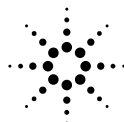


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# Agilent Technologies

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## IP Telephony Analyzer Getting Started



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**Product support**

Call your local Agilent Technologies representative, or:

Tel: 1-800-698-0061

Fax: 303-754-4802

or call your local Agilent Sales and Service Office

Agilent Technologies  
5070 Centennial Boulevard  
Colorado Springs, Colorado  
80919-2497

Web: <http://onenetworks.comms.agilent.com/>

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## Introduction

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# Introduction

The Agilent Advisor IP Telephony Analyzer is a powerful protocol analyzer measurement designed to help you troubleshoot and analyze Real-time Transport Protocol (RTP) Quality of Service (QoS) of voice on your IP network.

It consists of the Agilent Advisor LAN and the Agilent Advisor IP Telephony Analyzer (J4618C). It can be used with “C” and “D” Advisor mainframes and with any Ethernet and Fast Ethernet network interfaces.

The Advisor IP Telephony Analyzer software also includes VoIP expert commentator and VoIP protocol decode.

You can use Advisor IP Telephony Analyzer to:

- Identify multiple RTP sessions in real-time
- For each session, track packets sent, received, expected, lost, and inter-arrival delay variation (jitter)
- Graph packet loss and interarrival jitter over time and by distribution
- View decoded frames filtered by RTP session information
- View decoded frames containing VoIP protocols

The following pages provide a more detailed overview of the features of this network test equipment.

- Start with RTP Statistics to see statistics about the QoS for IP voice and data traffic on your network.
- Examine the details of frames being captured to understand the RTP participants and sessions on your network
- Use protocol filters to analyze frames containing VoIP protocols

---

**NOTE**  
**Using the J4618A**  
**RQM -- RTP Quality of**  
**Service Monitor**

If you are using the J4618A RQM RTP Quality of Service monitor application on an Agilent Advisor with version 11.4 or older software, use the application’s online help for information about the application.

The J4618A is a stand-alone application and its operation is slightly different than the operation described in this manual for the J4618C Agilent Advisor IP Telephony Analyzer application. The J4618C application is integrated into the Advisor LAN application’s user interface.

---

## Viewing RTP Quality of Service

**See the Quality of Service on your network at a glance**

In the Advisor IP Telephony Analyzer, the RTP Statistics measurement shows the RTP QoS performance of your network.

With the RTP Statistics measurement, you can quickly see how Interarrival Jitter and Packet Loss affect the quality of service.

A spreadsheet at the top of the window shows counts and statistics about participants, sessions, and errors/alarms on your network. The spreadsheet shows how much activity is occurring in each of these categories. From this measurement, you can quickly drill-down to the Decode measurement to see supporting frame data details.

Graphs at the bottom of the window show Inter-arrival Jitter and Packet Loss plotted over time and by distribution.

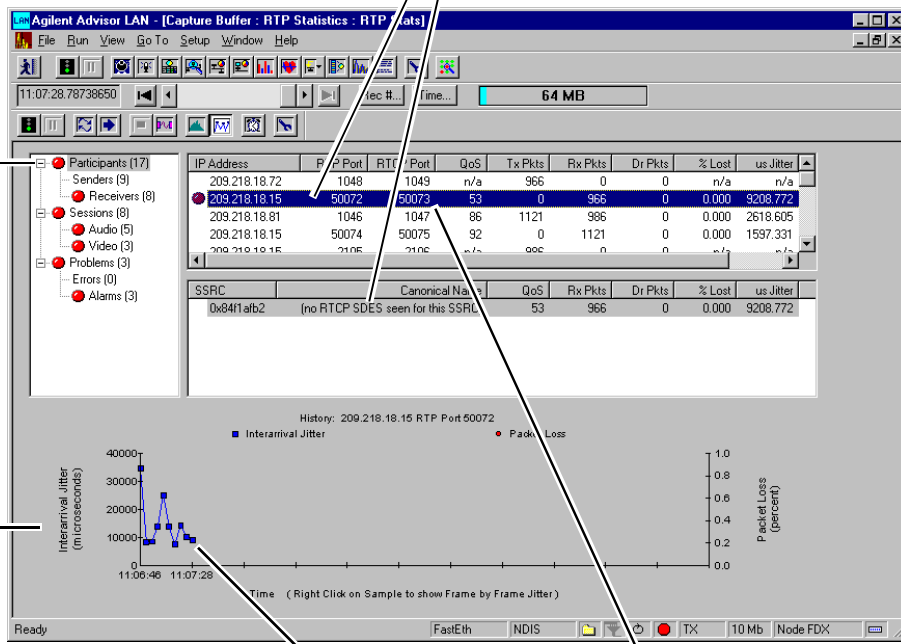
The display below is an example of when Participant is selected in the directory tree in the left pane.

You can use the directory tree to select between viewing Participant Sender or Receiver information.

The directory tree controls which parameter is displayed in the spreadsheet. Participant information is selected in this example.

This graph shows Interarrival Jitter and Packet Loss over time. It can also show the distribution of these parameters (see page 1-6).

Details about the Participant summary line selected in the top of the spreadsheet are displayed in the bottom of the spreadsheet.



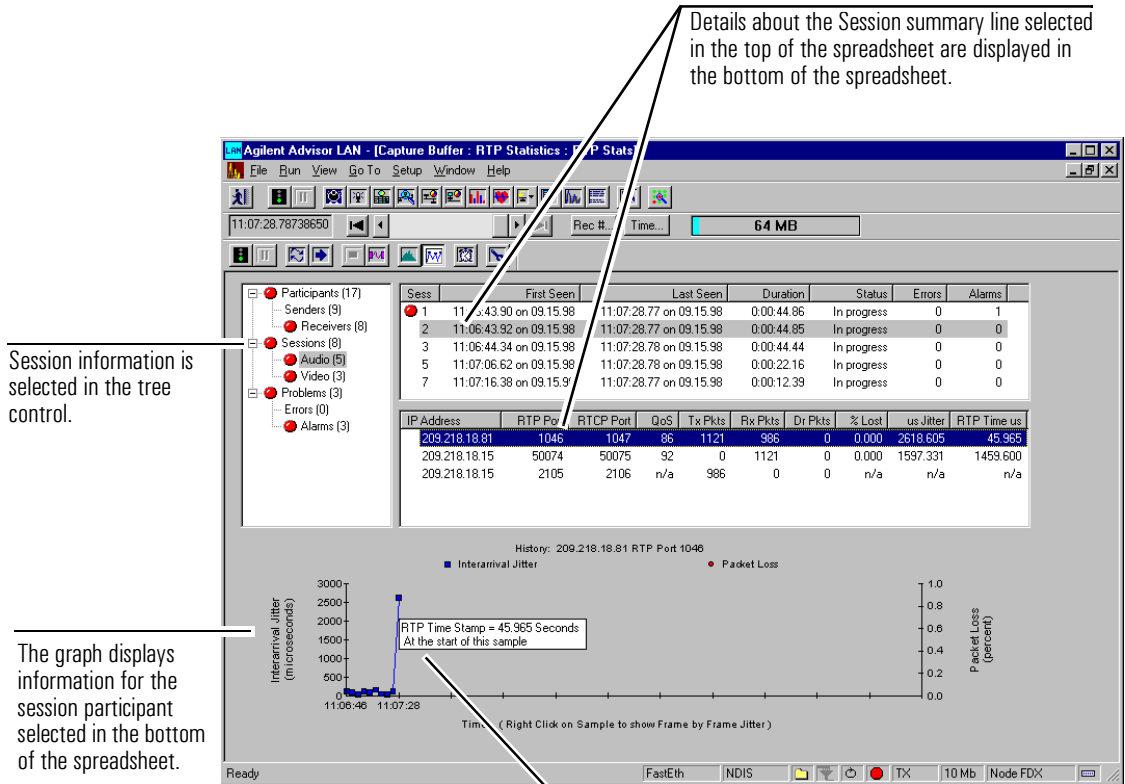
These samples show the interarrival jitter. Left-clicking a sample lets you display the time stamp. Right-clicking lets you view frame-by-frame jitter.

This participant is selected. Right-clicking a participant lets you select options to enable and play the audio of the conversation, and save the audio to a .wav file (these options are available when supported codecs are used).

In this example, the graph shows the jitter and packet loss over time for the participant that is selected in the top of the spreadsheet.



The display below shows an example of when Session is selected in the directory tree in the left pane. Each Session tracks packets sent, received, dropped, lost, and inter-arrival jitter.



These samples show the interarrival jitter. Left-clicking a sample lets you display the time stamp. Right-clicking lets you view frame-by-frame jitter.

At the end of each sample interval, the number of packets received is noted. The number of packets sent or expected is derived from the maximum sequence number seen. These two are subtracted to give the number of packets lost.

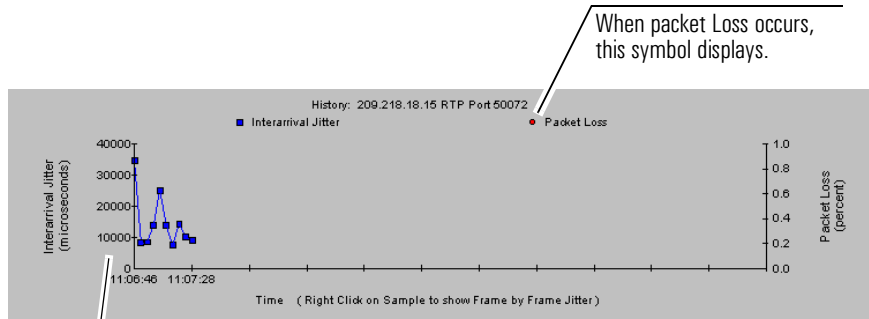
If duplicate packets are created by the network, a negative packet loss could be calculated. This should be interpreted as zero % packet loss.

You can display graphs of the RTP Statistics measurement in two formats:

- Interarrival Jitter and Packet Loss over time
- Interarrival Jitter and Packet Loss by distribution



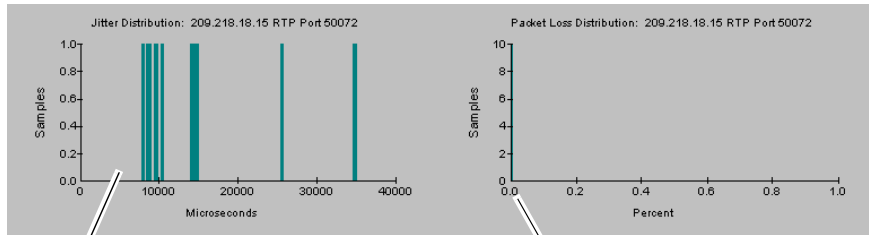
This tool bar button displays Interarrival Jitter and Packet Loss over time.



This graph shows Interarrival Jitter between packets received, averaged for each sample period.



