HEWLETT PACKARD

Internet Advisor

Gigabit Ethernet Getting Started

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Printing history

New editions of this guide are issued to reflect extensive changes made to the software. Revisions may be issued, between editions, to correct errors in the manual. There may not be a new edition issued in conjunction with every software release. The software release, at the date of printing, is noted in the following table.

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Product support

Call your local HP representative, or:
Tel: 1-800-698-0061
Fax: 303-754-4802
web: http://www.hp.com/go/internetadvisor
or call your local HP Sales and Service Office

Hewlett-Packard Company
5070 Centennial Boulevard
Colorado Springs, Colorado
80919-2497

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Introduction

Getting Started

Sample Tests

Declaration of Conformity

1

Introduction

Introduction

The HP Internet Advisor LAN - Gigabit Ethernet is a powerful protocol analyzer designed to help you troubleshoot and analyze your network.

It consists of a ruggedized personal computer equipped with modular data acquisition and transmission hardware, as well as powerful Microsoft® Windows® based network analysis software. Standard peripherals such as serial/parallel ports, floppy drive, pc card slot, etc. are also included.

You can use the Internet Advisor LAN - Gigabit Ethernet to:

- prevent network problems before they affect users
- resolve network problems quickly and effectively
- optimize network performance

Today, Gigabit Ethernet is used mostly for switch-to-switch communication. These links are both the most heavily used and the most critical for network up-time. You need to have equipment that can be used for more than troubleshooting your network.

The Gigabit Ethernet Advisor measurements help you with all phases of network operation - from designing and implementing new networks to maintaining and troubleshooting existing networks.

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

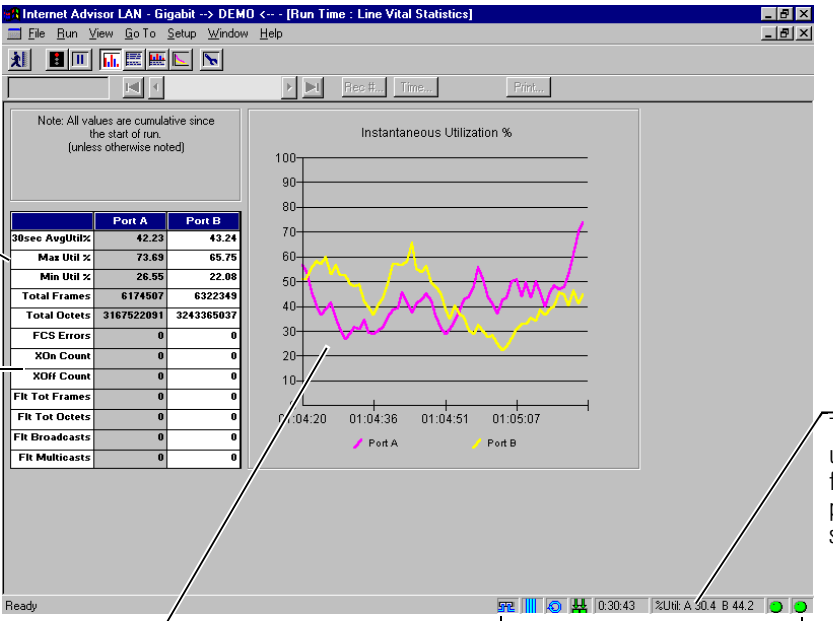
- Use Statistics to perform baseline testing when your network is operating correctly. Then, if problems arise, new measurements can be compared to the baseline measurements to see where the differences lie. These measurements also let you develop long-term analysis of trends.
- Use Statistics and RFC1944 Benchmarks to find frame, byte and error counts; utilization and connection statistics; and latency, throughput and frame loss measurements.
- Use the Full Traffic Generation and Simple Traffic Generation measurements to inject specialized traffic patterns of variable length, utilization, frame rate, and interframe spacing and delays onto your network.

Looking at the Health of Your Network

See network utilizations, errors, and statistics at the physical layer

Line Vital Statistics give you a quick view of the health of your network. Statistics collected include utilization and physical errors. The information is provided in both a tabular and a graphical view.

Use Line Vital Statistics to keep track of bandwidth utilization, counts and errors. The Instantaneous Utilization chart shows at a quick glance the current utilization rate.



Look at minimum, maximum, and average utilizations for both ports.

See counts and errors and which port they are occurring on.

The graph shows instantaneous utilization over a period of time.

The Status Bar shows the connection mode, capture filter status, buffer options, run status, duration of capture, and dropped frame indications at a glance.

The exact utilization for each port is shown.

