ipconfig -all` into a command line window.

You can also specify the server using either the short form or fully qualified DNS (Domain Name Server) host name. If the client and server workstations have been configured to do so, you can use the short form of DNS name. For example you may wish to use *myserver* , the short form of the fully qualified DNS name *myserver.mycompany.com* .

Note

You can find the server workstation host name by typing the command `hostname` into a command window.

For clients on PC platforms, the default server entry is *localhost* (specifying the client and server on the same PC workstation). On other platforms, the Server IP Address or DNS Name entry field is undefined by default.

The default port is 4790. For information on how to change the port number refer to *Connection Manager Server* (connectmui).

Discovering Connected Hardware

All instruments must connect to or through the server workstation. The *Remote Instrument Explorer* dialog provides information about the server workstation.

For PC-based systems, the Connection Manager client and server commonly reside on the same physical machine. Because of this, instrument configuration may take place on the same workstation that the client resides.

Note

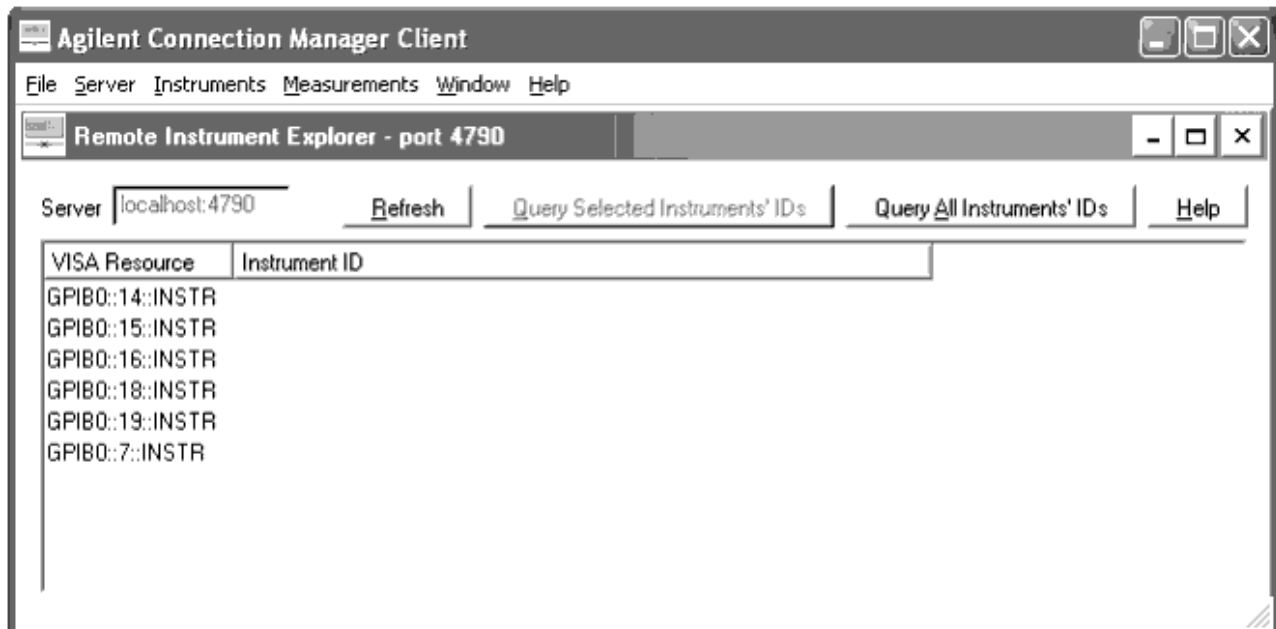
If you have not already done so, follow the steps in [To Configure Common LAN or GPIB Interfaces](#) to configure your Agilent IO Libraries.

1. To access the *Remote Instrument Explorer* dialog from the Connection Manager Client window, select **Instruments > Remote Instrument Explorer...**
2. Enter the DNS host name or IP address of the workstation on which the Connection Manager server is running.
3. If the default port number is not being used, enter the port number on which the server listens for incoming requests.

Note

By default the port number is 4790. For information on changing the port refer to *Understanding IO Configuration* (connectmui).

4. Select **OK** to access the *Remote Instrument Explorer* dialog.

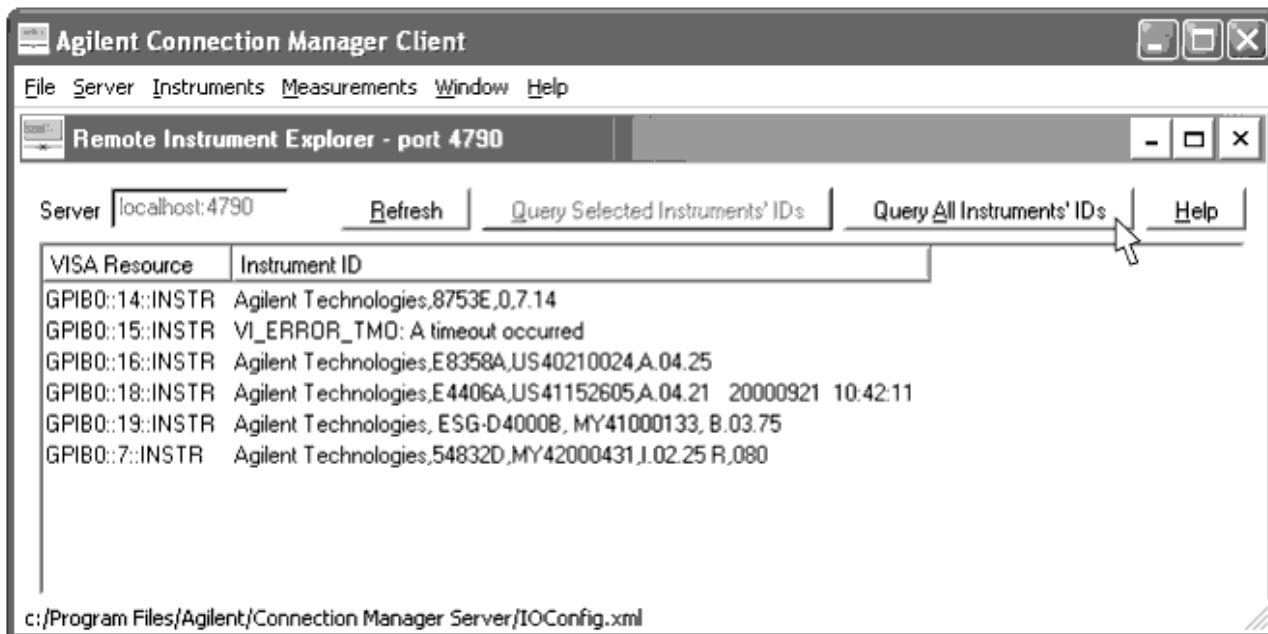


This dialog box shows the VISA (Virtual Instrument Software Architecture) Resource identifiers of all instruments that are currently connected to the workstation running the Connection Manager server. A VISA Resource identifier can uniquely identify an instrument among all the instruments connected to the workstation through all available interfaces.

To map the VISA Resource identifiers to the associated instrument model number, click **Query All Instruments' IDs**.

This instructs the Connection Manager server to send **IDN?* (the IEEE 488.2 standard command for instrument identification) to all instruments on the bus.

Note
Some older instruments cannot respond to **IDN?* and show an error, usually a time out, in the *Instrument ID* field.



Five instruments (and one printer pass-through at address 15) have been discovered on the GPIB0 interface.

Note
Though the VISA Resource column lists the instruments resource identifier syntax, it is not necessary to remember these VISA identifiers. The measurements that use these instrument resource identifiers display them in a drop-down list within the measurement panels.

To repopulate the list after adding or removing instruments from the server, click **Refresh**.

Customizing Instrument Identification Strings

File-based instrument discovery allows you to apply your own identification string to instruments displayed in the *Remote Instrument Explorer* dialog. This IO configuration file can be configured on either the client workstation (IOConfig.iml) or the server workstation (IOConfig.xml).

The Connection Manager server will attempt to populate the Instrument Explorer in the following order:

1. With the contents of the \$HOME/hpeesof/Config/IOConfig.iml (the client-based configuration file)
2. With the contents of the <CM server installation directory>/IOConfig.xml (the server-based configuration file)
3. With dynamically discovered instruments connected to the server.

Client-Based IO Configuration

Instead of the server querying the IO for connected instruments or the contents of a server-side user-defined XML file, the server queries a file on the client workstation and displays the results in the *Remote Instrument Explorer* dialog.

The VISA libraries do not have the capability to dynamically discover instruments through the TCPIP entry in the IO Libraries IO Configuration database. Using file-based instrument discovery allows the *Remote Instrument Explorer* dialog to list network-connected instruments that would otherwise not appear.

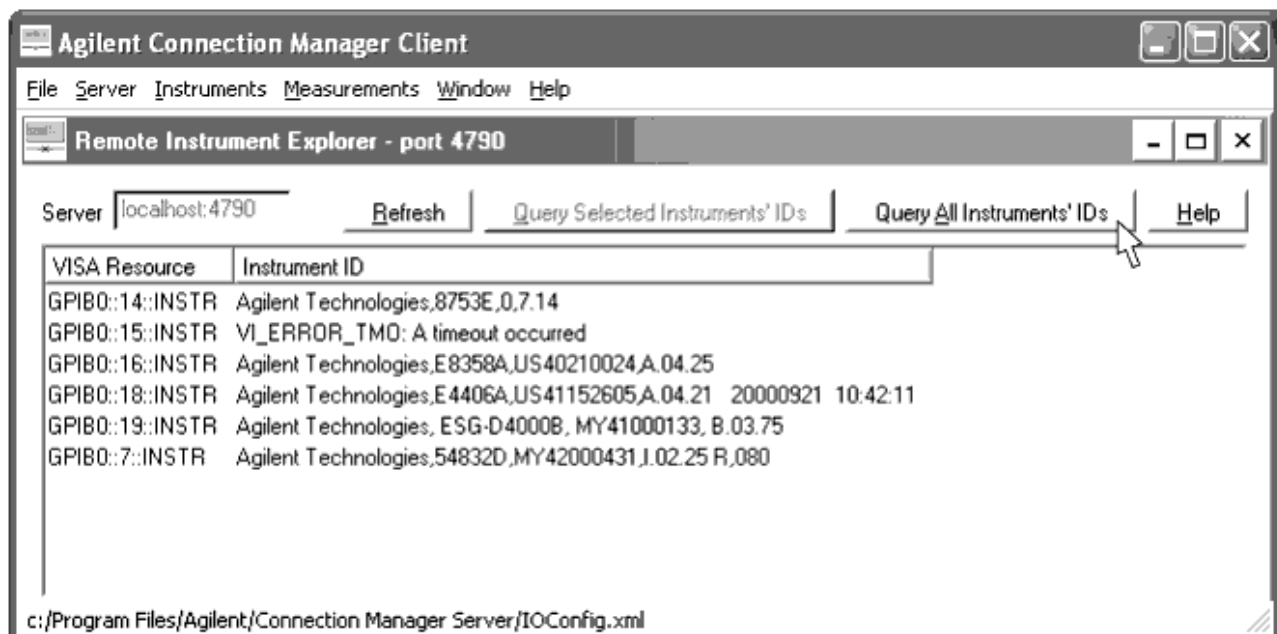
This configuration is useful for installations where many clients are connected to a single server. Using a client-side configuration allows for a smaller list of selectable instruments than are physically present on the server, making it possible to tailor the Instrument Explorer to display on the instruments of interest to a particular user.

Note

When using file-based instrument discovery, no instrument communication takes place during the discovery process.

This procedure modifies and then references the *IOConfig.iml* file on the client computer for instrument discovery.

1. In the Connection Manager Client main window, choose **Instruments > Remote Instrument Explorer**.
2. In the *Remote Instrument Explorer* dialog, click **Query All Instrument ID's**, as shown.



3. In the Connection Manager Client main window, choose **File > Save As**.
4. For *UNIX and Linux systems*, browse to the ADS configuration directory (by default \$HOME/hpeesof/config/), enter the file name *IOConfig.iml* (case sensitive), and click **Save**.
For *PC systems*, in the *Save As* dialog, use the **Look in:** drop-down box to navigate to the ADS configuration directory (by default C:\users\default\hpeesof\config),

enter IOConfig.iml (case sensitive).

5. In a text editor on the client workstation, open the IOConfig.iml file, as shown.

```
<MsmClientConfig Version="1.0" RemoteHost="localhost" Port="4790"
ServerSelected="0">
<InstExplorer RemoteHost="localhost" Port="4790">
<IOConfigEntries>
<IOConfigEntry VisaResource="GPIB0::14::INSTR" InstrumentDescription="Agilent
Technologies,8753E,0,7.14" />
<IOConfigEntry VisaResource="GPIB0::15::INSTR"
InstrumentDescription="VI_ERROR_TMO: A
timeout occurred" />
<IOConfigEntry VisaResource="GPIB0::16::INSTR" InstrumentDescription="Agilent
Technologies,E8358A,US40210024,A.04.25" />
<IOConfigEntry VisaResource="GPIB0::18::INSTR" InstrumentDescription="Agilent
Technologies,E4406A,US41152605,A.04.21 20000921 10:42:11" />
<IOConfigEntry VisaResource="GPIB0::19::INSTR" InstrumentDescription="Agilent
Technologies,
ESG-D4000B, MY41000133, B.03.75" />
<IOConfigEntry VisaResource="GPIB0::7::INSTR" InstrumentDescription="Agilent
Technologies,54832D,MY42000431,I.02.25 R,080" />
</IOConfigEntries>
</InstExplorer>
<Measurements />
</MsmClientConfig>
```

6. Add additional bolded sections, as shown, for every server you want to search for instruments. <MsmClientConfig Version="1.0" RemoteHost="localhost" Port="4790" ServerSelected="0">

```
<InstExplorer RemoteHost="localhost" Port="4790">
<IOConfigEntries>
<IOConfigEntry VisaResource="GPIB0::14::INSTR" InstrumentDescription="Agilent
Technologies,8753E,0,7.14" />
<IOConfigEntry VisaResource="GPIB0::15::INSTR"
InstrumentDescription="VI_ERROR_TMO: A
timeout occurred" />
<IOConfigEntry VisaResource="GPIB0::16::INSTR" InstrumentDescription="Agilent
Technologies,E8358A,US40210024,A.04.25" />
<IOConfigEntry VisaResource="GPIB0::18::INSTR" InstrumentDescription="Agilent
Technologies,E4406A,US41152605,A.04.21 20000921 10:42:11" />
<IOConfigEntry VisaResource="GPIB0::19::INSTR" InstrumentDescription="Agilent
Technologies,
ESG-D4000B, MY41000133, B.03.75" />
<IOConfigEntry VisaResource="GPIB0::7::INSTR" InstrumentDescription="Agilent
Technologies,54832D,MY42000431,I.02.25 R,080" />
</IOConfigEntries>
</InstExplorer>
<InstExplorer RemoteHost="sanc070322977.soco.agilent.com"
Port="4790">
<IOConfigEntries>
<IOConfigEntry VisaResource="GPIB1::16::INSTR" />
</IOConfigEntries>
</InstExplorer>
<InstExplorer RemoteHost="123.456.789.10" Port="4790">
```

```

<IOConfigEntries>
<IOConfigEntry VisaResource="GPIB2::7::INSTR"
InstrumentDescription="My Scope" />
</IOConfigEntries>
</InstExplorer>
<Measurements />
</MsmtClientConfig>

```

For each server (in this example, sanc070322977.soco.agilent.com and 123.456.789.10) connected to instrument you wish to list, there is an *InstExplorer* attribute, contained in the <InstExplorer> </InstExplorer> tags.

The *RemoteHost* attribute describes the server to which the instruments are connected.

The *IOConfigEntries* tag surrounds the list of instruments you want to list for the associated server. Each *IOConfigEntry* entry lists the information for one instrument. The *VisaResource* attribute is the string that will be used to identify the instrument to the IO Libraries.

The *InstrumentDescription* attribute populates the *Instrument ID* field in the Instrument Explorer. If you do not include an *InstrumentDescription* attribute, the Instrument Explorer will display the string No corresponding instrument description in IO configuration file in the Instrument ID field.

7. Change the *InstrumentDescription* attributes to customize the instrument identification, as shown.

```

<IOConfigEntries>
<IOConfigEntry VisaResource="GPIB0::14::INSTR" InstrumentDescription="NWA on
my bench" />
<IOConfigEntry VisaResource="GPIB0::15::INSTR" InstrumentDescription="NWA
printer
pass-through" />
<IOConfigEntry VisaResource="GPIB0::16::INSTR" InstrumentDescription="Agilent
E8358A in the
lab" />
<IOConfigEntry VisaResource="GPIB0::18::INSTR" InstrumentDescription="VSA on
my bench" />
<IOConfigEntry VisaResource="GPIB0::19::INSTR" InstrumentDescription="PSG on
my bench" />
<IOConfigEntry VisaResource="GPIB0::7::INSTR" InstrumentDescription="Infinium
on my bench" />
</IOConfigEntries>

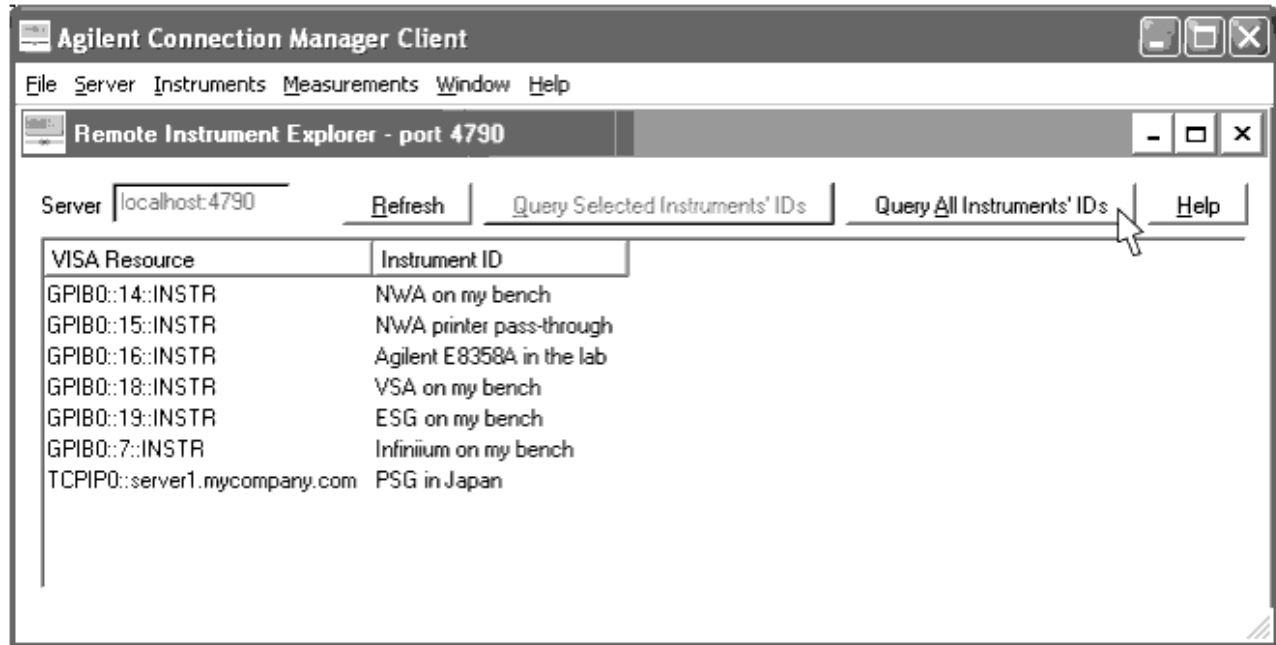
```
8. To list network-connected instruments, create the following *IOConfigEntry*, where *TCPIP0* is the configured network IO, *server1.mycompany* is the DNS name of the remote server to which the hardware is connected, and *PSG in Japan* is the customized instrument identifier, as shown.

```

<IOConfigEntry VisaResource="TCPIP0::server1.mycompany.com::INSTR"
InstrumentDescription="PSG in Japan" />

```

9. Save the IML file to the ADS configuration directory (by default \$HOME/hpeesof/config/).
10. To display your customized instrument identifiers, in the *Remote Instrument Explorer* dialog, click **Refresh** > **Query All Instrument ID's** , as shown.



Server-Based IO Configuration

Instead of the server querying the IO for connected instruments, the server displays the contents of a user-defined XML file in the *Remote Instrument Explorer* dialog.

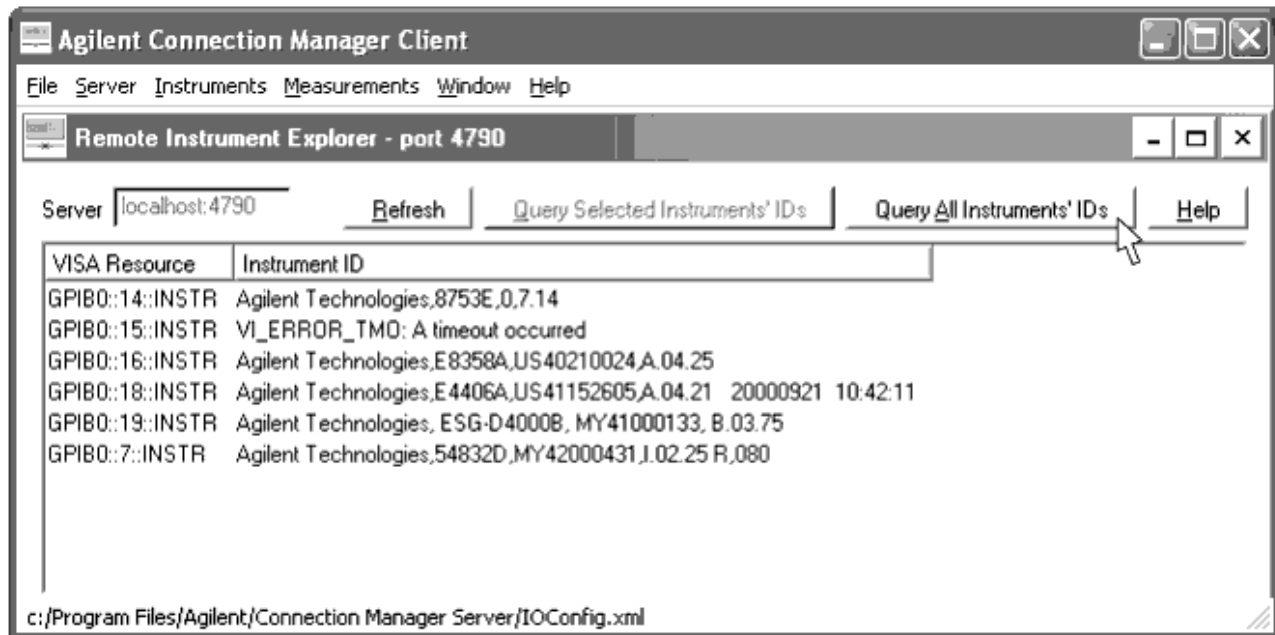
The VISA libraries do not have the capability to dynamically discover instruments through the TCPIP entry in the IO Libraries IO Configuration database. Using file-based instrument discovery allows the *Remote Instrument Explorer* dialog to list network-connected instruments that would otherwise not appear.

Note

When using file-based instrument discovery, no instrument communication takes place during the discovery process.

This procedure modifies and then references the *IOConfig.xml* file on the server PC for instrument discovery.

1. In the Connection Manager Client main window, choose **Instruments > Remote Instrument Explorer**.
2. In the *Remote Instrument Explorer* dialog, click **Query All Instrument ID's**, as shown.



3. In the Connection Manager Client main window, choose **File > Save As** .
4. *For UNIX and Linux systems* , enter the file name IOConfig.xml (case sensitive), note the directory to which the file is being saved, and click **Save** .
Next, from the server PC transfer this file from the UNIX or Linux directory to the Connection Manager installation directory on the server PC. This directory is C:\Program Files\Agilent\Connection Manager Server by default.
For PC systems , in the *_Save As* dialog, use the **Look in:** drop-down box to navigate the to CM server installation directory.
This directory is C:\Program Files\Agilent\Connection Manager Server\ by default.
In the *Save As* dialog **File name:** entry box, enter IOConfig.xml (case sensitive).
In the *Save As* dialog **File type:** drop-down box, choose **Connection Manager Client Serialization Files (.xml)*** and click **OK** .
5. In a text editor on the server PC, open the IOConfig.xml file, as shown.

```

<MsmClientConfig Version="1.0" RemoteHost="localhost" Port="4790"
ServerSelected="0">
<InstExplorer RemoteHost="localhost" Port="4790">
<IOConfigEntries>
<IOConfigEntry VisaResource="GPIB0::14::INSTR" InstrumentDescription="Agilent
Technologies,8753E,0,7.14" />
<IOConfigEntry VisaResource="GPIB0::15::INSTR"
InstrumentDescription="VI_ERROR_TMO: A
timeout occurred" />
<IOConfigEntry VisaResource="GPIB0::16::INSTR" InstrumentDescription="Agilent
Technologies,E8358A,US40210024,A.04.25" />
<IOConfigEntry VisaResource="GPIB0::18::INSTR" InstrumentDescription="Agilent
Technologies,E4406A,US41152605,A.04.21 20000921 10:42:11" />
<IOConfigEntry VisaResource="GPIB0::19::INSTR" InstrumentDescription="Agilent
Technologies,
ESG-D4000B, MY41000133, B.03.75" />
<IOConfigEntry VisaResource="GPIB0::7::INSTR" InstrumentDescription="Agilent
Technologies,54832D,MY42000431,I.02.25 R,080" />
</IOConfigEntries>
</InstExplorer>

```

```
<Measurements />
</MsmClientConfig>
```

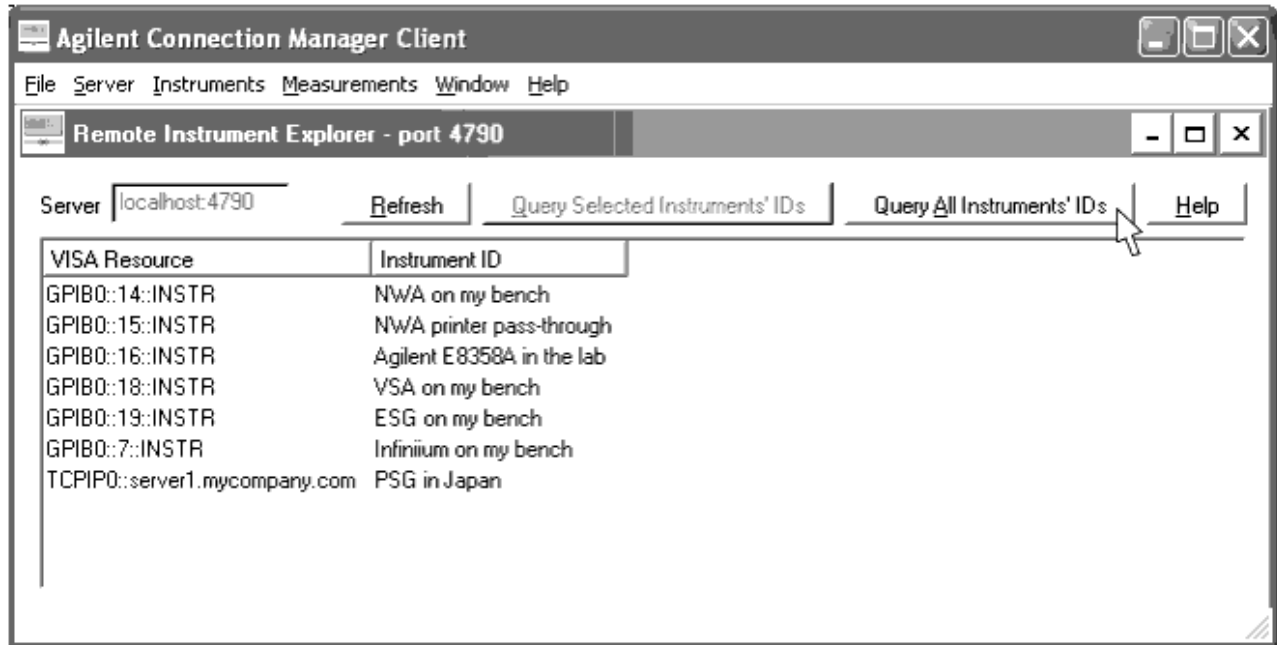
6. Remove all but the <IOConfigEntries> section, as shown. <IOConfigEntries>

```
<IOConfigEntry VisaResource="GPIB0::14::INSTR" InstrumentDescription="Agilent
Technologies,8753E,0,7.14" />
<IOConfigEntry VisaResource="GPIB0::15::INSTR"
InstrumentDescription="VI_ERROR_TMO: A
timeout occurred" />
<IOConfigEntry VisaResource="GPIB0::16::INSTR" InstrumentDescription="Agilent
Technologies,E8358A,US40210024,A.04.25" />
<IOConfigEntry VisaResource="GPIB0::18::INSTR" InstrumentDescription="Agilent
Technologies,E4406A,US41152605,A.04.21 20000921 10:42:11" />
<IOConfigEntry VisaResource="GPIB0::19::INSTR" InstrumentDescription="Agilent
Technologies,
ESG-D4000B, MY41000133, B.03.75" />
<IOConfigEntry VisaResource="GPIB0::7::INSTR" InstrumentDescription="Agilent
Technologies,54832D,MY42000431,I.02.25 R,080" />
</IOConfigEntries>
```
7. Change the InstrumentDescription attributes to customize the instrument identification, as shown. <IOConfigEntries>

```
<IOConfigEntry VisaResource="GPIB0::14::INSTR" InstrumentDescription="NWA on
my bench" />
<IOConfigEntry VisaResource="GPIB0::15::INSTR" InstrumentDescription="NWA
printer
pass-through" />
<IOConfigEntry VisaResource="GPIB0::16::INSTR" InstrumentDescription="Agilent
E8358A in the
lab" />
<IOConfigEntry VisaResource="GPIB0::18::INSTR" InstrumentDescription="VSA on
my bench" />
<IOConfigEntry VisaResource="GPIB0::19::INSTR" InstrumentDescription="PSG on
my bench" />
<IOConfigEntry VisaResource="GPIB0::7::INSTR" InstrumentDescription="Infiniium
on my bench" />
</IOConfigEntries>
```
8. To list network-connected instruments, create the following IOConfigEntry, where TCPIP0 is the configured network IO, server1.mycompany is the DNS name of the remote server to which the hardware is connected, and ESG in Japan is the customized instrument identifier, as shown.

```
<IOConfigEntry VisaResource="TCPIP0::server1.mycompany.com::INSTR"
InstrumentDescription="PSG in Japan" />
```

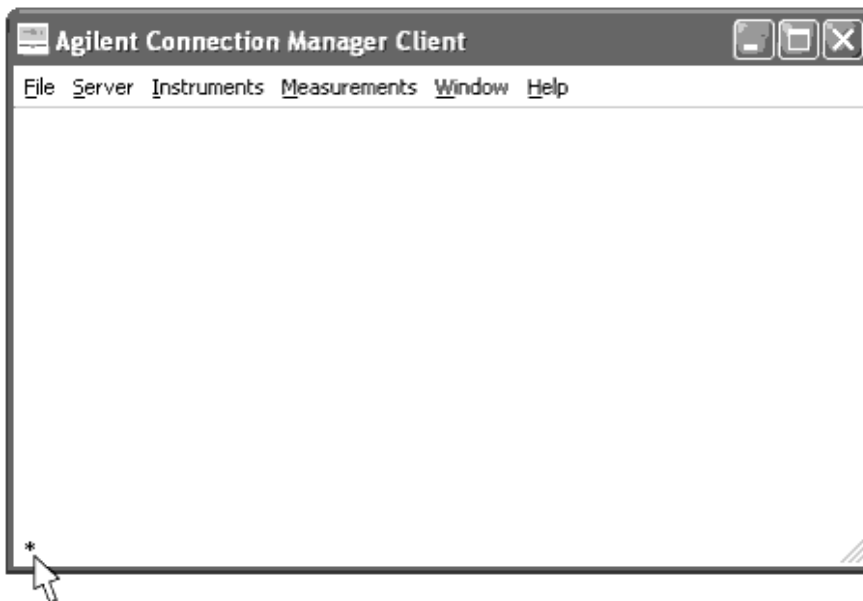
9. Save the XML file to the CM server installation directory (by default: C:\Program Files\Agilent\Connection Manager Server\).
10. To display your customized instrument identifiers, in the *Remote Instrument Explorer* dialog, click **Refresh** > **Query All Instrument ID's** , as shown.



Saving the Application State

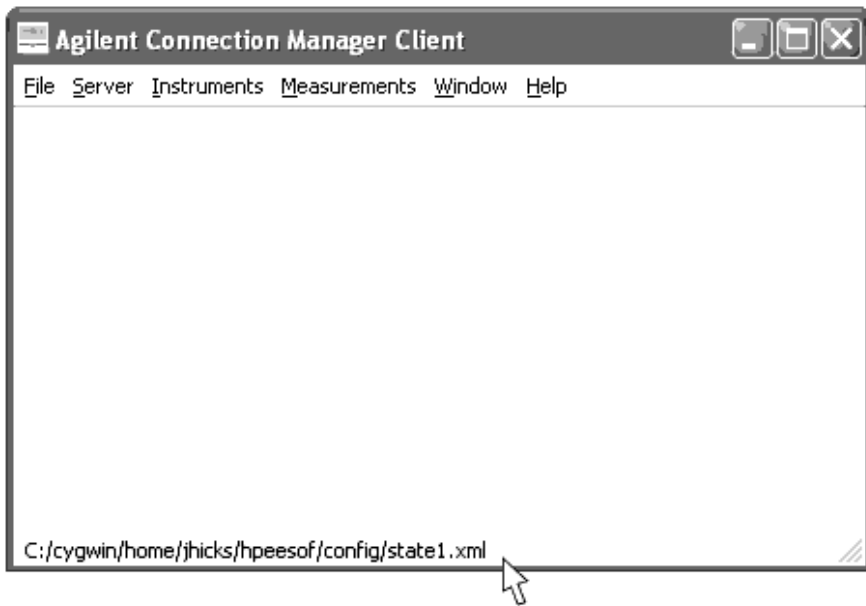
Connection Manager tracks the current state of configuration and saves this information to an *application state file*. A application state file contains the current client configuration. The status area of the client main window updates to indicate whether the application state has changed and if an application state file has been associated with a given session.

If a content change to the client window occurs before a state file is defined by a file save operation, an asterisk appears in the status bar.