This tool bar button displays Interarrival jitter and Packet Loss by distribution.

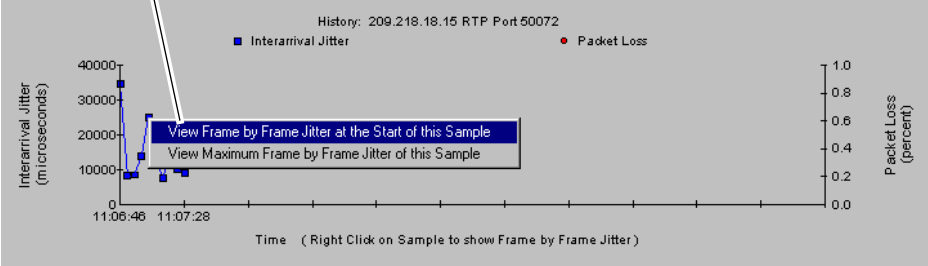


This graph shows that numerous different interarrival jitter times were seen between the different samples.

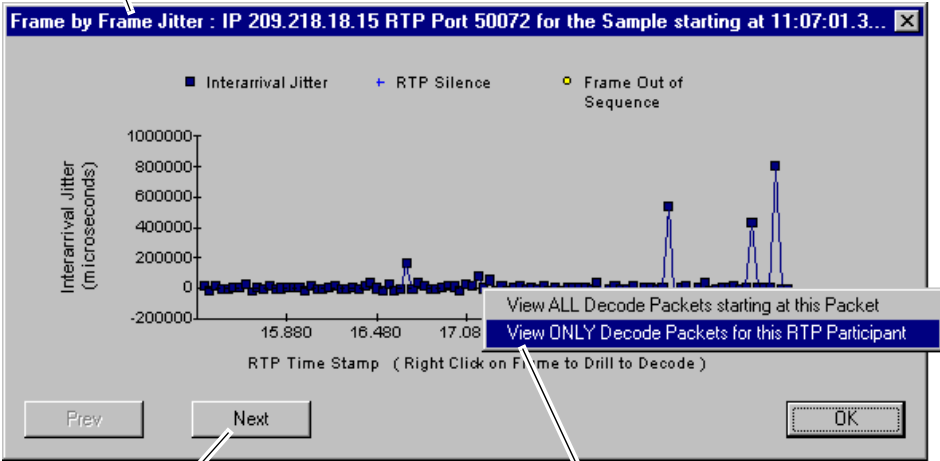
This graph shows 0.0 percent Packet Loss occurred in most of the samples.

You can show frame-by-frame jitter at the start of the sample, or the maximum frame-by-frame jitter for the entire sample.

Right-clicking a sample lets you display frame-by-frame jitter.



This view shows the frame-by-frame jitter at the start of the sample.



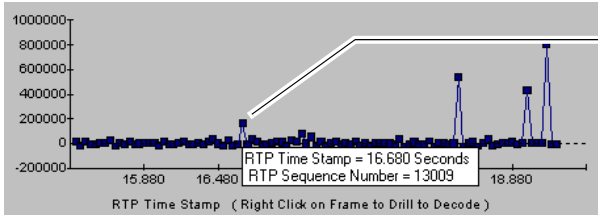
The Next and Prev buttons let you view additional detail about the frame-by-frame jitter for the sample.

Right-clicking a sample in the frame-by-frame jitter view lets you display the decode packets for the Participant.

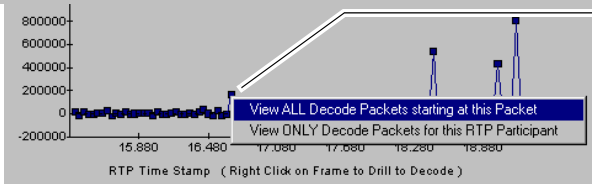
## Introduction

### Viewing RTP Quality of Service

You can show view the RTP Sequence Number for a sample, then find the matching number in the Decode view.



Left-clicking a sample in the frame-by-frame jitter view lets you display the RTP Sequence Number.



Right-clicking the same sample lets you display the decode packets for the Participant.

Agilent Advisor LAN - [File : Decode : Decode Data : RTPStatsDemo.dat]

File Run View Go To Setup Window Help

11:07:02.89696780 Rec #... Time... 64 MB

| Frame | Len | Absolute Time   | Source        | Destination   | Prot  |
|-------|-----|-----------------|---------------|---------------|-------|
| 2295  | 378 | 11:07:02.896967 | 209.218.18.72 | 209.218.18.15 | ETHER |
| 2298  | 378 | 11:07:02.929765 | 209.218.18.72 | 209.218.18.15 | ETHER |
| 2306  | 378 | 11:07:03.005460 | 209.218.18.72 | 209.218.18.15 | ETHER |
| 2313  | 378 | 11:07:03.060257 | 209.218.18.72 | 209.218.18.15 | ETHER |
| 2315  | 378 | 11:07:03.094620 | 209.218.18.72 | 209.218.18.15 | ETHER |
| 2319  | 378 | 11:07:03.129202 | 209.218.18.72 | 209.218.18.15 | ETHER |

RTP: P Bit = 0 (Padding Does Not Exist)  
 RTP: X Bit = 0 (No Extension Header Follows)  
 RTP: CSRC Count = 0  
 RTP: Marker Bit = 1  
 RTP: Payload Type = MU-Law Scaling (PCMU) (0)  
 RTP: Sequence Number = 13009  
 RTP: Time Stamp = 16.680 seconds

Record #2295 (From Hub To Node) Captured on 09.15.98 at 11:07:02.896967800 Length = 378

```

00 eU z9 11 8D z1 00 10 4b 21 69 46 08 00 45 00 ..)!.!.. K!iF..E.
01 68 5b 74 00 00 20 11 76 05 a1 da 12 48 d1 da .h[t... v...H..
12 0f 04 18 c3 98 01 54 31 08 80 80 82 d1 00 02 .....T l..2..
09 40 84 f1 af b2 70 78 7c 76 fd ff 7b 76 6a 66 .0....px |v..{vjf
  
```

Ready FastEth NDIS TX 10 Mb Node FDX

Scrolling through the Decode Detailed view shows the matching RTP Sequence Number of the sample you selected (above).

The Hex view shows the actual bytes in the selected frame. The next topic describes more about decoding frames.

You can configure thresholds to signal when errors and alarms occur in the frames you are monitoring.

A red ball identifies when an alarm threshold has been exceeded.

The screenshot shows a directory tree on the left with 'Participants (17)' expanded to show 'Senders (9)' and 'Receivers (8)'. A red ball is next to 'Receivers (8)'. To the right is a table with columns 'IP Address' and 'RTP Port'.

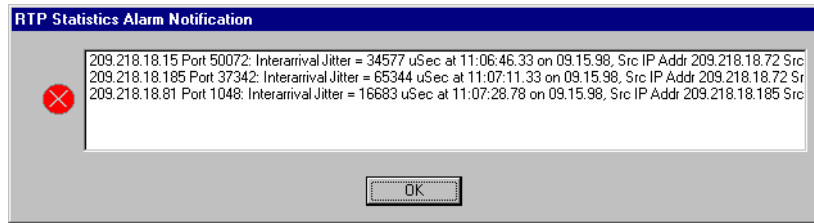
| IP Address    | RTP Port |
|---------------|----------|
| 209.218.18.15 | 50072    |
| 209.218.18.15 | 50072    |

A yellow ball identifies when an error threshold has been exceeded.

The screenshot shows a directory tree on the left with 'Participants (17)' expanded to show 'Senders (9)' and 'Receivers (8)'. A yellow ball is next to 'Receivers (8)'. To the right is a table with columns 'IP Address' and 'RTP Port'.

| IP Address     | RTP Port |
|----------------|----------|
| 209.218.18.185 | 36694    |
| 209.218.18.185 | 37772    |

The alarm dialog shows the threshold condition that has been exceeded. You can configure the application to display a dialog, beep, or stop capture when an alarm threshold is exceeded.



When an error or alarm condition occurs, you can use the directory tree to view a description of the problem.

The screenshot shows a directory tree on the left with 'Participants (17)' expanded to show 'Senders (9)', 'Receivers (8)', 'Sessions (8)', 'Audio (5)', 'Video (3)', 'Problems (3)', 'Errors (0)', and 'Alarms (3)'. A red ball is next to 'Alarms (3)'. To the right is a table with columns 'Sess', 'Dest IP Address', 'Dest RTP...', 'Description', 'Time', and 'Src IP Address'.

| Sess | Dest IP Address | Dest RTP... | Description                      | Time                    | Src IP Address |
|------|-----------------|-------------|----------------------------------|-------------------------|----------------|
| 1    | 209.218.18.15   | 50072       | Interarrival Jitter = 34577 uSec | 11:06:46.33 on 09.15.98 | 209.218.18.72  |
| 6    | 209.218.18.185  | 37342       | Interarrival Jitter = 65344 uSec | 11:07:11.33 on 09.15.98 | 209.218.18.72  |
| 8    | 209.218.18.81   | 1048        | Interarrival Jitter = 16683 uSec | 11:07:28.78 on 09.15.98 | 209.218.18.185 |

## Decoding Frames on Your Network

### What are the actual contents of a frame on my network?

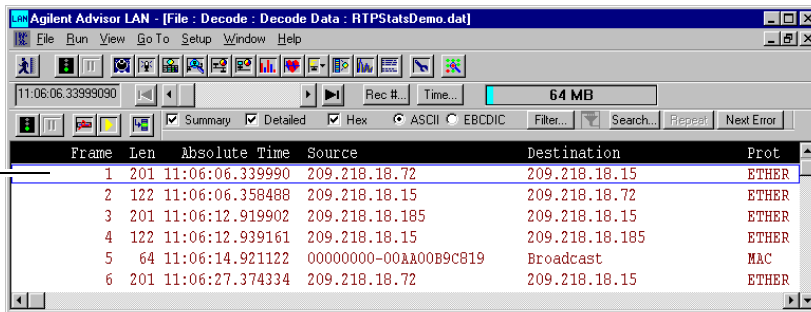
The Decode measurement interprets and displays the contents of the data in a frame according to its protocol. A timestamp and frame number are added to each frame to help you examine the data.

Examples of information you can determine from the Decode view include:

- Is a node on the network making requests and responses correctly?
- Do timing issues exist between frames on the network?

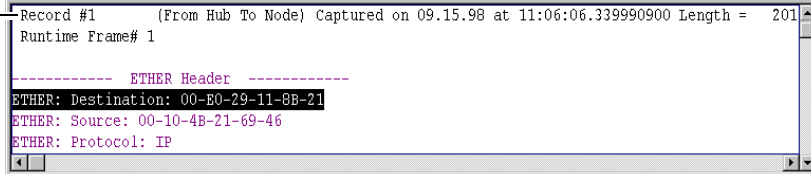
To view the Decode display, click on the  icon, or right mouse click on the participant line information of the RTP Stats view. This sets a display filter for the session of interest that takes you to the decode display.