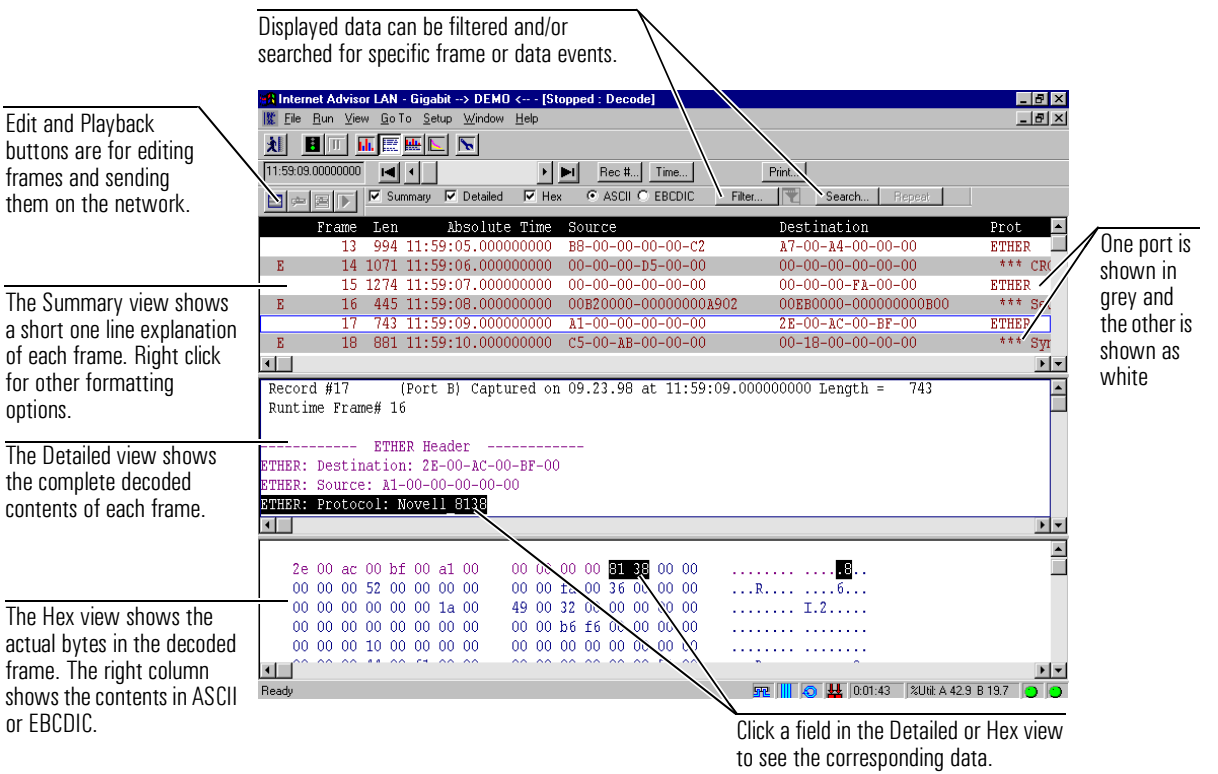
Decoding the Frames on your Network

Use Decodes to view the details of every frame.

Decoding network traffic helps you manage and troubleshoot a network. The basic function of a decode measurement is to examine data on a communications link to verify devices are handling data correctly. If unsuitable traffic is present, you can easily identify the source and take corrective action.

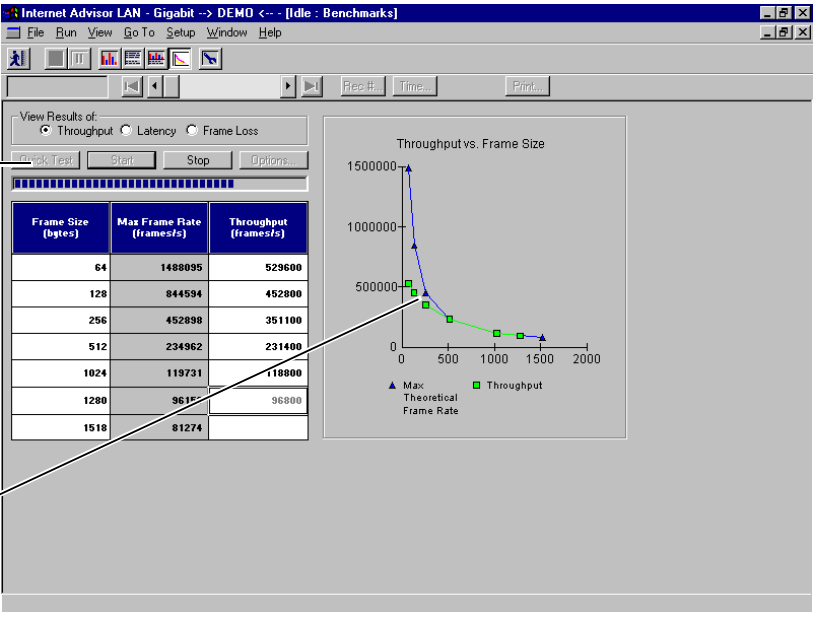
Sometimes all you need to see are the network addresses to ensure the data on the link is being properly routed. If unintended traffic is present, you may need to reconfigure some of the network devices. Protocol decodes help indicate which devices require attention.

Decodes help verify that expected protocols are present and, perhaps more importantly, discover whether unexpected protocols are present on the link. This is particularly important when wide area links connect LAN segments.



Measuring Throughput, Latency, and Frame Loss

The Benchmarks measurement is a specialized test that automatically runs the RFC1944 tests on a single piece of equipment such as a switch or router. This measurement has been specifically designed to help network manufacturers run repeatable, defined tests while developing or modifying their equipment.