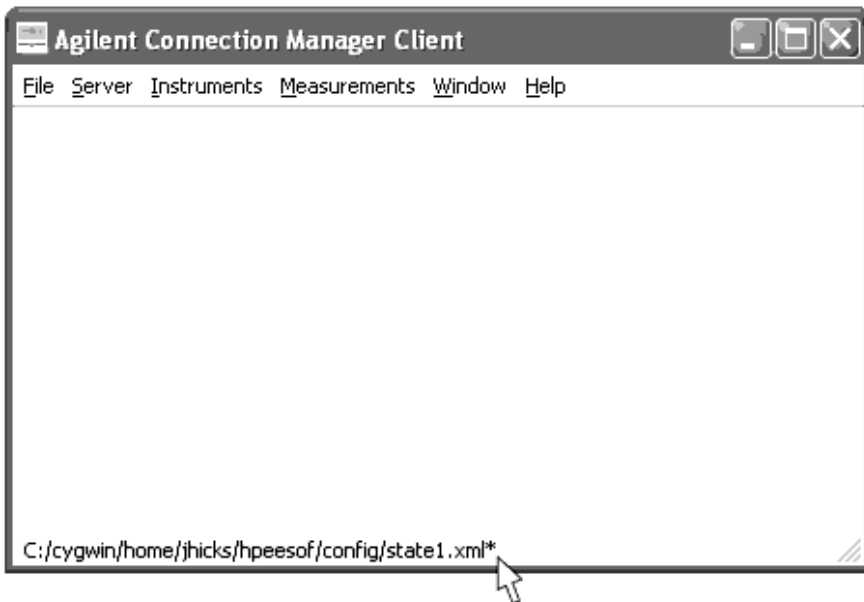


1. In the client dialog, click **File > Save as ...**.
2. Save the application to a file named `state1`.

After saving the session state, the status bar records the location of the state file.



Further changes to the client session append an asterisk to the state file name.



For more information, see *File Menu* (connectmui).

Operational and Functional Concepts

This section offers detailed information on the operational theory of the Connection Manager, including client-server architecture, server operational modes, removal, and installation, and detailed explanations of the measurement dialogs.

Client-Server Architecture

In its basic form, the client/server is a computational architecture involving a client process requesting a service from a server process.

Client-server architecture is referred to as a logical extension of modular programming, which recognizes that software can be broken into its constituent parts for manageability purposes. With client-server architecture this is carried a step further by acknowledging that the modules do not need to execute within the same memory space. This enables the client and the server to run on the hardware and software programs best suited for their individual functions.

In the case of Connection Manager, this allows the server to utilize a wide variety of instrument-control capabilities only available on the Windows platform, while the client can be accessed from any platform that supports ADS.

Functional Process

In this architecture, the client sends a message to the server, requesting that the server perform a task. The client provides the user-interface portion of the application, validates data entered by the user, sends requests to the server programs and can execute business logic.

The server program receives requests from the client, manages the interaction between the client and any connected instrumentation, retrieves and updates information, manages data integrity and dispatches responses to client requests.

The Connection Manager Client operates in conjunction with an ADS workspace. The datasets and other files generated from measurements reference the ADS workspace and workspace data directories.

The client caches the discovery dialog contents. For example, start the Remote Instrument Explorer and point it at a specific workstation (for example, *myserver*), then select the close icon in the title bar to dismiss it. The next time the Remote Instrument Explorer is opened and pointed at *myserver*, the client recalls the last information stored on the Connection Manager client about *myserver*'s contents. This prevents a potentially time-consuming conversation between the client and server every time a discovery dialog is opened.

Note
To get the latest view of the server configuration, on the measurement panel click **Refresh**.

Data Interface

For a client to communicate with the server, they must agree on a common endpoint for the communication. That common end point is a network port number. The port number is a unique number the server uses to allow Connection Manager client connections to particular services. By default, the server accepts client requests on port 4790.

The port number is defined within the *MsmSrvr.exe.config* file located in the server installation directory, by default, *C: \ Program Files \ Agilent \ Connection Manager Server \ MsmSrvr.exe.config*.

The contents of the default configuration file are:

```
<configuration>
  <appSettings>
    <add key="port" value="4790"/>
  </appSettings>
</configuration>
```

To change the default port number, see [Changing the Default Server Port Number](#).

Connection Manager Server

The Connection Manager (CM) Server is one half the Connection Manager client/server environment. By default, the CM server runs as an Windows program. To run the server as a Windows service, see [Running the Server as a Windows Service](#).

Because the server uses Windows-based supporting applications, it requires installation on a PC running a version of Microsoft Windows 2000 Professional or Windows XP Professional (or one of its successors).

The Connection Manager Server consists of two cooperating processes: *CMController.exe* and *MsmSrvr.exe*. These processes work together to create the Windows program user interface, provide instrument connectivity, and to manage application behavior.

The CMController.exe Process

CMController.exe is the main server process. It allows the CM server to run as a Windows program. CMController.exe produces the server user interface, the *Agilent Connection Manager Server* dialog and controls the lifetime of the MsmSrvr.exe process.

During installation, the Windows executable that produces the *Agilent Connection Manager Server* dialog is placed into the Windows system startup group. The server starts

automatically whenever you log on to the server PC.

When the Connection Manager server starts, the process examines the server PC configuration and displays the results in the *Agilent Connection Manager Server* dialog.

The process first checks to ensure the required support products are correctly installed and properly configured, then displays the results in the *Required Conditions* group box. If a component is missing or incorrectly configured, the dialog displays the problem condition in red.

Next, the process checks for installed instrument drivers and displays the results in the *Optional Components* group box. A check appears in the box in front of an installed driver. Instrument drivers are needed only for specific measurements, so in some cases, unnecessary drivers are not installed.

The *Agilent Connection Manager Server* dialog provides menu access to selections that control server functionality. These menus (File, Control, Diagnostics, and Help) provide access to server shutdown, restart, configuration diagnosis, and documentation, respectively.

The diagnostics function collects data on the installation and configuration of supporting applications, interface configuration, and account information. After diagnostics are run, the results are saved as a file that can be delivered to Agilent support engineers to aid in troubleshooting connectivity problems.

The MsmtSrvr.exe Process

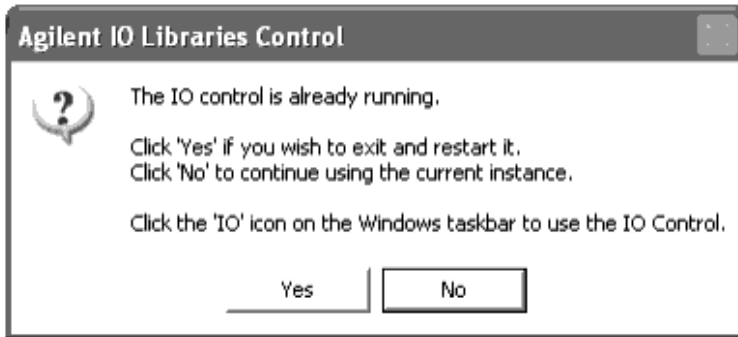
The MsmtSrvr.exe is a Microsoft .NET application that uses a networked interface capability called *remoting*. Remoting is the ability for a Microsoft .NET component to appear as if it is running locally in a client, when it is actually running remotely in another process.

Understanding IO Configuration

The Connection Manager's server uses the Agilent IO Libraries to achieve instrument communication. For the IO Libraries to communicate with the instrument interfaces, there must be one or more background processes (referred to as *daemons*) running on the server PC.

The IO Libraries installation usually puts a shortcut to this *daemon* in the system startup group of the Windows shell. This shortcut starts the IO Libraries daemon when you log onto the server PC.

If a user tries to log into the server PC while the server is running in the background, the system startup group tries to start the IO Libraries daemons a second time, which brings up the following dialog:



Note
When this dialog presents itself, click **No**. Otherwise, there will be two IO control applications running.

Viewing Installed IO Libraries

To view which version of the IO Libraries you have installed, complete the following steps.

1. In the server's Windows system tray, select **IO > View Documentation > Installation and Path Information**.
2. Observe the *Agilent IO Libraries Installation and Path Information* dialog.



Supported Instrument IO Interfaces

The supported Agilent IO interface hardware matrix can be found at:
http://www.home.agilent.com/upload/cmc_upload/All/Interface_Support_Matrix.pdf

Information on configuring the Agilent IO Libraries is available from:
<http://www.agilent.com/find/iolib>

Select the **IO Libraries Installation and Configuration Guide for Windows** link and go to *Configuring IO Interfaces*. This section has detailed configuration steps for the supported IO interfaces.

Additional Resources

For more detailed information on IO configuration, refer to the documentation for the IO libraries.

To view the documentation, in the Windows task bar, select **IO > View Documentation**.

Changing the Server Default Port Number from the Server

To change the server port, change the number in the value field of the port configuration key.

For example, to modify the server to listen on port 5885, modify the value in *MsmSrvr.exe.config* :

```
<add key="port" value="5885"/>
```

You must restart the server to initiate the port number change. To restart the server, in the *Agilent Connection Manager Server* dialog, click **Control > Restart Server**.

Note

You can view the currently active ports on the server by typing the command *netstat -a* into a command line window. This yields a list of bound ports including the Connection Manager server ports:

TCP	dude:top:4790	0.0.0.0:0	LISTENING
TCP	dude:top:4791	0.0.0.0:0	LISTENING

Overriding Windows Power Management Functionality

Windows 2000 and later versions of the Windows operating system include a power management facility that turns off the display and puts the PC into a low-power state after extended periods without activity.

The Connection Manager server is intended to operate for long periods of time unattended. The IO Libraries cannot perform instrument communications once a PC has transitioned to a low-power state. Therefore, at startup, the server issues a command preventing the operating system from transitioning to low-power states while allowing the monitor to turn itself off.

Once the server's main thread has finished running, it issues another command enabling the operating system to again transition to a *standby* or *hibernate* state.

Running the Server as a Windows Service

In ADS 2004A, the Connection Manager server runs as a Windows application. If preferred, the server can run as a Windows service, as in earlier implementations.

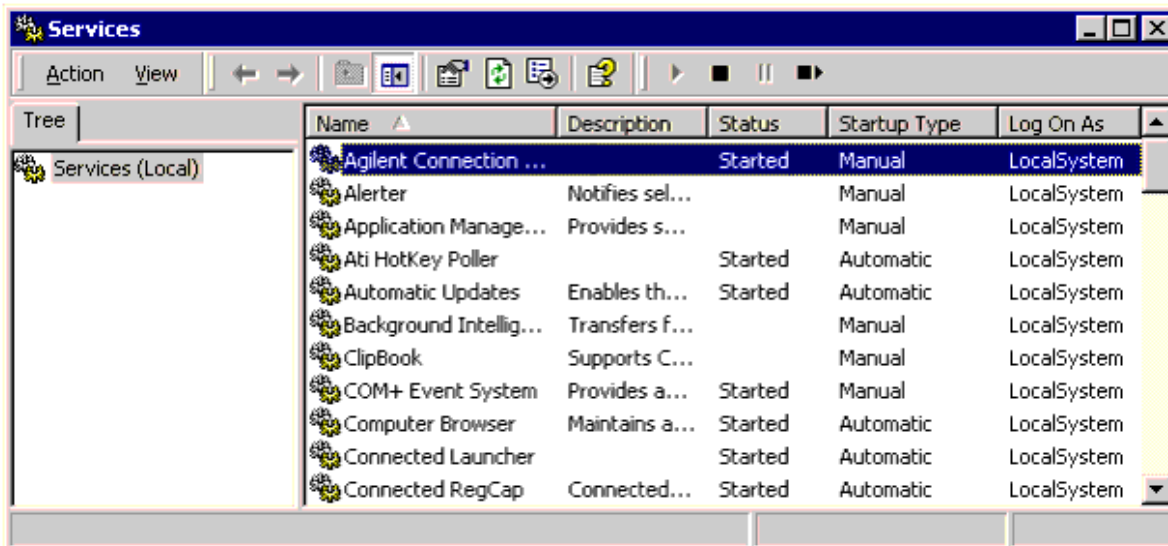
Note
The Windows service cannot be configured into the Windows system, as both the Windows service and the Windows application cannot control the MsmtSrvr.exe lifetime.

To configure the server to run as a service, complete the following steps.

1. Open a Windows session running under an account that has Administrator privileges.
2. Right click on the Windows **Start** button, then select **Explore All Users**.
3. Select the **Programs** icon, then the **Startup** icon.
4. Right click the *Agilent Connection Manager Server* icon and select **Properties**.
The CM server installation directory is listed in the Target field in the *Properties* dialog. Record the directory where the CM server is installed.
5. Remove the Agilent Connection Manager short cut from the Windows System Startup program group.
6. From a command prompt, change directories to the directory you recorded above.
7. Run the command `MsmtSrvc -install`.
8. Run the command `MsmtSrvc -start`.

The process owner is listed as `AUTHORITY\SYSTEM`. The System account in Windows is a privileged account, similar to the Super User account in UNIX. Many Windows services are configured to run under the security context of this account.

You can configure the environment under which the Windows Service runs to restrict its access privileges to those of a particular login account. You can configure the service to start when the server workstation boots or require someone to specifically start it. To configure a Windows Service select **Administrative Tools > Services** from the Windows Control Panel.



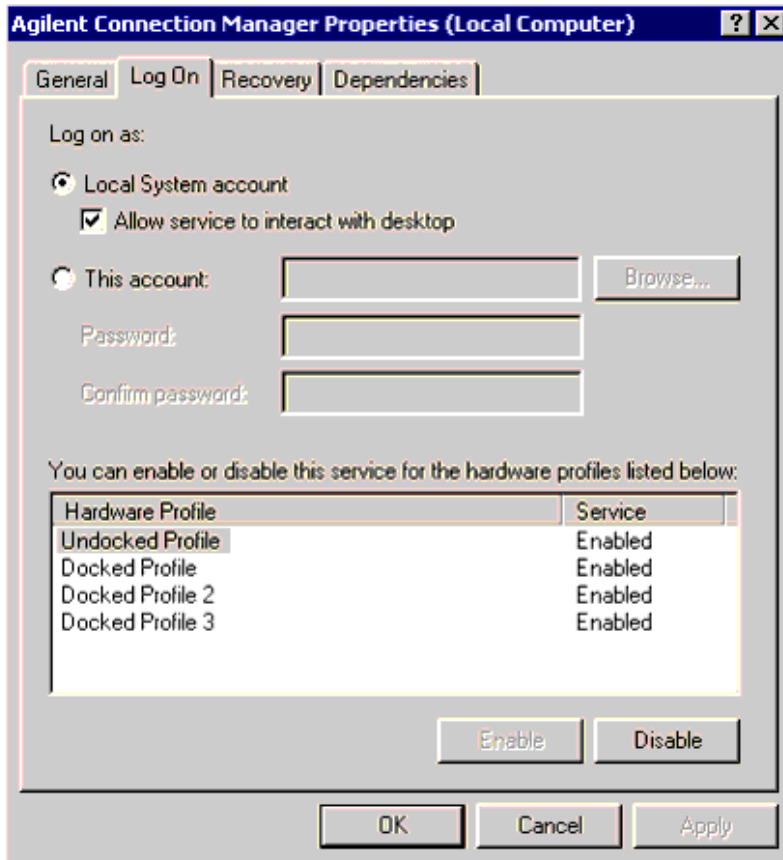
In the preceding illustration, the *Startup Type* is set to *Manual*. In this mode, the service requires someone to specifically start this service. When the type is set to *Automatic*, the service starts whenever the workstation is booted. Once a service is started, it remains running until specifically stopped. This allows a service to run and perform whatever activity it is responsible for, independent of whether other users log onto or off of the server workstation.

Note
By default, this service starts automatically.

The security environment is set in the *Log On* section of the *Properties* dialog in Windows 2000. To open this dialog:

1. Select a process (i.e., Connection Manager).
2. Choose **Action > Properties** from the *Services* toolbar.
3. Choose the **Log On** tab at the top of the dialog.

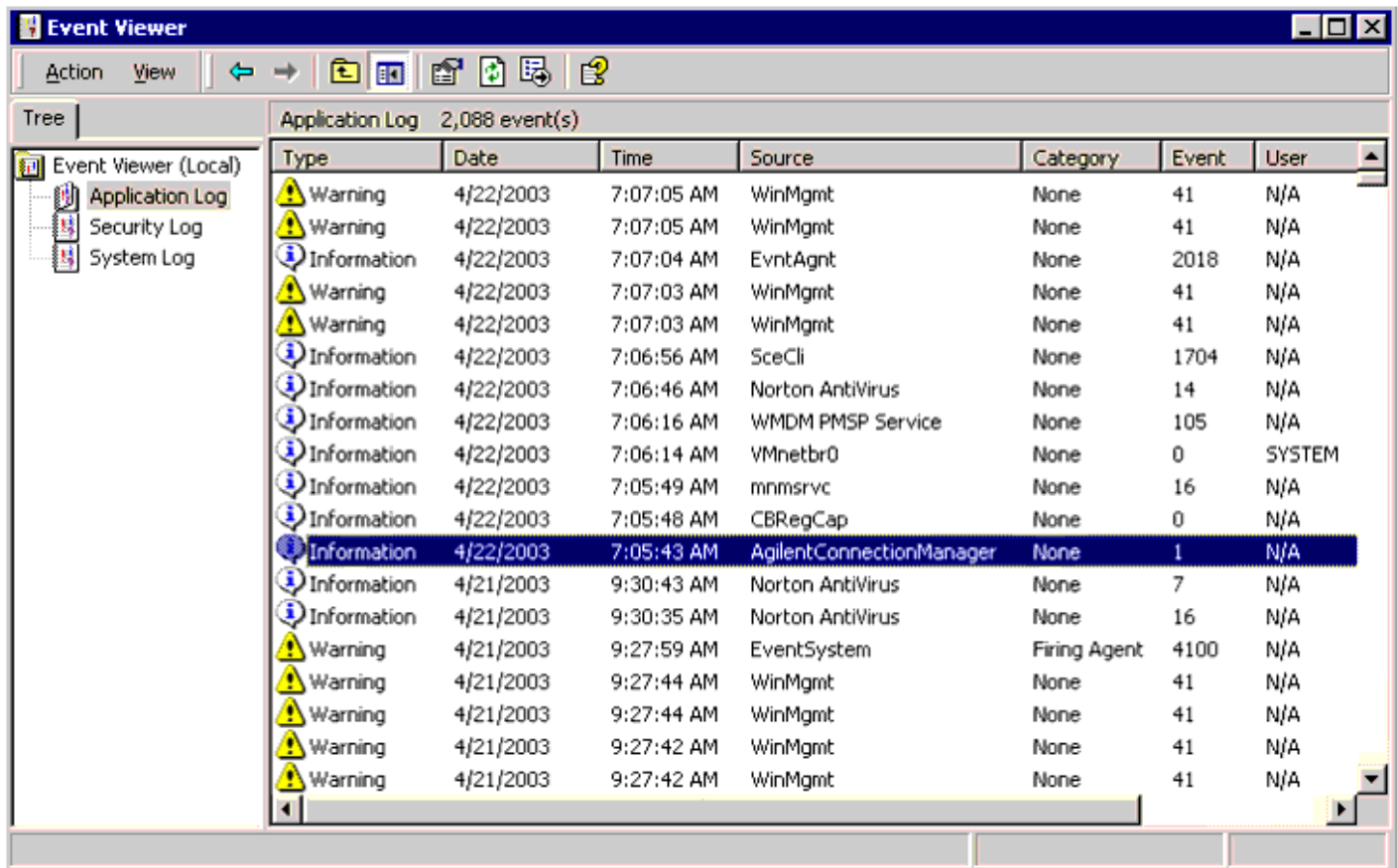
This section determines what security environment a service (and any processes it spawns) uses while running. The System account, as previously stated, is privileged.



The selection labeled *This account* runs the service under the account privileges of a distinguished principle (e.g., some login account other than System). When configured this way, the server inherits the named account's access privileges. Services running under the account privileges of a distinguished principle cannot open windows on the interactive desktop.

When the service is running, error and informational messages are reported using the Windows Event Log. To use the *Event Viewer* application, on Windows 2000 task bar, select **Start > Settings > Control Panel > Administrative Tools > Event Viewer**.

To view the Connection Manager event log entries, switch the Event Viewer to its Application mode and search for entries with the *Source* category of *AgilentConnectionManager*.



Configuring User Account Privileges on the PC

Many IT departments restrict the privileges on Local System accounts, thereby disabling Connection Manager Server instrument communications. We strongly recommend that you *do not* use the Local System account to run the Connection Manager server. Rather, the server should run under the account of a distinguished principal (i.e., a login account other than Local System).

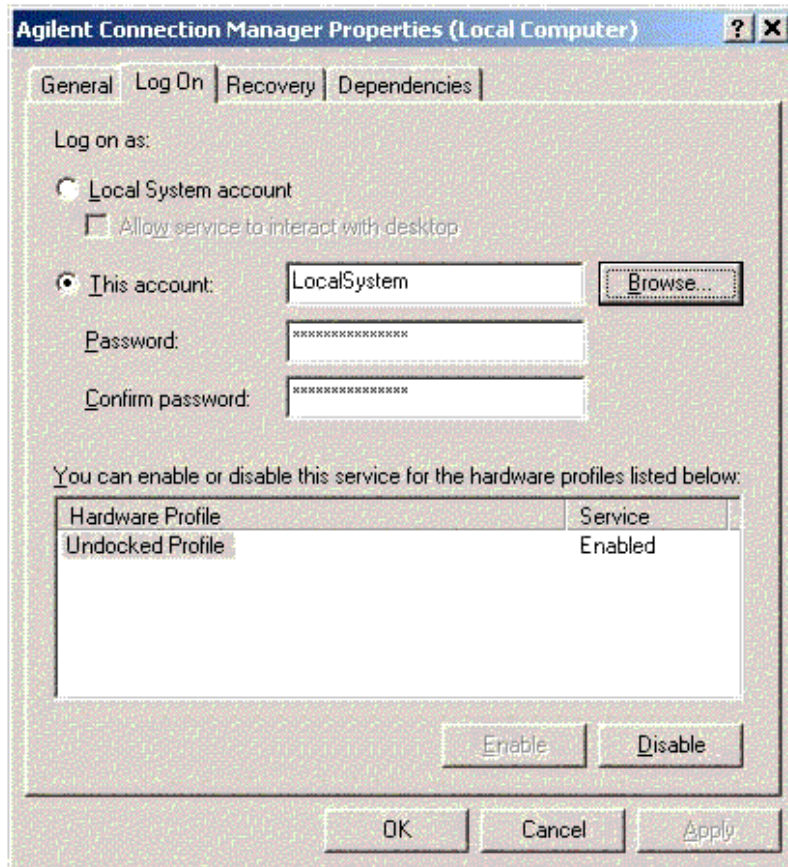
In addition, the supporting application Agilent VISA COM libraries require Administrator privileges on the user account. To ensure that this condition exists, we recommend that you change the account under which the Connection Manager Server runs.

Note

The following example illustrates the procedure for a Windows 2000 operating system. Windows XP has similar procedures for controlling the environment under which a service runs. The Services Control Panel application is the starting point on all Windows operating systems.

To change the account information on Windows 2000:

1. From the Windows 2000 toolbar, select **Start > Settings > Control Panel**.
2. From the *Control Panel* dialog, select **Administrative Tools > Services**.
3. Highlight **Agilent Connection Manager**, then click the **Properties** toolbar button.
4. From the *Log On* tab, select the **This account:** radio button from the *Log on as:* group.

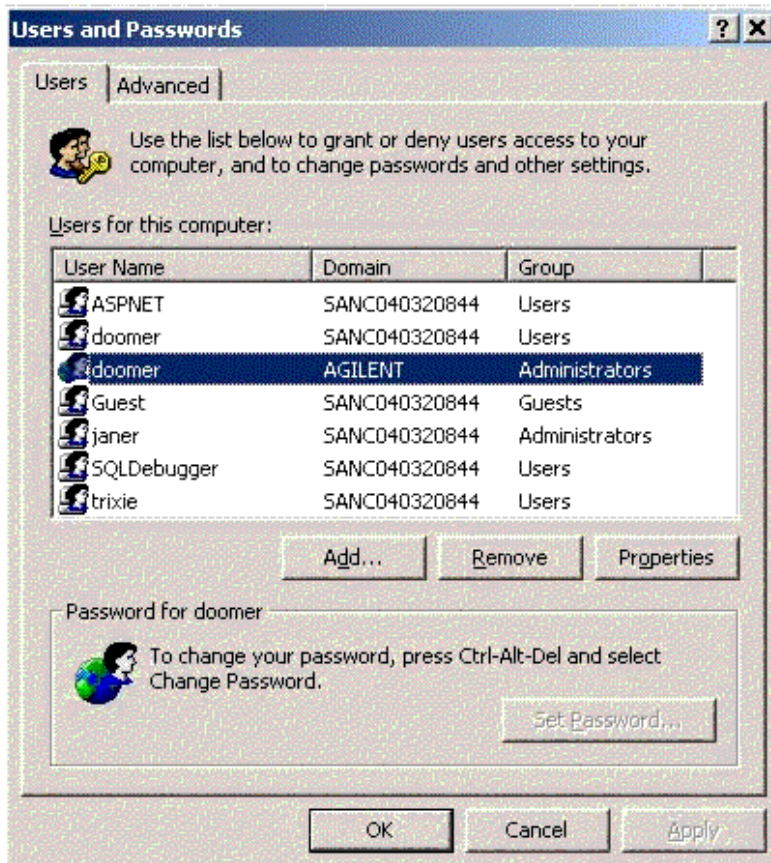


5. Change the account name from *LocalSystem* to an account that has Administrator privileges. To do this, either enter an account name, or select the name from a list by clicking the **Browse...** button.

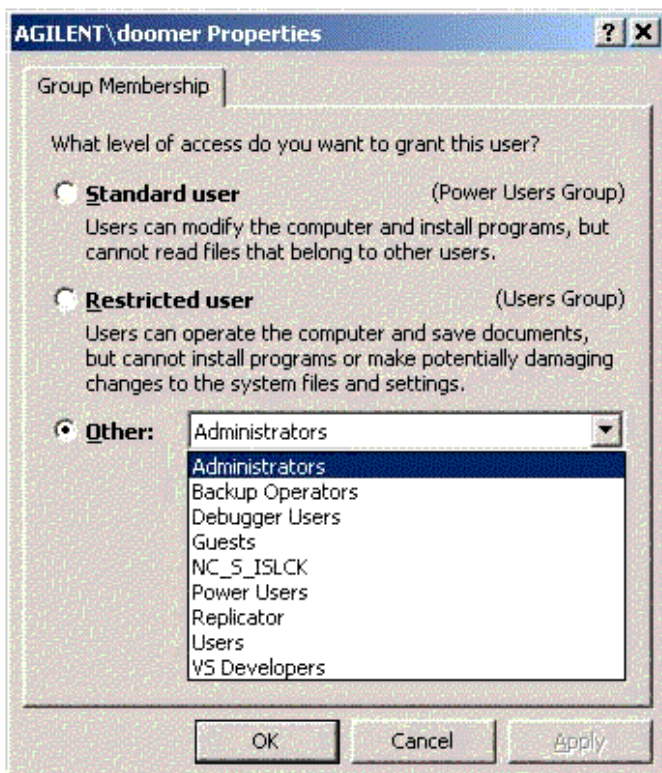
**Note**

You can select an account that is local to the PC running the CM server, or an account in your company's domain. If choosing an account in your domain, that domain account must be in the local Administrators group on the PC running the CM server.

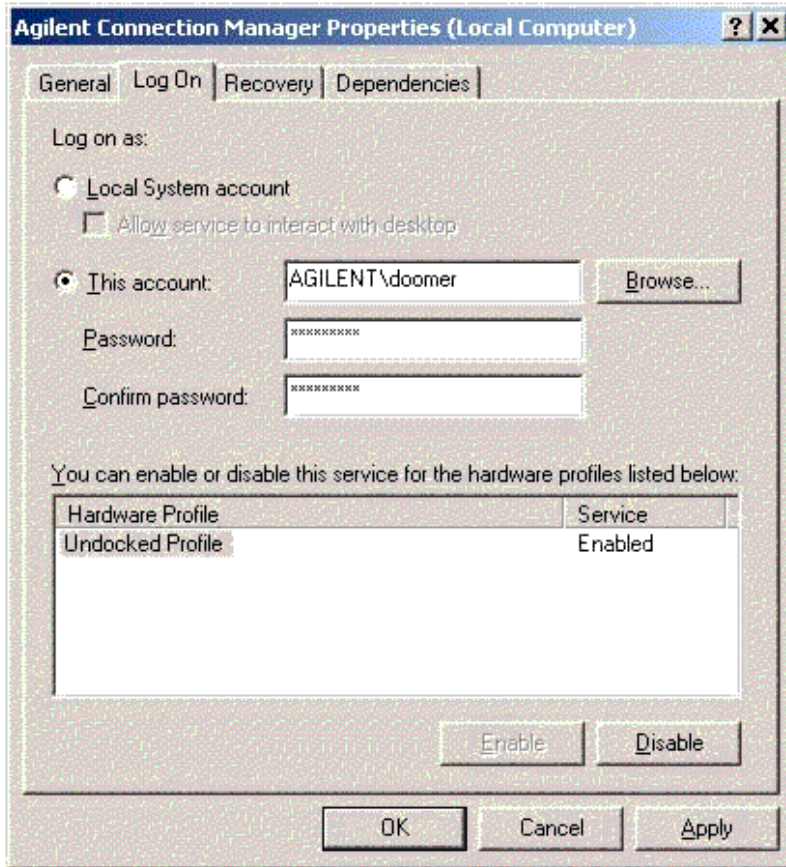
6. To ensure that a domain account has Administrator privileges on the machine running the CM server, open the Control Panel's *Users and Passwords* application.



7. Select the domain account from the *Users* tab, choose **Properties**.
8. From the *Properties* dialog select the *Group Membership* tab, choose **Other:**.
9. Select **Administrators** from the drop-down list control. Click **OK**.



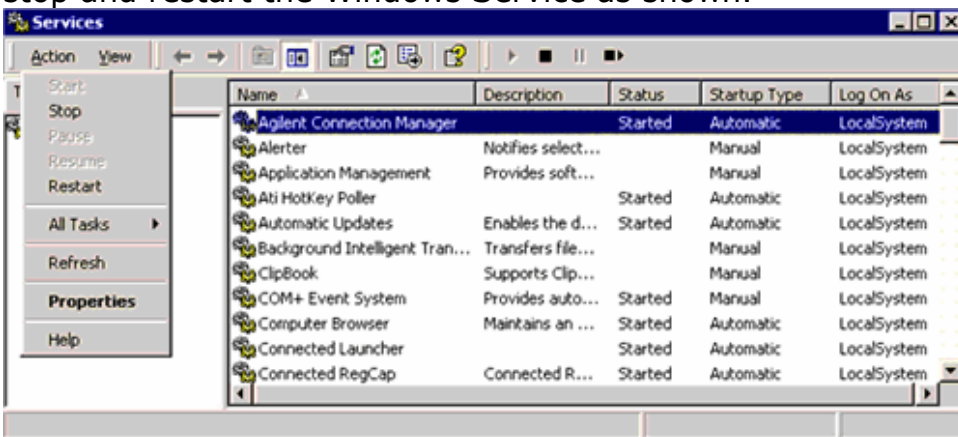
10. Type in the account password in your *Service Properties* dialog. Click **OK**.



11. Click **Restart Service** in the toolbar on the *Services* control panel for the new settings to take effect.

Changing the Default Server Port Number

If you are running the server as a Windows service, to have the server recognize this new value, select **Agilent Connection Manager** in the *Services* dialog, then choose **Action** to stop and restart the Windows Service as shown.



A Windows Service sets the security environment and controls the process lifetime of the other server components. The highlighted entry is the Windows Service. The subordinate process is the actual Connection Manager Server (MsmtSrvr.exe), as shown.

Process	PID	CPU	Description	Owner	Priority	Handles	Window
services.exe	240	0	Services and Controller app	NT AUTHORITY\SYSTEM	9	611	
ati2evnt.exe	136	0	ATI External Event Utility E...	NT AUTHORITY\SYSTEM	8	34	
svchost.exe	428	0	Generic Host Process for W...	NT AUTHORITY\SYSTEM	8	355	
spoolsv.exe	468	0	Spooler SubSystem App	NT AUTHORITY\SYSTEM	8	200	
CBRRegCap.EXE	560	0	Registry Capture Module	NT AUTHORITY\SYSTEM	8	74	
MsmSvc.exe	592	0		NT AUTHORITY\SYSTEM	8	35	
MsmSvc.exe	596	0		NT AUTHORITY\SYSTEM	8	314	
CBLaunch.exe	612	0	Connected TLM Launcher	NT AUTHORITY\SYSTEM	8	82	
delwatch.exe	628	0	Virus Definition Daemon	NT AUTHORITY\SYSTEM	8	35	
svchost.exe	648	0	Generic Host Process for W...	NT AUTHORITY\SYSTEM	8	476	
mrmssvc.exe	692	0	NetMeeting Remote Deskto...	NT AUTHORITY\SYSTEM	8	43	
ihvscan.exe	720	0	Norton AntiVirus	NT AUTHORITY\SYSTEM	8	228	
MsgSys.EXE	1204	0	CBA - Message System	NT AUTHORITY\SYSTEM	8	93	
rdmrun.exe	872	0	Remote Register Capture	NT AUTHORITY\SYSTEM	8	30	

Note

The Process Explorer tool is available at: <http://www.sysinternals.com/> _

Removing the Server from the PC

There are two methods for removing Connection Manager server from a PC workstation. The easiest method uses the installation disc to remove the server and all other related support programs.

The other method uses Windows *Add/Remove Programs* dialog to remove each individual component.

To remove the server using the server installation disc

1. When the *Connection Manager Server InstallShield* dialog appears, choose the **Remove** radio button and click **Next**.
2. When the program removal confirmation dialog appears, click **Yes**.
3. When the *Connection Manager Server InstallShield* dialog appears, click **Finish**.
4. When the *Connection Manager Server InstallShield* dialog appears, select the **Yes I want to restart my computer now** radio button and click **Finish**.

Removing the server using the installation disc does not remove any of the supporting applications. These supporting applications are considered shared system components that other applications may depend upon. To remove the supporting applications, use the Windows Control Panel *Add/Remove Programs* application to remove the shared components.

Remove these shared components in the following order:

1. 856x Plug & Play Driver
2. 859x Plug & Play Driver
3. 871x Plug & Play Driver
4. 875x Plug & Play Driver
5. E4406 Plug & Play Driver
6. E444x Plug & Play Driver
7. ESG Plug & Play Driver

8. AgilentRfSigGen IVI-COM Driver
9. Agilent T&M Programmers Toolkit Redistributable Package 1.1
10. Agilent IO Libraries, which removes VISA COM
11. Microsoft .NET Framework 1.1

To remove the server using Windows Add/Remove Programs dialog

1. From the Windows task bar, select **Start > Settings > Control Panel > Add/Remove Programs**.
2. Select the **Agilent IO Libraries** and click **Change/Remove**. Follow the command prompts to remove the Agilent IO Libraries.
3. Select the **Agilent T&M Programmers Toolkit Redistributable Package** and click **Change/Remove**. Follow the command prompts to remove the Agilent T&M Programmers Toolkit Redistributable Package.
4. Select each individual Plug&Play driver and click **Change/Remove**. Follow the command prompts to remove each individual Plug&Play driver.
5. Select **Agilent VisaCom** and click **Change/Remove**. Follow the command prompts to remove Agilent VISA COM.
6. Select **Connection Manager Server** and click **Change/Remove**. Follow the command prompts to remove Connection Manager Server.
7. Select **Microsoft .NET Framework** and click **Change/Remove**. Follow the command prompts to remove Microsoft .NET Framework.