The Summary view shows a summary line for each frame.



| Frame | Len | Absolute Time   | Source                | Destination    | Prot  |
|-------|-----|-----------------|-----------------------|----------------|-------|
| 1     | 201 | 11:06:06.339990 | 209.218.18.72         | 209.218.18.15  | ETHER |
| 2     | 122 | 11:06:06.358488 | 209.218.18.15         | 209.218.18.72  | ETHER |
| 3     | 201 | 11:06:12.919902 | 209.218.18.185        | 209.218.18.15  | ETHER |
| 4     | 122 | 11:06:12.939161 | 209.218.18.15         | 209.218.18.185 | ETHER |
| 5     | 64  | 11:06:14.921122 | 00000000-00AA00B9C819 | Broadcast      | MAC   |
| 6     | 201 | 11:06:27.374334 | 209.218.18.72         | 209.218.18.15  | ETHER |

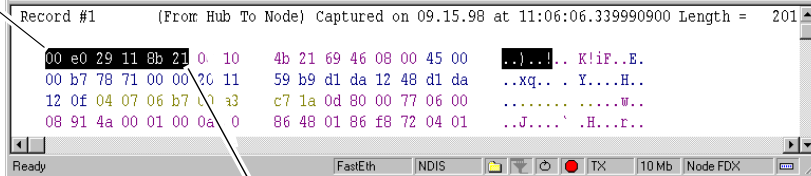
The Detailed view shows the decoded contents of each field in the selected frame.



```
Record #1 (From Hub To Node) Captured on 09.15.98 at 11:06:06.339990900 Length = 201
Runtime Frame# 1

----- ETHER Header -----
ETHER: Destination: 00-F0-29-11-8B-21
ETHER: Source: 00-10-4B-21-69-46
ETHER: Protocol: IP
```

The Hex view shows the actual bytes in the selected frame. The right column shows the contents in ASCII or EBCDIC.




```
Record #1 (From Hub To Node) Captured on 09.15.98 at 11:06:06.339990900 Length = 201

00 e0 29 11 8b 21 0. 10 4b 21 69 46 08 00 45 00 .)...).. K!iF..E.
00 b7 78 71 00 00 20 11 59 b9 d1 da 12 48 d1 da ..xq... Y....H..
12 0f 04 07 06 b7 03 c7 1a 0d 80 00 77 06 00 .....W..
08 91 4a 00 01 00 0a 0 86 48 01 86 f8 72 04 01 ..J....` .H...r..
```

Clicking a field in the Detailed view highlights the corresponding bytes in the Hex view.

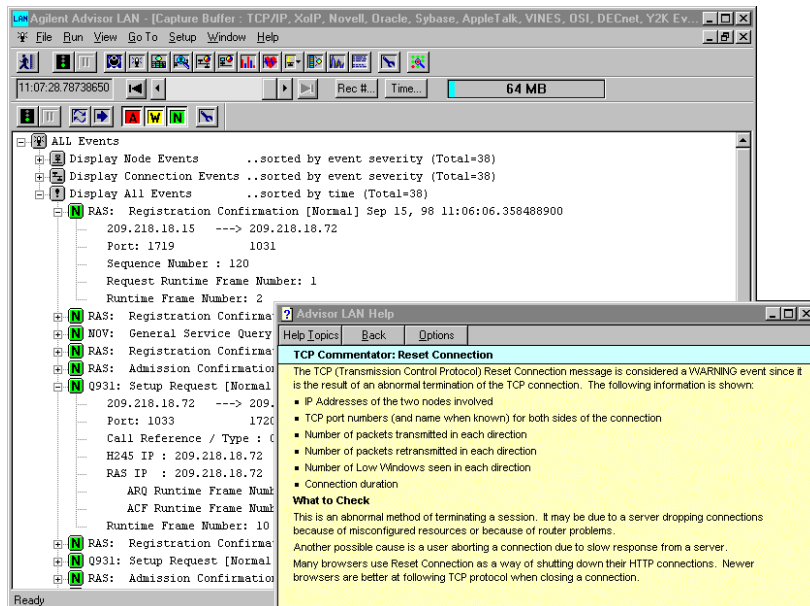
## VoIP Expert Commentator

### What are the actual contents of a frame on my network?

The Advisor IP Telephony Analyzer also provides the Expert Commentator measurement for VoIP protocols. To view the Commentator measurement display, click on the  tool bar button.

The Commentator measurement shows a high-level ordered view of significant protocol events. Some of the events indicate normal and desirable activity. Other events indicate the presence of potentially serious problems that should be present only in very rare instances.

The Commentator display shows node and connection information in one view. You can get more detailed information about a particular event by clicking on various parts of the event. For example, you can drill down on an event until you click on the help text icon for that event. The help text describes the event, and offers advice on how to resolve possible problems. This "drill down" capability is similar to the drill-down capability in the Expert Analyzer measurement.







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- Connecting to the Network, page 2-9
- Configuring the Instrument, page 2-12
- Enable Software License, page 2-8
- Selecting RTP Statistics Measurement, page 2-13
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## Getting Started

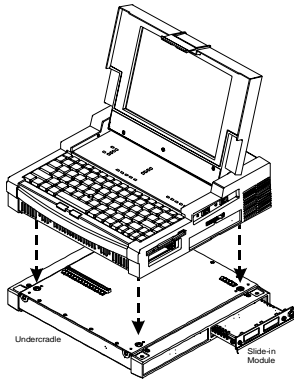
---

# Getting Started

This chapter describes the steps you use to get started testing with Agilent Advisor IP Telephony Analyzer.

There are some steps you perform each time you start testing your network. Other steps you do only one time or just check that a step you performed previously is still valid.

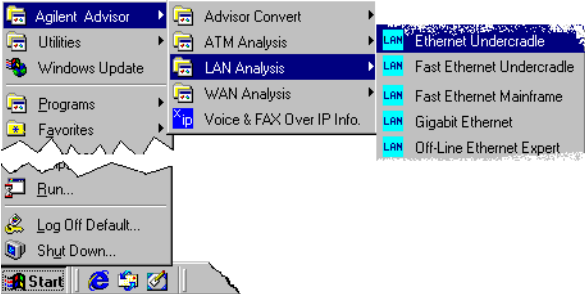
- 1 Install the undercradle and slide-in module you are using. Install software if necessary.



Use the System Guide to connect the mainframe, undercradle, and slide-in modules. Use the instructions on the CD holder for the Advisor LAN CD to install or add Advisor software.

Use the software license number provided with the J4618C documentation to enable the Advisor IP Telephony Analyzer. (see page 3-6).

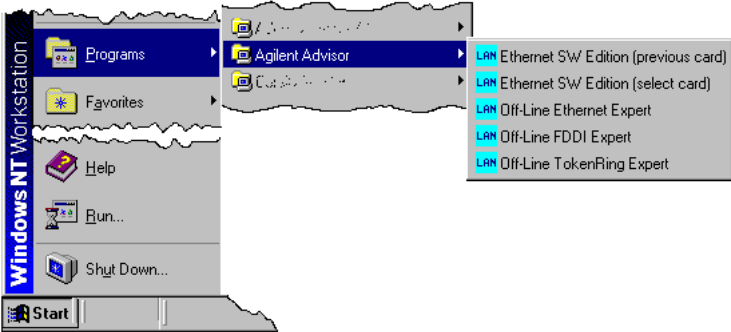
- ② Start the Advisor LAN application.  
Select the mainframe or undercradle LAN product you are using.



Menu choices for starting Advisor LAN.

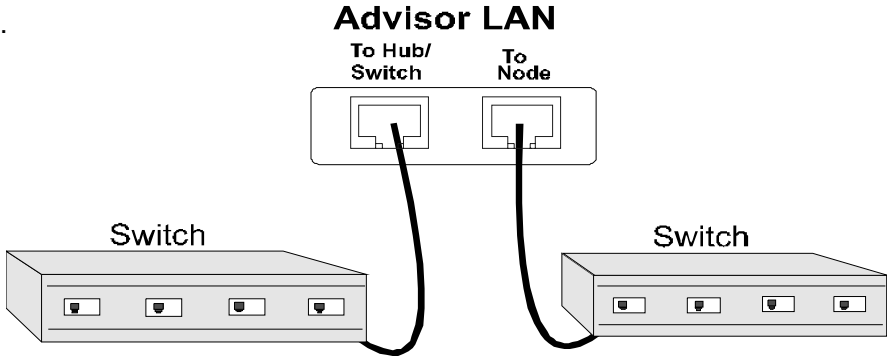
OR

- ③ Start the Advisor SW Edition.  
You can choose the NIC or PCMCIA card you want to use for the network connection.



- ④ Connect to the network.

This example shows connecting the Advisor between two switches in monitor-thru mode.

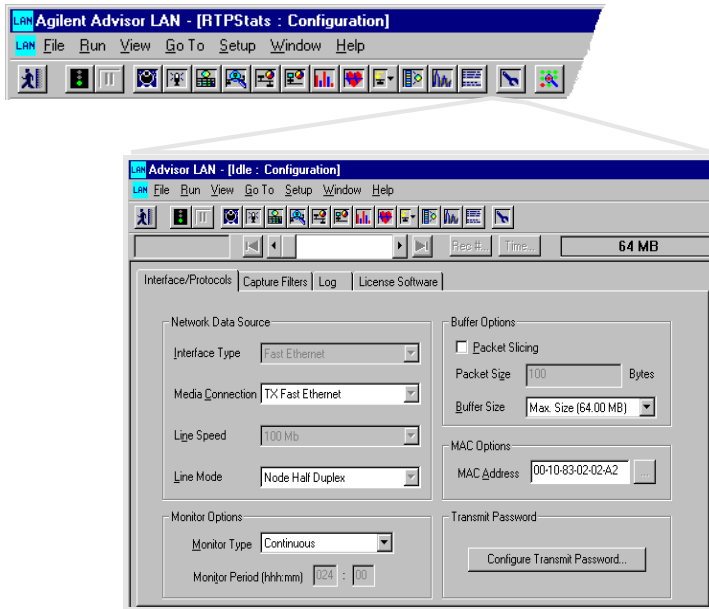


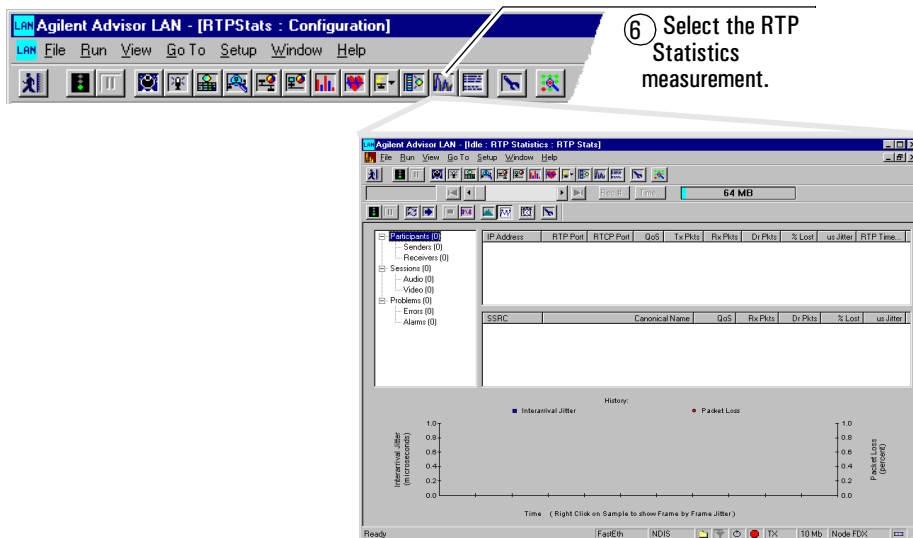
5 Configure the Advisor Instrument.