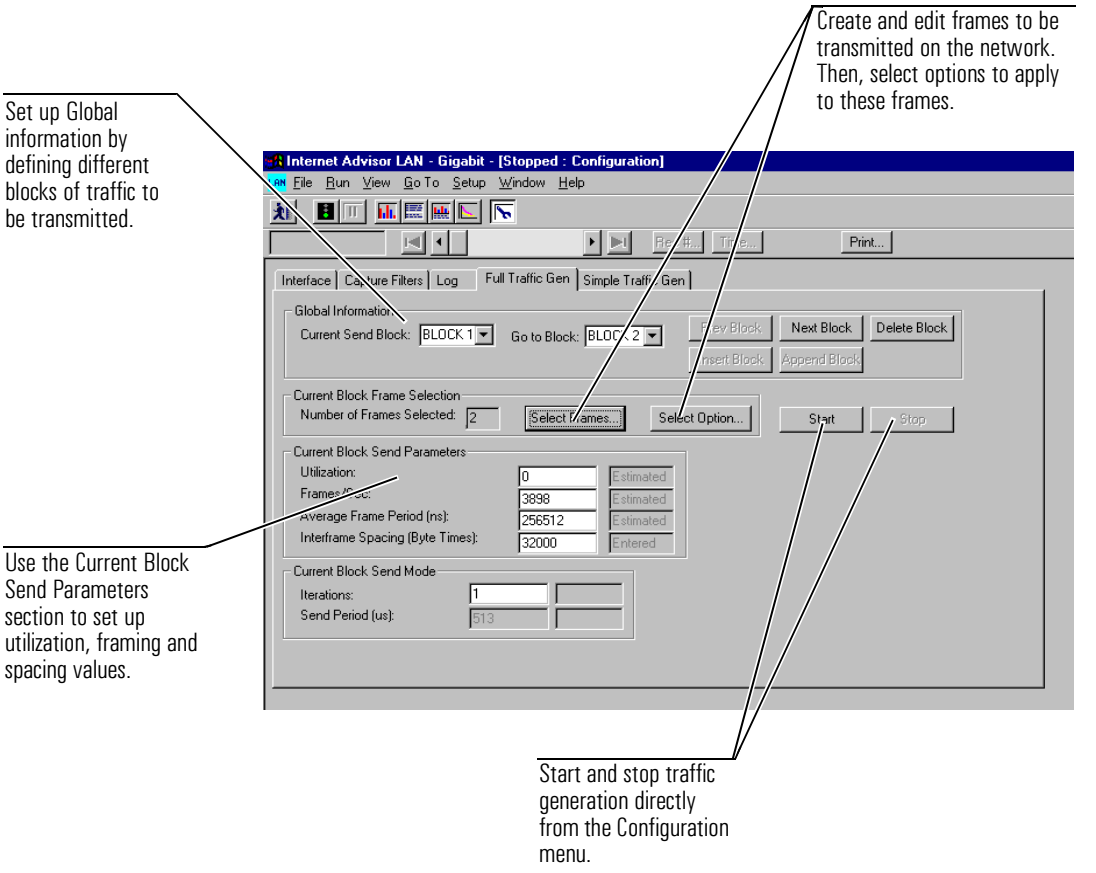
The Quick Test button performs a quick connectivity test.

Look at the measured throughput versus the various frame sizes.

Sending Generated Traffic on the Network

Choose from two Traffic generation measurements.

The Full Traffic Generation and Simple Traffic Generation measurements in the Gigabit Ethernet Advisor give you the ability to inject specialized traffic patterns of variable length, utilization, frame rate, and interframe spacing and delays onto your network.



2

Getting Started

Getting Started

This chapter describes the steps you use to get started testing with the HP Internet Advisor LAN - Gigabit Ethernet.

There are some steps you perform each time you start testing your network. Other steps you do only one time or periodically.

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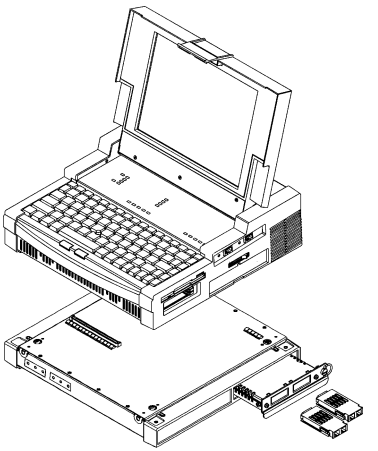
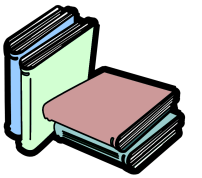
① Install the Gigabit Ethernet undercradle and the GBIC Transceivers. Install software if necessary.





Use the Mainframe Features Guide to connect the mainframe, undercradle, and slide-in modules.

Use the Installation Guide to install or add software.

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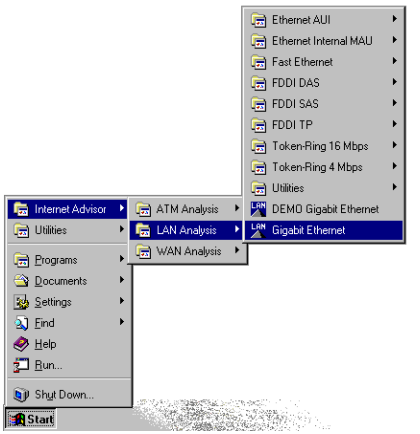
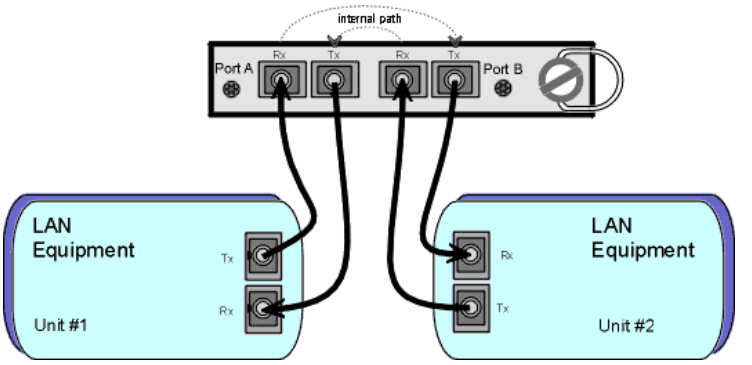
② Start the Gigabit Ethernet application.