Reinstalling the Server on a PC


Connection Manager server can be installed and used with an Advanced Design System (ADS). Follow these instructions to install the Connection Manager server and configure the server IO.

Before You Begin

To communicate with instruments, you must install the Connection Manager server. Before installing the server, ensure that your PC workstation and your EDA software licensing meet the following requirements.

System Requirements

The server must be installed on a Windows PC connected to the same network as the EDA software network server or local installation.

 Note Connection Manager Server cannot be installed on 64-bit machines.
--

Requirement	Description
Processor	Pentium III 450 MHz or higher
RAM	256 MB
Hard Disk Space	500 MB on system drive
Operating System	Windows 2000 Professional (Service Pack 2) Windows XP Professional (Service Pack 1)
Network Configuration	TCP/IP
Supported Media Type	CD-ROM required for program installation.

Licensing Requirements

Although the Connection Manager client requires a license, Connection Manager server does not require a license regardless of where it is installed.

Note
The Connection Manager client is installed during the main software installation. The *link_connect_mgr* license is required to run the client from a schematic page. Connection Manager client and server installations are not related to the client-server installation of the EDA software .

EDA Software Version Requirements

The Connection Manager client and server software must be from the same release.

If you used an older release of Connection Manager, install latest version of Connection Manager server when you install latest version of the EDA software.

Installation Package Overview

The Connection Manager server installation installs all the software necessary to enable the EDA software-supplied measurements. This includes:

- Run-time versions of the Agilent Test and Measurement Programmer's Toolkit. This includes the most recent version of VISACom available when the Toolkit was released. The latest version is available from the Agilent Developer Network at: <http://adn.tm.agilent.com>
- The Agilent IO Libraries
- ADS Measurement Libraries
- Plug&Play and IVI-COM drivers
- Run-time versions of Microsoft .NET, suitable for running .NET application
- The Connection Manager server

Installation Types

Complete

The **Complete** installation installs all program features in the default installation directory *C:\Program Files\Agilent\Connection Manager Server*.

Custom

The **Custom** installation lets you define the installation directory and choose the optional program features, such as the ADS Measurement Library, Connection Manager documentation, Ptolemy VEE Link Server, and VEE Service Control Panel Application.

Installing the Server

1. Ensure that your PC workstation meets the system requirements.
2. Insert the Connection Manager Server 2004A Installation Disc into the workstation CD-ROM drive.
3. When the installation wizard prompts you, choose the type of installation.
4. Follow the command prompts to complete the installation.

For Windows XP Service Pack 2 Systems Only

1. When the system reboots, Connection Manager Server starts and the *Windows Security Alert* dialog appears.



2. In the *Windows Security Alert* dialog, click **Unblock**.

This creates an exception in the Windows Firewall that allows network connections through

the firewall to the Connection Manager server.

This completes the installation process. To connect instruments to the server workstation, complete the steps in *Configuring the Server IO on the PC* (connectmui).

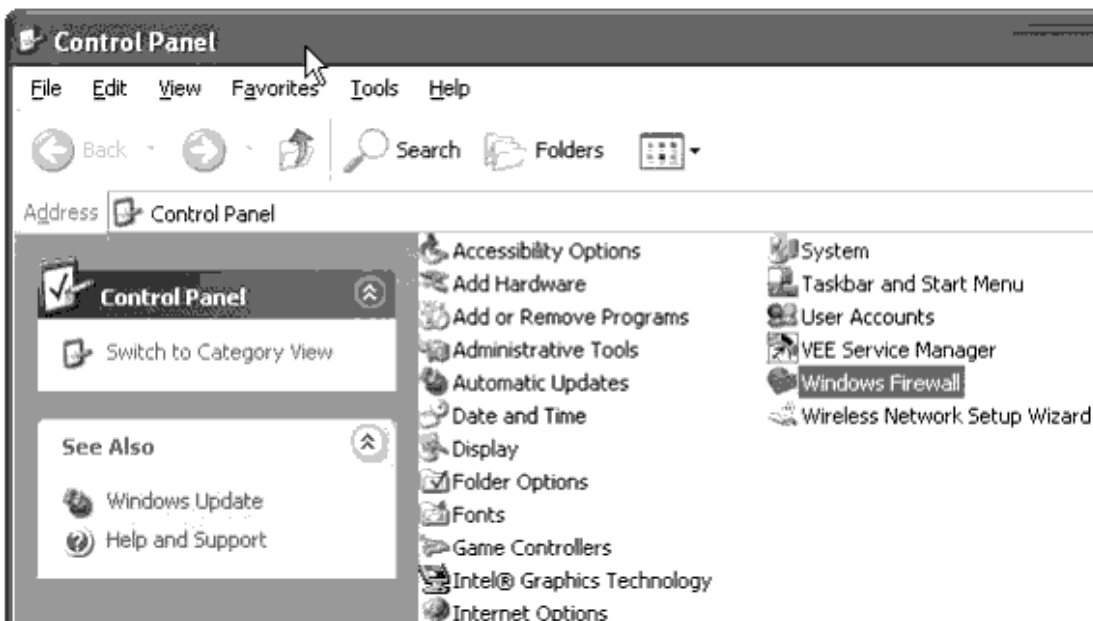
Using Connection Manager with Windows XP Service Pack 2

By default, computers using Windows XP Service Pack 2 will not allow access to the Connection Manager server and VEE Service through the firewall.

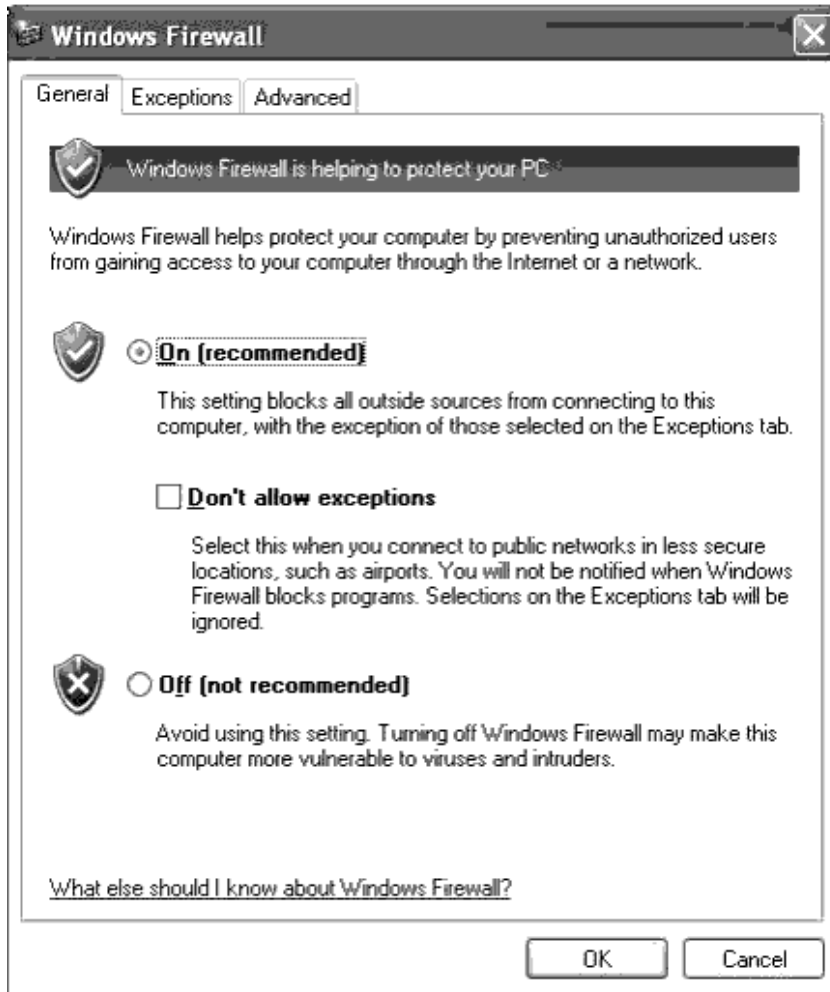
If you have upgraded from another operating system version to Windows XP Service Pack 2, you must enable connections to the PC hosting the Connection Manager server and/or VEE Service by listing them as exceptions to the firewall.

Follow these steps to enable network connections to Connection Manager server (and VEE Pro, if necessary) through the firewall.

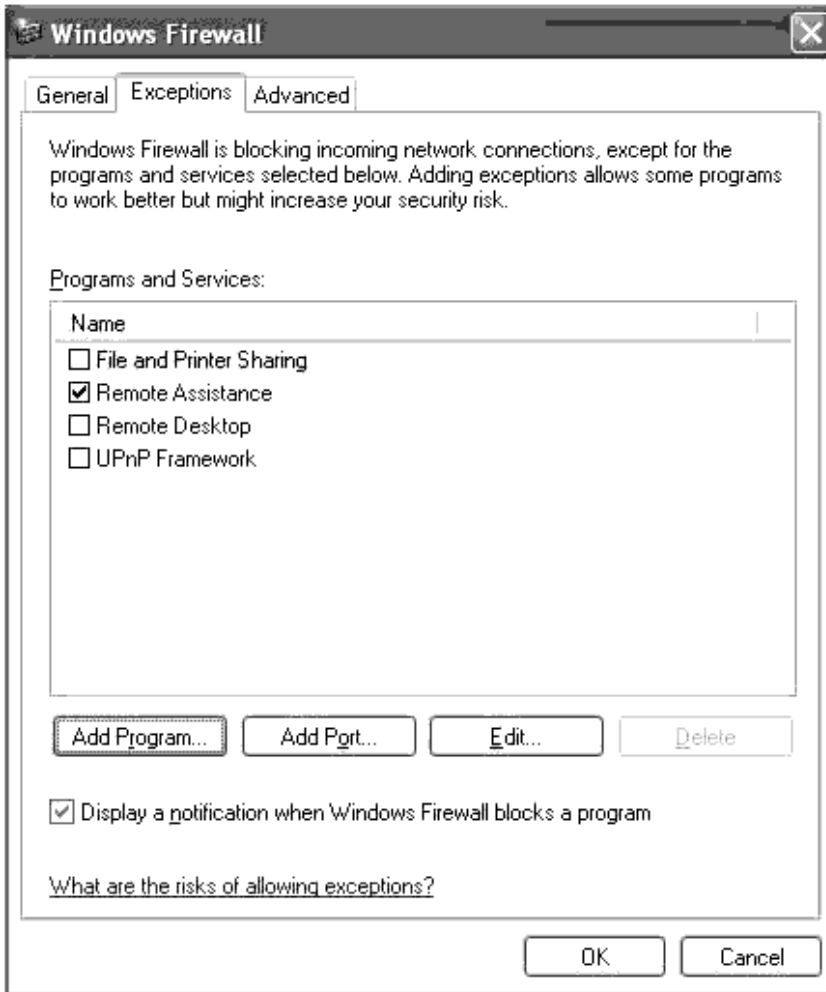
1. In the Windows menu bar, choose **Start > Settings > Control Panel**.
2. In the Control Panel dialog, click **Windows Firewall**.



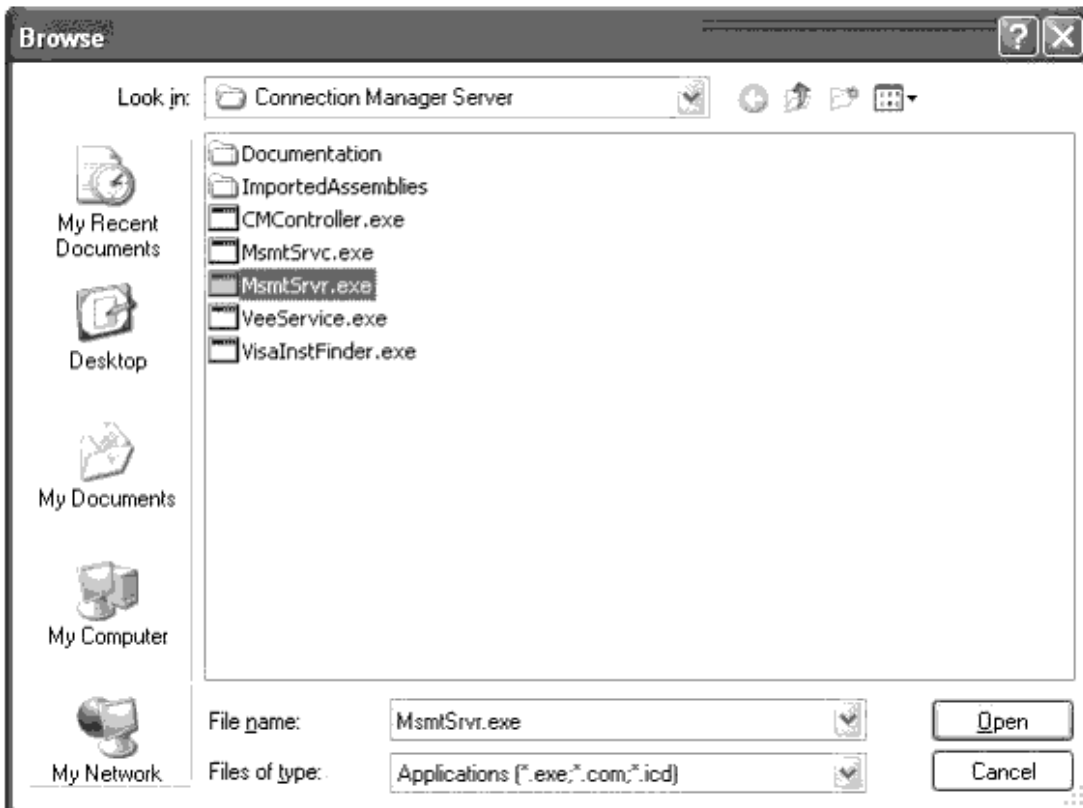
3. In the *Windows Firewall* dialog, ensure that the **Don't allow exceptions** checkbox is unchecked.



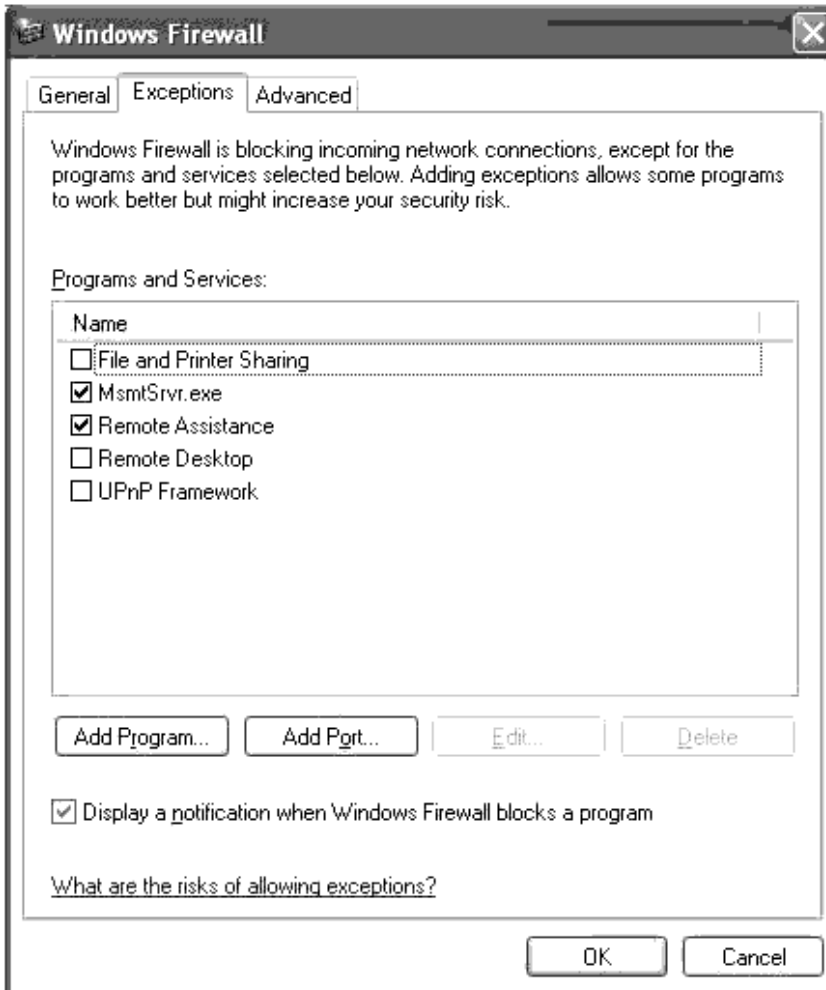
4. In the *Windows Firewall* dialog, click the **Exceptions** tab.



5. In the *Exceptions* tab, click **Add Program....**
6. In the *Add a Program* tab, click **Browse.**
7. Use the *Browse* dialog to enter the Connection Manager Server installation directory (by default, *<installation drive>\Program Files\Agilent\Connection Manager Server*).
8. From the *Connection Manager Server* installation directory, choose **MsmstSrvr.exe** and click **Open.**



9. In the *Add a Program* tab, click **OK**.
The *Windows Firewall* dialog *Exceptions* tab shows the MsmtSrvr.exe exception.



10. If you are using VEE Service, in the *Exceptions* tab, click **Add Program....**
11. In the *Add a Program* tab, click **Browse**.
12. Use the *Browse* dialog to enter the VEE Pro installation directory (by default, *<installation drive> \Program Files\Agilent\VEE Pro 7.0*).
13. From the VEE Pro installation directory, choose **veesm.exe** and click **Open**.
14. In the *Add a Program* tab, click **OK**.
15. In the *Windows Firewall* dialog, click the **OK**.

Connections to the PC hosting the Connection Manager server and/or VEE Service are now enabled as firewall exceptions.

Connection Manager Client

Connection Manager (CM) client, is the client half of the Connection Manager client/server system. Although the server requires a version of Microsoft Windows 2000 Professional or Windows XP Professional (or one of its successors), clients can exist on any platform having TCP/IP networking capabilities.

The CM client creates ADS datasets, holds the results of S-parameter, spectrum, and voltage waveform measurements, and provides measurement panels enabling interaction with measurements located on the server.

The client also provides instrument *discovery* by identifying instruments that are connected to your server workstation. This enables the client to easily associate a particular instrument with a particular measurement.

Note
The term *measurement* describes functions in a server library. Generally, a measurement includes gathering physical data from one or more instruments, but is not limited to instrument control.

The client uses the menus to access file, server, instrument, window, and help/troubleshooting functionality.

File Menu

The File menu contains entries to save and recall application states and to exit the client. For more information, see [Understanding Application State Files](#).

Server Menu

The Server menu contains a single entry that allows you to specify a connection for the remainder of the Connection Manager client session. For more information, refer to *Selecting a Server Workstation and Connection Port* (connectmui) and [Managing the Set Server Dialog from the Client](#).

Instruments Menu

The Instruments menu contains entries enabling dynamic instrument discovery and rudimentary interactive instrument IO.

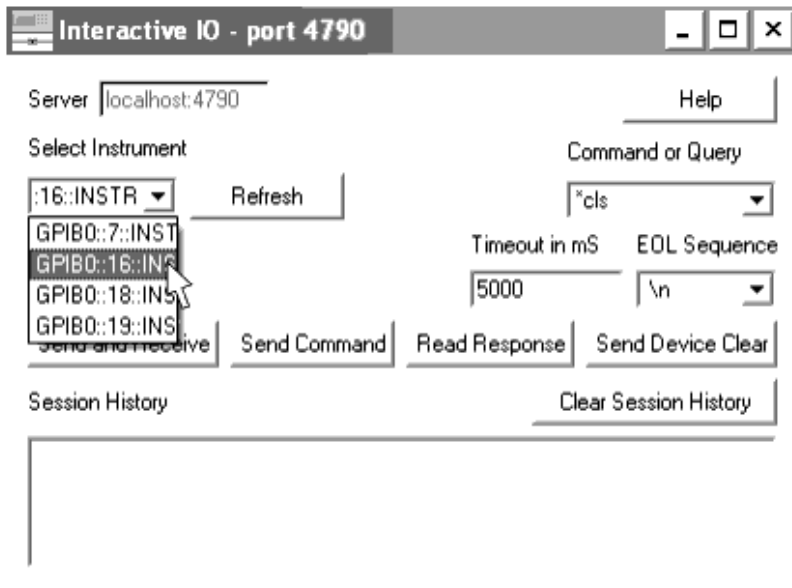
The Remote Instrument Explorer

This dialog queries connected instruments and lists the results of the query.

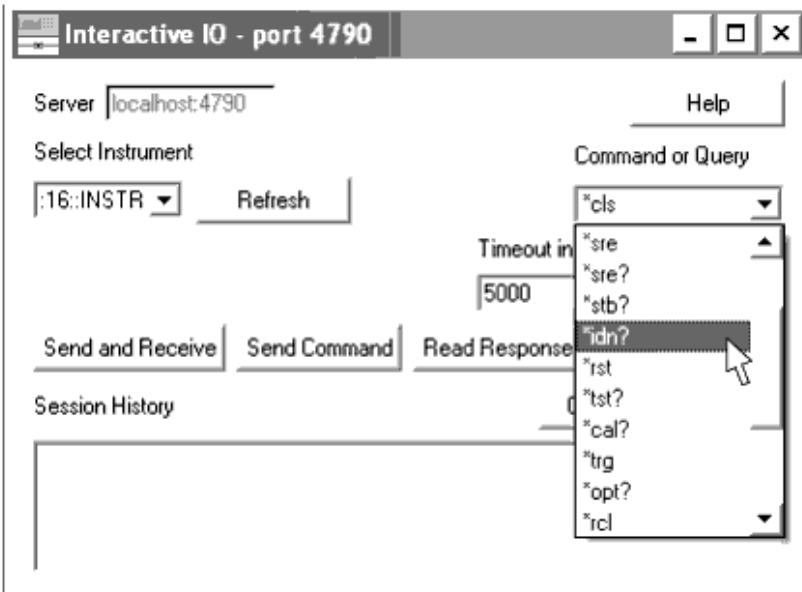
Interactive IO

This dialog provides some rudimentary interactive instrument IO capabilities. This capability is used in troubleshooting simple instrument connectivity problems. Selecting **Server > Interactive IO** opens the *Interactive IO* dialog.

To communicate with a specific connected instrument, select an instrument using the Select Instrument drop-down list.



You can select an instruction to send to the instrument by choosing from the *Command or Query* drop-down list or by typing a command into that same field.



Note
The definition of the IEEE-standard commands in the *Command or Query* field are listed in most instrument programming documentation. This documentation is available from the Agilent Developer Network: <http://adn.tm.agilent.com>.

You can specify a waiting period before an unsuccessful communication attempt is aborted by changing the value in the *Timeout in milliseconds* entry field. The default is five seconds.

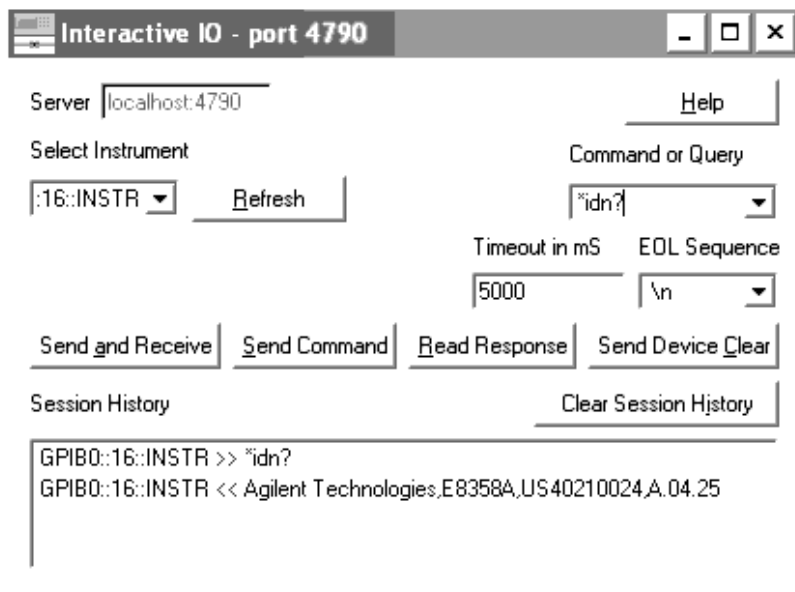
Different types of instruments use different character sequences to mark the end of an instruction.

The *EOL Sequence* drop-down list enables you to select the correct command termination for a specific instrument. Almost all new instruments use a new line character as the instruction terminator, so the default entry in the drop-down control is `\n`, a common representation for new line. The other termination sequences involve the use of the carriage return character, commonly represented by the `\r` symbol.

Click **Send and Receive** to send an instruction that results in the instrument placing an immediate response on the interface bus. Generally, this type of instruction ends with a " ? " character.

For example, the IEEE-488.2 standard command for an instrument identification query is *idn?. To send an instrument identification query from the server to an instrument, choose the setting shown in the following figure, and click **Send and Receive** to send *idn? to the instrument and display the response.

Note
This dialog can only read instrument response data in text format. Attempting to read a response that contains binary data will result in an error.



Click **Send Command** to send a command that does not prompt a response. For example, use this button to send *.cls to clear the instrument buffer.

Click **Read Response** to read data from an instrument independent from a transmitted instruction. Some instruments can sample continuously. To get several samples of information, send a command to start the instrument sampling, then select the *Read Response* button several times.

Click **Send Device Clear** to send the IEEE-488 bus command for selected device clear. This command is a high-priority bus command (superseding ordinary instructions) that forces an instrument to abort its current function and return to an idle state in order to regain control over an instrument.

The *Session History* is an edit field that logs the instructions you send to an instrument and the instrument's responses to those commands. To delete the contents of this field click **Clear Session History**.

Measurements Menu

The Measurements menu provides access to behavioral modeling, S-parameter, spectrum, and voltage waveform measurements located on the server. For more information, see [Understanding the Measurement Panels](#).

For a list of instrument model numbers compatible with the measurements provided by the Connection Manager Measurement panels, in the Connection Manager client window, click **Help > Supported Instruments...** .

Note
Though the N5230A PNA network analyzer can measure S11 through S44 via Connection Manager, Connection Manager cannot be used to make differential measurements.

Windows Menu

The Windows menu provides control over the function of the measurement panels contained within the client main window.

Choose **Tile** to resize the contained dialogs, arranging them so that they fill the entire client window without overlapping.

Choose **Cascade** to arrange the contained dialogs so that they overlay each other with the upper left corner of each dialog offset down and to the right of the dialog it covers.

Help Menu

The Help menu contains access to documentation and support, as well as access to server diagnostics and a list of supported instruments . For more information, see *Connection Manager Server Diagnostics* (connectmui).

Managing the Set Server Dialog from the Client

The check box labeled *Do not prompt me again* enables you to select whether the server connection dialog displays when you select any of the entries in the Server, Instruments, or Measurements menus.

Selecting this check box directs all further activities to the server identified when you dismissed the *Set Server* dialog. Leaving this box cleared, causes the CM client to display the *Set Server* dialog every time you select from the Server, Instruments, or Measurements menus.

Note
In a case where a client is connected to several different servers, leave this check box unselected. You can have multiple instances of the measurement panels and discovery dialogs point to multiple servers.

The information governing whether the *Set Server* dialog is displayed is stored in the XML file named *CM_InitConfig.cml*, under the `< ADS Home > /hpeesof/config` directory. The file contains the following command line:

```
<MsmClientInitConfig StartupDlgChecked="0" RemoteHost="localhost" Port="4790"
ServerDlgChecked="0" />
```

The *ServerDlgChecked* value determines whether the *Set Server* dialog is displayed. Entering 0 displays the dialog, entering 1 suppresses it.

This file also records the default value of server host and port number.

Understanding Application State Files

Using the File menu you can save and recall application state and exit the client. By default, Connection Manager stores its application state in the workspace data directory as an XML file. You can also store application state data in a user-defined directory.

Following is an example of a Connection Manager application state file.

```
- <MsmClientConfig Version="1.0" RemoteHost="localhost" Port="4790"
ServerSelected="0">
  <InstExplorer RemoteHost="localhost" Port="4790" />
  - <Measurements>
    - <SParm8753 RemoteHost="localhost" Port="4790">
      <VisaRsrc Value="GPIB0::16::INSTR" />
      <QueryInstId Value="0" />
      - <SelectMeasurements>
        <S11Msmt Value="1" />
        <S12Msmt Value="1" />
        <S13Msmt Value="0" />
        <S21Msmt Value="1" />
        <S22Msmt Value="1" />
        <S23Msmt Value="0" />
        <S31Msmt Value="0" />
        <S32Msmt Value="0" />
        <S33Msmt Value="0" />
      </SelectMeasurements>
    - <ExportTextFile Value="0">
      <FileType Value="0" />
    </ExportTextFile>
    <DataSetName Value="Ag8753" />
    <BlockName Value="All4" />
  </SParm8753>
</Measurements>
</MsmClientConfig>}}
```

Understanding the Measurement Panels

Measurement panels are measurement-specific, not instrument-specific. Because these dialogs do not interact with schematics, the Connection Manager Client window manages and groups the measurement panels.

All measurement panels have **Measure** and **Help** buttons.

Click **Measure** to execute the configured measurement.

Click **Help** to access Connection Manager documentation.

Common Functional Groups

Many of these measurement panels have a common subset of controls used to collect the information needed to record an ADS dataset. Some measurement panels provide a limited set of controls to setup an instrument and gather data from a manually configured instrument.

Some measurements do not require the use of these programmatic controls. For example, the S-parameter measurements assume a valid network analyzer calibration. Changing an instrument configuration programmatically could invalidate the calibration. In this instance, the measurement control dialog omits controls that could cause the instrument to make a measurement without a valid calibration.

Select Instrument



Every measurement panel contains the *Select Instrument* group. It is used to query, view, and select connected instrumentation, control the automated instrument identification process, and in some cases reset instrument states.

Refresh

Click **Refresh** to repopulate the drop-down list with the latest instrumentation configured on the server.

Select Instrument

Use the drop-down list to view the connected instrumentation and choose an instrument for a given measurement. The information displayed in the list is the same information found in the Remote Instrument Explorer.

Override instrument model check

Select the check box labeled *Override instrument model check* to disable the automated instrument identification process. Leaving this check box deselected queries an instrument for its identification string and verifies that the instrument is a particular model number or

belongs to a particular family at the beginning of the measurement.

Select this check box if an instrument's instruction set is compatible with a given instrument or family, but is not specifically listed in the measurement. Deselect this check box if a measurement must be performed by a specific model number or family of instruments.

For example, to make a voltage waveform measurement using an instrument with an Agilent 86100-compatible instruction set, selecting this check box would allow the measurement to execute on the unlisted oscilloscope without returning an error.

Note
Measurements have only been tested with the instruments identified in the measurement panel. Using an unlisted instrument may result in inaccurate measurement data.

Select Measurement

Every measurement panel contains the *Select Measurement* group, used to select a specific measurement or series of measurements. The dialog displays measurements appropriate to the instrument driver: S-parameters, trace, channel, and memory.

Select All

Click Select All to choose all available measurements.

Clear All

Click Clear All to deselect all selected measurements.

Save Dataset

Every measurement panel contains the *Save Dataset* group. It is used to construct an ADS dataset from measured data.

The screenshot shows a dialog box titled "Save Dataset". It contains two text input fields. The first is labeled "Dataset Name" and is currently empty, with a "Browse..." button positioned to its right. The second is labeled "Block Name" and contains the text "CM".

The entry field labeled *Dataset Name* contains the file name of the destination ADS dataset. Every measurement creates a temporary dataset file in the workspace data directory.

When a measurement completes successfully, the temporary dataset file is renamed as

specified in the Dataset Name field. When a measurement does not run to completion, the temporary dataset file will remain in the workspace data directory to try to preserve as much information as possible.

Browse...

Click **Browse...** open the *Export* dialog where you can choose a folder and select an existing file name or enter a file name for the exported measurement data. In the case where you specify the name of an existing dataset, its contents will be replaced with the contents of a new measurement.

The *Block Name* field holds the name of a containing variable that holds the actual measurement variables. This enables you to select measurement values of the same name from different measurement runs. Normally, a measurement creates a dataset, holding a single block filled with all the variables representing the various pieces of measured data. There are occasions where this is not true.

Each measurement creates a temporary dataset file prefixed by two underbars (__) in the *__\Protect Data* directory. Upon successful completion of the measurement, the temporary dataset file is renamed using the value entered in the **Dataset Name:** field.

Though not specifically part of the dataset group, selecting the **Measure** button confirms the measurement configuration before executing the hardware commands. The client tells the server to make the measurement, sending the information gathered in the measurement panel as configuration data.

Understanding S-Parameter and Behavioral Modeling Measurements

This section explains S-parameter data formatting, dataset and data file referencing, and an overview of the measurement panel functionality.

Note

Connection Manager can only use S-parameter data that contains both magnitude and phase information, as found in vector network analyzers. Scalar analyzers do not provide information in a format suitable for use with Connection Manager.

Matrix and Non-Matrix Variable Formatting for S-Parameter Data

Depending on the available instrumentation, Connection Manager can perform 2-, 3-, and 4-port S-parameter measurements.

The format of the variable names stored in an S-parameter dataset depend on the measurements selected. There are two variable name formats used in S-parameter datasets:

- a matrix notation
- a non-matrix notation

The matrix notation is used when you select all measurements needed to fully populate a matrix for a given number of ports, the minimum number being two ports.

The matrices for a 2-port measurements will contain the variables:

$S[1,1]$ $S[1,2]$ $S[2,1]$ $S[2,2]$

3-port matrices contain:

$S[1,1]$ $S[1,2]$ $S[1,3]$ $S[2,1]$ $S[2,2]$ $S[2,3]$ $S[3,1]$ $S[3,2]$ $S[3,3]$

4-port matrices contain:

$S[1,1]$ $S[1,2]$ $S[1,3]$ $S[1,4]$ $S[2,1]$ $S[2,2]$ $S[2,3]$ $S[2,4]$ $S[3,1]$ $S[3,2]$ $S[3,3]$ $S[3,4]$
 $S[4,1]$ $S[4,2]$ $S[4,3]$ $S[4,4]$

Non-matrix formatting is used for individual S-parameter measurements, or measurements that do not contain all of the 2 or 3-port data. In non-matrix formatting, the variable names take the form $s1_1$, $s1_2$, $s2_1$, $s2_2$ and so forth.

You must differentiate between a fully-populated and a partially-populated matrix. Expression evaluators in the *Data Display Server* and in simulation components make simplifying assumptions when they encounter variables named using matrix notation. Those assumptions enable faster lookup for matrix variables, but depend on a particular layout and ordering of the stored data. The absence of data within the matrix data cause the matrix evaluation expressions to fail.

S-Parameter Data Acquisition

The most common reason for measuring S-parameters is to use the data in an S-parameter simulation. To be useful in an S-parameter simulation, the measured data must be stored in the dataset as real and imaginary pairs. Because the instruments will return data in differing formats (depending on the analyzer's data display configuration), when the Connection Manager reads the measured data from the instrument, it will momentarily switch the display to a Smith chart. When displayed this way, the instrument returns data in real and imaginary pairs required for an ADS dataset.

Note

This momentary change in display format does not compromise the measurement integrity. When finished gathering data, Connection Manager restores the instrument data display to its original format.