What test port (Media Connection) are you connecting to?

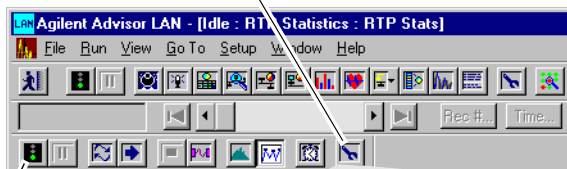
How do you want the capture buffer (Monitor Options) to operate?

You can press F1 in the configure instrument dialog to see detailed help for configuring the Advisor.

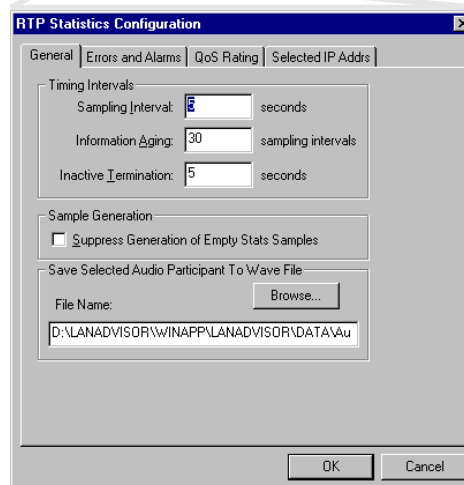




- 7 Configure the measurement.  
What time do you want for the sample period?  
Do you want to set any thresholds?



- 8 Start the run.



## Installing Undercradles, Interface Modules, and Software

### **Undercradle and Interface Module installation**

Depending on the options you have purchased, you may have to install an interface module or undercradle for the specific physical interface you intend to connect to. If these items are not already connected to your Advisor, refer to the *System Guide* for instructions.

---

### **CAUTION**

Be sure the Advisor power switch is set to Off before removing or installing undercradles or interface modules.

---

### **Advisor LAN Software Installation**

The Advisor LAN is shipped with its application software installed on the hard drive. If you are reinstalling Advisor software, or adding a new application, be sure to save any measurement and configuration files you have created to a floppy disk before installing the new software.

To reinstall Advisor LAN software, or add a new application, first remove any attached undercradle and then use the instructions on the cover for the Advisor installation CD.

If you are installing other application software, first remove any attached undercradle and then follow the instructions provided with that software.

### **Advisor IP Telephony Analyzer Installation**

The Agilent Advisor IP Telephony Analyzer software is installed with the standard Advisor LAN software on the hard drive. Use the software license key provided with the J4618C Agilent Advisor IP Telephony Analyzer documentation to enable the application.

## Starting the Advisor

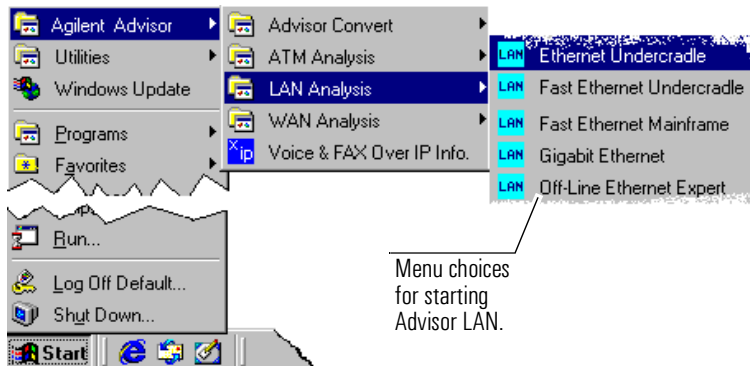
### Start the Advisor for the first time

The first time you start the Agilent Advisor LAN with software shipped from Agilent Technologies, Microsoft requires you to provide some information to complete the configuration.

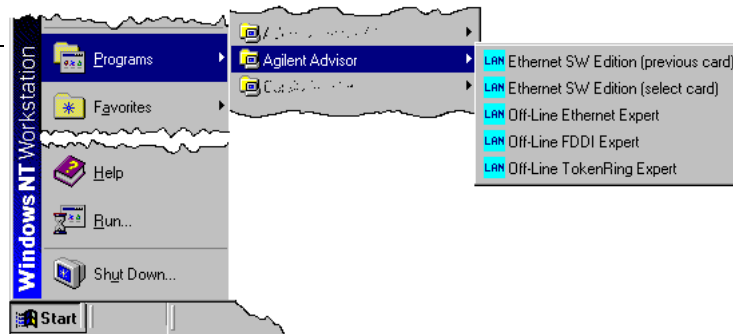
Several dialog boxes prompt you for information such as user name and company name. You can accept the default selections by pressing ENTER.

A Certificate of Authenticity box prompts you for an authenticity number. Enter the Microsoft Windows authenticity product ID# supplied with the mainframe.

Start menu for Advisor LAN.



Start menu for Advisor SW Edition.



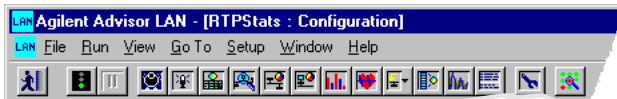
---

## Enable Software License

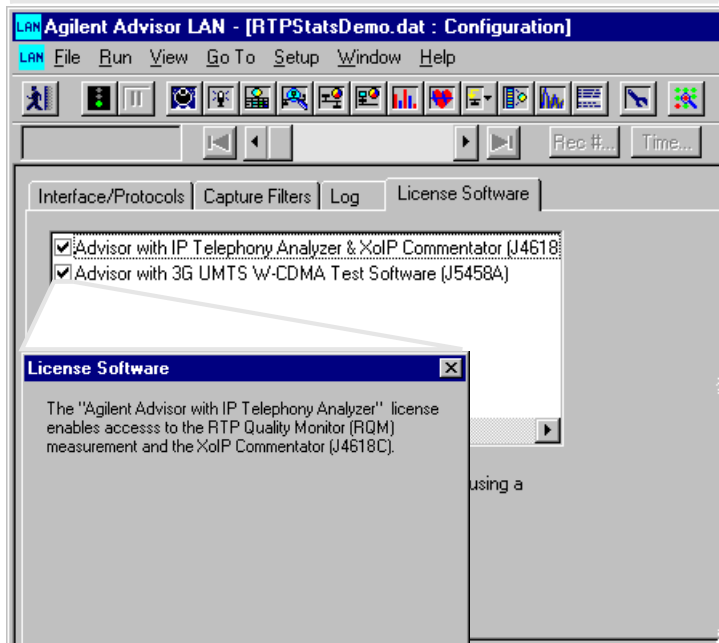
### Enter software key to enable the software license

Before you can use the Advisor IP Telephony Analyzer (J4618C) application, you have to enter a software key. Use the License Software tab in the Configure Instrument window to enter the key.

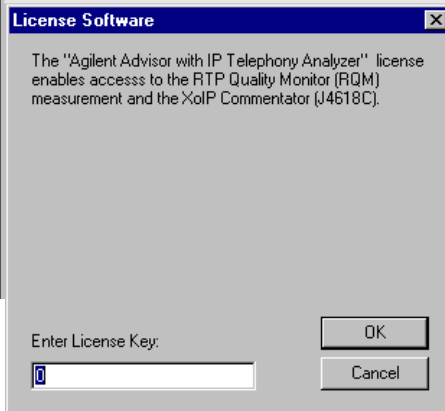
- 1 Select the Configure Instrument button.



- 2 Select the application by checking the J4618C box.



- 3 Enter the license number.





---

## Connecting to the Network

The figures on the two following pages show how to connect the Advisor as a node to a network segment or in monitor-thru mode between two network devices. See the Connect to the Network topic in the online help index for more details about connecting to the network.

### Connect as a Node

When you connect the Advisor as a node to a network segment, the Advisor acts as regular node on the network. The Advisor can see all the traffic occurring on that network segment.

The Advisor measurements transparently see all the traffic that occurs at the hub or switch port you are connected to. The Advisor does not affect the data stream.

### Connect in Monitor-Thru Mode

When you connect the Advisor in monitor-thru mode, the Advisor is inserted between two network devices. The Advisor does not interact with the traffic it sees, it only passively displays the traffic that is passing between the two devices connected to it.