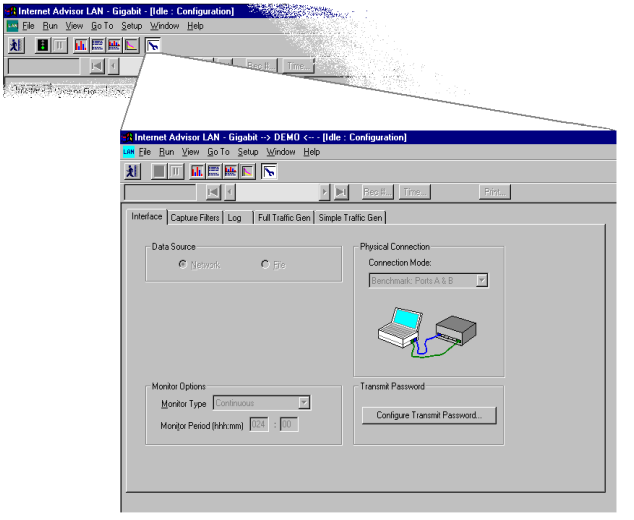


③ Connect to the network.

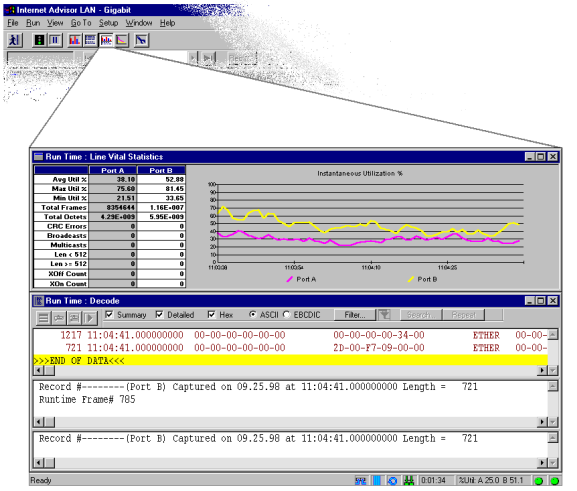


This illustration shows the Gigabit Ethernet Advisor connected in the Rx Pass Through:Ports A & B mode.

④ Configure the Gigabit Ethernet application.



5 Select a measurement, start a test, and view the results.



Installing Undercradles, Interface Modules, and Software

Undercradle and Interface Module installation

Depending on the options you have ordered, you may have to install an interface module or undercradle for the specific physical interface you intend to connect to.

To attach a Gigabit Ethernet undercradle to an Internet Advisor mainframe, the connector board must be inserted in the slot closest to the front of the Internet Advisor.

For more information about installing hardware, refer to the *Mainframe Features* guide for instructions.

CAUTION

Be sure the Internet Advisor power is ***Off*** before removing or installing undercradles or interface modules.

The Gigabit Ethernet software should be installed on your Internet Advisor when you received it.

Software Installation

If, for some reason the software is not installed or you want to reinstall the software, remove any attached undercradle and then use the instructions in the *HP Internet Advisor Software Installation Guide* supplied with the Internet Advisor software CD.

Be sure to save any measurement and configuration files you have created to a floppy disk before installing any new Internet Advisor software.

Installing the GBIC Transceivers.

The GBIC (Gigabit Interface Converter) transceivers are packaged separately for shipment. To install the transceivers, gently slide each GBIC transceiver into the opening of the Gigabit Ethernet interface module until it clicks into place (it is not possible to insert the GBIC transceivers upside-down).

The GBIC ports are available in either 1000Base SX 850nm laser multimode (standard on the J2901A) or in 1000Base LX 1300nm laser multimode or single mode (option 201). It is possible to mix the GBIC transceivers, using an SX in one port and an LX in the other.

Starting the Application

Start the Internet Advisor for the first time.

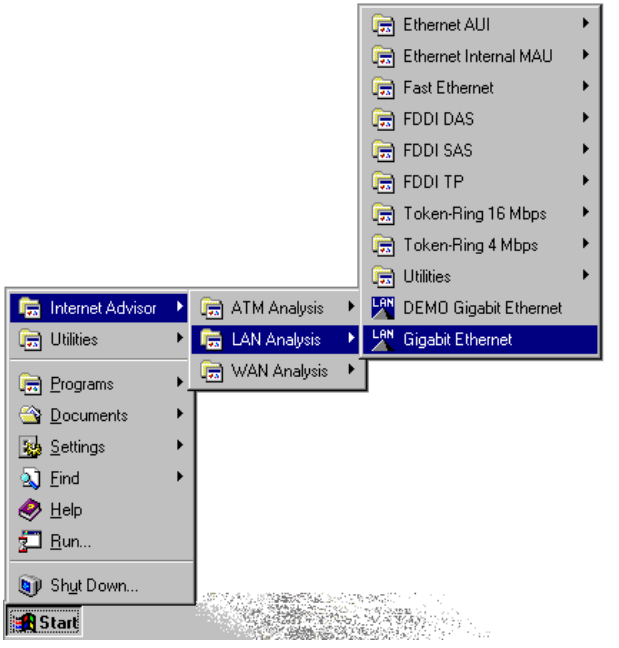
The first time you start the HP Internet Advisor with software shipped from Hewlett-Packard, Microsoft requires you to provide some information to complete the configuration.