Earlier versions of Connection Manager acquired S-parameter data prior to the analyzer formatting the data for display on the analyzer's front panel. With ADS 2004A, Connection Manager now acquires S-parameter data after the data has been formatted to display real and imaginary pairs (represented as a Smith chart).

If you require a particular S-parameter representation, configure the instrument in the same manner you want the measured data stored in the dataset. If you want to store raw data, turn off corrections on the instrument. If you want to store corrected data, turn on corrections on the instrument. If you want to store data that includes electrical delay, set the instrument to a display mode that includes electrical delay and apply the required delay. This is a change from previous versions of ADS, where only corrected data was

stored.

Because the Connection Manager reads S-parameter data from the display buffer, any electrical delay you add to the measurement will be included in the data stored in the dataset. When displayed in an ADS data display window Smith chart, you can observe the electrical delay. DDS displays that do not show phase information, such as the rectangular plot displaying the data in dB, will look the same as any instrument display that doesn't show phase information, for example the Log Magnitude format.

Sweep Configuration

Connection Manager will not automatically acquire a new data sweep when asked to return measured data.

If the instrument is in hold mode, executing a measurement from the client returns the last data stored to the instrument memory.

To gather all of the data traces from the same sweep, configure the instrument to take the required measurements using the required conditions, then trigger a single sweep on the instrument. When the sweep is complete, the instrument enters hold mode, allowing the transfer of all the trace data into a dataset without taking a new sweep.

The single exception to this is the PNA power-swept measurement. When asked to retrieve data, the PNA power-swept measurement will always initiate a new sweep.

If you are using the 8753 power-swept measurement, make sure the instrument is set to trigger continuously.

Exporting S-Parameter Data to Text Files

The S-parameter measurement panels provide data export functionality through the Export Data group box.

There are five *File Type* options:

- **AmplifierP2D** (use with *AmplifierP2D* (ccsys) circuit component)
- **AmplifierS2D** (use with *AmplifierS2D* (ccsys) circuit component)
- **AmpSingleCarrier** (use with *AmpSingleCarrier* (ccsys) circuit component)
- **GainRF** (use with *GainRF* (timed) signal processing component)
- **All-4-Formats**

Data exported to an S2D file must meet the following requirements:

- The file must contain at least one GCOMPx x:{1,2,...,7} block
- It may contain an ACDATA and/or and NDATA block (and/or an IMT block)
- It may be multi-dimensional. For example, it may contain VAR statements above each basic S2D block.

The contents of such an S2D file may be distributed to the following models in the following capacities:

- *AmplifierS2D* can read multi-D S2D files (including ACDATA, GCOMPx and NDATA) blocks and is highly recommended for generic use. It is mounted on top of *Amplifier2* so all FILE-mode properties of the latter are preserved. See also, *AmplifierS2D* component documentation.
- *Amplifier2* can read 1-D S2D files (only reads the GCOMPx block) if placed in FILE-mode. Its small signal parameters and noise parameters need to be supplied manually at run time. Less effective for using direct instrument read data. See also, *Amplifier2* component documentation.
- Both *AmplifierS2D* and *Amplifier2* can create odd order harmonics and IMDs to some degree of accuracy and model nonlinear noise, but cannot handle gain expansion very well because of the polynomial curve fitting constraints. See also, *AmplifierS2D* component documentation.

AmpSingleCarrier is not recommended because it contains a subset of the functionality available with *AmplifierS2D* (for example, *AmpSingleCarrier* does not provide harmonic modeling). If non-poly fitted single carrier modeling is required, *AmplifierP2D* handles full 2-port S-parameters. See also, *AmpSingleCarrier* component documentation.

AmplifierP2D is recommended for all single carrier applications. It can handle small signal noise and full 2-port large signal nonlinearity. It does not have problems handling arbitrary compression curves because it data fits by direct interpolation of P2D file data. See also, *AmplifierP2D* component documentation.

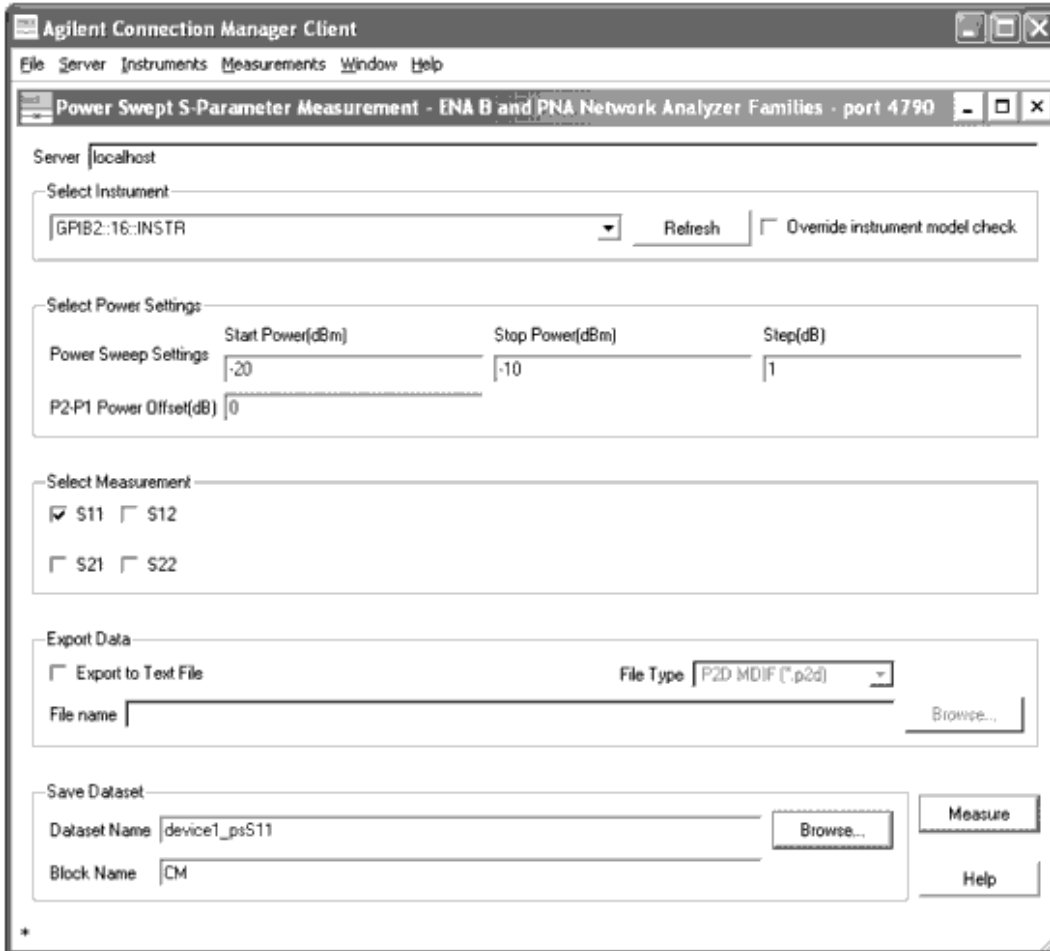
Behavioral Modeling (Power Swept S-Parameter) Measurement Panels

This measurement is available for two network analyzer families, the *Agilent 8753/8722/8720/8719 Network Analyzer Family* and the *Agilent ENA B and PNA Series Network Analyzer Families*.

Note

Instruments in the *Agilent 8753/8722/8720/8719 Network Analyzer Family* have varying capabilities to make S-parameter measurements. Instruments with an "ET" designation have only transmission and reflection test sets, and are not capable of making a full suite of S-parameter measurements. Instead, they measure transmission and reflection only on one port.

The *Power Swept S-Parameter Measurement* panels contain five sections.



Select Instrument

Use this section to select and initialize the instrument used for data collection.

The drop-down list shows the VISA identification strings of all instruments connected to the server. You can either select a VISA identification string from this list or type in any valid VISA identification string corresponding to an instrument connected to the server. After a new interface is created, use the *Refresh* button to update the instruments on the *Select Instrument* drop-down list.

The check box labeled *Override instrument model check* determines whether the measurement queries an instrument for instrument model, its identification number or its identification string, and verifies that the instrument is a particular model number or belongs to a particular family. This identification takes place once at the beginning of the measurement. If you know that a measurement needs to take place only on a certain model number of instrument or family of instruments, leave this box cleared. If you want to use an instrument whose instruction set is compatible with a given instrument or family, but is not specifically listed in the measurement, then check this box.

Note
Measurements have only been tested with the instruments identified in the measurement panel. Using an unlisted instrument may provide inaccurate results.

Select Power Settings

Use this section to specify the power range over which the stimulation power is swept.

Power sweep always starts from the minimum power and ends at the maximum power. If the specified *Start Power* is higher than *Stop Power*, they are swapped.

If any of the specified power entries cannot be set correctly (usually out of range) during the measurement, the measurement stops and no data file/dataset is generated.

P2-P1 Power Offset can be set to a non-zero value in order to offset port 2 power from port 1 power. Only the *Amplifier P2D* file can reflect the power offset. Other data files and datasets only record the *P1* power.

If *P2-P1 Power Offset* is set to a non-zero value, for example 5 dB, Agilent E88XX/E83XX/N338X network analyzers uncouple port 1 and port 2 automatically. However, for Agilent 8753/8722/8720/8719 network analyzers, port 1 and port 2 must be uncoupled manually. Otherwise, the measurement will warn out and stop.

Note
Agilent E88XX/E83XX/N338X network analyzers turn off auto attenuator control during the measurement for better accuracy.

Select Measurement

Use the check boxes in this section to select the S11, S12, S21, and S22 measurements.

Note
At least one of the check boxes must be selected to proceed.

Export Data

Use this section to choose a file name and export an ASCII text file.

There are five *File Type* options:

- **AmplifierP2D**
- **AmplifierS2D**
- **AmpSingleCarrier**
- **GainRF**
- **All-4-Formats**

Selecting a *file type* from the drop-down list produces a file in that format. Selecting **All-4-Formats** generates four data files, one of each type.

Entering a file name with an extension is not recommended. A *.p2d*, *.s2d*, *.sc*, or *.txt* is automatically appended to the *File name* for each of the file types respectively.

Note

_ Save Data File_ is only active if the *Export to Text File* check box is selected.

For more information, see [Exporting S-Parameter Data to Text Files](#).

Save Dataset

Use this section to specify the dataset and block name for saving trace data.

Measure

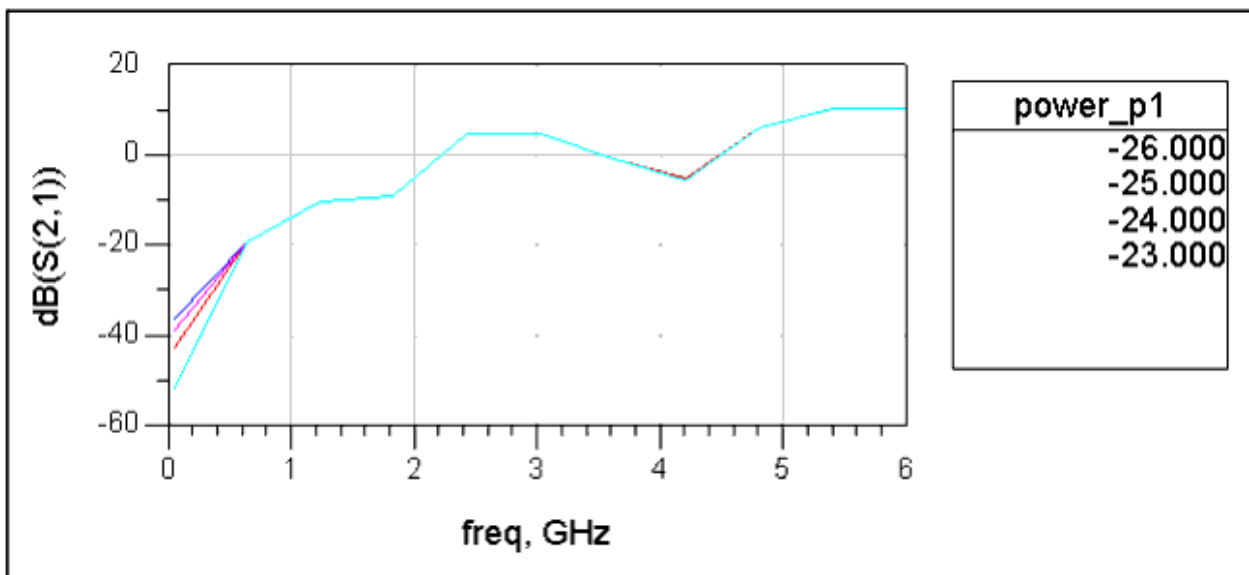
Select the **Measure** button to perform the measurement. At this point data is saved in the specified dataset.

Note

While the measurement is running, the measurement panel is disabled. Upon completion, a *Measurement complete* dialog box appears. Select **OK** to dismiss.

Measurement Results

The following data display shows the typical results from a measurement performed with an Agilent E8364A.



The following screen shot shows part of the generated MeasuredByAgilentPNA.p2d file performed with the Agilent E8364A.

```

BEGIN ACDATA
# AC (HZ S RI R 50 FC 1 0)
! small signal s-parameter
% F n1lx n1ly n2lx n2ly n12x n12y n22x n22y
45000000      5.862551E-001      -6.657859E-001      5.302571E-003      -4.772100E-001
640500000    8.596374E-001      -4.337893E-002      9.617110E-002      -4.734988E-001
1236000000   6.115355E-001      6.015485E-001      2.935761E-001      5.110881E-001
1831500000   -2.796059E-002      7.829126E-001      1.715985E-001      3.022285E-001
2427000000   -3.248371E-001      4.834614E-001      -1.215954E+000      1.251036E+000
3022500000   -2.479562E-001      -4.701518E-001      -6.181526E-001      1.605319E+000
3618000000   2.215237E-001      -6.035740E-001      -7.367508E-001      4.687943E-001
4213500000   5.317558E-001      -3.627541E-001      -1.564360E-001      -5.081304E-001
4809000000   6.543083E-001      -9.287953E-002      1.818110E+000      -7.466930E-001
5404500000   4.715164E-001      -8.392654E-002      3.207382E+000      -8.377711E-001
6000000000   3.203769E-001      -7.510165E-002      3.171045E+000      4.313560E-001
! power dependent s-parameter
% F
45000000
% P1 P2 n1lx n1ly n2lx n2ly n12x n12y n22x n22y
-26          -26          5.862551E-001      -6.657859E-001      5.302571E-003
-25          -25          5.868558E-001      -6.671214E-001      -1.113311E-002
-24          -24          5.897495E-001      -6.660354E-001      5.479844E-003
-23          -23          5.904784E-001      -6.648927E-001      -2.477052E-003
% F
640500000
% P1 P2 n1lx n1ly n2lx n2ly n12x n12y n22x n22y
-26          -26          8.596374E-001      -4.337893E-002      9.617110E-002
-25          -25          8.621008E-001      -4.300044E-002      9.347188E-002

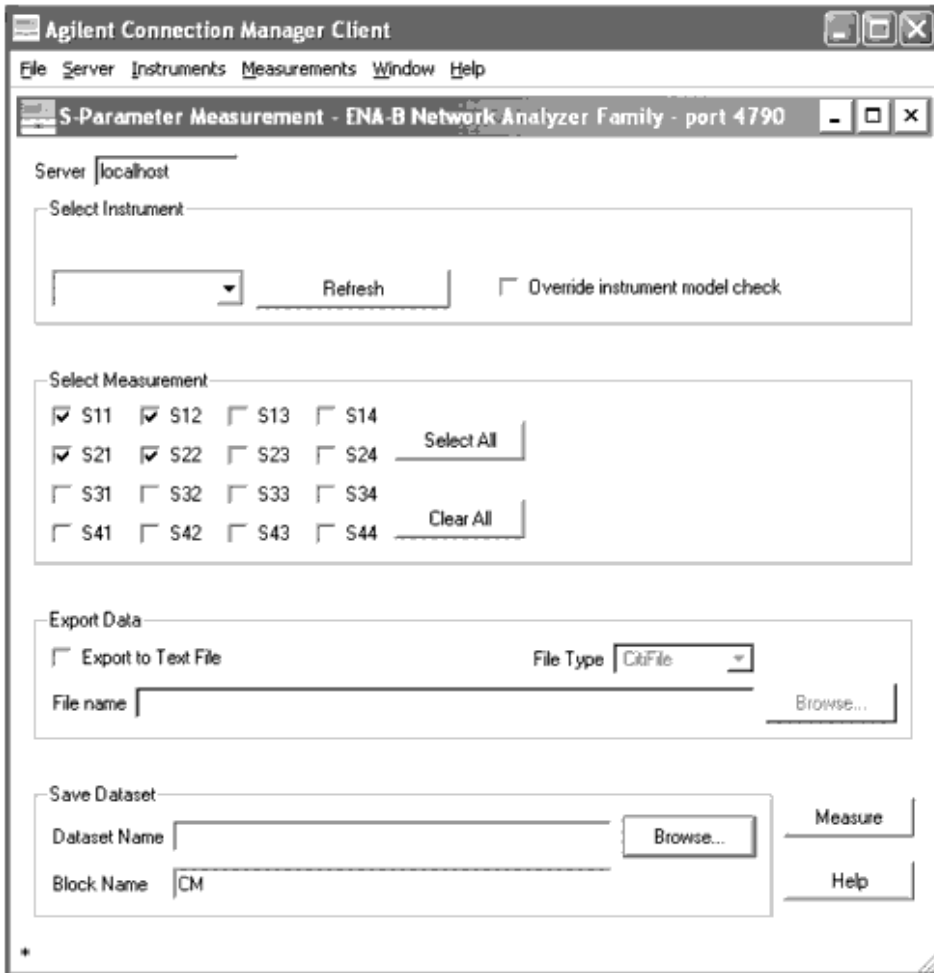
```

S-Parameter Measurement Panels

2-Port, 3-port, and 4-port S-parameter measurement using one or more instruments from the following network analyzer families:

- Agilent 8753/8722/8720/8719 Network Analyzer Family
- Agilent 8712/8714 Network Analyzer Family
- Agilent ENA B and PNA Network Analyzer Families
- Agilent 8510 Network Analyzer Family

The *S-Parameter Measurement* panels contain of four functional sections.



Select Instrument

Use this section to select and initialize the instrument used for data collection.

The drop-down list shows VISA identification strings of all instruments connected to the server. You can either select a VISA identification string from this list or type in any valid VISA identification string corresponding to an instrument connected to the server. After a new interface is created, use the *Refresh* button to update the instruments on the *Select Instrument* drop-down list.

The check box labeled *Override instrument model check* determines whether the measurement queries an instrument for its identification string and verifies that the instrument is a particular model number or belongs to a particular family. This identification takes place once at the beginning of the measurement. If you know that a measurement needs to take place only on a certain model number of instrument or family of instruments, leave this box cleared. If you want to use an instrument whose instruction set is compatible with a given instrument or family, but is not specifically listed in the measurement, then check this box.

Note
Measurements have only been tested with the instruments identified in the measurement panel. Using an unlisted instrument may provide inaccurate results.

Select Measurement

Use this field to select which S-parameter(s) from S11, S12, S13, S21, S22, S23, S31, S32, and S33 are measured. The S11 measurement uses port 2 as load port, S22 and S33 measurements use port 1 as load port.

4-port measurements are available with the ENA B family of network analyzers. The *Select All* and *Clear All* functions in the *Select Measurement* section are useful in selecting or clearing all the boxes without having to make individual measurement selections.

Note
The ENA family of instruments need to be individually configured to make 4-port measurements. For information regarding making 4-port measurements, refer to the specific instrument's documentation.

Note
At least one of the check boxes must be selected to proceed.

Export Data

Use this section to choose a specific file name and to export an ASCII text file. Use the *File Type* drop-down list to choose one of two available file types - *CitiFile* or *Touchstone*.

Note
_ Save Data File_ is only active if the *Export to Text File* check box is selected.

Save Dataset

Use this section to specify the dataset and block name for saving trace data.

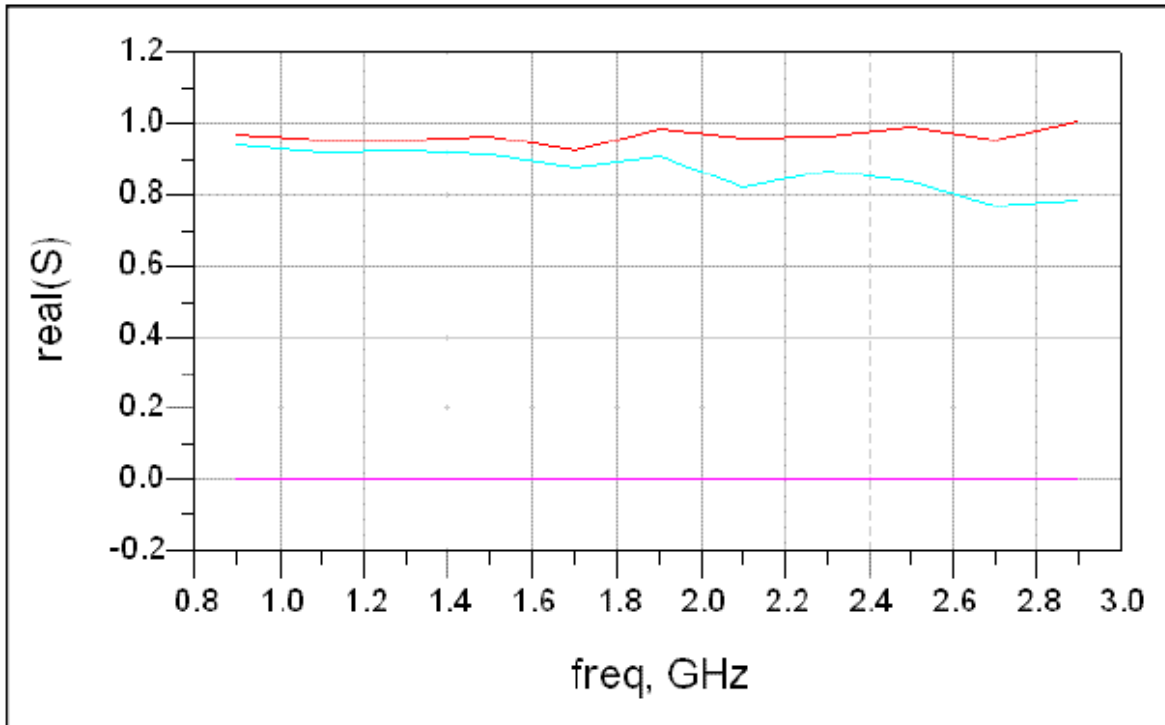
Measure

Select the **Measure** button to perform the measurement. At this point data is saved in the specified dataset.

Note
While the measurement is running, the measurement panel is disabled. Upon completion, a *Measurement complete* dialog box appears. Select **OK** to dismiss.

Measurement Results

The following data display shows typical results from a measurement performed with an Agilent E8364A.



The following screen shot shows part of a text file generated using the *Save Data File* feature.

```

# Created Wed Mar 05 14:05:01 2003

CITIFILE A.01.00
NAME CM
VAR freq MAG 11
DATA S[1,1] RI
DATA S[1,2] RI
DATA S[2,1] RI
DATA S[2,2] RI
VAR_LIST_BEGIN
    900000000
    1.1e+009
    1.3e+009
    1.5e+009
    1.7e+009
    1.9e+009
    2.1e+009
    2.3e+009
    2.5e+009
    2.7e+009
    2.9e+009
VAR_LIST_END
BEGIN
    0.967220545,    0.0445486493
    0.955558896,    0.051563181
    0.954256415,    0.018186802
    0.964494348,    0.0591026673
    0.92330122,     0.0319634527
    0.984793961,    0.00109367177
    0.958580613,    0.0419565849
    0.96601361,     -0.00757869147
    0.989797533,    0.0206268057
    0.956061065,    0.0306763947
    1.00478876,     -0.00724043418
END
BEGIN
    -8.98296037e-007,    0.000565900356
    2.03472791e-005,    2.89343607e-005

```

Understanding Spectrum Measurements

Spectrum measurements are available for three types of spectrum analyzers:

- 856XX Spectrum Analyzer Family
- 859XX Spectrum Analyzer Family
- E444XA PSA Series spectrum analyzers

The Spectrum measurement panel collects frequency domain data into a dataset. To read this data during a simulation, use the *CM VSA E444xA Source* (instruments) component.

Note

The only differences between the three *Spectrum Measurement* panels are the title bars and trace names.

The *Spectrum Measurement* panels contain five sections.

Spectrum Measurement - Agilent E444XA Spectrum Analyzer Family - port 4790

Server

Select Instrument

Refresh

Override instrument model check
 Reset Instrument on Initialization

Select Frequency Settings

Use Current Instrument Settings

	Center Freq	Units	Span	Units
<input type="radio"/> Center Frequency/Span	<input type="text" value="10.0"/>	<input type="text" value="MHz"/>	<input type="text" value="1.0"/>	<input type="text" value="MHz"/>
<input checked="" type="radio"/> Start/Stop Frequency	<input type="text" value="1.998"/>	<input type="text" value="GHz"/>	<input type="text" value="2.002"/>	<input type="text" value="GHz"/>

Select Measurement

Trace 1
 Trace 2
 Trace 3

Save Dataset

Dataset Name Browse...

Block Name

Measure

Help

Select Instrument

Use this section to select and initialize the instrument used for data collection.

The *Select Instrument* drop-down list shows the VISA identification strings of all instruments connected to the server. You can either select a VISA identification string from this list or type in any valid VISA identification string corresponding to an instrument connected to the server. After a new interface is created, use the *Refresh* button to update the instruments on the drop-down list.

The check box labeled *Override instrument model check* determines whether the measurement queries an instrument for its identification string and verifies that the instrument is a particular model number or belongs to a particular family. This identification takes place once at the beginning of the measurement. If you know that a measurement needs to take place only on a certain model number, leave this box cleared. If you want to use an instrument whose instruction set is compatible with a given instrument or family, but is not specifically listed, then check this box.

Note

Measurements have only been tested with the instruments identified in the measurement panel. Using an unlisted instrument may provide inaccurate results.

Reset instrument on initialization check box

Select this check box to reset the spectrum analyzer to a preset state before executing a measurement.

Use this function when the measurement instructions would otherwise be invalid given the current the spectrum analyzer configuration.

If the *Reset Instrument on Initialization* check box is selected, the instrument is reset, any prior setup is lost, and the instrument returns to the factory default state. This is used in cases where the instructions a measurement sends to an instrument are not valid for the instrument configuration.

Select Frequency Settings

The Frequency Selection section is used to specify the frequency range over which the spectrum measurement is performed.

Selecting *Use Current Instrument Settings* performs a spectrum measurement over the last specified range. If the *Reset Instrument on Initialization* check box (in the Select Instrument section) is also selected, then the measurement is performed over the factory default range.

Selecting *Center Frequency/Span* defines a new frequency range. The values entered in the *Center Freq* and *Span* fields and the values selected in the *Units* drop-down lists must define a valid frequency range ($\text{Center Freq} > 0$, $\text{Span} > 0$, $\text{Center Freq} - 0.5 \times \text{Span} \geq 0$), otherwise the measurement will stop.

Selecting *Start/Stop Frequency* defines a new frequency range. The values entered in the *Start Freq* and *Stop Freq* fields and the values selected in the *Units* drop down lists must define a valid frequency range ($0 \leq \text{Center Freq} < \text{Stop Freq}$), otherwise the measurement will abort.

Note

Defining a new frequency range using the *Center Frequency/Span* or the *Start/Stop Frequency* radio buttons may return unexpected results in the case where some traces are *frozen*. Traces can be in two states: an *update state*, where each new sweep updates the trace in some way (when *Clear Write*, *Max Hold*, or *Min Hold* option is selected) or a *frozen state*, where each new sweep leaves the trace unchanged (when the *View* option is selected). If the *View* option is selected and new frequency range defined is not the same as the one with which the trace was captured before being frozen, the frequency axis of the trace read corresponds to the new frequency range and will be incorrect.

Select Measurement

The Measurement Selection area is used to select which traces are read. The Agilent 856XX family supports only two traces, whereas the Agilent 859XX and E444XA families support three traces.



Note

At least one of the check boxes in this area must be selected to proceed.

Save Dataset

Use this section to specify the dataset and block name for saving trace data.

Measure

Select the **Measure** button to perform the measurement. At this point data is saved in the specified dataset.

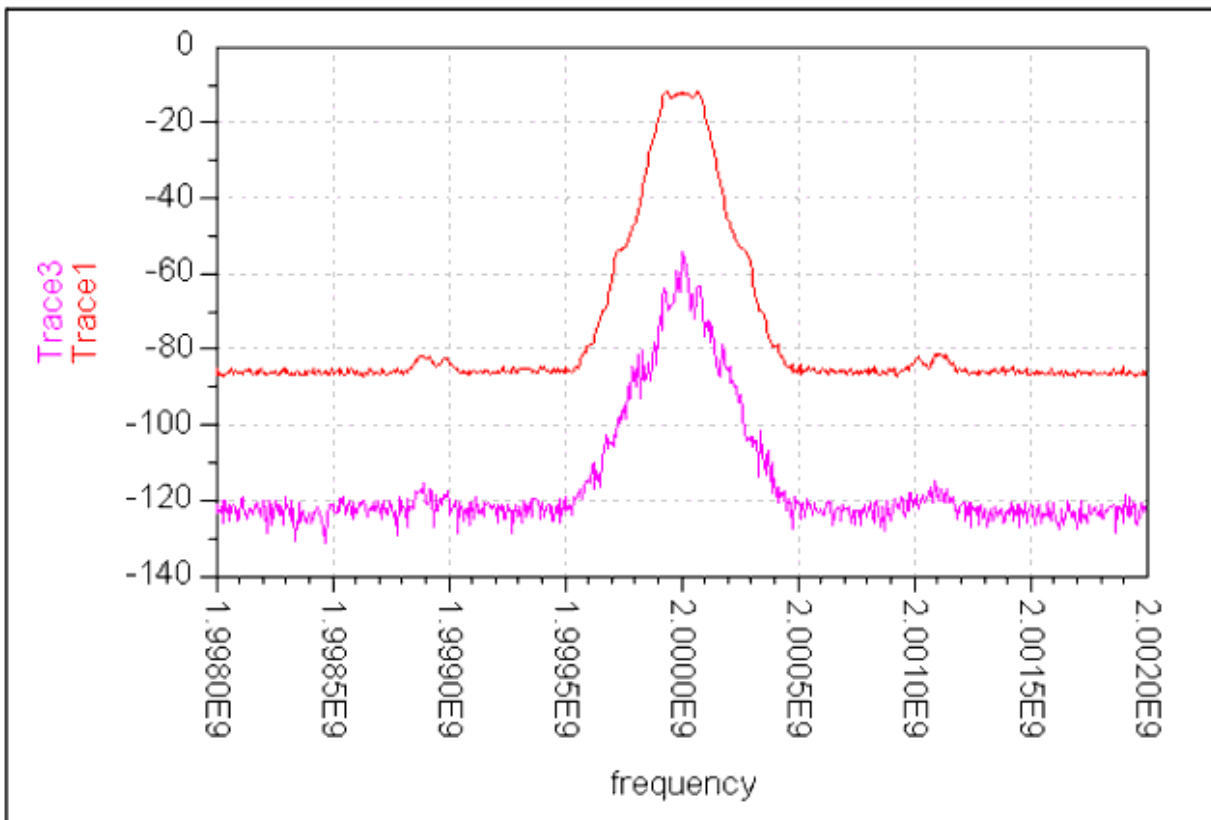


Note

While the measurement is running, the Measurement panel is disabled. Upon completion a *Measurement complete* dialog appears. Select **OK** to dismiss this dialog.

Measurement Results

These are the results from a measurement performed using an Agilent E444XA and the setup shown earlier. For this measurement, Trace1 was set to Max Hold and Trace3 was set to Min Hold.



Understanding Voltage Waveform Measurements

Voltage waveform measurements are available for the following oscilloscopes:

- Agilent 86100A oscilloscope
- Agilent 5462X and 5464X Oscilloscope Families
- Agilent 5485X and 5483X Oscilloscope Families

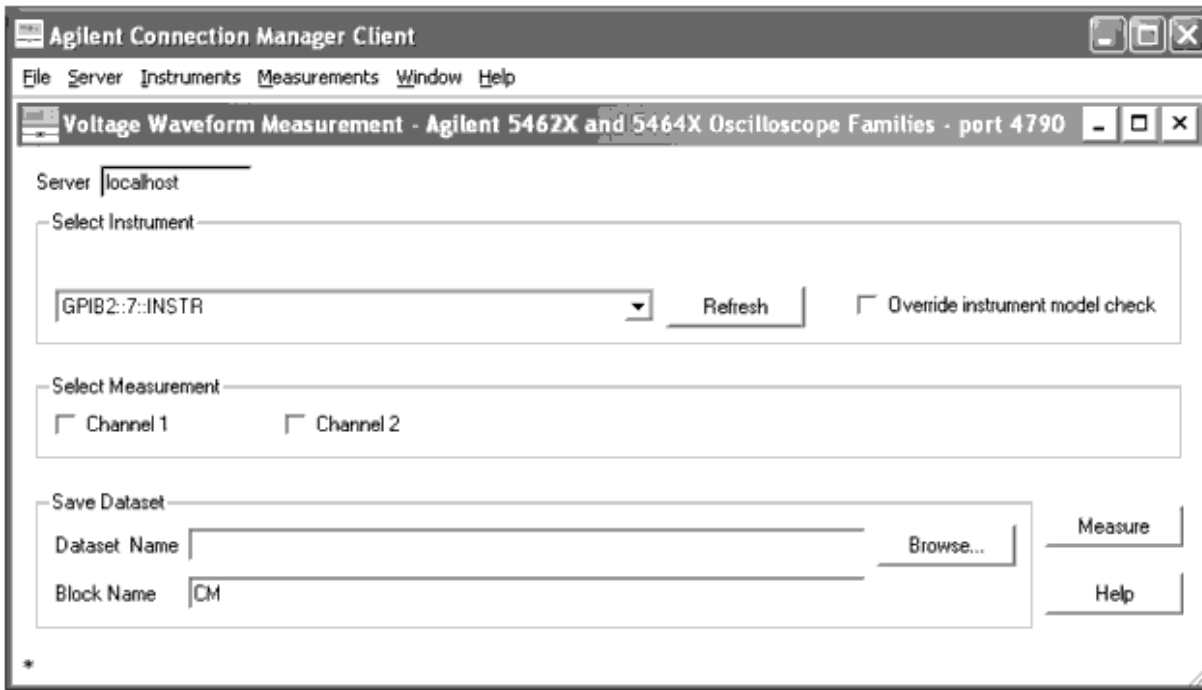
The Agilent 86100A, 5462X, and 5464X oscilloscopes require manual measurement configuration from the instrument front panel.

The Agilent 5485X and 5483X oscilloscopes can be configured from the measurement panel.

Measurement Panels Requiring Manual Measurement Configuration

The measurement panels under this menu selection create datasets where the Y-axis values represent sampled voltage data and the X-axis values represent the times at which each voltage sample was taken.

Use the *CM Infiniium 548xx Source1* (instruments) and *CM Infiniium 548xx Source2* (instruments) components to read the data during a simulation.