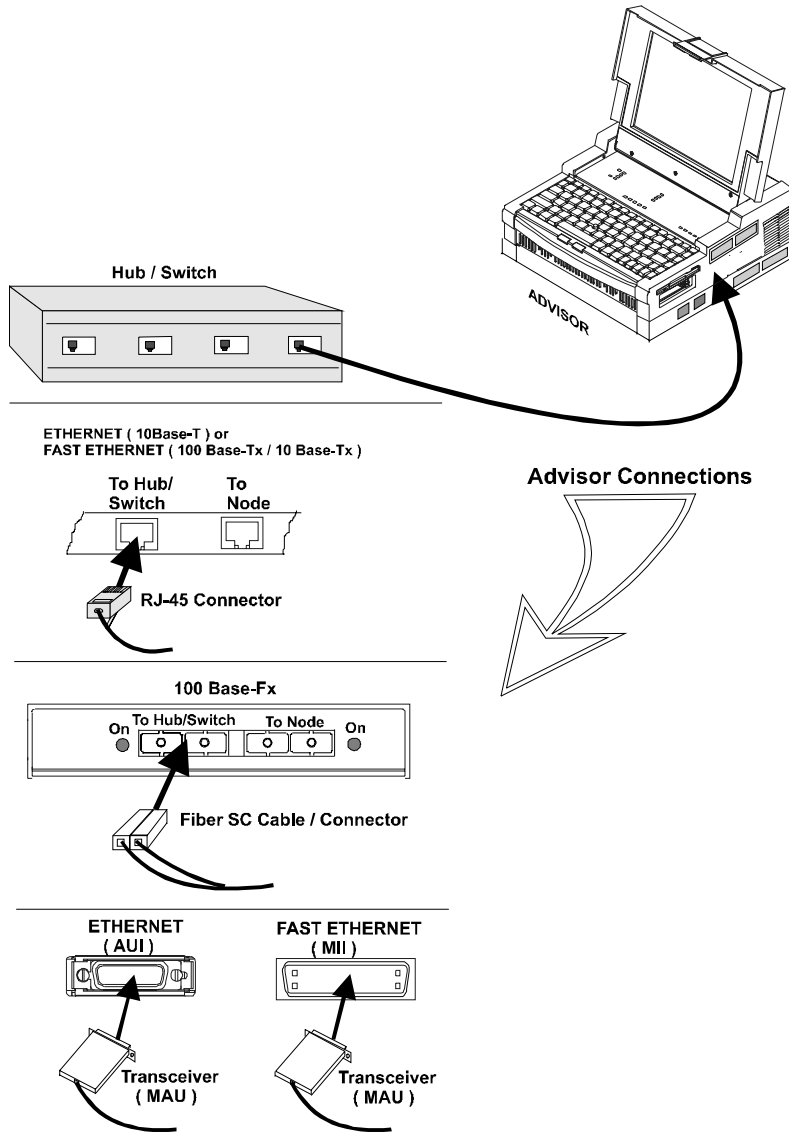
The following table shows what connectors you can use for monitor-thru operation with Ethernet or Fast Ethernet.

|   |   |
|---|---|
| 10 Mbit Operation                       | 100 Mbit Operation<br>(no Auto-Negotiate)   |
| RJ-45 (10BaseT)                         | SC fiber connectors<br>(monitor HDX or FDX) |
| RJ-45 (100BaseTx)<br>(monitor HDX only) | RJ-45 (100BaseTX)<br>(monitor HDX or FDX)   |

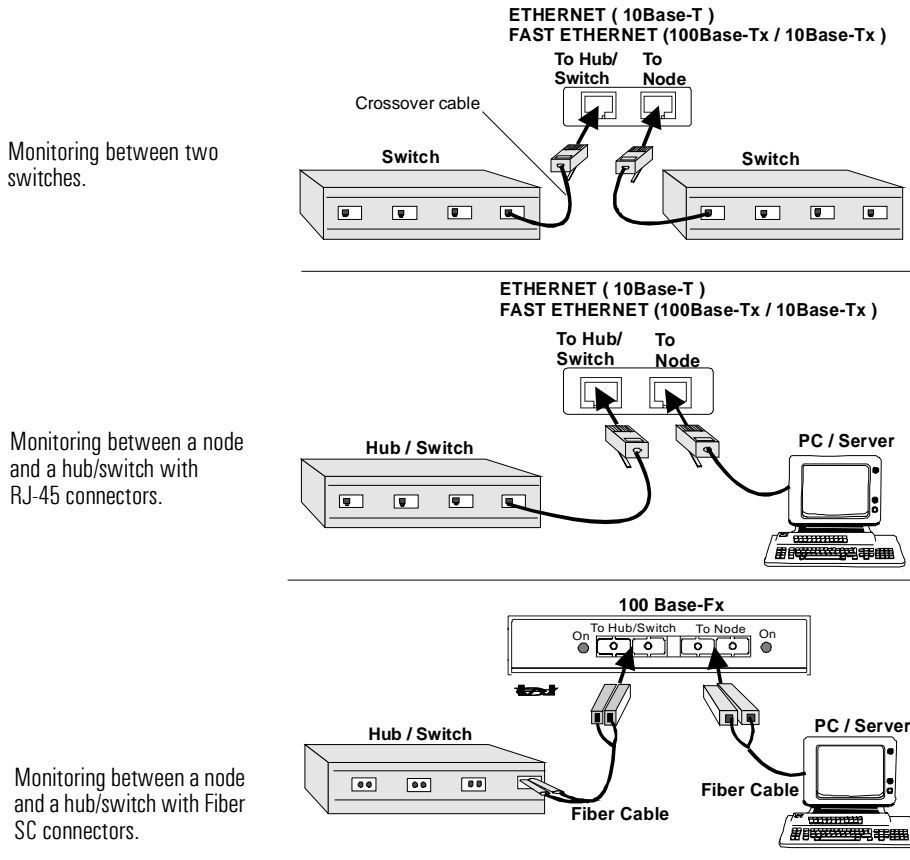
**TIP:** You can not monitor with TX Auto Negotiate selected as the media connection because auto negotiation can only occur between the two end devices. In this mode, the Advisor is only monitoring and cannot participate in the auto negotiate process.

---

## To Connect as a Node



## To Connect in Monitor-Thru Mode



**To connect in monitor mode with a crossover cable**

For switched 10/100 Ethernet, Advisor does not perform crossover of transmit/received pairs internally. If this function is required (such as connecting two switches together) the crossover function must be done external to the Advisor.

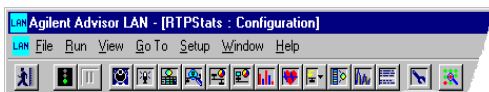
Use the cable you would use for a node to hub/switch connection as one of the cables in monitor mode and then use a straight-through cable for the other connection. The combined cable length for the two connections should not exceed 100 meters.

## Configuring the Instrument

Before you run a measurement, you need to configure the Advisor.

You can configure the Interface/Protocols tab, to determine which test port you are connecting to and how you want the capture buffer to operate.

You can create Filters/Counters to control which frames are stored in the capture buffer. Also, you can Log or store measurement results over a long period of time.

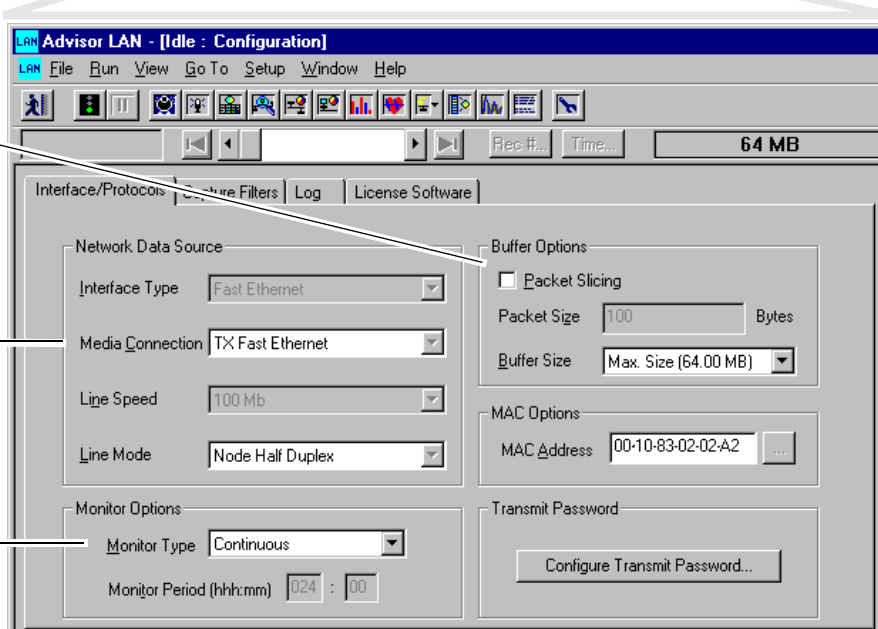


To display online help for a measurement window or configure dialog, open the window or dialog and press F1.

Do you want to capture each entire frame, or only a portion of each frame?

What speed test port are you connecting to?

How do you want the capture buffer to operate?



## Selecting RTP Statistics Measurement

Agilent Advisor with Voice Personality uses the RTP Statistics measurement to show different views about how your network is operating.

You can display this measurement with a button on the toolbar or with items in the Window menu.

The toolbar button is the quickest way to display a measurement. Position the cursor over a toolbar button to display the measurement name.

Top level toolbar.

Toolbar for open and currently selected measurement.

RTP Statistics measurement.

| IP Address    | RTP Port | RTCP Port | QoS | Tx Pkts | Rx Pkts | Dr Pkts | % Lost | us Jitter |
|---------------|----------|-----------|-----|---------|---------|---------|--------|-----------|
| 209.218.18.72 | 1048     | 1049      | n/a | 966     | 0       | 0       | n/a    | n/a       |
| 209.218.18.15 | 50072    | 50073     | 53  | 0       | 966     | 0       | 0.000  | 3208.772  |
| 209.218.18.31 | 1046     | 1047      | 96  | 1121    | 966     | 0       | 0.000  | 2518.605  |
| 209.218.18.15 | 50074    | 50075     | 92  | 0       | 1121    | 0       | 0.000  | 1597.331  |
| 209.218.18.15 | 2106     | 2107      | n/a | 000     | 0       | 0       | n/a    | n/a       |

| SSRC      | Canonical Name                    | QoS | Rx Pkts | Dr Pkts | % Lost | us Jitter |
|-----------|-----------------------------------|-----|---------|---------|--------|-----------|
| 0x6411ab2 | (no RTCP SDES seen for this SSRC) | 53  | 966     | 0       | 0.000  | 3208.772  |

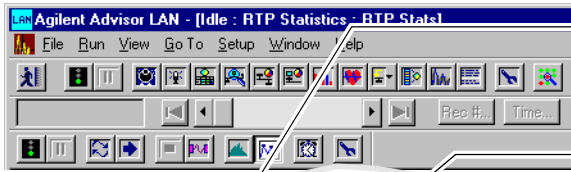
History: 209.218.18.15 RTP Port 60072

Interarrival Jitter (microseconds) vs. Packet Loss (percent) graph showing jitter values between 10000 and 40000 and packet loss percentages between 0.0 and 1.0 over time from 11:06:46 to 11:07:28.

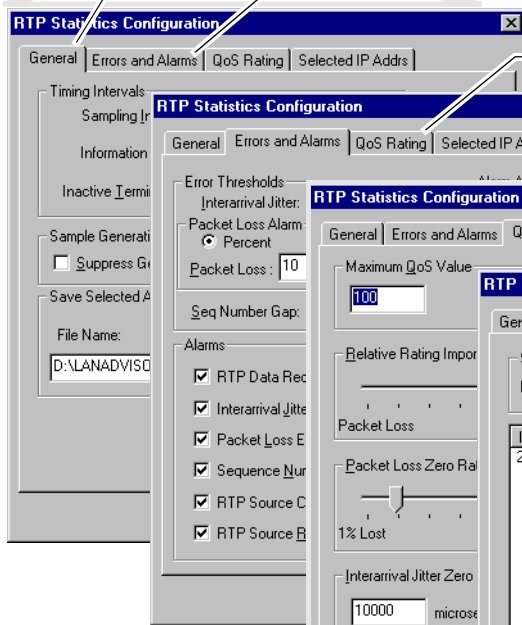
To display online help for a measurement window, open the window and press F1.