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

A Certificate of Authenticity box prompts you for an authenticity number. The number you should enter is located on the front cover of the *Microsoft Windows 98 Getting Started* book shipped with your Internet Advisor. Look for the Product ID number above the bar code label.

Start the Gigabit Ethernet application.

To start the Gigabit Ethernet application, select Internet Advisor | LAN Analysis | Gigabit Ethernet from the Start menu in the Windows desktop.



Connecting to the Network

The type of measurements you want to make determines how you physically connect the Gigabit Ethernet Advisor to a network.

For monitoring tests, the Internet Advisor passively monitors the circuit under test. To monitor passively means to gather information from the circuit without interfering with the circuit. Each device's received signal is instantly retransmitted, with no significant delay, to the other device.

For traffic generation tests, the Internet Advisor is used to generate traffic to the network or to stress test a device. This is the only connection mode in which the Internet Advisor can generate traffic to the network.

For Benchmark tests, the Internet Advisor is used to run the RFC1944 suite of tests on a gigabit device. RFC1944 discusses and defines a number of standard tests that are used to characterize performance results such as latency, throughput, and frame loss.

All of the connection modes are set using the Interface/Protocols tab in the Configuration options.

Cables

Use standard SC fiber connectors such as AMP's SC Duplex Multimode Cable assemblies for the J2901A multimode GBICs. For single mode GBICs, it is important to use single mode cable. Call AMP at 1 800 522 6752 for information.

The following part numbers are current as of January 1998:

- 504941-1: 1 meter SC Duplex 62.5 micron Multimode Cable Assembly
- 503141-1: SC Loopback 62.5 micron Cable Assembly
- 503625-1: 1 meter SC to ST Multimode 62.5 micron Cable Assembly
- 107842-3: multimode 1 x 2 coupler (hdx splitter) (order 2)

Check the Network Diameter and Latency.

The operating distances of gigabit fiber networks vary depending on the testing mode and diameter of the fiber. The operating distance of 62.5 micron multimode fiber is specified as 260 meters; for 50 micron multimode fiber the distance increases to 550 meters.

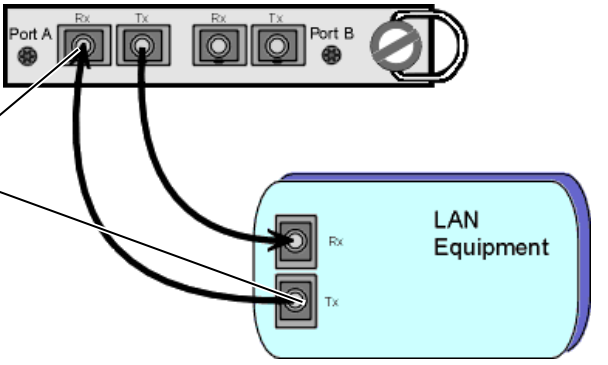
As a signal passes through a network device, some latency can be expected. The worst case latency through the Gigabit Advisor is 125 bit periods (100 ns). The nominal latency is 110 bit periods (88 ns). In full-duplex, Pass Through mode, the signal is regenerated and thus extends the possible network diameter. For half-duplex networks, the effective diameter reduction through the Advisor is 25 meters.

Rx/Tx Port A

Use the Rx/Tx mode to generate traffic on the network.

In the Rx/Tx Port A mode, Port A is used to connect the Internet Advisor to another gigabit device in a point-to-point configuration.

This is the only connection mode in which the Internet Advisor Gigabit Ethernet can generate traffic to the network. When connecting the Advisor in this way, make sure you use Port A, as shown below.



The fiber connecting from the device under test must be plugged into Port A, the port closest to the front of the instrument.

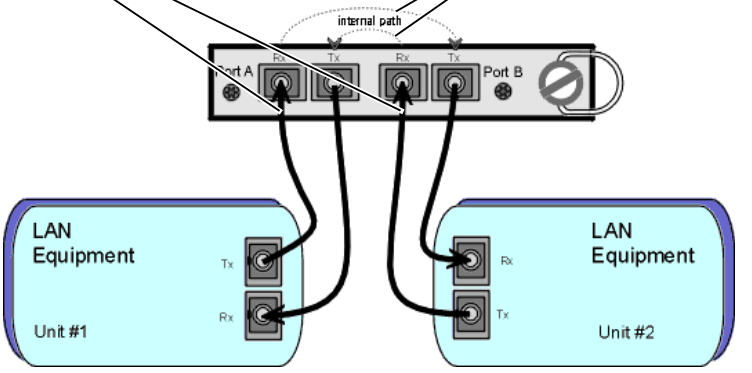
Rx Pass Through: Ports A & B Connection

Pass Through mode monitors two full-duplex devices in-line.

In Rx Pass Through mode, the Gigabit Advisor is inserted between two communicating devices in order to monitor and analyze frames being sent in both directions on a connection. The Advisor is completely passive in this mode. Measurements that require transmitting on the network do not run in this mode.

When the optical signal is received at Port A or Port B the signal is terminated, converted to an electrical signal, and then passed to the transmit side of the other port.

Then the signal is converted back to an optical signal and retransmitted.