Select Instrument

Use this section to select and initialize the instrument used for data collection.

The drop-down list shows the VISA identification strings of all instruments connected to the server. You can either select a VISA identification string from this list or type in any valid VISA identification string corresponding to an instrument connected to the server. After a new interface is created, use the *Refresh* button to update the instruments on the *Select Instrument* drop-down list.

The check box labeled *Override instrument model check* determines whether or not the measurement queries an instrument for its identification string and verifies that the instrument is a particular model number or belongs to a particular family. This identification takes place once at the beginning of the measurement. If you know that a measurement needs to take place on a certain model number of instrument or family of instruments, leave this box unselected. If you want to use an instrument with an instruction set compatible with a given instrument or family, but not specifically listed, then select this check box.

Note
Measurements have only been tested with the instruments identified in the measurement panel. Using an unlisted instrument may produce inaccurate results.

Select Measurement

When stored in the dataset, each measurement selected creates a variable named according to the name assigned to the measurement, *Channelx* or *Memoryx* in the case of the Agilent 86100A oscilloscope or *Channel 1 - Channel 2* in the case of the Agilent 5462x

and 5464x oscilloscope families.

The *Voltage Waveform Measurement - Agilent 86100A Oscilloscope* dialog reads channel and memory data from an Agilent 86100A oscilloscope. Some applications use the *TDR* data captured by this instrument. To do this, select the channel that displays the *TDR* trace.



Note

At least one of the check boxes in this area must be selected to proceed.

Save Dataset

Use this section to specify the dataset and block name when saving trace data.

Measure

Select the **Measure** button to perform the measurement. At this point data is saved in the specified dataset.



Note

While the measurement is running, the Measurement panel is disabled. Upon completion a *Measurement complete* dialog appears. Select **OK** to dismiss.

Voltage Waveform Measurements Using 5483X Family Oscilloscopes

When using these oscilloscopes with Connection Manager, all measurements must contain equal numbers of trace data points.



Note

This measurement requires the instrument to have firmware revision A.02.30 or later. To view the firmware revision, on the main instrument menu, click **Help > About Infiniium**. For firmware updates, visit the Agilent web site.

Matching Numbers of Trace Data Points

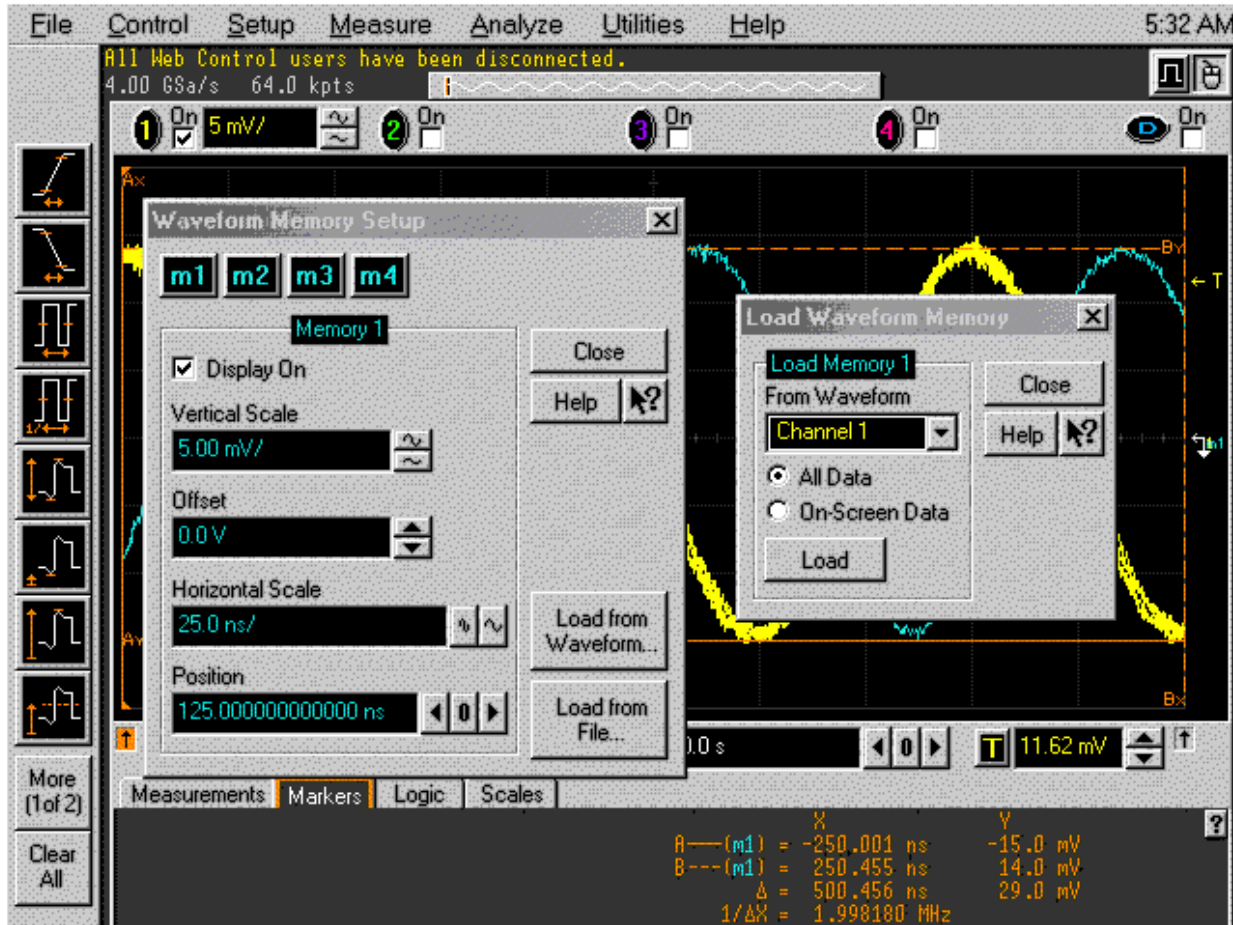
These instruments require datasets to have all the independent variables mapped over the same dependent variable. If you select more than one measurement in the client window, all the selected measurements must return the same number of trace points.

For example, if you select *Channel 1* and *Memory 1* it is important that *Memory 1* contain the same number of trace points as *Channel 1*. If the number of trace points differ, store the data in separate datasets.

When copying a waveform to memory, follow these steps to set the memory trace to have

the same number of points as a display trace.

1. From the instrument's *Setup* menu, select **Waveform Memory...**
2. In the *Waveform Memory Setup* dialog, select **Load from Waveform....**
3. In the *Load Waveform Memory* dialog, select the **All Data** radio button.



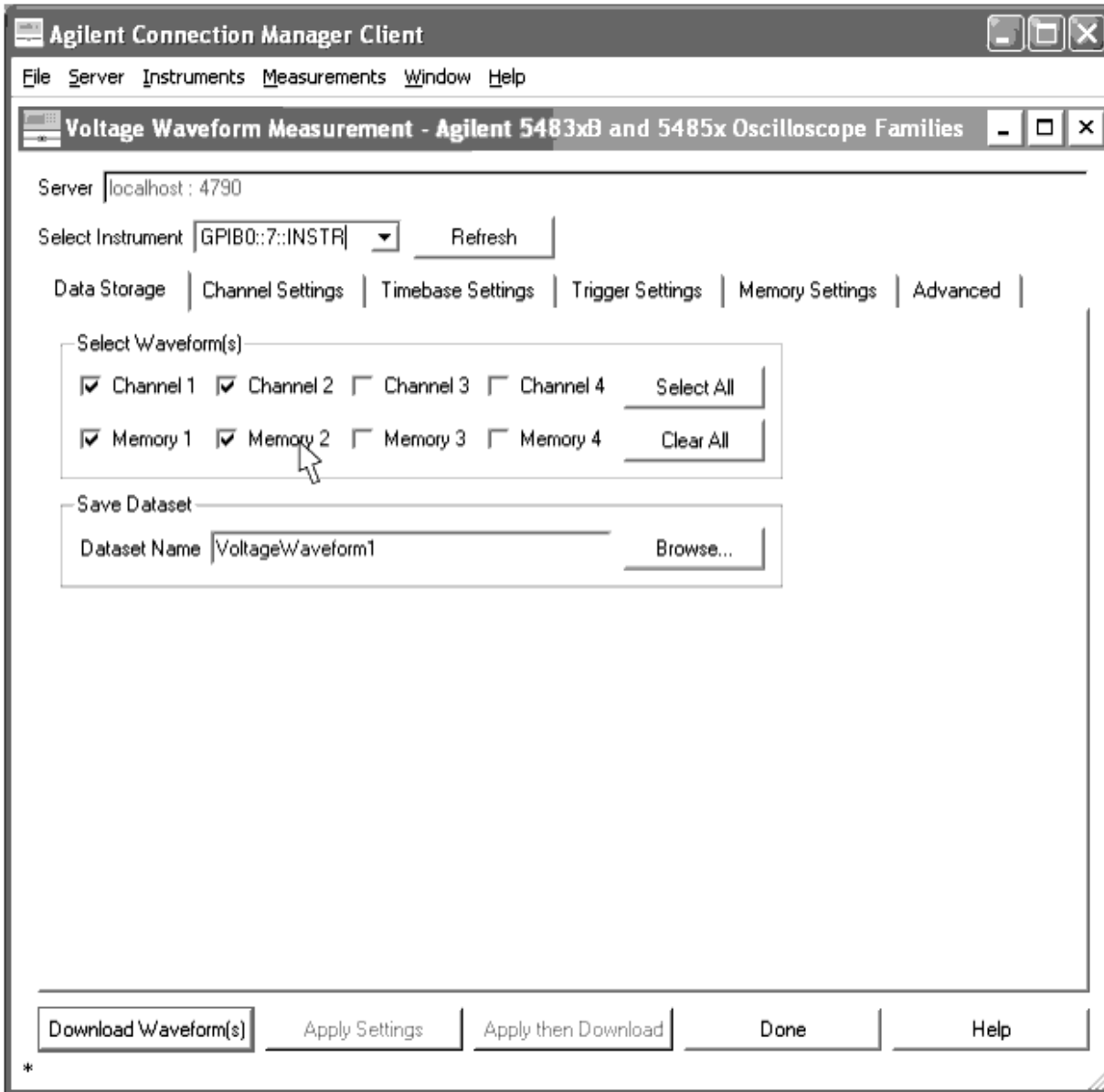
Measurement Panels With Client-Based Measurement Configuration

Connection Manager offers client-based measurement configuration using Agilent 5483XB and 5485XB Oscilloscope Families. This measurement panel has extensive instrument control capabilities in addition to the capability to store downloaded waveforms. The panel groups the data gathering and instrument control functions into related tabs.

The buttons near the bottom of the panel download waveforms, send setup information to the instrument, send setup information to the instrument, then immediately perform a download, dismiss the dialog, and display context-sensitive help.

Note

This measurement requires the instrument to have firmware revision A.02.30 or later. To view the firmware revision, on the main instrument menu, click **Help > About Infiniium**. For firmware updates, visit the Agilent web site.



Select Instrument

Use this section to select and initialize the instrument used for data collection.

The drop-down list shows the VISA identification strings of all instruments connected to the server. You can either select a VISA identification string from this list or type in any valid VISA identification string corresponding to an instrument connected to the server. After a new interface is created, use the **Refresh** button to update the instruments on the *Select Instrument* drop-down list.

Note
Measurements have only been tested with the instruments identified in the measurement panel. Using an unlisted instrument may produce inaccurate results.

Data Storage Tab

The screenshot shows the 'Data Storage' tab selected. The 'Select Waveform(s)' section contains the following controls:

- Channel 1: Channel 2: Channel 3: Channel 4: Select All:
- Memory 1: Memory 2: Memory 3: Memory 4: Clear All:

The 'Save Dataset' section contains:

- Dataset Name: Browse...:

Select Waveform(s)

Like the manually configured oscilloscope measurement *Select Measurement* group box, the *Channel* and *Memory* check boxes select the data traces to store in a dataset.

The measurement stores these traces with dataset variable names identical to those used in manually configured oscilloscope measurements.

Select All and **Clear All** are convenient ways to select and exclude all data and memory channels from data download, respectively.

Save Dataset

Use this section to specify the dataset when saving trace data. This measurement does not include a block name field. In addition to being able to type the name of a dataset file into the *Dataset Name* field, the **Browse...** button will display a file selection dialog that you may use to select an existing data or specify a new one.

Channel Settings Tab

The screenshot shows the 'Channel Settings' tab selected. The 'Channel 1' sub-tab is active. The controls are as follows:

- Include panel contents in instrument upload:
- Display channel 1:
- Scale (Volts / division):
- Offset:

This tab contains additional tabs that allow control of the instrument's vertical scale setup

for channels having a physical input connector. Each acquisition channel is controlled through a separate tab labeled *Channel 1* through *Channel 4*.

Every control tab contains an *Include panel contents in instrument upload* check box. When selected, the contents of the tab get transmitted to the instrument when you click the **Upload Settings**. For example, the *Channel 1* tab contents will be transmitted to the instrument when the panel is configured as it is in the preceding screen shot.

Each channel is controlled independently, as are all memories. This allows adjustment of particular instrument settings, while leaving all others unchanged.

The *Display channel X* check box determines whether or not the instrument will display the associated trace on its screen. Selecting a channel for waveform download overrides this setting. For example, if you turn off channel 2, but select it for download, the oscilloscope will display channel 2 following the data download.

The *Scale* field sets the associated channel's vertical scale. The number in this field corresponds to the instrument's Volts/division setting for a given channel.

The *Offset* field sets the vertical value that is represented at the center of the display for the selected channel. Offset parameters are probe and vertical scale dependent.

Timebase Settings Tab

The screenshot shows the 'Timebase Settings' tab selected. It contains the following controls:

- Include panel contents in instrument upload
- Timebase reference: Center
- Timebase scale (Seconds / division): 100 ns
- Timebase delay: 0 ps

The *Timebase reference* drop-down list selects the location of the time zero point on the instrument display. **Left** puts time zero at the left edge of the display. **Center** puts time zero in the middle of the display. **Right** puts time zero at the right edge of the display. Anything to the left of time zero is data captured before the trigger event.

The *Timebase scale* field sets the instrument's horizontal scale. This field corresponds to the instrument's time/division setting.

The *Timebase delay* field sets the time interval between the trigger event and the delay reference point.

Trigger Settings Tab

Data Storage | Channel Settings | Timebase Settings | **Trigger Settings** | Memory Settings | Advanced

Include panel contents in instrument upload

Trigger Settings:

Trigger mode: Auto

Trigger source: Channel 1

Trigger slope: Positive (rising edge)

Trigger holdoff: 80 ns

Trigger hysteresis: Normal

Trigger Levels:

External: 0 mV

Channel 1: 0 mV

Channel 2: 0 mV

Channel 3: 0 mV

Channel 4: 0 mV

The *Trigger Settings* group controls how the instrument takes a sweep.

When *Trigger mode* is set to **Auto**, the instrument is in free-run mode, requiring no trigger event to take a sweep. When in **Triggered** mode, the instrument will continuously take sweeps, as long as trigger conditions are met. When in **Single** mode, the instrument will take one sweep when trigger conditions are met and then stop sweeping.

The instrument can use any of the active channels, the Aux connector on the back of the instrument (**External**) or the AC power (**Line**) as the trigger source.

The settings in the *Trigger levels* group determine the voltage value at which the instrument will take a sweep when the associated trigger source is active.

The *Trigger slope* setting determines whether the instrument considers the trigger point to be the rising or falling edge of the signal selected as the trigger source.

Trigger holdoff specifies the amount of time the oscilloscope should wait after receiving a trigger before enabling the trigger again.

Trigger hysteresis specifies the trigger hysteresis (noise reject) as either Normal or High Sensitivity. **Normal** sensitivity adds hysteresis to the trigger circuitry for rejecting noise and should be used for waveform frequencies at or below 4 GHz. **High Sensitivity** lowers the hysteresis of the trigger circuitry and should be used for waveforms frequencies above 4 GHz.

The *Trigger Levels* group specifies the voltage level at which the instrument will take a sweep when the corresponding trigger source is active.

Memory Settings Tab

Data Storage	Channel Settings	Timebase Settings	Trigger Settings	Memory Settings	Advanced
Memory 1	Memory 2	Memory 3	Memory 4		
<input type="checkbox"/> Include panel contents in instrument upload <input type="checkbox"/> Display memory 1					
X Range	100		ms		
X Offset	0		ps		
Y Range	200		mV		
Y Offset	0		mV		

This tab contains more tabs that control each of the instrument's waveform memories.

The *Display memory X* selection determines whether the instrument will display the contents of the corresponding waveform memory. This setting is overridden by selecting to download the associated waveform memory trace.

The *X Range* field sets the X-axis (horizontal) range for the selected waveform memory's display scale. The horizontal scale is the horizontal range divided by 10.

The *X Offset* field sets the X-axis (horizontal) position for the selected waveform memory's display scale. The position is referenced to center screen.

The *Y Range* field sets the Y-axis (vertical) range for the selected memory. The vertical scale is the vertical range divided by 8.

The *Y Offset* field sets the Y-axis (vertical) position for the selected waveform memory. The position is referenced to center screen.

Advanced Tab

Data Storage	Channel Settings	Timebase Settings	Trigger Settings	Memory Settings	Advanced
<input type="checkbox"/> Override instrument model check <input type="checkbox"/> Perform autoscale before acquiring trace data					
Time to wait to acquire exclusive instrument lock (seconds)			2		
Time to wait for waveform transfer (seconds)			10		
Save Instrument State...		Recall Instrument State...			
Reset Instrument		Clear Instrument Status			

When selected, the *Perform autoscale before acquiring trace data* check box causes the instrument to perform an autoscale operation before downloading the waveforms you have selected on the *Data Storage* tab. Autoscale is a convenient way to have the instrument determine the optimal settings for displaying the waveforms present on the

input connectors.

The *Time to wait to acquire exclusive instrument lock* check box is an advanced setting intended to allow you to determine how long to wait for a shared instrument to become available for your exclusive use. If two clients want to use the same instrument at the same time, the instructions getting to the instrument would be intermingled between the different clients. To prevent this intermingling of instructions, the server locks an instrument during the time a client is actively communicating with that instrument. When a client is done, the server unlocks the instrument. This field specifies how long to wait for a shared instrument to become unlocked (thereby granting access to it) before giving up.

The *Time to wait for waveform transfer* field specifies how long to wait for an instruction sent to the instrument to complete its task before deciding that the instrument will most likely never complete the task. For example, an instrument is set to trigger on an external event and the event is expected to occur within 10 seconds. If that event never occurs, the measurement would hang indefinitely. Use this field to specify how long to wait before giving up.

Note
Increase this value when downloading large waveforms that may take a long time to transfer out of the instrument.

Clicking **Save Instrument State** records the instrument's learn string (as specified by the IEEE-488.2 specification) into a data file. Use this function to save redoing a complicated instrument configuration. If undesired adjustments are subsequently made to the measurement configuration, simply recall the stored setup into the instrument by clicking **Recall Instrument State**.

Recall Instrument State allows you to select a file containing a previously-stored instrument state to be sent back to the instrument.

Clicking **Reset Instrument State** sets the instrument to its default state by issuing the IEEE-488.2 standard *RST command.

Clicking **Clear Instrument Status** clears the error status bit in the instrument's status byte by sending the IEEE-488.2 standard command *CLS. Use this to clear an error caused by a previous instruction that timed out.

Use the *CM Infiniium 548xx Source1* (instruments) and *CM_Infiniium_548xx_Source2* (instruments) components to read the data and to configure the Infiniium scope during a simulation.

Download Waveform(s)

Select the **Download Waveform(s)** button to capture the selected traces from the instrument and store the data in the dataset. See [Matching Numbers of Trace Data Points](#) for important information regarding waveform memory trace acquisition.

Download Waveform(s) is active only when the following conditions are met:

- One or more data or memory channels has been selected for download.
- The Select Instrument drop-down list contains an entry.
- The Dataset Name field contains an entry.

Upload Settings

Every control tab includes an *Include panel contents in instrument upload* check box. When selected, the contents of the tab are transmitted to the instrument when you click **Upload Settings**.

For example, the *Channel 1* tab contents will be transmitted to the instrument when the panel is configured. Each channel is controlled independently, as are all memories.

This allows adjustment to some instrument settings, while leaving all others unchanged. **Upload Settings** is active only when one or more of the *Include panel contents in instrument upload* check boxes are selected.

Upload then Download

Clicking **Upload then Download** configures the measurement, acquires the trace or memory data, and saves the data in a dataset. **Upload then Download** is active only when both the **Download Waveform(s)** and **Upload Settings** buttons are active.

Done

Click **Done** to close the measurement panel.

Help

Click **Help** to access Connection Manager documentation.

Performing Connected Measurements

This section teaches you how to make connected measurements using the measurement panels accessible through the Connection Manager client.

Overview

From the Connection Manager client dialog, you can access 2-port power swept S-parameter, S-parameter, spectrum, and voltage waveform measurements. Connection Manager uses measurement panels to configure instruments, execute measurements, and collect and format ADS datasets. Using these dialogs, you can easily configure and perform measurements made available on the server. For detailed information on the measurement configuration, see *Understanding the Measurement Panels* (connectmui).

Measuring S-Parameters

Connection Manger measurement panels enable behavioral modeling (2-port power swept) measurements and 2-, 3-, and 4-port frequency swept S-parameter measurements using the following network analyzer families. 2-port power swept measurements available for:

- 8753/8722/8720/8719 network analyzer family
- ENA B, ENA C, PNA, and PNA-X network analyzer families
2-, 3-, and 4-port frequency swept measurements available for:
- 8753/8722/8720/8719 network analyzer family
- 8712/8714 network analyzer family
- ENA B, ENA C, PNA, and PNA-X network analyzer families
- 8510 network analyzer family

Note

In all cases, the instrument must return both amplitude and phase information. Scalar analyzers do not provide information in a format suitable for use with Connection Manager.

Note

2-port measurements can be made on any combination of S11, S21, S12, and S22 parameters. The following discussion is also relevant to measuring S11 on 1-port devices. The text can be interpreted by the reader for such 1-port applications.

To Measure 2-Port Power Swept S-Parameters

This measurement is available for two network analyzer families, the *Agilent 8753/8722/8720/8719 Network Analyzer Family* and the *Agilent ENA B, ENA C, PNA, and PNA-X Series Network Analyzer Families* .

For detailed information regarding S-parameter measurement panel functionality, see *Understanding S-Parameter and Behavioral Modeling Measurements* (connectmui).

To make a 2-port power swept S-parameter measurement, complete the following steps.

1. Configure the frequency and power settings, and calibrate the network analyzer.
2. Insert the device under test into the measurement path.
3. Select **Measurements > Behavioral Modeling > ENA B and PNA Network Analyzer Families** .
4. To update the Select Instrument list with the latest instruments configured on the server, click **Refresh** .
5. Select the VISA resource connected to the network analyzer from the *Select Instrument* drop-down list.
6. In the *Select Power Settings* group box *Start Power (dB)* data entry field, enter -20 .
7. In the *Stop Power (dB)* data entry field, enter -10 .
8. In the *Step (dB)* data entry field, enter 1 .
9. Deselect all measurements except **S11** .
10. Enter `device1_psS11` in the Dataset Name field.
11. To send the client information in the *Power Swept Measurement* panel to the server workstation, click **Measure** .

Agilent Connection Manager Client

File Server Instruments Measurements Window Help

Power Swept S-Parameter Measurement - ENA B and PNA Network Analyzer Families - port 4790

Server localhost

Select Instrument
 GPIB2::16::INSTR Refresh Override instrument model check

Select Power Settings

Power Sweep Settings	Start Power(dBm)	Stop Power(dBm)	Step(dB)
	-20	-10	1

P2-P1 Power Offset(dB) 0

Select Measurement

S11 S12
 S21 S22

Export Data

Export to Text File File Type P2D MDIF (*.p2d)

File name Browse...

Save Dataset

Dataset Name device1_psS11 Browse... Measure

Block Name CM Help

*

The server processes the request and returns the results. The first time a measurement is run, the server imports the drivers and libraries necessary for the proper execution of the measurement. The results are stored in the dataset file. These stored values can be used by Data Display and/or in a simulation.



Note

While the measurement is running, the *Measurement* window is disabled. When finished, a *Measurement complete* window appears. Select **OK** to dismiss.

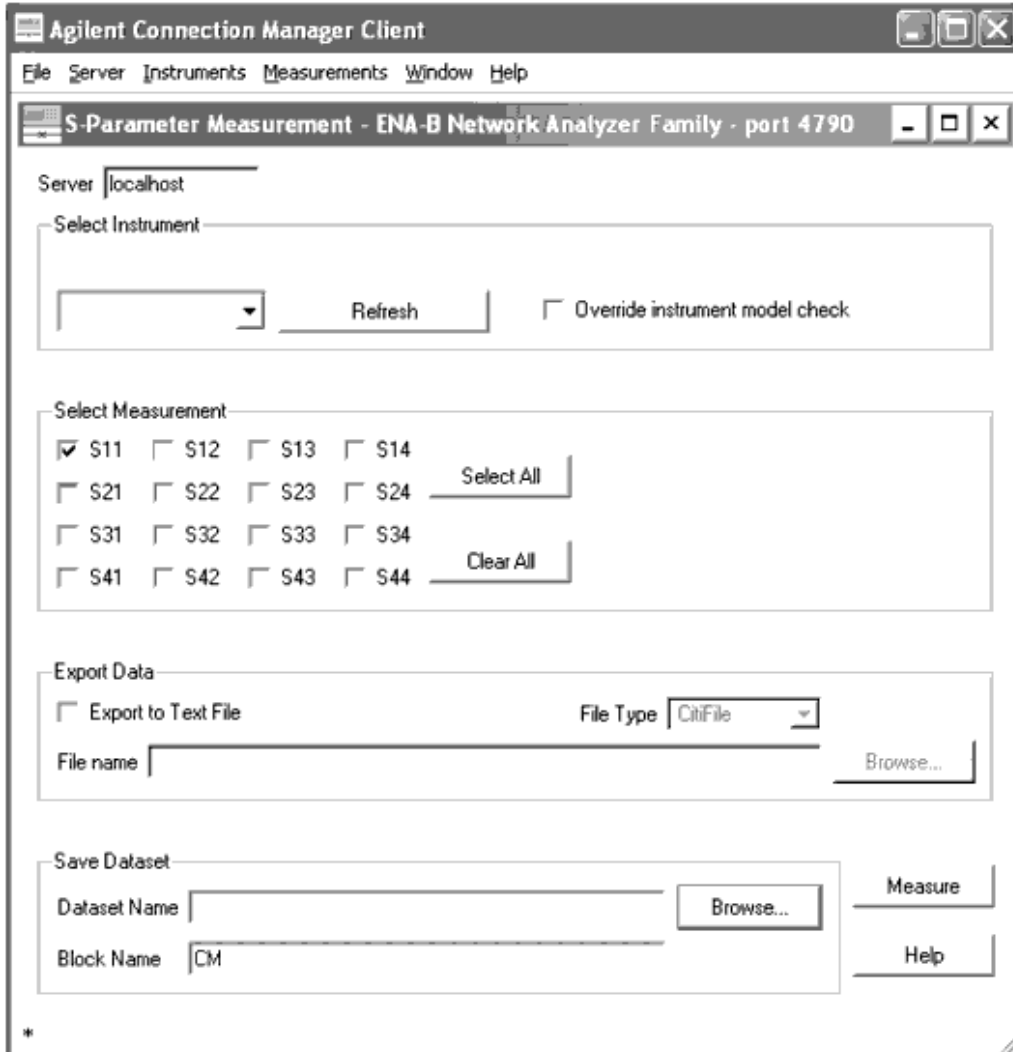
To Measure 2-Port Frequency Swept S-Parameters

To make a 2-port S-parameter measurement, complete the following steps.

1. Configure the frequency and power settings, and calibrate the network analyzer.
2. Insert the device under test into the measurement path.
3. Select **Measurements > S-Parameters > ENA B and PNA Network Analyzer**

Families .

4. To update the Select Instrument list with the latest instruments configured on the server, click **Refresh** .
5. Select the VISA resource connected to the network analyzer from the *Select Instrument* drop-down list.
6. Deselect all measurements except **S11** .
7. Enter `device1_S11` in the Dataset Name field.
8. To send the client information in the *S-Parameter Measurement* panel to the server workstation, click **Measure** .



The server processes the request and returns the results. The first time a measurement is run, the server imports the drivers and libraries necessary for the proper execution of the measurement. The results are stored in the dataset file. These stored values can be used by Data Display and/or in a simulation.

Note

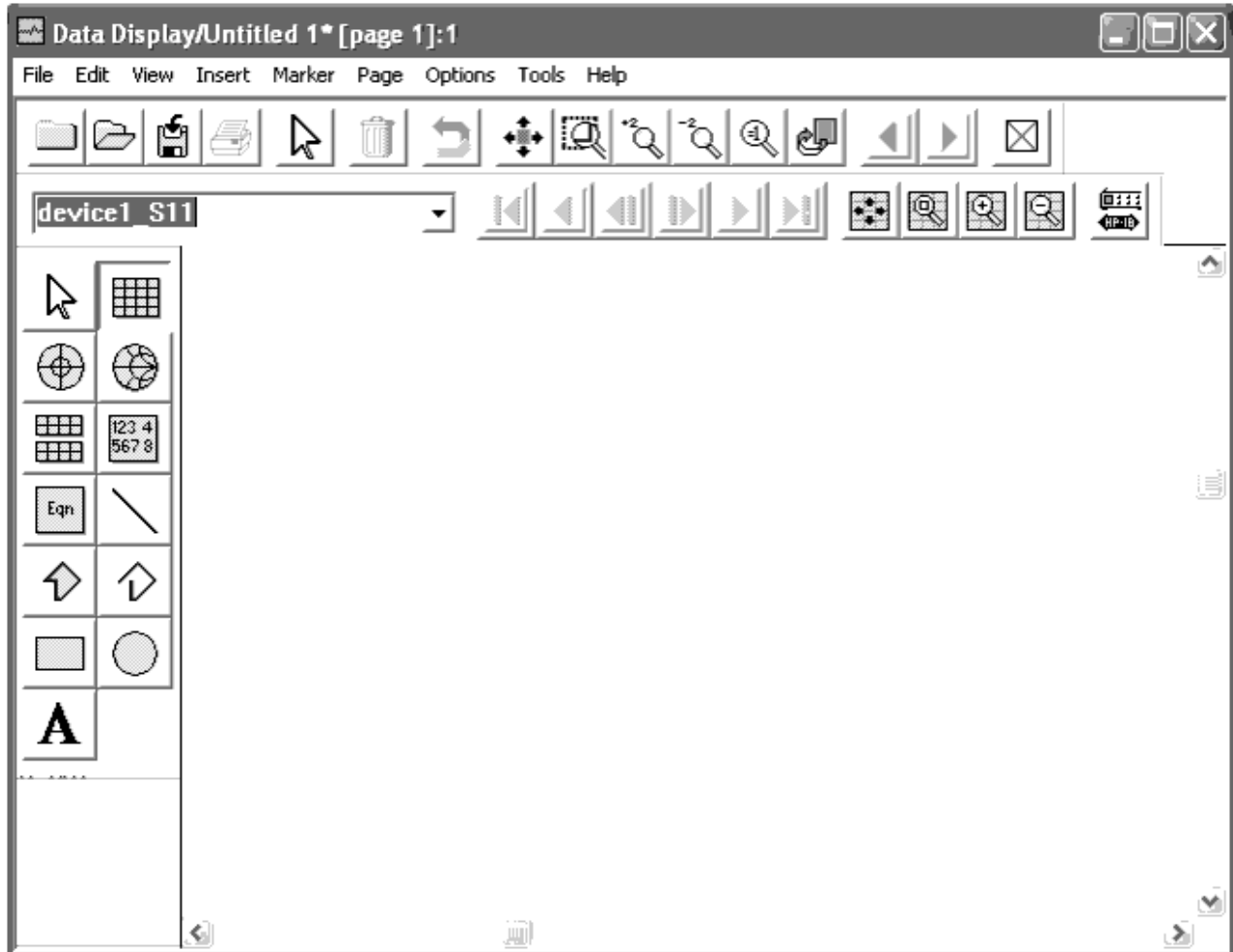
While the measurement is running, the *Measurement* window is disabled. When finished, a *Measurement complete* window appears. Select **OK** to dismiss.

For more information, see *Understanding S-Parameter and Behavioral Modeling Measurements* (connectmui).

To Display the Measurement Data

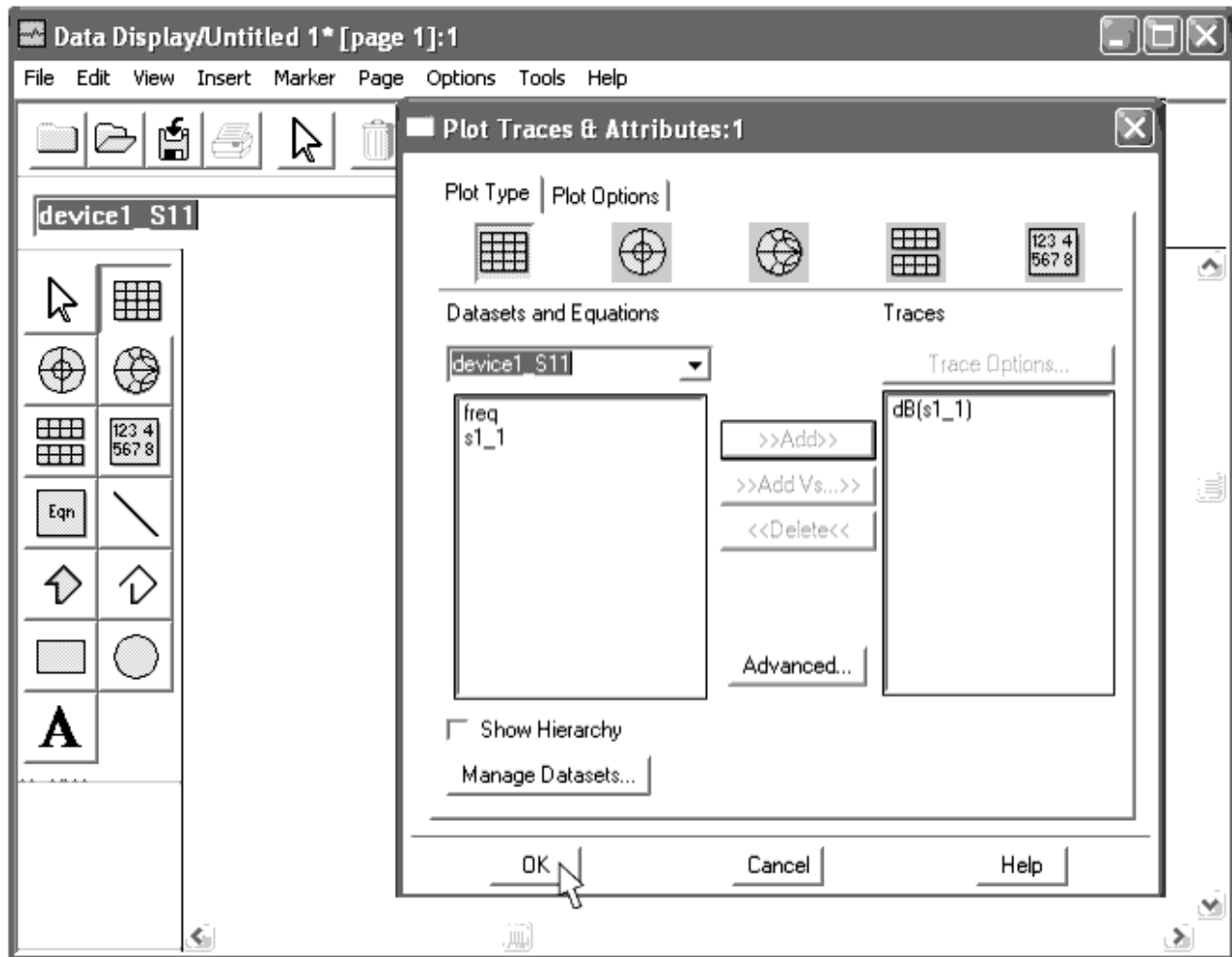
To view the measurement data in a Data Display window, complete the following steps.