## Configuring the RTP Statistics Measurement

Before you run the RTP Statistics measurement, you can customize the measurement by selecting parameters to control how the measurement operates.

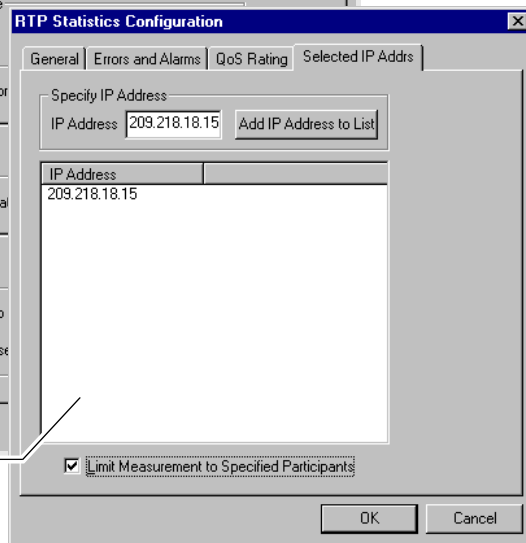
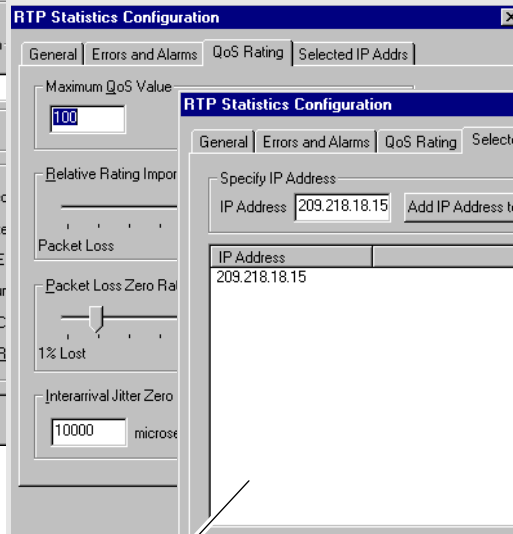


General Tab - What sampling interval do you want to use? Do you want to change the aging and inactive termination intervals to control how participants and sessions are dropped from the display?



Errors and Alarms Tab - Do you want to set thresholds to control error and alarm conditions that are reported?

QoS Rating Tab - Do you want to set how Interarrival Jitter and Packet Loss are used to calculate Quality of Service?



To display online help for a measurement window or configure dialog, open the window or dialog and press F1.

Selected IP Addr Tab - Do you want to include only certain IP addresses in the measurement?

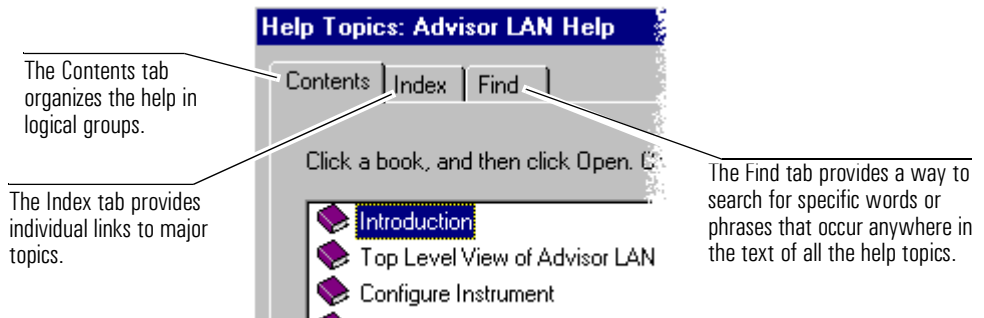
## Finding More Information

### Advisor Online Help

Online help is built into the Advisor LAN applications. You can quickly find information for the currently selected window by pressing the **F1** key.

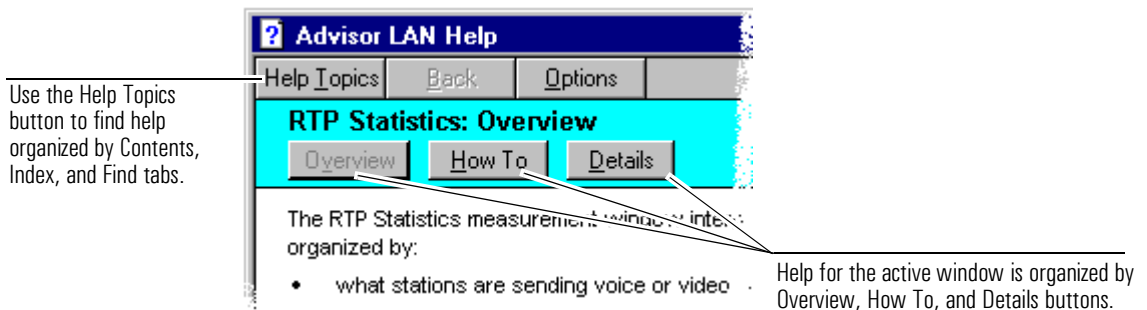
### Online Help Menu

The Help menu item opens the general Advisor LAN help window so that you can choose from three different ways to find the help you want.



### Context Sensitive Online Help

You can quickly find information about the Advisor IP Telephony Analyzer measurement by opening the measurement and then pressing the **F1** key.



**Sample Tests**

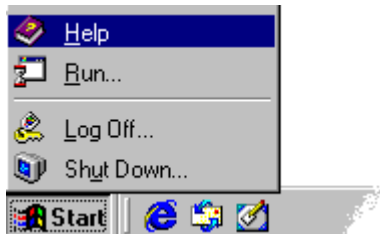
The next chapter in this book describes examples for using the Advisor IP Telephony Analyzer to make measurements on your network.

**Other Advisor Books**

Agilent Advisor IP Telephony Analyzer works with Ethernet or Fast Ethernet interfaces for Advisor LAN and for Advisor SW Edition. Use the Agilent Advisor LAN or Advisor SW Edition Getting Started manuals to make other LAN measurements.

**Windows 98 Online Help**

You can find information on general Windows operation from the online Help tutorial - About Windows. If you are not familiar with the Windows operating system, it is a good idea to spend a few minutes learning the basic functions and terminology associated with the Windows environment.



**Mainframe Features System Guide**

The manual, *Mainframe Features System Guide*, is shipped with each Advisor to help you get up and running quickly.



- Capturing Frames Without a Filter, page 3-3
- Capturing Frames With a Filter, page 3-7

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## Sample Tests

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# Sample Tests

This chapter illustrates sample test examples to lead you quickly through using the Agilent Advisor IP Telephony Analyzer to solve common Real-time Transport Protocol (RTP) Quality of Service (QoS) testing problems:

- Capture Frames Without a Filter
- Capture Frames With a Filter

**To learn more...**

For more information about how to use the features of the Agilent Advisor IP Telephony Analyzer, refer to the online Help. You can press F1 while in any Advisor application to get specific information about the currently active window, measurement view, or dialog box.

---

## Capturing Frames Without a Filter

Often, the first thing you want to do with a network analyzer is to simply observe frames that are occurring on your network. Things you may want to know include:

- Are RTP or RTCP frames occurring?
- What stations are participating in voice or video over IP?
- How much data is being transferred?
- What protocols are being used?
- What errors are being generated?

### **Example equipment and menu choices**

The Advisor used in this example has a Fast Ethernet interface. You can use this interface or you can also use a standard Ethernet interface.

Several menu choices are made to configure the Advisor for this example. These choices are usually the default selection or have been made for the easiest configuration. You can make these same choices or you can make different choices to observe how the Advisor responds.

# Sample Tests

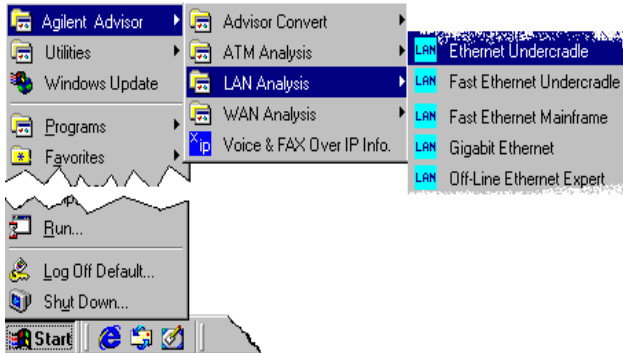
## Capturing Frames Without a Filter

### ① Connect to a network.

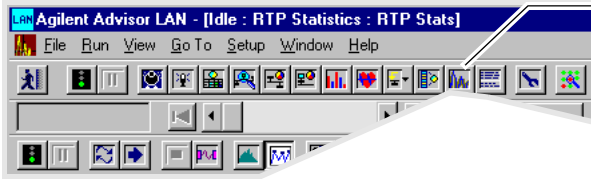
See chapter 2 for information about connecting the Advisor to your network as a node (station) or in monitor-thru mode.

### ② Start the Advisor LAN.

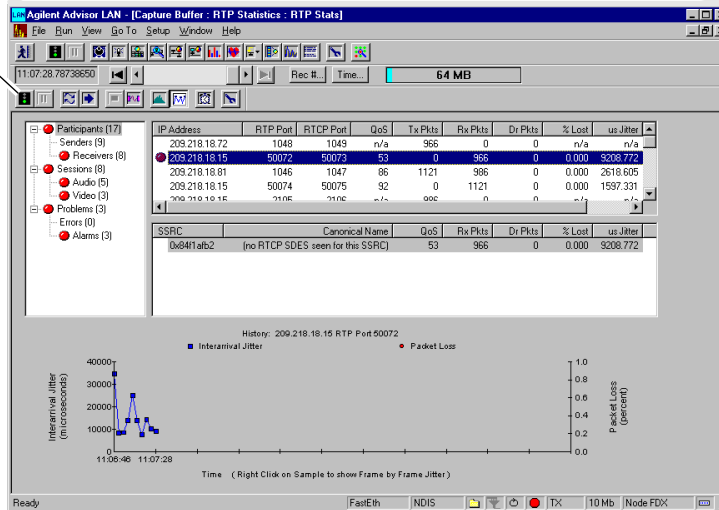
Choose the Ethernet or Fast Ethernet menu item appropriate for your system.



### ③ Select the RTP Stats measurement.



### ④ Start the measurement run.



5 Use the graph buttons to change the graph display.

6 Use the directory tree to select either Participants, Sessions, or Problems to view in the spreadsheet.

These buttons let you run and control the audio payout - you can allow jitter in the audio payout or toggle the button to de-jitter the payout.

7 Right click in the spreadsheet to display a menu for displaying the Decode view filtered by the current display.

Notice that the left speaker is enabled for this Participant.