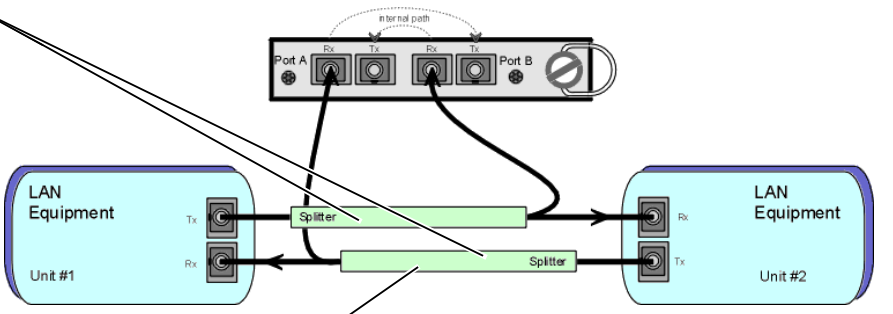
Rx Pass Through: Ports A & B Connection with a Splitter

Pass Through mode used with a splitter monitors the network unobtrusively.

Use Rx Pass Through mode to insert the Gigabit Advisor between two communicating devices using splitters. This lets you attach and remove the Internet Advisor without interrupting network traffic and eliminates the small amount of latency added to the line by passing traffic through the Advisor. The Gigabit Ethernet Advisor is completely passive in this mode.

This is a good way to run baseline tests to get a feel for how the network is operating under normal conditions.

Use optical splitters with a 50/50 power split.



Some splitters that have been qualified by HP are:

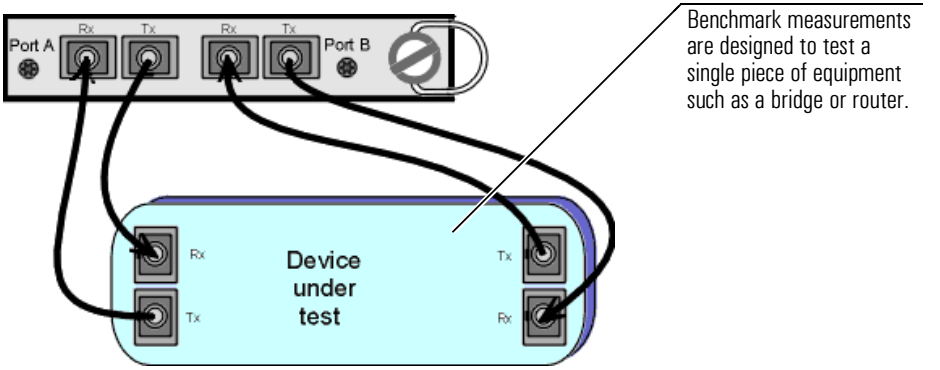
AMP multimode 1x2 coupler; 2-107842-3 (order two)

Netoptics FDX Splitter; 96042-2

Alcoa Fugikura Ltd. HDX Splitter; 1-1x2 (order two)