1. From the toolbar in the schematic window select **Window > New Data Display** .
2. Select the **device1_S11** dataset.
3. Select the **Rectangular Plot** button, then select inside the Data Display window to open the *Plot Traces & Attributes* dialog box.

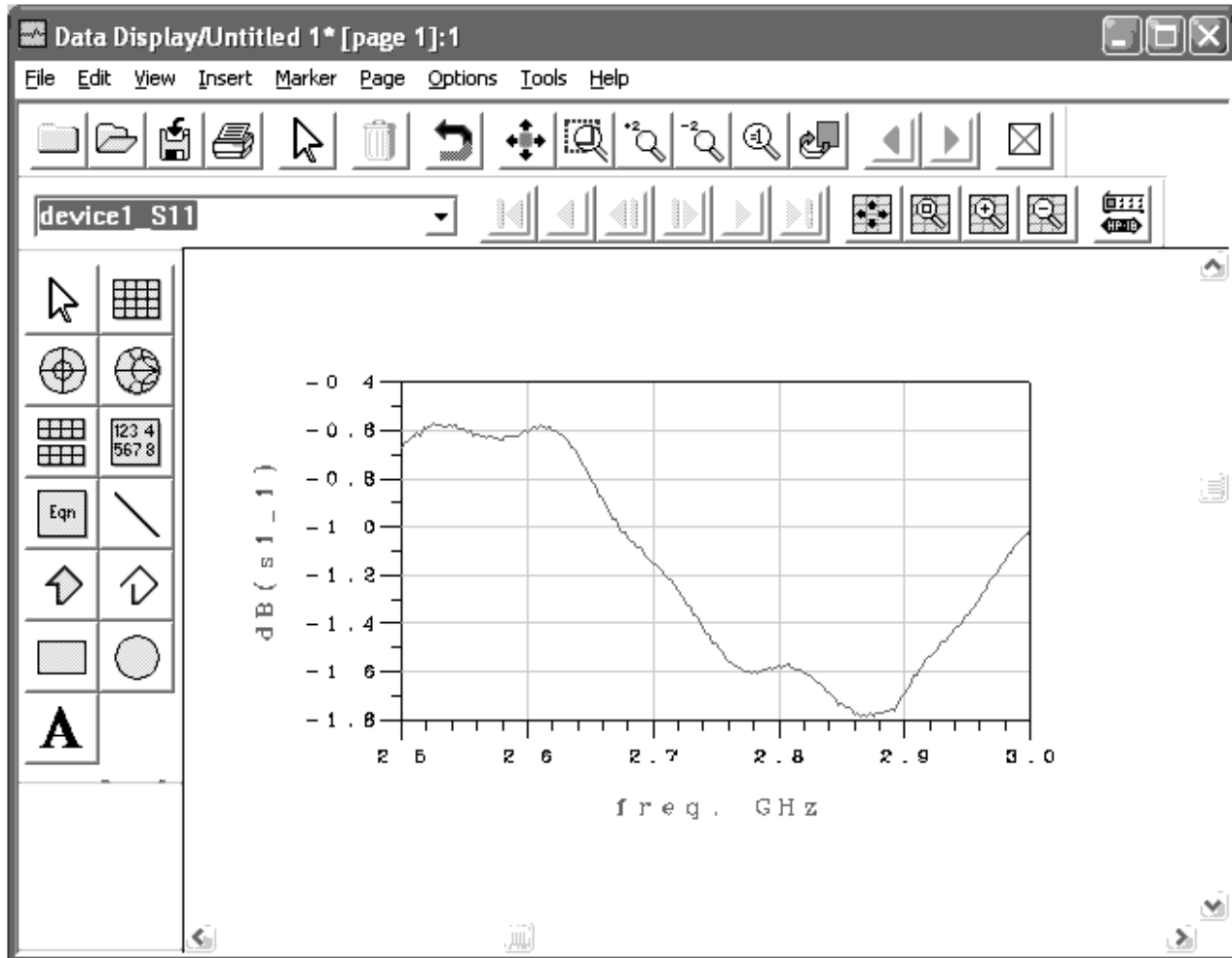


Note

The measurement variable is $s1_1$. If only part of an S-parameter matrix is stored, the variable names cannot use the standard matrix notation. If all four S-parameters are selected, and *Measure* is selected again, the dataset variable naming conforms to the matrix notation.



The following illustration shows the result of an S11 measurement displayed in the *Data Display* window.

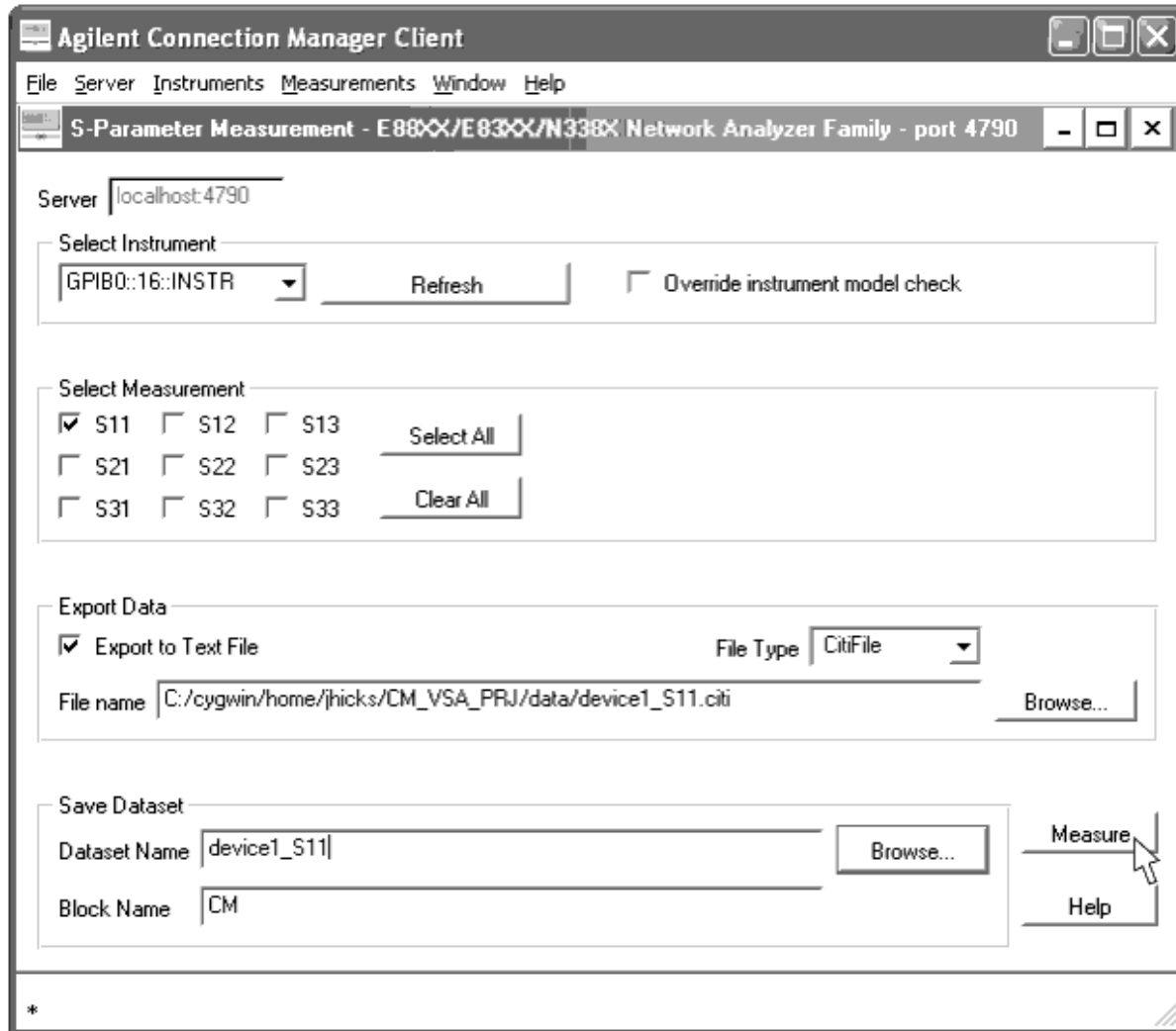


To Export the Measurement Data to a Text File

Besides storing measured S-parameter data in a dataset, you can also export it to a text file in either *CitiFile* or *Touchstone* formats.

To export the S-Parameter measurement data to a text file, follow these steps.

1. Select the **Export to Text File** check box.
2. Select the file type to export from the *File Type* drop-down list.
3. Click **Browse** to select an existing file, or type the file name for a new file.
4. To record the data into the selected text file and dataset, click **Measure**.



For more information on exporting S-parameter data, see *Understanding S-Parameter and Behavioral Modeling Measurements* (connectmui).

Measuring Frequency Spectrum

Use the Spectrum measurement panel to gather frequency domain measurement data. Spectrum measurements are available for three types of spectrum analyzers:

- 856XX spectrum analyzer family
- 859XX spectrum analyzer family
- E444XA PSA Series spectrum analyzers

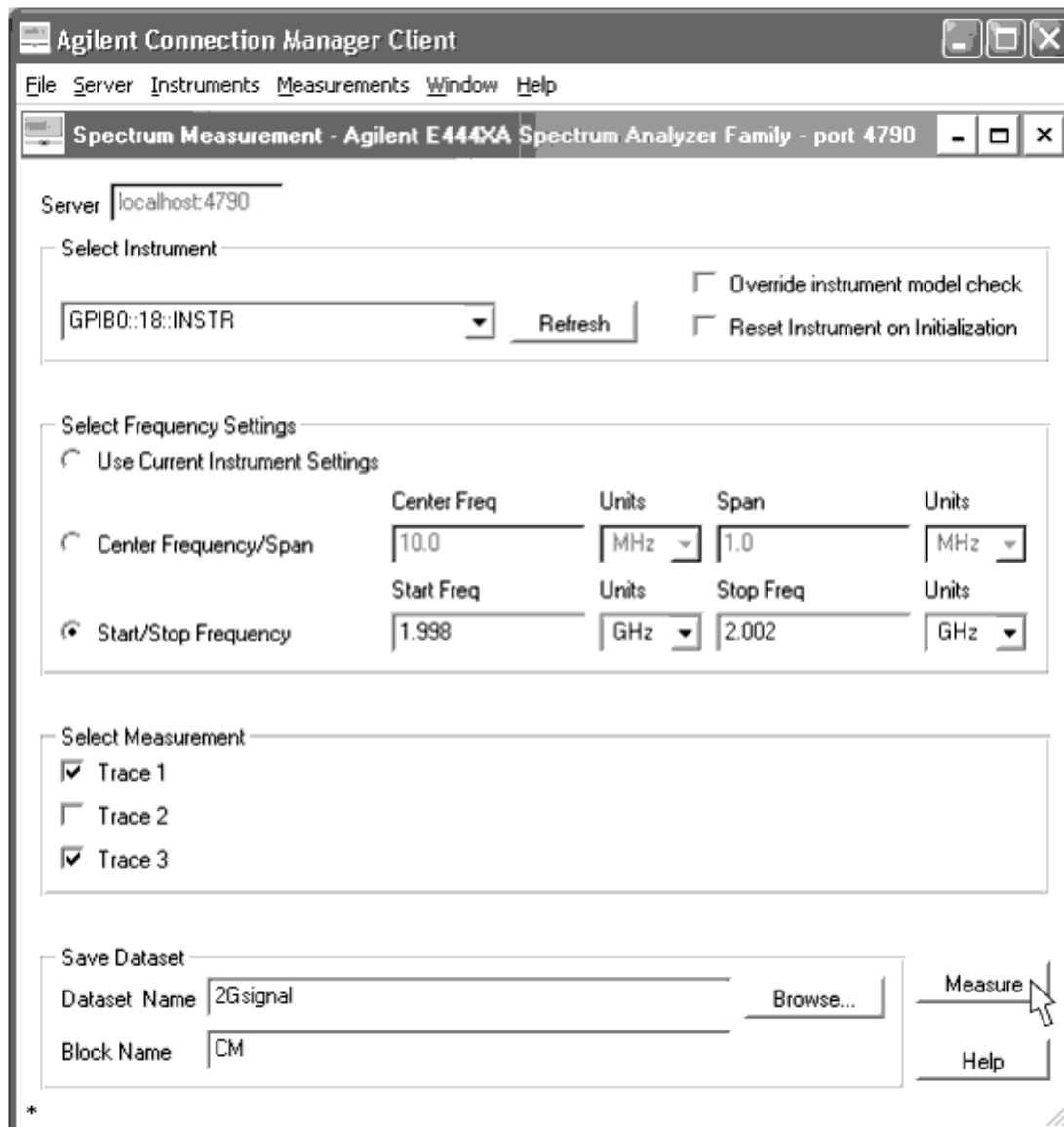
To Measure Frequency Spectrum

For detailed information regarding frequency spectrum measurement panel functionality, see *Understanding Spectrum Measurements* (connectmui).

To make a frequency spectrum measurement of a carrier at 2 GHz –10 dBm using an

E444XA PSA, complete the following steps.

1. Preset the spectrum analyzer.
2. Connect the spectrum analyzer INPUT to the signal source.
3. On the PSA, set Trace 1 to Max Hold and Trace 3 to Min Hold.
4. Select **Measurements > Spectrum > E444X Spectrum Analyzer Family** .
5. To update the Select Instrument list with the latest instruments configured on the server, click **Refresh** .
6. Select the VISA resource connected to the spectrum analyzer from the *Select Instrument* drop-down list.
7. In the *Select Frequency Settings* group box, choose the **Start/Stop Frequency** radio button.
8. In the *Start Freq* field and *Units* drop-down list, enter 1.998 and choose **GHz** .
9. In the *Stop Freq* field and *Units* drop-down list, enter 2.002 and choose **GHz** .
10. In the *Select Measurement* group box, select the **Trace 1** and **Trace 3** check boxes.
11. To send the client information in the *Spectrum Measurement* panel to the server workstation, click **Measure** .



The server processes the request and returns the results. The first time a measurement is run, the server imports the drivers and libraries necessary for the

proper execution of the measurement. The results are stored in the dataset file. These stored values can be used by Data Display and/or in a simulation.

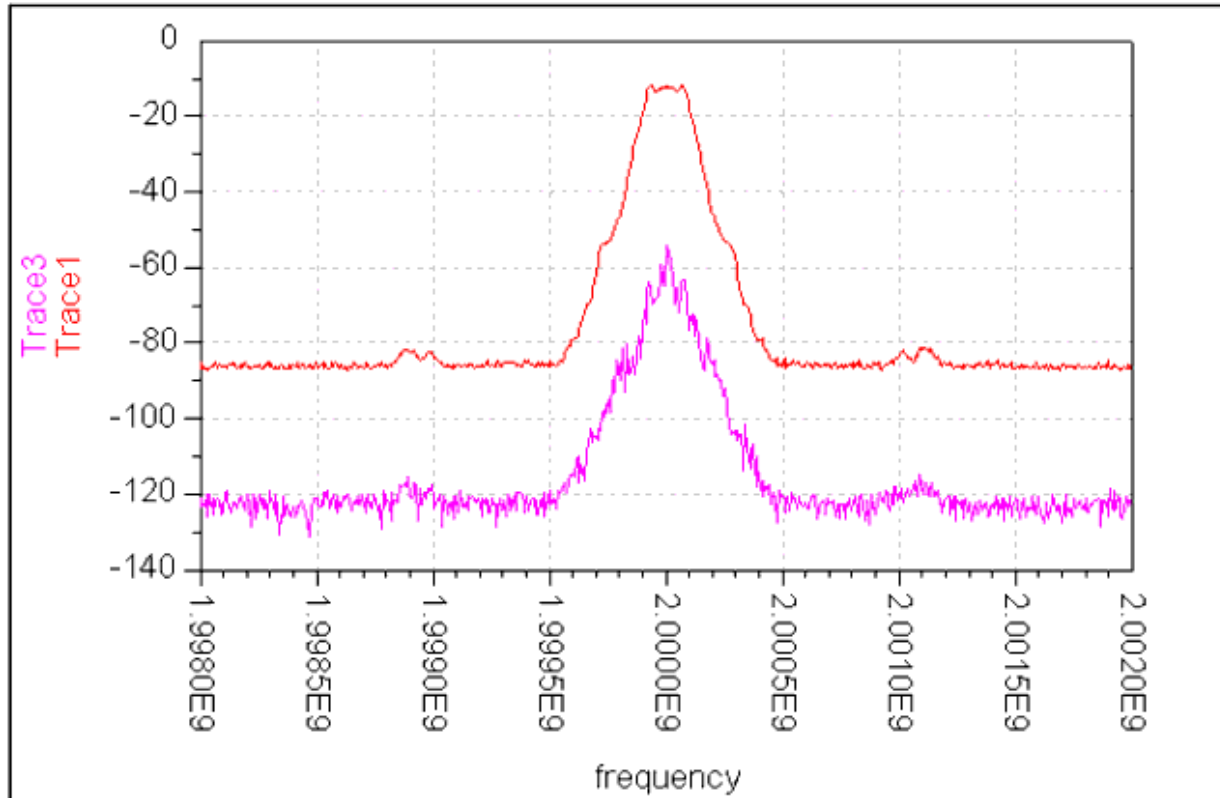
**Note**

While the measurement is running, the *Measurement* window is disabled. When finished, a *Measurement complete* window appears. Select **OK** to dismiss.

**Note**

While the measurement is running, the Measurement window is disabled. Upon completion a *Measurement complete* window appears. Select **OK** to dismiss this window.

The following screen capture shows the results of the preceding measurement.



For more spectrum measurement information, see *Understanding Spectrum Measurements* (connectmui).

Measuring Voltage Waveform

Use a Voltage Waveform Measurement panel to gather time domain measurement data. Voltage waveform measurements create datasets where the Y-axis values represent sampled voltage data and the X-axis values represent the times at which each voltage sample was taken.

Voltage waveform measurements are available for the following oscilloscopes:

- Agilent 86100A oscilloscope
- Agilent 5462X and 5464X oscilloscope families
- Agilent 5483X and 5485X oscilloscope families (with client-based instrument configuration)


When using the first three measurement panels, the client measurement panel configures only data storage. You must manually configure channel, timebase, trigger, and memory settings on the oscilloscope front panel before executing the measurement.

Using the Agilent 5483X and 5485X Oscilloscope Families measurement panel, you can configure many oscilloscope settings and download the settings to the oscilloscope from the client.

A cooperative protocol exists between clients and the server to prevent buffer overrun caused by transferring waveforms with too many data points, allowing the transfer of waveforms containing as many data points as the oscilloscope can store.

The 5483x and 5485x oscilloscope measurement checks to see that the corresponding server library is at the correct revision to support buffered transfers.

The state of the instrument is set during its use and is not reset to its initial state after use. Customer needs to rely on manual reset of the instrument to its former state as desired, such as instrument internal interpolation state, after its use.

 **Caution**
Use caution when transferring large waveforms, as doing so results in extremely large data set files.

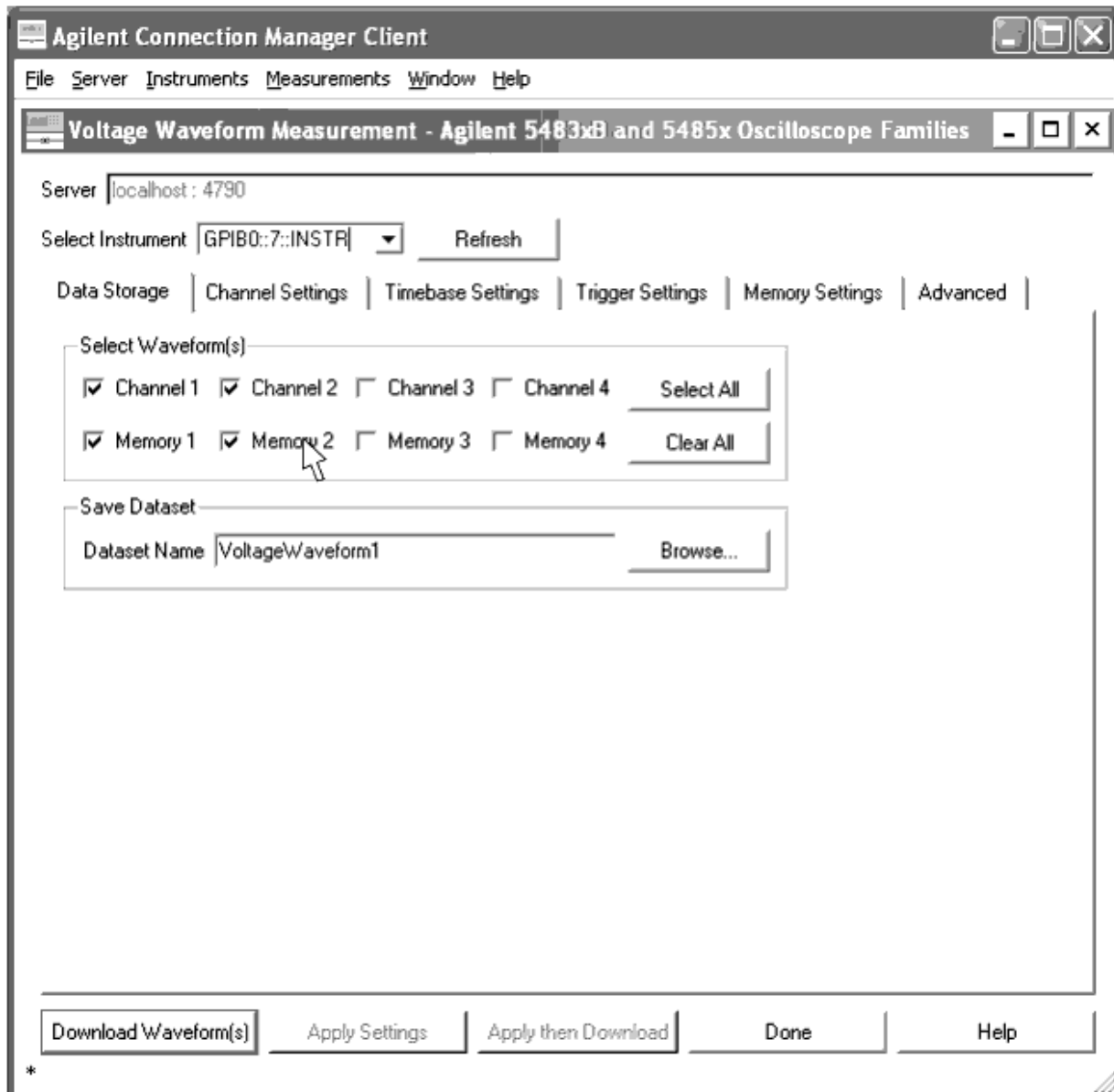
To Measure Voltage Waveform

The following example uses the Agilent 54832B Infiniium oscilloscope to make a voltage waveform measurement. This measurement includes instrument configuration from the client measurement panel.

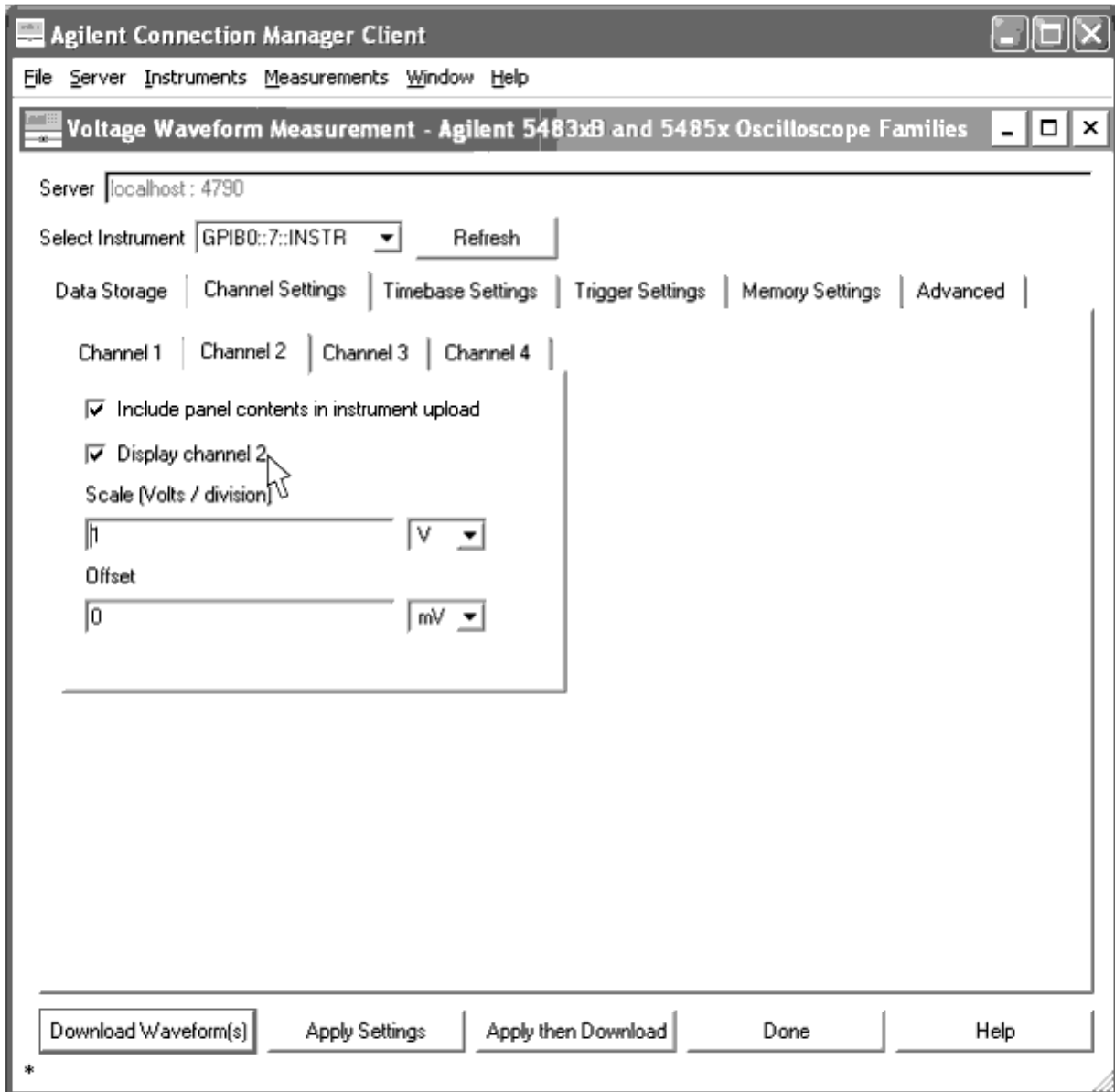
For detailed information regarding voltage waveform measurement panel functionality, see *Understanding Voltage Waveform Measurements* (connectmui).

To configure the instrument and perform the measurement, complete the following steps.

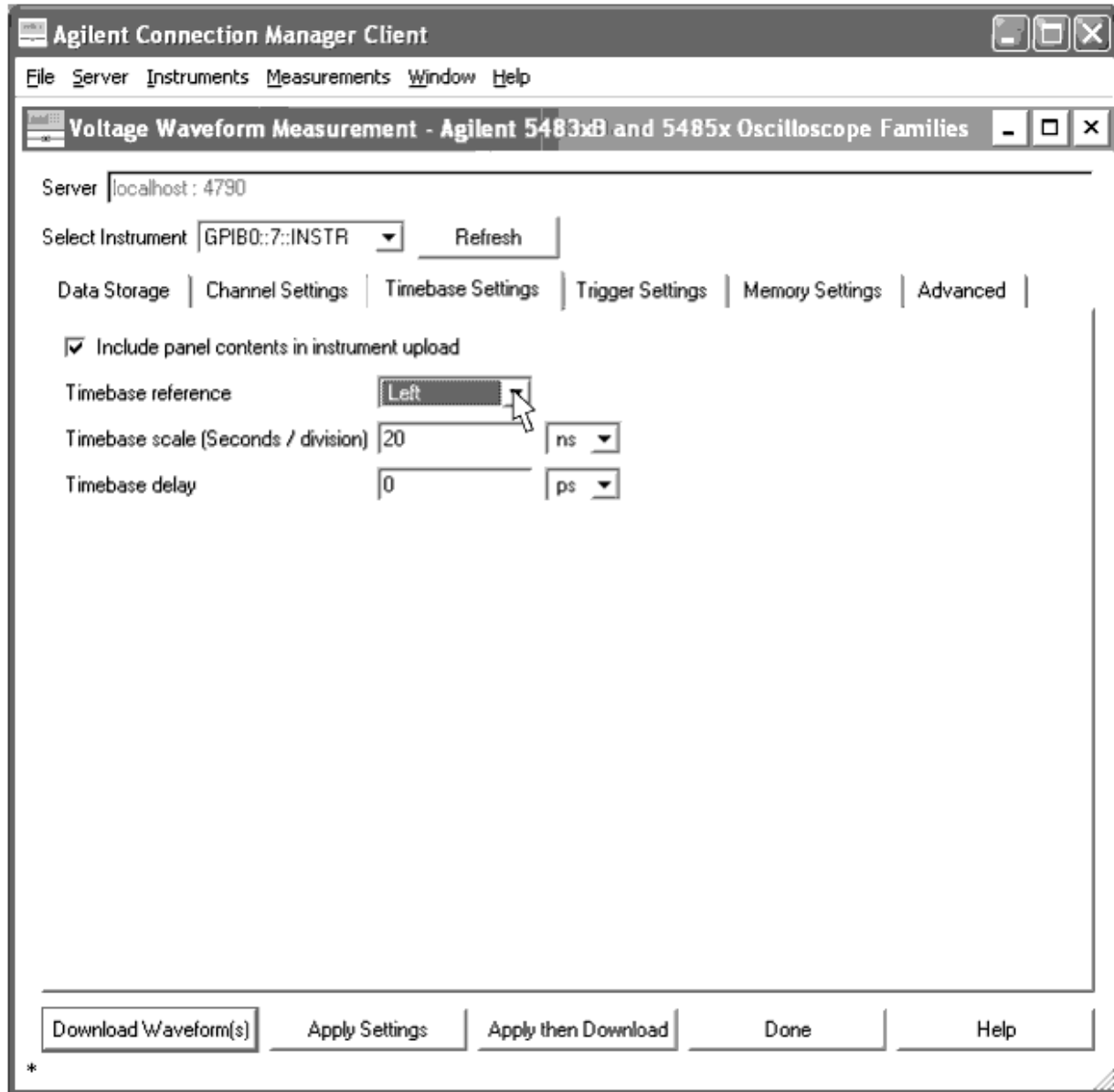
1. Connect the oscilloscope channel 1 INPUT to the signal source.
2. From the client, select **Measurements > Voltage Waveform > 5485X and 5483X Oscilloscope Families** .
3. To update the Select Instrument list with the latest instruments configured on the server, click **Refresh** .
4. Select the VISA resource connected to the oscilloscope from the *Select Instrument* drop-down list.
5. In the *Data Storage* tab, select the **Channel 1** , **Memory 1** , **Channel 2** , and **Memory 2** check boxes. In the Dataset Name entry field, enter `VoltagWaveform1` .



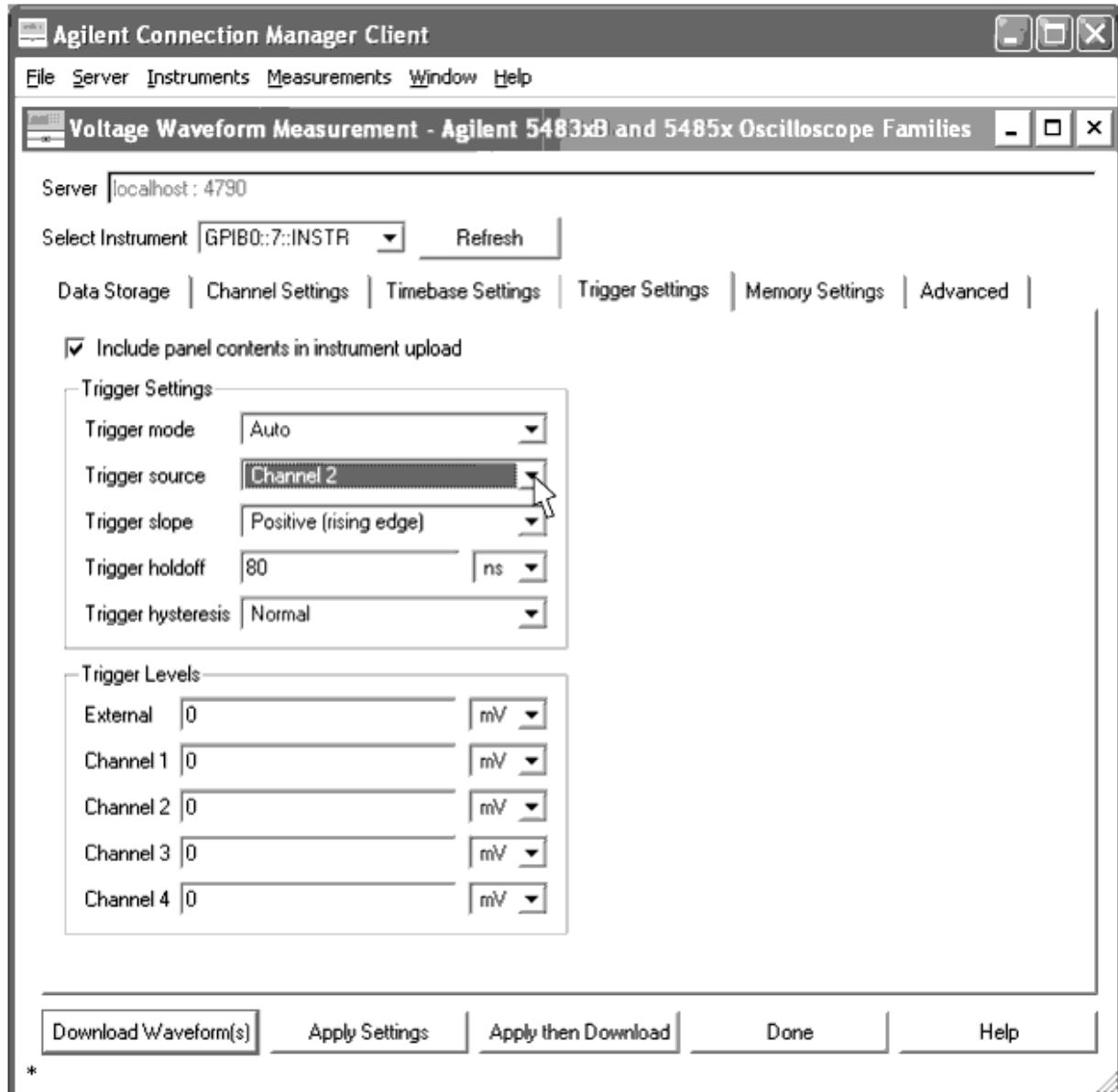
6. In the *Channel Settings* tab, choose the Channel 1 tab and enter 2 v for the Scale, select the **Display channel 1** and the **Include panel contents in instrument upload** check box. Choose the *Channel 2* tab and select the **Display channel 2** and the **Include panel contents in instrument upload** check box.