The screenshot shows the 'RTP Stats' window with the following data in the spreadsheet:

| IP Address    | RTP Port | RTCP Port | QoS | Tx Pkts | Rx Pkts | Dr Pkts | % Lost | us Jitter |
|---------------|----------|-----------|-----|---------|---------|---------|--------|-----------|
| 209.218.18.72 | 1048     | 1049      | n/a | 966     | 0       | 0       | 0.000  | n/a       |
| 209.218.18.15 | 50072    | 50073     | 53  | 0       | 966     | 0       | 0.000  | 9208.772  |
| 193.218.18.81 | 1046     | 1047      | 86  | 1121    | 966     | 0       | 0.000  | 2618.605  |
| 193.218.18.15 | 50074    | 50075     | 92  | 0       | 1121    | 0       | 0.000  | 1597.331  |
| 193.218.18.15 | 2106     | 2106      | n/a | 966     | 0       | 0       | 0.000  | n/a       |

The context menu is open over the row for IP 209.218.18.15, RTP Port 50072, showing options like 'Include RTPC Packets when Viewing Decode' and 'Enable Left Audio for Rx Pkts of this RTP Participant'.

8 Select a line in the top half of the spreadsheet and see details about that line in the bottom of the spreadsheet.

## Sample Tests Capturing Frames Without a Filter

### 9 Select the Decode button.

With no capture or display filter enabled, all frames occurring on the network are displayed.

The screenshot shows the Agilent Advisor LAN interface. The top toolbar contains a 'Decode' button (represented by a magnifying glass icon) which is highlighted by a callout line from step 9. Below the toolbar is a table of captured frames:

| Frame | Len | Absolute Time   | Source                | Destination    | Prot  |
|-------|-----|-----------------|-----------------------|----------------|-------|
| 1     | 201 | 11:06:06.339990 | 209.218.18.72         | 209.218.18.15  | ETHER |
| 2     | 122 | 11:06:06.358488 | 209.218.18.15         | 209.218.18.72  | ETHER |
| 3     | 201 | 11:06:12.919902 | 209.218.18.185        | 209.218.18.15  | ETHER |
| 4     | 122 | 11:06:12.939161 | 209.218.18.15         | 209.218.18.185 | ETHER |
| 5     | 64  | 11:06:14.921122 | 00000000-00AA00B9CB19 | Broadcast      | MAC   |
| 6     | 201 | 11:06:27.374334 | 209.218.18.72         | 209.218.18.15  | ETHER |

Below the table, the 'Detailed' pane shows the selected frame's structure:

```
Record #1 (From Hub To Node) Captured on 09.15.98 at 11:06:06.339990900 Length = 201
Runtime Frame# 1
----- ETHER Header -----
ETHER: Destination: 00-E0-29-11-8B-21
ETHER: Source: 00-10-4B-21-69-46
ETHER: Protocol: IP
```

The 'Hex' pane shows the raw data:

```
Record #1 (From Hub To Node) Captured on 09.15.98 at 11:06:06.339990900 Length = 201
00 e0 29 11 8b 21 00 10 4b 21 69 46 08 00 45 00 ..).. K!iF..E.
00 b7 78 71 00 00 20 11 59 b9 d1 da 12 48 d1 da ..xq.. Y...H..
12 0f 04 07 06 b7 00 a3 c7 1a 0d 80 00 77 06 00 .....w...
08 91 4a 00 01 00 0a 60 86 48 01 86 f8 72 04 01 ..J....` .H...r..
```

### 10 If you select a field in the Detailed pane, the same field is highlighted in the Hex pane also.

### 11 Select the Stop button in the tool bar to stop the run.

---

## Capturing Frames With a Filter

On a Fast Ethernet network, frames occur so quickly, the capture buffer can be filled in seconds. Also, a session you are interested in may be only a small percentage of the total network traffic you are seeing. You can define a capture filter so that only certain frames that are of interest to you are captured.

Frame elements you can filter on include:

- protocol
- station network address
- port address

### Example equipment

The Advisor used in this example has the Fast Ethernet interface. You can use this interface or a standard Ethernet interface.

### About filtering

To use filtering, you have to know some information about the traffic you want a filter to match. From the previous example test, Capturing Frames Without a Filter, you saw some IP addresses of station on your network that were participants in sessions. In addition, you could see several ports that were being used.

Capture filters control what frames are saved in the capture buffer. In the Decode measurement, you can use a display filter to view only selected frames already in the capture buffer. Display filtering does not affect the frames in the capture buffer, it only controls what frames are displayed.

You can filter on characteristics such as a protocol suite. You can filter on specific packet types or messages within a protocol suite. You can filter on station addresses for frames going to or from a particular address. You can filter on UDP port addresses.

In this sample test, we will filter on IP address 209.218.18.15 and RTP Port 50072, highlighted in the figure below.

| IP Address    | RTP Port | RTCP Port | QoS | Tx Pkts |
|---------------|----------|-----------|-----|---------|
| 209.218.18.72 | 1048     | 1049      | n/a | 966     |
| 209.218.18.15 | 50072    | 50073     | 53  | 0       |
| 209.218.18.81 | 1046     | 1047      | 86  | 1121    |
| 209.218.18.15 | 50074    | 50075     | 92  | 0       |
| 209.218.18.15 | 50075    | 50076     | 92  | 0       |

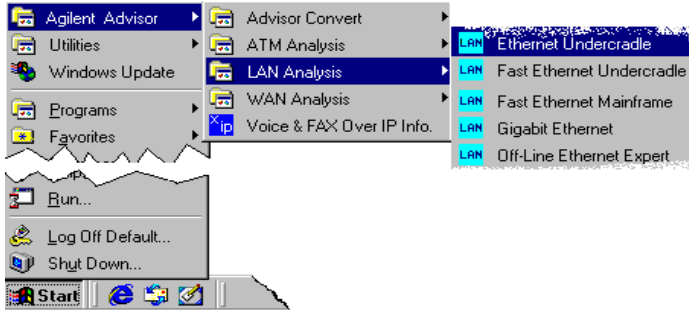
## Sample Tests Capturing Frames With a Filter

### ① Connect to a network.

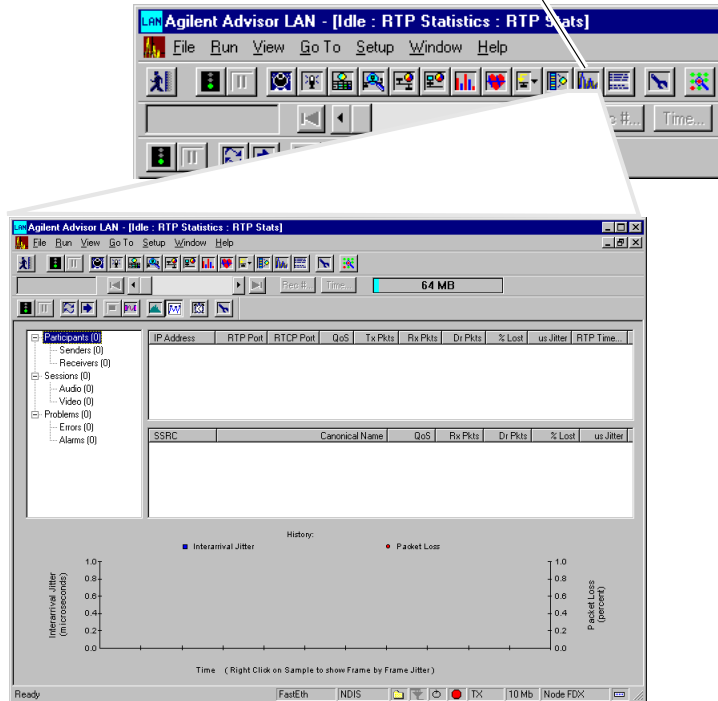
See chapter 2 for information about connecting the Advisor to your network as a node (station) or in monitor-thru mode.

### ② Start the Advisor LAN application.

Choose the Ethernet or Fast Ethernet menu item appropriate for your system.



### ③ Select the RTP Stats measurement.





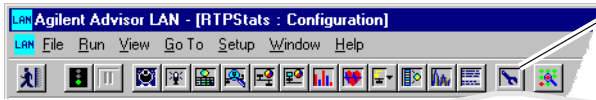
④ Select the Start button to start the measurements.

⑤ Find a Participant IP address and UDP Port you want to filter.

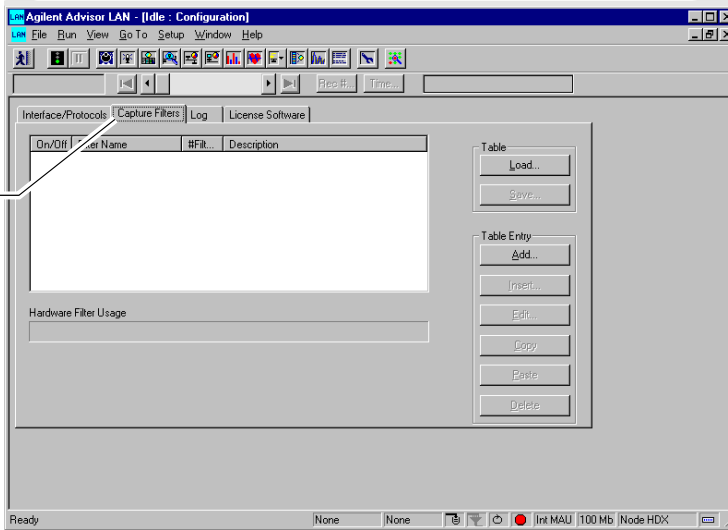
Right mouse click on the Participant line to display a quick way to set a Display filter for the RTP Packets for the session being observed.

| IP Address    | RTP Port | RTCP Port | QoS | Tx Pkts |
|---------------|----------|-----------|-----|---------|
| 209.218.18.72 | 1048     | 1049      | n/a | 966     |
| 209.218.18.15 | 50072    | 50073     | 53  | 0       |
| 209.218.18.81 | 1046     | 1047      | 86  | 1121    |
| 209.218.18.15 | 50074    | 50075     | 92  | 0       |
| 209.218.18.15 | 50076    | 50077     | 92  | 0       |

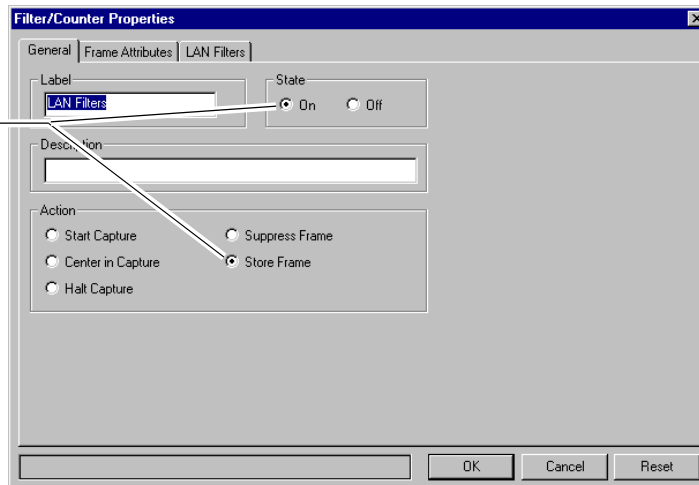
## Sample Tests Capturing Frames With a Filter



⑥ Select the Configure Instrument button in the main tool bar.