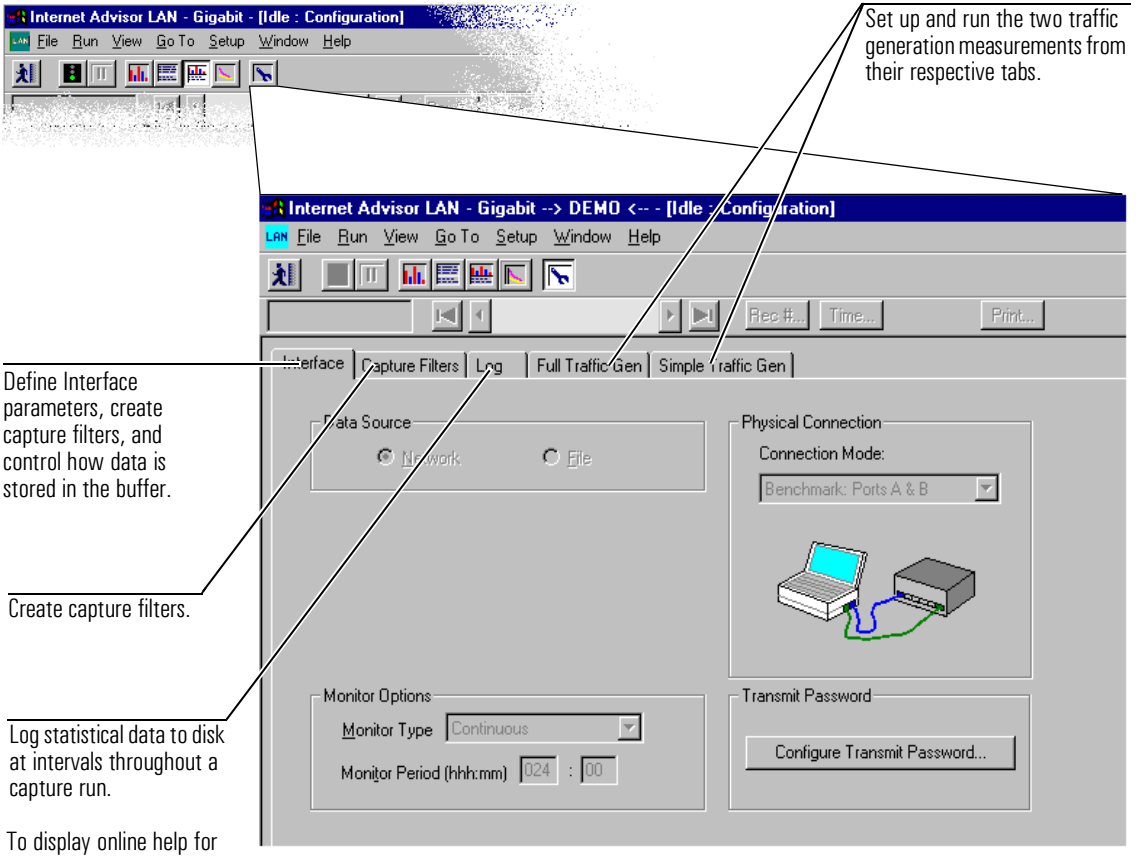
Benchmark: Ports A & B

The Benchmark mode is used to run the RFC1944 suite of tests on a gigabit device. RFC1944 discusses and defines a number of standard tests that are used to characterize performance results such as latency, throughput, and frame loss.



Configuring the Instrument

Before you start a measurement, you need to configure the Gigabit Ethernet Advisor. The configuration menu has a list of tabs designed to make setting up the various functions of the Gigabit Ethernet Advisor quick and simple.



Set up and run the two traffic generation measurements from their respective tabs.

Define Interface parameters, create capture filters, and control how data is stored in the buffer.

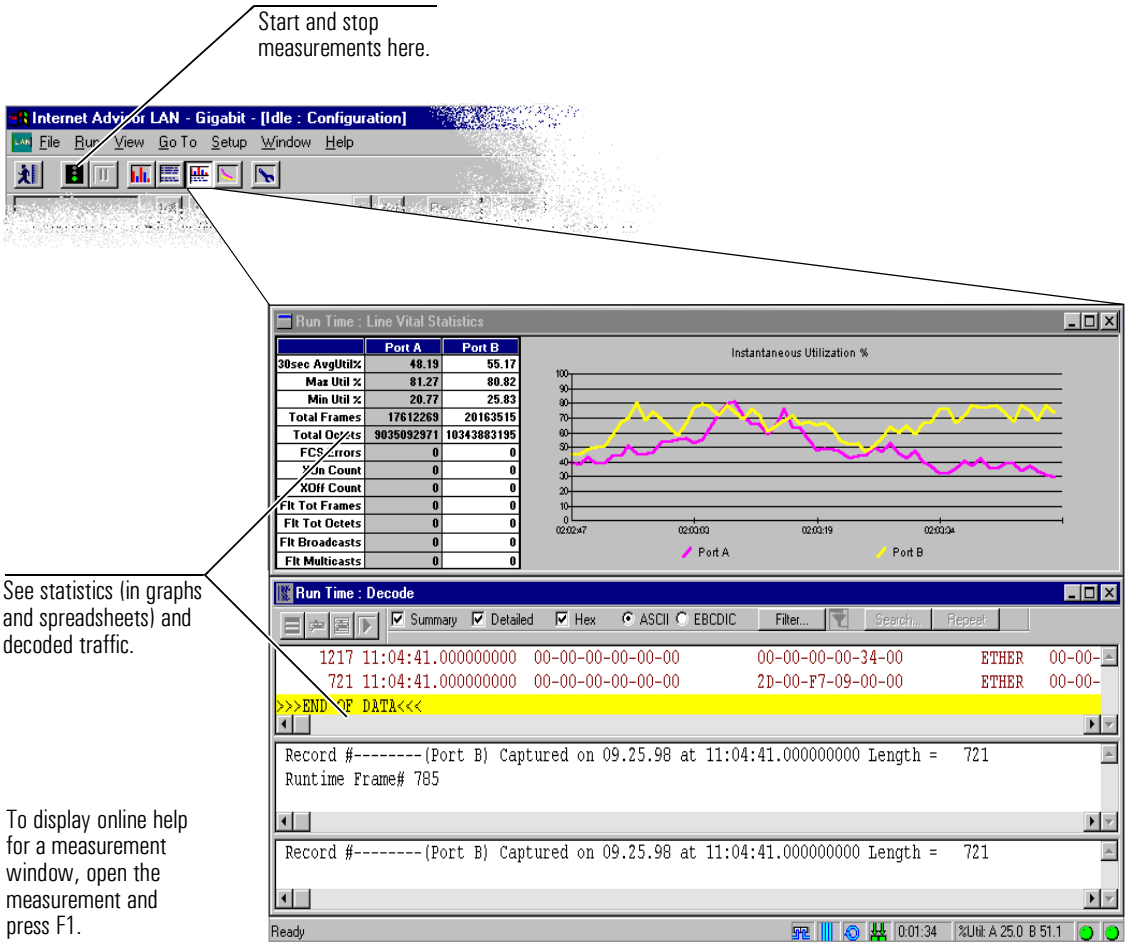
Create capture filters.

Log statistical data to disk at intervals throughout a capture run.

To display online help for configuration items, click on the tab and press F1.

Starting a Capture and Looking at the Results

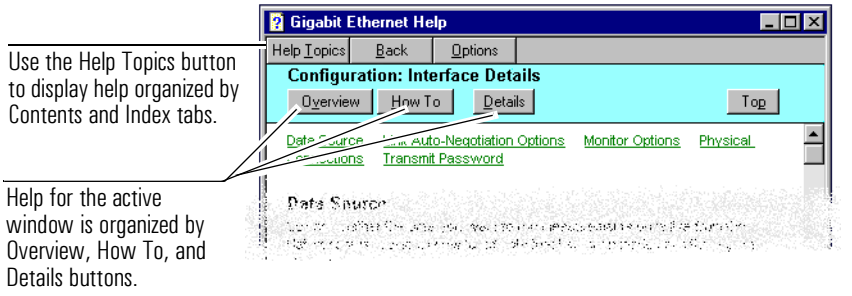
Start a capture run and analyze Data in real time. You can look at data in several different formats as the Gigabit Ethernet Advisor is capturing data as well as study the data after the run has been stopped.