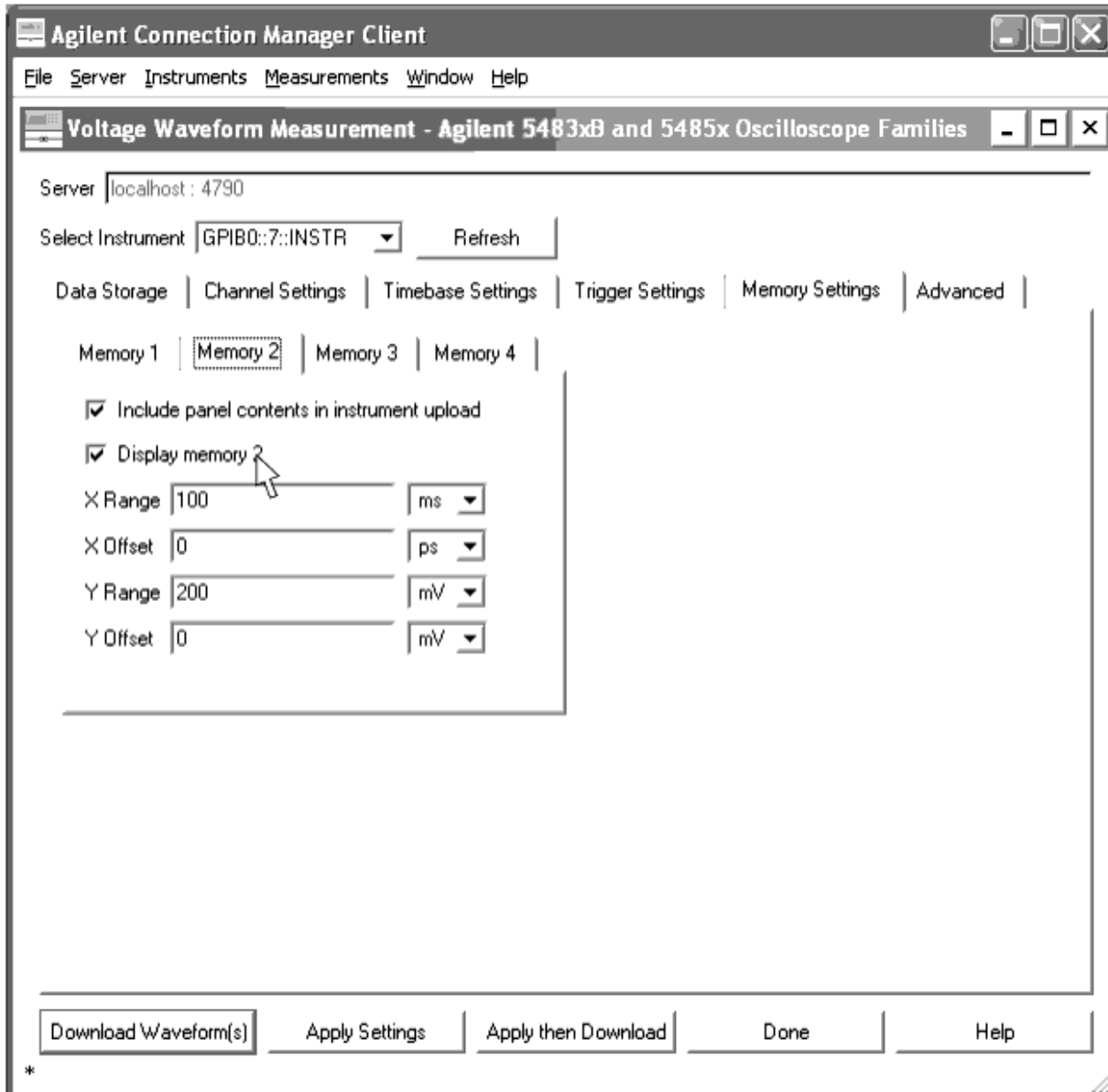
7. In the *Timebase Settings* tab, choose **Left** from the Timebase Reference drop-down list and select the **Include panel contents in instrument upload** check box. In the Timebase Scale entry fields, enter 20 ns .



8. In the *Trigger Settings* tab, choose **Channel 2** from the Trigger source drop-down list and select the **Include panel contents in instrument upload** check box.



9. In the *Memory Settings* tab, choose the *Memory 1* tab and select the **Include panel contents in instrument upload**, and **Display memory 1** check boxes. Choose the *Memory 2* tab and select the **Include panel contents in instrument upload**, and **Display memory 2** check boxes.

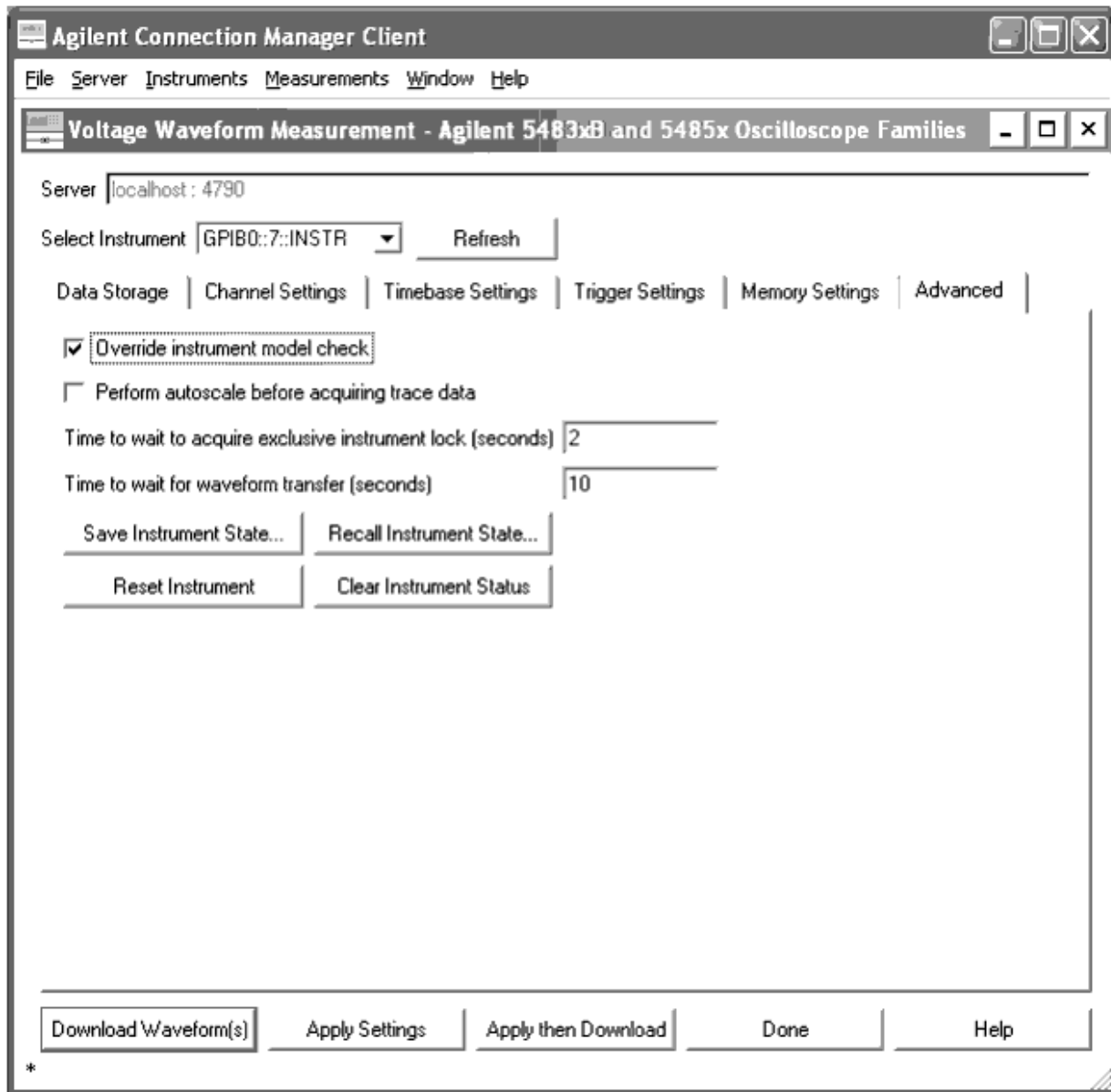


10. In the *Advanced* tab, select the **Override instrument model check** check box.



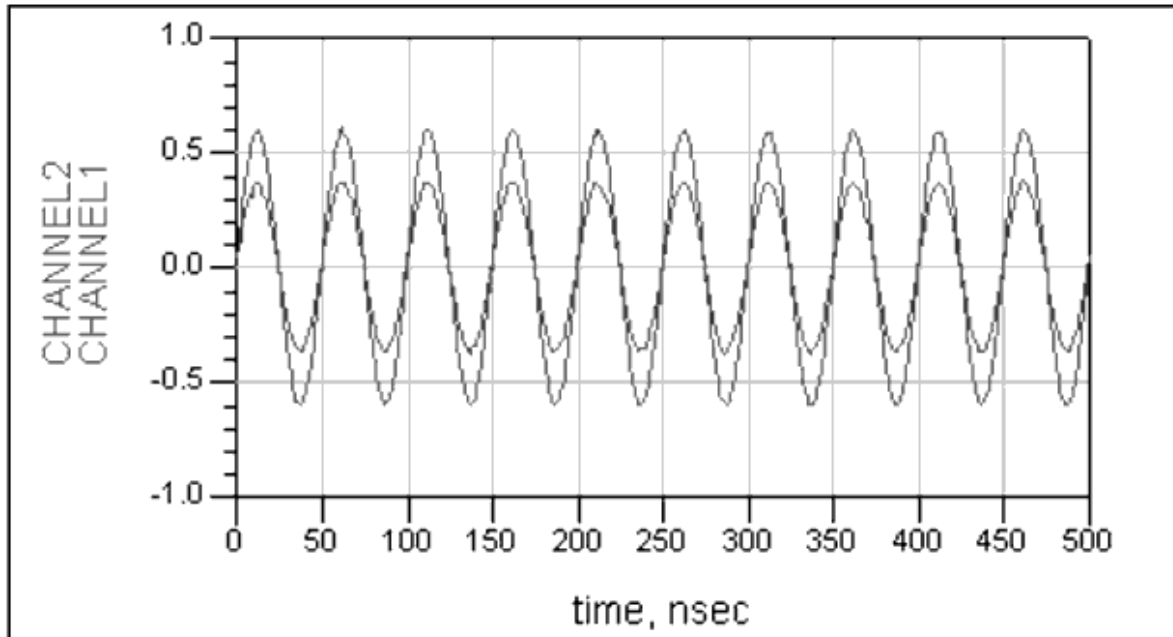
Note

Selecting the **Override instrument model check** check box is necessary only when using an unsupported oscilloscope. Other oscilloscopes will most likely use the same instruction sets as the Agilent 54832X or 54855X.



11. Click **Apply then Download** .

The following screen capture shows the results of the preceding measurement using the Data Display server.



For more spectrum measurement information, see *Understanding Voltage Waveform Measurements* (connectmui).

Troubleshooting Connection Manager

This section offers solutions to common installation, configuration, and instrument communication problems, as well as instruction on using the server diagnostics tools

Server Installation and Configuration

This section lists common Connection Manager server installation and configuration problems and their possible solutions.

Server IO Fails Running Under the LocalSystem Account

When running the Connection Manager as a Windows service (see *Running the Server as a Windows Service* (connectmui)) and trying to connect to the *CM ESG E4438C Sink* (instruments) (or other CM component), the following error message (or a message announcing the VISA32.dll did not load) is displayed.



Solution: use a named account.

Run the Connection Manager Server under an account with Administrator privileges. The problem is a conflict involving the SICL interface and Connection Manager interface on certain PCs. In some cases, Connection Manager cannot be run as a LocalSystem account service.

To check if Connection Manager is running under a LocalSystem Account:

1. From the Windows toolbar, click **Start > Settings > Control Panel**.
2. In the *Control Panel* dialog, click **Administrative Tools**.
3. In the *Administrative Tools* dialog, click **Services**. (If you do not have access to the **Services** icon from the *Administrative Tools* dialog, see following section.)
4. In the *Services* dialog, right-click on the **Agilent Connection Manager** and select **Properties**.
5. In the *Properties* dialog, select the **Log On** tab.
6. Observe the *Log on as:* setting.

If your PC is set to **LocalSystem** account, follow the instructions in *Configuring User Account Privileges on the PC*. (connectmui)

If you do not have access to the Services icon from the Administrative Tools dialog

Some PCs may not have the **Services** shortcut available in the *Administrative Tools* dialog. If so, follow these steps.

1. In Windows Explorer, navigate to %SystemRoot%\system32 to find the *services.msc* (Microsoft Common Console Document). For example, *C:\WINNT\system32\services.msc*.
2. Double-click on the **services.msc** file to bring up the *Services* dialog.
3. In the *Services* dialog, right-click on the **Agilent Connection Manager** and select **Properties**.
4. In the *Properties* dialog, select the **Log On** tab.
5. Observe the *Log on as:* setting.

If your PC is set to **LocalSystem** account, follow the instructions in *Configuring User Account Privileges on the PC*. (connectmui)

No Connection and "Connection Refused" Error Messages

Solution: for systems with firewalls, specify the server port number to allow access.

Firewall software, like Norton Internet Security, Zone Alarm, or the Windows XP Personal Firewall application, can interfere with the server's ability to communicate on a network. This will manifest itself as the client application receiving a *Connection Refused* message when trying to run a measurement.

Most of these applications allow you to configure the server to allow certain applications to access the network. For firewall software applications that require the port number for the CM server, see the *C:\Program Files\Agilent\Connection Manager Server\MsmtSrvr.exe.config* file for the configured port number the server uses to communicate with clients.

The server uses transient ports, which allow for faster data transfer. The ports are allocated dynamically, starting with port number 5001, extending to 10,000.

Solution: determine if another process is binding the port and reconfigure.

The server allows network communication from clients by listening to a port identified in the *MsmSrvr.exe.config* file. If the server cannot bind the port, possibly because another application is using that port, the client will get " *connection refused* " messages. In addition, the server machine will run slowly. The server will try to restart itself in the event that it exits abnormally. Failure to bind to the port in the *MsmSrvr.exe.config* file

will cause an abnormal exit. Continued failure to bind the port will cause the server to continually try to restart, resulting in a slow server PC.

You can determine if there is a port conflict by running the command " *netstat -a* " from a command prompt on the server PC.

If the client receives a message that the connection has been refused and the server becomes very slow, it is probable that the server port is being used by another process.

To verify this problem, complete the following steps:

1. From the Windows tool bar, select **Start > Settings > Control Panel > Administrative Tools > Services** __ to open the Services window.
2. Highlight *Agilent Connection Manager*.
3. Select **Action > Stop** to stop the Connection Manager service.
4. Open a Command Prompt window and type:

```
netstat -a
```
5. Press **Enter**.

This provides a list of active connections on the server workstation. If the port number used by Connection Manager is present in the *Active Connections* list, another process is using the Connection Manager port.

If this is the case, you must either stop this process to free the port or select a new port for use by Connection Manager. To change the server's port number, refer to *The MsmtSrvr.exe Process* (connectmui).

To solve this problem, stop the server using the Windows *Services* control panel applet, change the server's *port* entry in the *MsmtSrvr.exe.config* file, and restart the server. Since the clients and server must agree on this port number, change the client parameters to use the port value you just put into the *MsmtSrvr.exe.config* file.

Note

The Process Explorer tool available from SysInternals, <http://www.sysinternals.com/>, can help to determine if the cause of refused connections is due to abnormal server termination. If you see the server process (MsmtSrvr.exe) highlighted in red, it (the server) is continuously re-spawning.

Measurements Using Plug and Play Drivers Fail

Solution: install the required the required driver(s).

Several measurements depend on having Plug and Play drivers installed on the server PC. If a required driver is not available, the client displays an error dialog, as shown.



To correct this, you must install the driver on the server PC. Drivers are available at the **Drivers and Downloads** link at the *Agilent Developer Network* web site:
<http://www.agilent.com/find/adn>

Solution: install the Agilent IO libraries with Agilent VISA set to Primary.

Some of the Connection Manager measurements achieve instrument control by using Plug and Play drivers. Those drivers depend on an Application Programming Interface known as VISA to communicate with instruments. There are two major vendors supplying VISA implementations. Those implementations are not necessarily compatible, so, when installing the Agilent IO Libraries, you may be presented with the need to choose between installing Agilent VISA as either *Primary* or *Secondary*. Always install the Agilent VISA Libraries as *Primary*. For a complete description of this topic, refer to the *Agilent IO Libraries and NI Software* document found at:

<http://www.agilent.com/find/iolib> .

You can determine if your IO libraries have VISA installed and if VISA is installed as *Primary* by selecting the **About Agilent IO Libraries Control** entry from context menu in the IO libraries icon in the task bar.

To install the IO libraries with VISA as primary, run the IO libraries installation on the PC server, select the custom installation button, then select the option that does a full installation with VISA as primary.

Part of the process of installing a Plug and Play driver causes the driver to record where it finds its VISA library. If you upgrade or otherwise replace the IO Libraries installation and change the installation from *primary* to *secondary* (or vice versa), the Plug and Play driver may not be able to find its VISA implementation. This results in a measurement displaying an error dialog indicating that the T&M Toolkit's *driver interoperation layer* encountered a failure trying to call the driver's *Init* function.

The solution is to uninstall the IO libraries and reinstall with VISA as primary. Then uninstall and reinstall the Plug and Play driver. Drivers are available at the **Drivers and Downloads** link at the *Agilent Developer Network* web site:

<http://www.agilent.com/find/adn>

For support installing and configuring the Agilent IO Libraries and for answers to your hardware or measurement questions, contact your local Agilent Instrument Support Center at the number found on the following website:

<http://www.agilent.com/find/support>

Server Unregisters After Installing 2003C then Uninstalling 2003A

Solution: restart the measurement server from the control panel applet.

Part of the uninstalling process unregisters the Connection Manager Server - a Windows service. Since this is a system component, only one instance may be actively registered on a system. When installing the server, the system registry gets updated to use the server in whichever version of ADS is being installed. Likewise, uninstalling deletes the registry entries related to the server.

If you install 2003A, then install 2003C, the registry uses the 2003C server. If you subsequently remove 2003A, the server registry entries will be removed, and the server will no longer be configured.

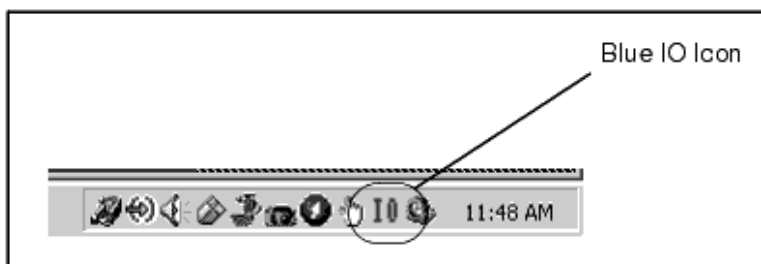
To configure the server, open a command window on the server workstation and perform the following procedure:

1. From the <ADS Installation Directory Path>/bin directory, enter `MsmSrvC -install`.
2. Open the *Services* control panel applet and select the **Agilent Connection Manager** entry's properties.
3. Select the login account you wish the server use.
4. Select the server startup option.
5. Start the service running by choosing **Start** from the control panel applet.

Missing Blue IO icon in System Icon Tray

Solution: uninstall ADS 2003C server and install ADS 2004A server.

The blue IO icon must be active in the Windows system icon tray for the Connection Manager server to run.



The IO Libraries installation places a shortcut to the IO Libraries application called *iprocsvr* in the system program startup group. *Iprocsvr* is the entity responsible for putting the IO icon in the system icon tray. If *iprocsvr* is not running on the server PC, instrument IO will not function.

The IO Libraries will not operate when there is no interactive logon session running on the CM server workstation. This prevents the CM server from performing instrument IO unless a user is interactively logged onto the server PC.

ADS 2003C and Earlier Running Server as Windows Service

As a work around, the ADS 2003C CM Server installation removed the *iprocsvr* shortcut. At startup, the ADS 2003C server would check to see if *iprocsvr* was running. If not, the ADS 2003C server would start *iprocsvr*.

Running the 2003C server uninstall will restore the *iprocsvr* shortcut to the system program startup group.

ADS 2004A Running Server as Windows Application

To integrate better with the IO Libraries, the 2004A CM server runs as a Windows *application*. The 2004A server installation unconfigures any previous server, effectively replacing the Windows *service* with a Windows *application*. This is necessary, because two servers cannot run and listen to the same network port simultaneously.

If you install the 2004A server without first running the 2003C server uninstall, the *iprocsvr* shortcut may not be in the system program startup group. There will be no IO icon in the system tray and any attempt to perform instrument IO will fail.

To prevent this, run *setup.exe* from the */CM_Server* directory of disk 2 in the 2003C media kit and select the option to uninstall.

Alternatively, you could create a shortcut to the *iprocsvr.exe* program in the system program startup group.

Solution: enable process listing.

In ADS 2003C, the CM server process (*MsmstSrvr.exe*) would try to start the IO Libraries' IO Control application (*iprocsvr.exe* - the program responsible for putting the blue IO icon in the icon tray) if that application was not already running.

To know whether it is necessary to start the IO Control application, the CM Server program would list the processes currently running on the server PC. Some Windows installations disable the ability to perform this process listing, so the CM Server could not run.

This results in the CM client not connecting, even after having changed the Windows service to run under an account other than LocalSystem. Also, the Diagnostics application would not create an output file.

To verify that the problem is related to the server PC having disabled the ability to list processes, follow these steps.

1. In Windows, click **Start > Settings > Control Panel**.
2. From the *Control Panel* dialog, click **Administrative Tools > Event Viewer**.
3. Scroll down to find error entries titled *AgilentConnectionManager*.
4. Right-click on the error entry and select **Properties**.
5. In the *Description* field, observe the following description.

```
Event Type: Error
Event Source: AgilentConnectionManager
Event Category: None
Event ID: 4
Date: 6/15/2004
Time: 12:24:54 PM
User: N/A
Computer: SANC040320844
Description:
The following information is part of the event:
```

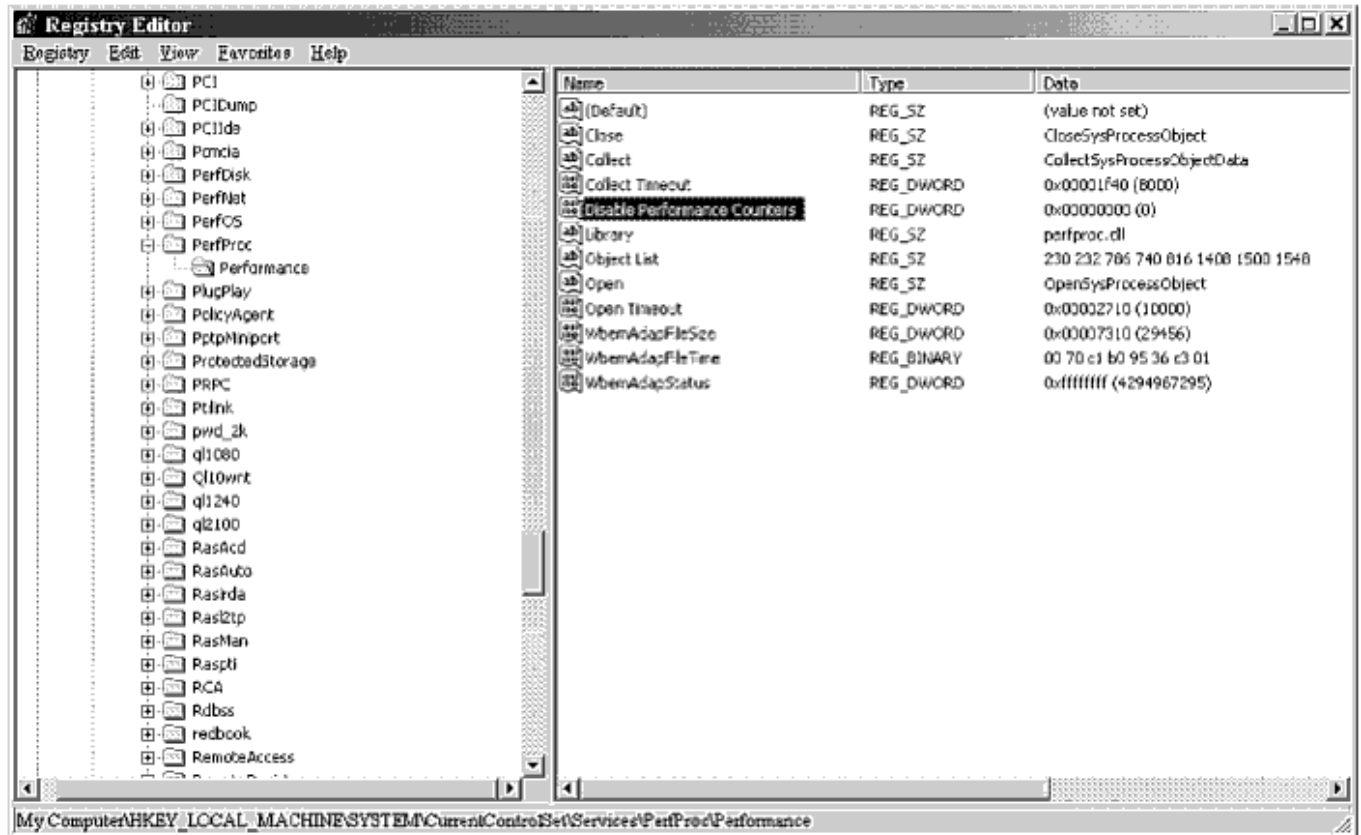
Advanced Design System 2011.01 - Connection Manager

```
Caught exception: System. InvalidOperationException:
Process performance counter is disabled,
so the requested operation cannot be performed.
at System.Diagnostics.NtProcessManager.
  GetProcessInfos\(PerformanceCounterLib library\)
at System.Diagnostics.NtProcessManager.GetProcessInfos
  \(String machineName, Boolean isRemoteMachine\)
at System.Diagnostics.ProcessManager.GetProcessInfos
  \(String machineName\)
at System.Diagnostics.Process.GetProcessesByName
  \(String processName, String machineName\)
at System.Diagnostics.Process.GetProcessesByName
  \(String processName\)
at Agilent.MeasurementServer.MsmtSrvr.StartSiclDaemons
  \(Boolean& weStartedSicl, Process& iproc\)
at Agilent.MeasurementServer.MsmtSrvr.
  Main\(String\[\] args\).
```

This verifies that the process performance counter has been disabled, in turn disabling Connection Manager.

To enable the process performance counter (and thereby Connection Manager), from an account with Administrator privileges, complete the following steps.

1. Open a command prompt and cd to the ADS installation's bin directory, for example, cd c:\ads2003c\bin
2. Stop the CM service by executing the command `MsmtSrvc -stop`.
3. Open the *Registry Editor* by entering `regedit`.
4. Open the registry key `HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\PerfProc\Performance`.
5. If that registry key contains a value named `Disable Performance Counters`, set its value to 0, as shown below.



- Restart the CM Service by executing the command `MsmcSrv -start`.

No Instrument Access when Using Agilent 89600 Software

Solution: unconfigure the instrument using the Agilent 89600 Select Hardware dialog.

Agilent 89600 software claims total ownership of instruments for the length of time those instruments are configured.

If Connection Manager generates an error when trying to communicate with an instrument that has been used with the Agilent 89600 software, unconfigure the instrument using the Agilent 89600 *Select Hardware* dialog.

To unconfigure the instruments, follow these steps.

- Open the 89600 software.
- From the Main dialog, choose **Utilities > Hardware**.
- Using the instrument tabs, uncheck instruments you want to use with Connection Manager.

Instrument Interface and Communication

This section lists common instrument interface and communication problems and their possible solutions.

The Server Hangs During Measurements or Remote Instrument Explorer is not Responding

Solution: observe the instrument display, correct any error state, and clear any instrument errors.

Many older instruments may generate error messages and shut down their IO when they encounter an invalid state setting or command. This will disrupt instrument communication until the error state has been corrected and the error message has been cleared from the queue. Correct any invalid settings, ensure the instrument is receiving the correct commands, clear the error queue, and repeat the measurement.

Solution: connect and power on all instruments listed in the IO configuration.

If you have configured a LAN-connected instrument, but the instrument is not connected or not powered on, the IO Libraries will try to open every listed device. Since the default time out value for opening a LAN instrument is 2 minutes, any absent LAN-connected instrument could cause the IO Libraries to take a long time to open an instrument session. If an instrument listed in the server workstation IO configuration is not accessible (i.e., disconnected or turned off), the client's *Remote Instrument Explorer* will become unresponsive.

To run the IO Config setup

To check for an unresponsive instrument, follow these steps.

1. In the server's Windows system tray, select **IO > Run IO Config**.
2. In the *IO Config* dialog, highlight the `TCPIP lan` entry in the *Configured Interfaces* group box and select **Edit**.
3. In the *LAN Client* dialog, select **Edit VISA Config**.
4. The *TCPIP* dialog lists which instruments are connected to the server through the LAN.
5. Ensure that the instruments are connected and functioning properly.
6. If an instrument is not functioning, you must either return it to a functional state or remove it from the IO config and restart the Connection Manager service.

Run VISA Assistant to Verify Communication Link

To verify the server recognized your GPIB instrument, follow these steps.

1. In the server's Windows system tray, select **IO > Run VISA Assistant**.
2. Observe your instrument displayed in the VISA Assistant display panel.
3. Close VISA Assistant.

Communication Problems with Older Instruments

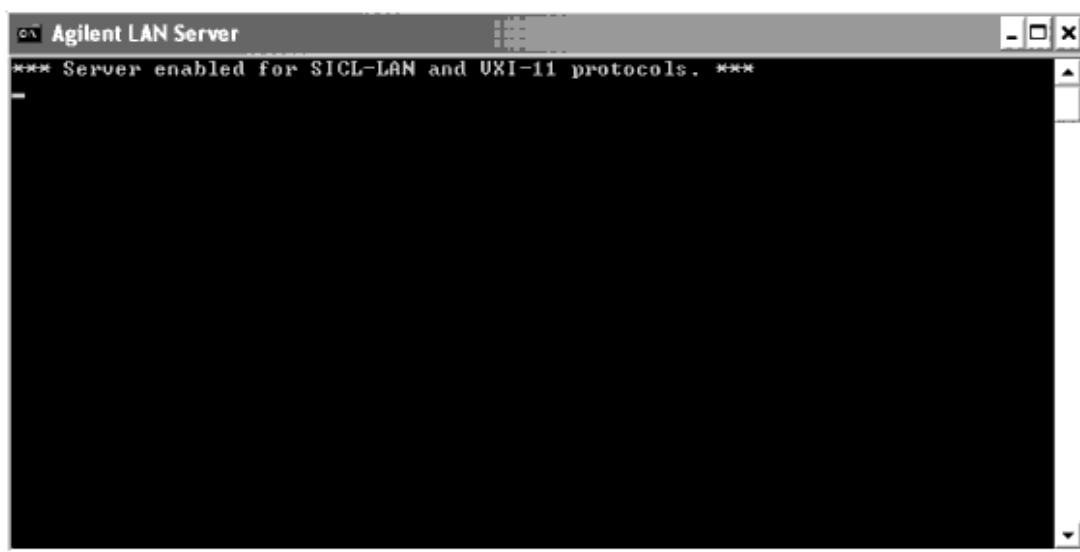
Solution: send commands through the LAN server to slow the rate.

Late model computers can send instructions faster than many vintage instruments can process them. This situation often manifests itself when the instrument returns a message that is not consistent with the measurement being made.

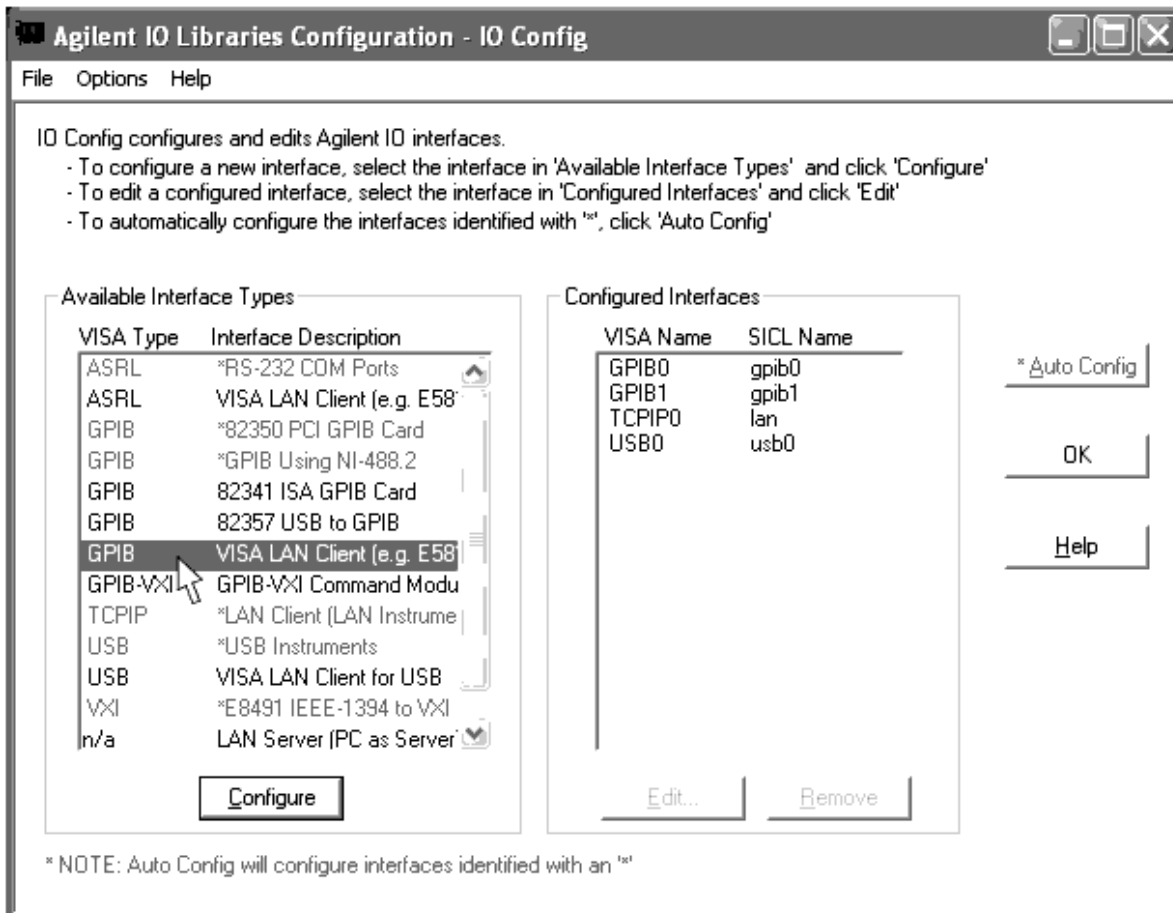
It is possible to slow down communications with an older instrument by running the interface through the IO Libraries LAN server, causing the instructions to be sent to the instrument at a slightly slower rate.