⑦ Select the Capture Filters tab and then select the Add button.



⑧ Select an action of Store Frame and set the filter state to On.

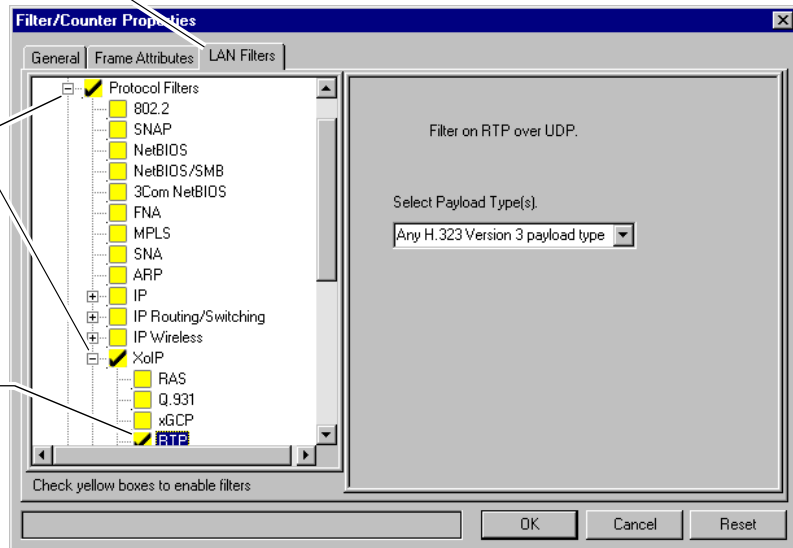
- ⑨ Select the LAN Filters tab.

- ⑩ Expand the Protocol Filters branch and the XoIP branch.

- ⑪ Select the RTP and RTCP protocol boxes so a check mark displays.

The Protocol Filters and XoIP boxes should also have check marks.

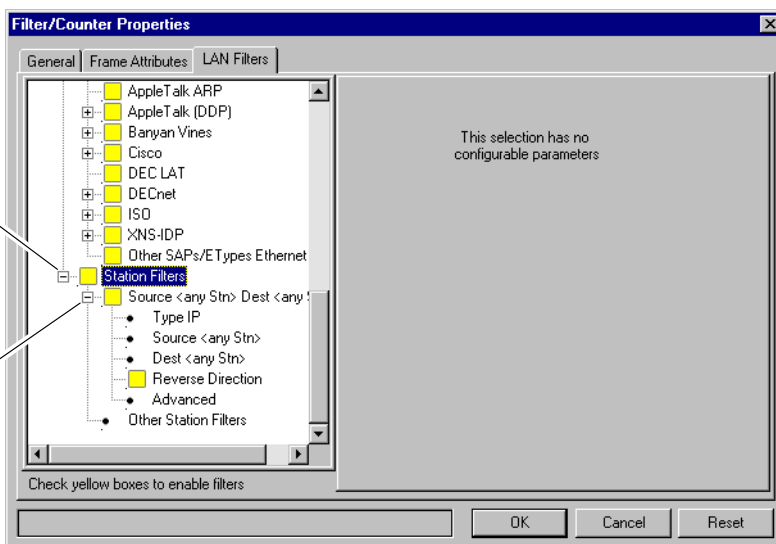
This creates and enables a filter so that only frames having RTP and RTCP protocols will be stored.



## Sample Tests Capturing Frames With a Filter

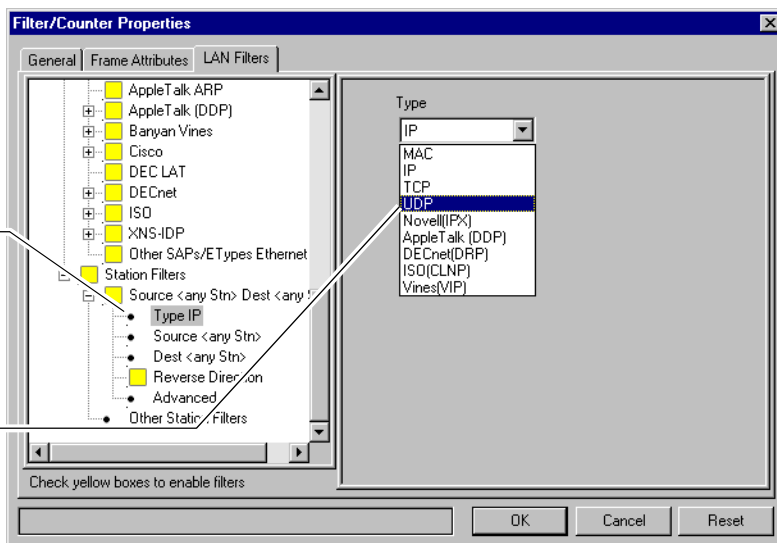
12 Expand the Station Filters branch.

13 Expand the Source < any Stn > Dest < any Stn > branch.



14 Select the Type branch.

15 In the Type field, select the UDP protocol.



16 Select the Source < any Stn > branch.

17 Enter the address you want to filter in the IP Address field.

18 Enter the port you want to filter in the Source UDP Port field.

19 Select the Advanced branch.

20 Select the encapsulations you want.

Tip: Using the Advanced filter feature this way ANDs the protocol filter with the station filter.

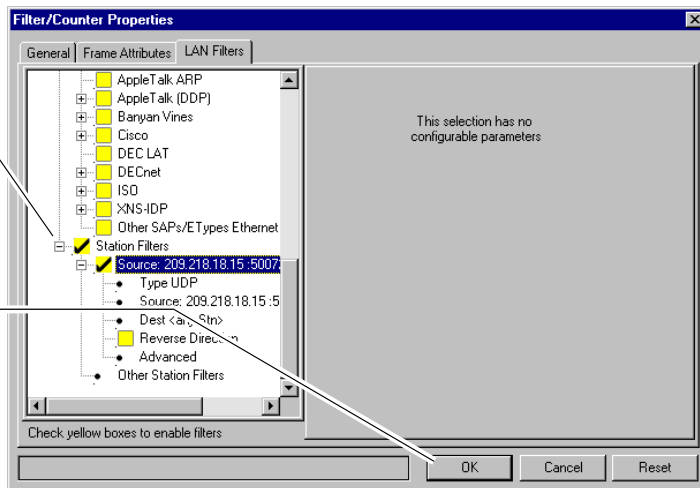
## Sample Tests

### Capturing Frames With a Filter

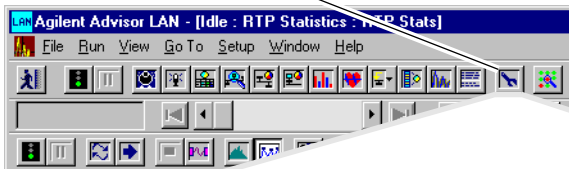
- 21 Select the Station Filters and Source yellow checkboxes to enable the selected filter parameters.

Notice the filter resources bar shows how much filter resources are currently in use.

- 22 Select OK to end the filter definition.



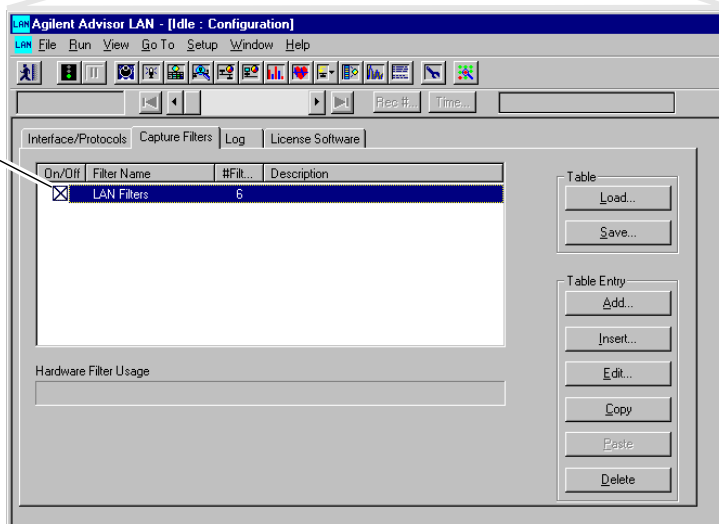
- 23 Select the Configure Instrument button.



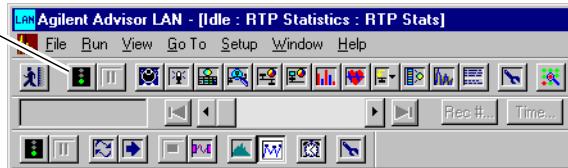
- 24 Check that the filter you just defined is enabled.

An X in the On/Off column means the filter is enabled.

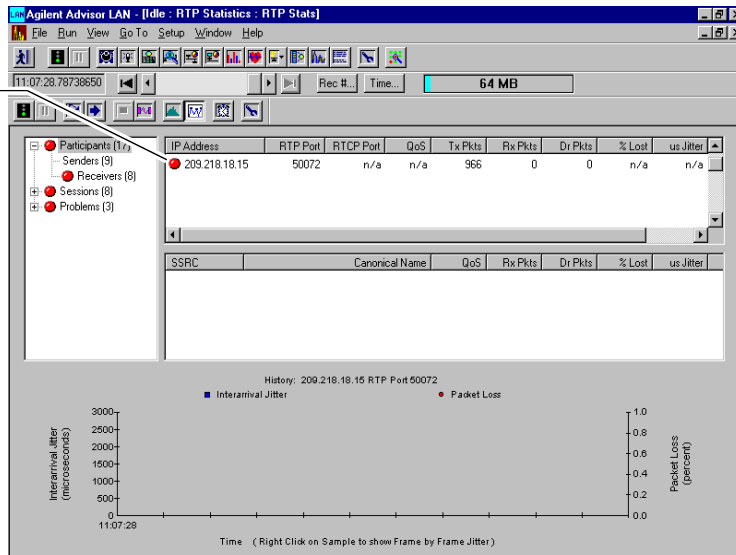
- 25 Minimize the Configure Instrument dialog.



- 26 Click the Start button to start the run.



- 27 Notice that the display shows only RTP and RTCP frames with the IP address and UDP Port you defined in the filter.



### Conclusion:

- By using a capture filter, you can store in the capture buffer only the frames that are of interest to you.
- You can filter on protocol, Participant sender and/or receiver addresses.
- By using a port address, you can filter on only particular messages to/from a UDP address.

### Tip:

- You can use a similar process for Display and Search filters in the Decode measurement. Use the Display and Search buttons in the Decode measurement to open the filter dialog.

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