To send commands through the IO server, complete the following steps.

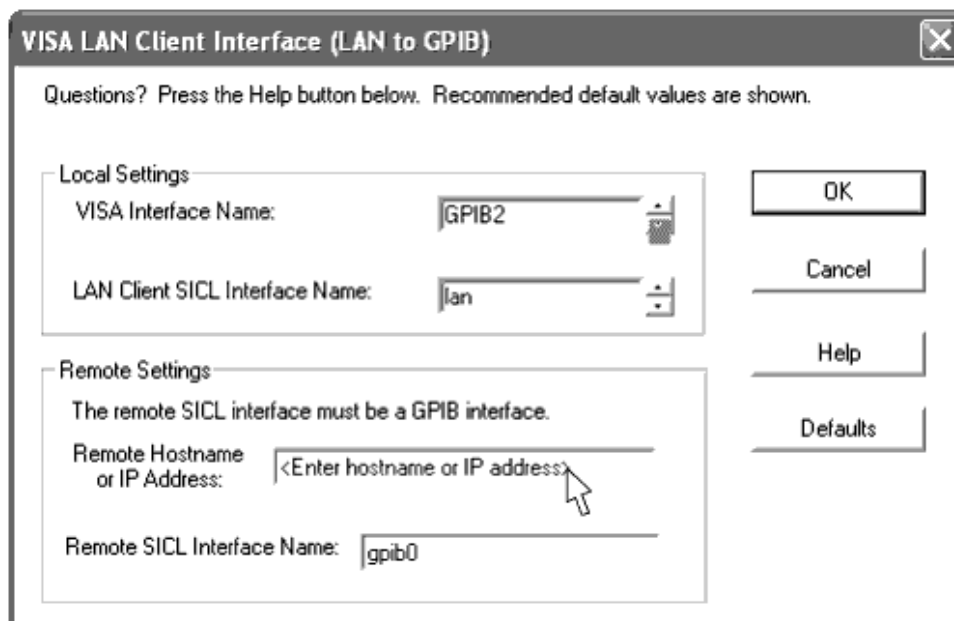
1. Run *siclland.exe*, located in the IO Libraries installation *bin* directory (i.e., *\ Program Files \ Agilent \ IO Libraries \ bin*) on the server workstation.



2. Run *IO Config* and add a VISA LAN client entry.



3. Select **Configure** and specify the IP address of the server workstation (i.e., the workstation running *IO Config*).



4. When you use the Connection Manager client to specify an instrument, select the instruments shown on the LAN interface (*GPIB1* in the preceding example).

Solution: Extend the length of the GPIB cabling between the server and the instrument.

Extending the length of GPIB cable between the server and the instrument can decrease the speed at which the instrument receives data from the server.

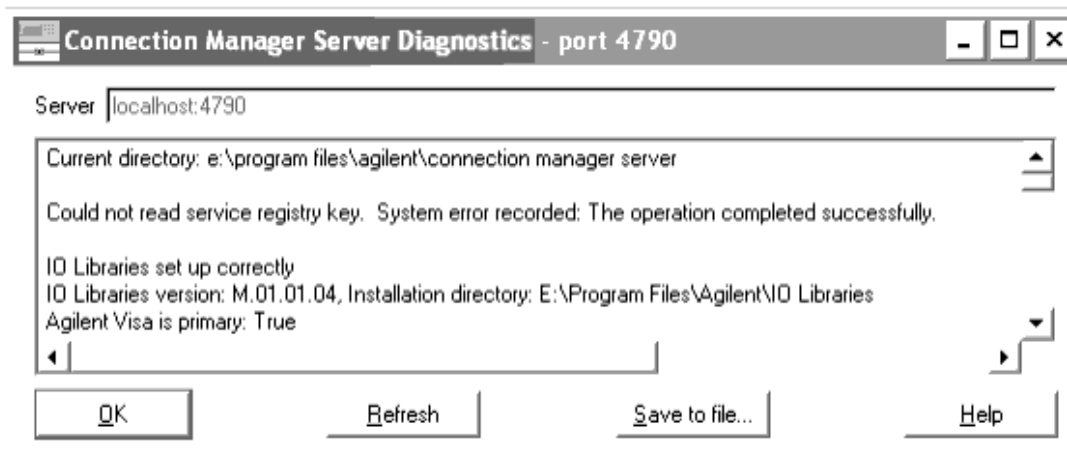
Connection Manager Server Diagnostics

The Connection Manager client and server dialogs include server diagnostics. The *Connection Manager Server Diagnostics* and *Diagnostics Display* dialogs collect and display server configuration information for use in troubleshooting instrument communication problems.

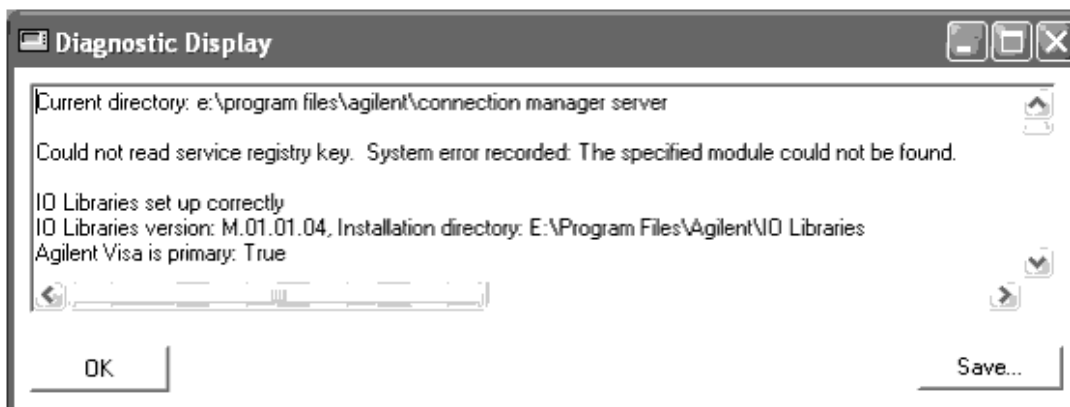
Note

At no time does the server implementation of this capability interact directly with instruments. Doing so could interrupt a measurement in progress.

Client Dialog



Server Dialog



As shown, the client dialog contains a **Server** entry field, an information display area, as well as **OK**, **Refresh**, **Save to file...**, and **Help** buttons. The server dialog contains an information display area, as well as **OK** and **Save...** buttons.

The **Server** field displays the name of the currently configured server.

The display area will contain the information gathered by the diagnostics routine. For

individual explanations, see [Understanding the Server Diagnostics Output](#).

Choose **OK** to dismiss the dialog.

Choose **Refresh** to refresh the diagnostic information after making changes to your server configuration.

Choose **Save to file...** or **Save...** to open a Save File dialog where you can save the diagnostic dialog contents in a text file. E-mail this text file to Agilent EEsof support staff to provide them with the information to diagnose an instrument IO problem.

To Diagnose the Server From the Server Window

1. From the Connection Manager Server main window, choose **Diagnostics > Run Diagnostics**.
2. Observe the information in the display area.
3. Make necessary corrections to the server configuration.
4. Close the server.
5. Reopen the server.
6. Choose **Diagnostics > Run Diagnostics**.
7. Observe the information in the display area.
8. To save the diagnostics information, click **Save to file...** and enter a file name and directory path.
9. To exit diagnostics, click **OK**.

To Diagnose the Server From the Client Window

1. From the Connection Manager Client main window, choose **Help > Diagnostics**.
2. Choose server using the *Set Server* dialog and click **OK**.
3. Observe the information in the display area.
4. Make necessary corrections to the server configuration.
5. Click **Refresh** to run the diagnostics again.
6. To save the diagnostics information, click **Save to file...** and enter a file name and directory path.
7. To exit diagnostics, click **OK**.

Understanding the Server Diagnostics Output

This section describes the individual server diagnostics output items, from top to bottom of the display.

The CM Service Information

This section contains server version, server installation path, and the operating state of the server, as shown:

```
CM Service version info: 3.0.2004.1, Installation path:  
  C:\Program Files\Agilent\Connection Manager  
Server\MsmtSrv.exe, Service state: The service is running.
```

Server version 2.0.2003.3 is ADS 2003C, server version 3.0.2004.1 is ADS 2004A, server version 4.0.2005.1 is ADS 2005A, ADS 2006A is 5.0.2006.1.

The installation path is read from the registry key *HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\AgilentConnectionManager\ImagePath*. The installation package creates this registry key when you install the Connection Manager server.

The diagnostic routine queries the Service Control Manager to obtain the service state to determine whether you are running the CM server as an application or a Windows service. In server versions prior to version 3.0.2004.1, the CM server functioned as a Windows service. Versions 3.0.2004.1 and later function as a Windows application. The 2004A CM server installation, by default, will stop a previous instance of the Windows service, remove the service from the system, then configure the Windows application to take its place.

If preferred, you can override this new default and continue to use the Windows service. Even though the Windows service is not configured into the system, it is still installed with ADS 2004A.

If the service is not running, the following message appears on the display:

```
CM Service version info: 3.0.2004.1, Installation path:  
  C:\Program Files\Agilent\Connection Manager  
Server\MsmtSrv.exe  
Could not get service status. System error recorded:  
  The service has not been started.
```

If the service isn't installed, the following message appears on the display:

```
Could not read service registry key. System error  
recorded:
```

IO Libraries Information

This section records the IO Libraries registry information. This is a complete description of all IO configuration settings. This section contains IO libraries installation path, version, and configured interfaces, as shown (important entries are highlighted):

```
IO Libraries set up correctly  
IO Libraries version: M.01.01.04, Installation directory:  
  C:\Program Files\Agilent\IO Libraries  
Agilent Visa is primary: True  
IO Libraries registry information...  
  Registry key: CurrentVersion  
    Registry name: Platform, Registry value: -1  
    Registry name: PlatformName, Registry value: unknown  
    Registry name: BaseDir, Registry value:
```

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```
C:\Program Files\Agilent\IO Libraries
Registry name: CurrentVersion, Registry value:
M.01.01.04
Registry name: CurrentVersionNumber, Registry value:
1291911428
Registry name: ProductCode, Registry value:
\{04107B50-CCF1-11D3-931C-00108301D203\}
Registry name: InstallLevel, Registry value: 256
Registry name: 1394VersionCheck, Registry value:
5.0.2195.2096
Registry name: IOLibrariesVisaPresent, Registry value: 1
Registry name: IOCFGRebootVal, Registry value: 0
Registry name: IOControlHidden, Registry value: 0
Registry key: Aliases
  Registry name: Serial, Registry value: ag232i
  Registry name: ag82341, Registry value: ag341i
  Registry name: hp82341, Registry value: ag341i
  Registry name: hp82340, Registry value: ag341i
  Registry name: e2071a, Registry value: ag341i
  Registry name: 82340, Registry value: ag341i
  Registry name: 82341, Registry value: ag341i
  Registry name: ag82350, Registry value: ag350i
  Registry name: hp82350, Registry value: ag350i
  Registry name: 82350, Registry value: ag350i
  Registry name: e2078a, Registry value: ag350i
  Registry name: hpe8491, Registry value: ag491i
  Registry name: age8491, Registry value: ag491i
  Registry name: e8491, Registry value: ag491i
  Registry name: hpilan, Registry value: agtlan
  Registry name: hptcpi, Registry value: agtlan
  Registry name: agilan, Registry value: agtlan
  Registry name: agtcpi, Registry value: agtlan
  Registry name: usb488, Registry value: agUsb488
  Registry name: 82357, Registry value: ag357i
Registry key: INTF1
  Registry name: Name, Registry value: gpib0
  Registry name: VISAName, Registry value: GPIB0
  Registry name: VISAIntfType, Registry value: GPIB
  Registry name: VISAAutoConfigDriver,
  Registry value: AUTOCF
  Registry name: VISAAutoConfig, Registry value:
  System.Byte[ ]
  Registry name: LU, Registry value: 8
  Registry name: Interface, Registry value: 82357
  Registry name: BusAddr, Registry value: 21
  Registry name: SysCtl, Registry value: 1
  Registry name: Slot, Registry value: 0
  Registry name: TimeoutFloorMsec,
  Registry value: 2000
  Registry name: TimeoutUsbFlushMsec,
  Registry value: 2000
  Registry name: TimeoutWrCompleteFlushMsec,
  Registry value: 15000
  Registry name: IOBufferSizeKb,
  Registry value: 64
  Registry name: PNPvid, Registry value:
  0x00000957
  Registry name: PNPmodel, Registry value:
  0x00000107
  Registry name: PNPsn, Registry value:
  US42251605
```

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```
Registry name: EnableExport, Registry value:
  System.Byte[ ]
Registry key: VISADev
Registry key: VISAIntfRsrc
  Registry key: GPIB0::INTFC
    Registry name: Driver,
    Registry value: INSTR
    Registry name: Prefix,
    Registry value: INTFC
Registry key: INTF3
  Registry name: Name, Registry value: lan
  Registry name: LU, Registry value: 30
  Registry name: Interface,
  Registry value: agtlan
  Registry name: VISAName,
  Registry value: TCPIP0
  Registry name: VISAIntfType,
  Registry value: TCPIP
  Registry name: VISAAutoConfigDriver,
  Registry value: AUTOCF
  Registry name: VISAAutoConfig,
  Registry value: System.Byte[ ]
  Registry name: log_errors,
  Registry value: 1
  Registry name: lan_delta,
  Registry value: 25
  Registry name: sicl_infinity,
  Registry value: 120
  Registry name: lanProtocol,
  Registry value: 1
  Registry name: Slot,
  Registry value: 0
  Registry name: BusAddr,
  Registry value: 0
  Registry name: sigio,
  Registry value: 0
  Registry name: EnableExport,
  Registry value: System.Byte[ ]
Registry key: VISADev
  Registry key:
  TCPIP0::123.456.789.101::inst0
  Registry key:
  TCPIP0::123.456.789.101::inst0::INSTR
    Registry name: Driver,
    Registry value: INSTR
    Registry name: Prefix,
    Registry value: INSTR
  Registry key: VISAIntfRsrc
Registry key: INTF4
  Registry name: Name, Registry value: usb0
  Registry name: VISAName,
  Registry value: USB0
  Registry name: VISAIntfType,
  Registry value: USB
  Registry name: VISAAutoConfigDriver,
  Registry value: AUTOCF
  Registry name: VISAAutoConfig,
  Registry value: System.Byte[ ]
  Registry name: LU, Registry value: 20
  Registry name: Interface,
  Registry value: usb488
```

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Registry name: EnableExport,
Registry value: System.Byte[]
Registry key: Usb488Devices
Registry key: VISADev
Registry key: VISAIntfRsrc
Registry key: PARAMS
Registry name: ag232i,
Registry value: LU,Name,Interface,NotUsed,
PortNumber,SRQ,HWFLOWControl
Registry name: ag341i,
Registry value: LU,Name,Interface,Slot,
BusAddr,Switches,SysCtl,IRQ,
PNPvid,PNPsn
Registry name: ag350i,
Registry value: LU,Name,Interface,Slot,
BusAddr,PNPvid,PNPModel, PNPsecId,PNPsn,
SysCtl,PNPprefix
Registry name: ag491i, Registry value:
LU,Name,Interface,NotUsed,NotUsed,
CageIdHi,CageIdLo, RsrcMngrDelay,VmeBto,
VmeBusReqLvl,ExtClockEnable,
ExtTrigOutPolarity,ExtTrigInLevel,
ExtTrigInPolarity,
UseAllExtendedMem
Registry name: agtlan,
Registry value: LU,Name,Interface,Slot,
BusAddr,sicl_infinity,lan_delta,
sigio,log_errors,reserved,lanProtocol
Registry name: aglansvr,
Registry value: LU,Name,Interface,Slot,
BusAddr,sicl_infinity,log_errors,
log_locks_conns,keepalives
Registry name: agUsb488,
Registry value: LU,Name,Interface,Slot,
BusAddr
Registry name: ag357i,
Registry value: LU,Name,Interface,Slot,
BusAddr,PNPvid,PNPmodel,PNPsn
Registry key: VISAIInfo
Registry name: , Registry value: Comment: General Information on Agilent's VISA
Implementation
Registry name: Spec Version, Registry value: 3145728
Registry name: Manufacturer, Registry value: Agilent Technologies
Registry name: Copyright, Registry value: Copyright Agilent Technologies, 2003.
Registry name: ManfVersion, Registry value: M.01.01.04
Registry name: LastMod, Registry value: Fri Apr 30 10:34:17 2004
Registry name: ModTool, Registry value: Agilent VISA Configuration Tool
Registry name: ManfVersionNbr, Registry value: 1291911428
Registry name: ManfID, Registry value: 4095
Registry name: Logging, Registry value: OFF
Registry name: MaxSessNbr, Registry value: 256
Registry name: MaxNbrOfProcs, Registry value: 64
Registry name: DefaultQSize, Registry value: 50
Registry name: SleepMs, Registry value: 0
Registry name: DefaultLockWait, Registry value: 0
Registry name: DefaultAllowLocalSpaceFifo,
Registry value: 0
Registry key: DefaultIntfRsrcs
Registry name: , Registry value: Interface
Resources to load during configuration ADD
functions

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```
Registry key: BACKPLANE
  Registry name: DrvrName, Registry value: INSTR
  Registry name: PrefixName, Registry value: BACKPLANE
  Registry name: GPIB, Registry value: System.Byte[ ]
  Registry name: VXI, Registry value: System.Byte[ ]
  Registry name: GPIB-VXI, Registry value: System.Byte[ ]
  Registry name: ASRL, Registry value: System.Byte[ ]
  Registry name: TCPIP, Registry value: System.Byte[ ]
  Registry name: USB, Registry value: System.Byte[ ]
Registry key: INTFC
  Registry name: DrvrName, Registry value: INSTR
  Registry name: PrefixName, Registry value: INTFC
  Registry name: GPIB, Registry value: System.Byte[ ]
  Registry name: VXI, Registry value: System.Byte[ ]
  Registry name: GPIB-VXI, Registry value: System.Byte[ ]
  Registry name: ASRL, Registry value: System.Byte[ ]
  Registry name: TCPIP, Registry value: System.Byte[ ]
  Registry name: USB, Registry value: System.Byte[ ]
Registry key: MEMACC
  Registry name: DrvrName, Registry value: INSTR
  Registry name: PrefixName, Registry value: MEMACC
  Registry name: GPIB, Registry value: System.Byte[ ]
  Registry name: VXI, Registry value: System.Byte[ ]
  Registry name: GPIB-VXI, Registry value: System.Byte[ ]
  Registry name: ASRL, Registry value: System.Byte[ ]
  Registry name: TCPIP, Registry value: System.Byte[ ]
  Registry name: USB, Registry value: System.Byte[ ]
Registry key: DefaultRsrcs
  Registry name: , Registry value: Resources to load
    during auto-connect and configuration
  ADD functions
Registry key: INSTR
  Registry name: DrvrName, Registry value: INSTR
  Registry name: PrefixName, Registry value: INSTR
  Registry name: GPIB, Registry value: System.Byte[ ]
  Registry name: VXI, Registry value: System.Byte[ ]
  Registry name: GPIB-VXI, Registry value: System.Byte[ ]
  Registry name: ASRL, Registry value: System.Byte[ ]
  Registry name: TCPIP, Registry value: System.Byte[ ]
  Registry name: USB, Registry value: System.Byte[ ]
Registry key: SOCKET
  Registry name: DrvrName, Registry value: INSTR
  Registry name: PrefixName, Registry value: SOCKET
  Registry name: GPIB, Registry value: System.Byte[ ]
  Registry name: VXI, Registry value: System.Byte[ ]
  Registry name: GPIB-VXI, Registry value: System.Byte[ ]
  Registry name: ASRL, Registry value: System.Byte[ ]
  Registry name: TCPIP, Registry value: System.Byte[ ]
  Registry name: USB, Registry value: System.Byte[ ]
```

The diagnostics routine reads this information out of the registry key *HKEY_LOCAL_MACHINE\SOFTWARE\Agilent\IO Libraries\CurrentVersion*. Agilent IO Libraries version M.01.01.04 is included with ADS 2004A and ADS 2003C. To return the configured interfaces information, the routine dynamically loads the visa32.dll library and queries the interface. To return the local interfaces information, the routine loads the sicl32.dll library and queries the logical unit information. For Plug and Play drivers to work correctly, VISA must be installed and the Agilent VISA library has to be configured as **Primary**. With regards to the entry Registry key: TCPIP0::123.456.789.101::inst0, when you add a

device to the IO Configuration using the *Edit VISA Configuration* dialogs, each device entry is recorded in the registry.

If visa32.dll is not in the system path or has had its name changed IO Libraries not set up correctly.

The most common reason for this error is that the IO libraries did not install visa32.dll into a directory in the system path.

Another common reason for this error is that the IO libraries are not installed with Agilent Visa as the primary Visa implementation.

System error recorded: The specified module could not be found.

IO Libraries version: M.01.01.04, Installation directory: C:\Program Files\Agilent\IO Libraries

Agilent Visa is primary: False

This system needs to remove the IO Libraries and re-install with Agilent Visa as primary.

Could not generate interface information.

The most common cause for this error is that the IO libraries Visa installation is incorrect.

Service Account Information

This section contains IO libraries installation path, version, and configured interfaces, as shown (important entries are highlighted):

Service account as configured in the registry: LocalSystem

Running as Local System. This is a potential problem, as running as Local System on some systems causes instrument IO to fail

Privileges...

- SeTcbPrivilege, Act as part of the operating system
- SeCreateTokenPrivilege, Create a token object
- SeTakeOwnershipPrivilege, Take ownership of files or other objects
- SeCreatePagefilePrivilege, Create a pagefile
- SeLockMemoryPrivilege, Lock pages in memory
- SeAssignPrimaryTokenPrivilege, Replace a process level token
- SeIncreaseQuotaPrivilege, Increase quotas
- SeIncreaseBasePriorityPrivilege, Increase scheduling priority
- SeCreatePermanentPrivilege, Create permanent shared objects
- SeDebugPrivilege, Debug programs
- SeAuditPrivilege, Generate security audits
- SeSecurityPrivilege, Manage auditing and security log
- SeSystemEnvironmentPrivilege, Modify firmware environment values
- SeChangeNotifyPrivilege, Bypass traverse checking
- SeBackupPrivilege, Back up files and directories
- SeRestorePrivilege, Restore files and directories
- SeShutdownPrivilege, Shut down the system
- SeLoadDriverPrivilege, Load and unload device drivers
- SeProfileSingleProcessPrivilege, Profile single process
- SeSystemtimePrivilege, Change the system time
- SeUndockPrivilege, Remove computer from docking station
- SeManageVolumePrivilege, Perform volume maintenance tasks
- SeImpersonatePrivilege, Impersonate a client after authentication
- SeCreateGlobalPrivilege, Create global objects

Running the server under the Local System account on certain systems prevents the system from loading visa32.dll. If the IO is not functioning and all the IO libraries information is correct, run the service under an account with Administrator privileges.

Drive Types

As a security precaution, runtime versions of .NET will not allow running networked applications from removable media. Attempting to run the CM server from a removable drive will fail and issue a security exception.

Enumerating drive types...

```
C: Drive type: Fixed
D: Drive type: CdRom -- the server will not work when
  installed on this type of drive
R: Drive type: Remote -- the server will not work when
  installed on this type of drive
S: Drive type: Remote -- the server will not work when
  installed on this type of drive
```

Processes

This section contains a list of running processes. Important entries are highlighted, as shown:

Snapshot of running processes...

```
MsmtSrvc, Process id: 1280
DiagnosticServi, Process id: 744
CMD, Process id: 2080
mstask, Process id: 956
CTFMON, Process id: 1704
iprocsvr, Process id: 2024
SMSS, Process id: 204
TASKMGR, Process id: 2128
ati2evxx, Process id: 628
adcist, Process id: 1696
IDA, Process id: 1588
MsmtSrvr, Process id: 2056
Directcd, Process id: 1692
winvnc, Process id: 1048
IDASched, Process id: 1740
iproc82357, Process id: 936
PageMill, Process id: 732
LSASS, Process id: 292
WinMgmt, Process id: 1040
svchost, Process id: 504
OSA, Process id: 1572
CreateCD50, Process id: 1676
mdm, Process id: 712
SERVICES, Process id: 280
nutsrv4, Process id: 916
explorer, Process id: 1448
WZQKPICK, Process id: 1768
```



```

VPTray, Process id: 1660
ltmoh, Process id: 1552
CMD, Process id: 1764
NMSSvc, Process id: 800
epsilon, Process id: 1292
SynTPEnh, Process id: 1332
realsched, Process id: 1652
CMServerDiagnos, Process id: 1972
SynTPLpr, Process id: 1436
regsvc, Process id: 352
DefWatch, Process id: 676
Eudora, Process id: 1744
SMTray, Process id: 1636
ltmsg, Process id: 1528
atiptaxx, Process id: 1420
svchost, Process id: 456
CSRSS, Process id: 232
WINLOGON, Process id: 228
CMD, Process id: 2160
Crypserv, Process id: 660
spoolsv, Process id: 552
Rtvscan, Process id: 872
iproc488, Process id: 2048
PROMon, Process id: 1512
EABSERVER, Process id: 1508
CMD, Process id: 116
System, Process id: 8
prpcui, Process id: 1612
bash, Process id: 752
Idle, Process id: 0

```

For the IO libraries to work, the processes named *iprocsvr* , *iproc488* , and *iproc82357* must be running. In 2003C, if these processes are not running, the CM server will start them. Prior to that, the processes started when somebody interactively logged into the server PC. If IO isn't working, one potential problem in 2003A is that no user is logged onto the server PC.

Directory Contents

This section contains a list of the server installation directory contents and revision information for each file. The measurement DLLs are in the *ImportedAssemblies* directory. The CM server revision for 2004A is 3.0.2004.1.

Directory contents...

```

C:\Program Files\Agilent\Connection Manager Server\
  Agilent.TMFramework.dll, Version: 1.0.4230.0
C:\Program Files\Agilent\Connection Manager
  Server\Agilent.TMFramework.InstrumentDriverInterop.dll,
  Version: 1.0.4230.0
C:\Program Files\Agilent\Connection Manager
  Server\Agilent.TMFramework.InstrumentIO.Configuration.dll,
  Version: 1.0.4230.0
C:\Program Files\Agilent\Connection Manager Server\
  Agilent.TMFramework.InstrumentIO.dll, Version:
  1.0.4230.0

```

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C:\Program Files\Agilent\Connection Manager
Server\Agilent.TMFramework.InstrumentIO.VisaInterop.dll,
Version: 1.0.4230.0

C:\Program Files\Agilent\Connection Manager Server\
Agilent.TMFramework.InternalUtils.dll, Version:
1.0.4230.0

C:\Program Files\Agilent\Connection Manager Server\
CMDiagnostics.dll, Version: 3.0.2004.1

C:\Program Files\Agilent\Connection Manager Server\
CMServerDiagnostics.dll, Version: 3.0.2004.1

C:\Program Files\Agilent\Connection Manager Server\
HwCatalog.dll, Version: 0.0.0.0

C:\Program Files\Agilent\Connection Manager Server\
IsAdmin.dll, Version: 3.0.2004.1

C:\Program Files\Agilent\Connection Manager Server\
LibMgr.dll, Version: 3.0.2004.1

C:\Program Files\Agilent\Connection Manager Server\
MsmtEvents.dll, Version: 0.1.0.0

C:\Program Files\Agilent\Connection Manager Server\
PowerManagement.dll, Version: 3.0.2004.1

C:\Program Files\Agilent\Connection Manager Server\
VisaIO.dll, Version: 3.0.2004.1

C:\Program Files\Agilent\Connection Manager Server\
vsassert.dll, Version: 7.0.9466.0

C:\Program Files\Agilent\Connection Manager Server\
CMController.exe, Version: 3.0.2004.1

C:\Program Files\Agilent\Connection Manager Server\
MsmtSrv.exe, Version: 3.0.2004.1

C:\Program Files\Agilent\Connection Manager Server\
MsmtSrvr.exe, Version: 3.0.2004.1

C:\Program Files\Agilent\Connection Manager Server\
VisaInstFinder.exe, Version: 3.0.2004.1

C:\Program Files\Agilent\Connection Manager
Server\ImportedAssemblies\AGE444XAVxipnpNETWrapper.dll,
Version: 1.0.0.0

C:\Program Files\Agilent\Connection Manager Server\
ImportedAssemblies\Agilent8753.dll, Version:
0.0.0.0

C:\Program Files\Agilent\Connection Manager Server\
ImportedAssemblies\ESGBServer.dll, Version:
3.0.2004.1

C:\Program Files\Agilent\Connection Manager Server\
ImportedAssemblies\ESGCServer.dll, Version:
3.0.2004.1

C:\Program Files\Agilent\Connection Manager
Server\ImportedAssemblies\HP856XEVxipnpNETWrapper.dll,
Version: 1.0.0.0

C:\Program Files\Agilent\Connection Manager
Server\ImportedAssemblies\HP859XEVxipnpNETWrapper.dll,
Version: 1.0.0.0

C:\Program Files\Agilent\Connection Manager Server\
ImportedAssemblies\HP871XVxipnpNETWrapper.dll,
Version: 1.0.0.0

C:\Program Files\Agilent\Connection Manager
Server\ImportedAssemblies\HPE4406VxipnpNETWrapper.dll,
Version: 1.0.0.0

C:\Program Files\Agilent\Connection Manager Server\
ImportedAssemblies\HPESGVxipnpNETWrapper.dll,
Version: 1.0.0.0

C:\Program Files\Agilent\Connection Manager Server\
ImportedAssemblies\ScopeServer.dll, Version:

3.0.2004.1

C:\Program Files\Agilent\Connection Manager Server\
ImportedAssemblies\SparmServer.dll, Version:

3.0.2004.1

C:\Program Files\Agilent\Connection Manager Server\
ImportedAssemblies\SparmServerPNA.dll, Version:

3.0.2004.1

C:\Program Files\Agilent\Connection Manager Server\
ImportedAssemblies\SpectrumServer.dll, Version:

3.0.2004.1

C:\Program Files\Agilent\Connection Manager Server\
ImportedAssemblies\VSAServer.dll, Version:

3.0.2004.1

Plug and Play Driver Information

This section contains a list of the VISA Plug and Play drivers and revision information for each file. ADS measurements require the highlighted DLLs shown below.

Plug and Play driver installation directory: C:\Program Files\VISA\winnt.

C:\Program Files\VISA\winnt\bin\
AG875XVxipnpNETWrapper.dll, Version: 1.0.0.0
C:\Program Files\VISA\winnt\bin\
AGE444XAVxipnpNETWrapper.dll, Version: 1.0.0.0
C:\Program Files\VISA\winnt\bin\
age444xa_32.dll, Version: 1.0.0.1
C:\Program Files\VISA\winnt\bin\
hp548xx_32.dll
C:\Program Files\VISA\winnt\bin\
hp856xe_32.dll, Version: 1.0.0.0
C:\Program Files\VISA\winnt\bin\
hp859xe_32.dll, Version: 1.0.0.0
C:\Program Files\VISA\winnt\bin\
hp871x_32.dll
C:\Program Files\VISA\winnt\bin\
hpe4406_32.dll, Version: 1.0.0.1
C:\Program Files\VISA\winnt\bin\
HPESGVxipnpNETWrapper.dll, Version: 1.0.0.0
C:\Program Files\VISA\winnt\bin\
hpesg_32.dll, Version: 1.0.0.1
C:\Program Files\VISA\winnt\bin\
hpgpvx32.dll, Version: 77.1.1.4
C:\Program Files\VISA\winnt\bin\
ag875x_32.dll, Version: 1.0.0.1

Module Information

This section contains a list of the modules loaded into the MsmtSrvr.exe process. This information contains the versions of system and measurement libraries the server actually has loaded in memory.

Module information for MsmtSrvr...

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Module name: MsmtSrvr.exe
File: C:\Program Files\Agilent\
Connection Manager Server\MsmtSrvr.exe
InternalName: MsmtSrvr.exe
OriginalFilename: MsmtSrvr.exe
FileVersion: 5.0.2006.1
FileDescription: Agilent Connection Manager
Product: Agilent Connection Manager
ProductVersion: 5.0.2006.1
Debug: False
Patched: False
PreRelease: False
PrivateBuild: False
SpecialBuild: False
Language Language Neutral

Module name: ntdll.dll
File: C:\WINDOWS\system32\ntdll.dll
InternalName: ntdll.dll
OriginalFilename: ntdll.dll
FileVersion: 5.1.2600.2180\xpsp_sp2_rtm.040803-215\
FileDescription: NT Layer DLL
Product: Microsoft Windows Operating System
ProductVersion: 5.1.2600.2180
Debug: False
Patched: False
PreRelease: False
PrivateBuild: False
SpecialBuild: False
Language English (United States)

System Information

This section contains a description of the server PC memory, operating system, and processor. Important entries are highlighted, as shown:

Memory information...

Total Physical Memory: 527941632
Free Physical Memory: 281899008
Total Page File: 1289859072
Free Page File: 1006911488
Total Virtual Memory: 2147352576
Free Virtual Memory: 1947172864

Operating system information...

Microsoft Windows XP
Uniprocessor Free
Service Pack 1

Processor information...

Registry key: 0
Registry name: Component Information,
Registry value: System.Byte[]
Registry name: Identifier, Registry value:
x86 Family 15 Model 2 Stepping 4
Registry name: Configuration Data, Registry value:
Registry name: ProcessorNameString, Registry value:
Intel® Pentium® 4 Mobile CPU 1.70GHz
Registry name: VendorIdentifier, Registry value:
GenuineIntel

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Registry name: FeatureSet, Registry value: 12287

Registry name: ~MHz, Registry value: 1694

Registry name: Update Status, Registry value: 0

Registry name: Update Signature, Registry value:

System.Byte[]

Registry name: Previous Update Signature,

Registry value: System.Byte[]

New, higher-speed computers with fast HPIB interfaces can overload old, slower instruments. By recording the processor clock speed and the IO Libraries information above, EEsof support engineers can help diagnose these data overflow problems.

If the PC has more than one processor, there will be additional entries with headings like Registry key: 1 and so on.