Finding More Information

Gigabit Ethernet Online Help

The Gigabit Ethernet Advisor has an extensive online help system. You can quickly find information for the currently displayed measurement view or dialog by pressing **F1.**



Sample Tests

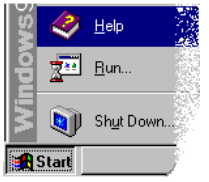
The next chapter in this book describes examples for using the Advisor to make measurements on your network.

Other Internet Advisor Books

Each of the technologies that can be tested with the Internet Advisor has a separate Getting Started manual. Use the appropriate Getting Started manual when you go to test another network technology. All Getting Started manuals for the Internet Advisor are on the documentation CD.

Windows Online Help

You can find information on general Windows operation from the online Help tutorial - About Windows. It is a good idea to spend a few minutes learning the basic functions and terminology associated with the Windows environment.



***Microsoft Windows 98 Getting Started* manual**

The manual, Introducing Microsoft Windows, is shipped with each Internet Advisor to help you get up and running quickly.

3

Sample Tests

Sample Tests

This chapter illustrates some sample tests to help you quickly learn and use the Gigabit Ethernet Advisor:

- Editing and Replaying captured frames to verify network operations
- Stress Testing network devices using Traffic Generation
- Verifying a new Bridge is operating up to RFC1944 Standards using the Benchmark Measurements

Example data file

Data used in some of the example tests is available in a file. You can just read the following pages, or, you can use the sample data file and perform the example steps with your Internet Advisor.

The data file for this example is included with the Internet Advisor in location:

```
C:\ADVISOR\GELAN\CONFIG\TRANSMIT.DAT
```

This file is just a sampling of all the parameters and may be handy as a template to learn with.

To learn more...

For more information about how to use the features of the Internet Advisor, refer to the online help. You can press F1 while using the Gigabit Ethernet Advisor application to get specific information about the currently active window, measurement view, or dialog box.

Stress Testing Network Devices using Traffic Generation

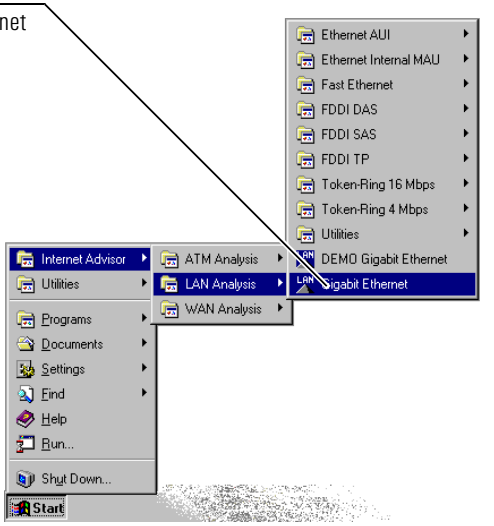
You want to create some traffic conditions that cause hard to find intermittent problems on the network. At the same time, you want to stress test network components and traffic handling applications to see how they react to repeating data patterns, high bit rates, etc.

This example illustrates how you can use the Gigabit Ethernet Advisor to automatically generate and transmit traffic onto the network. Some conclusions you want from a test like this might include:

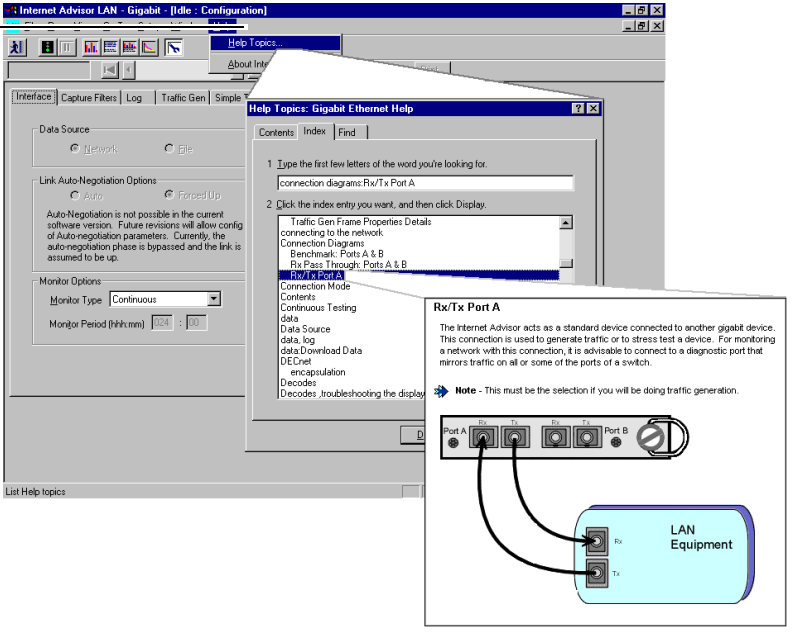
- verify utilization rates
- test the limits of a device
- check specialized traffic patterns

To begin, you need to have a Gigabit Ethernet Advisor, have the necessary cables, and have turned the Advisor on.

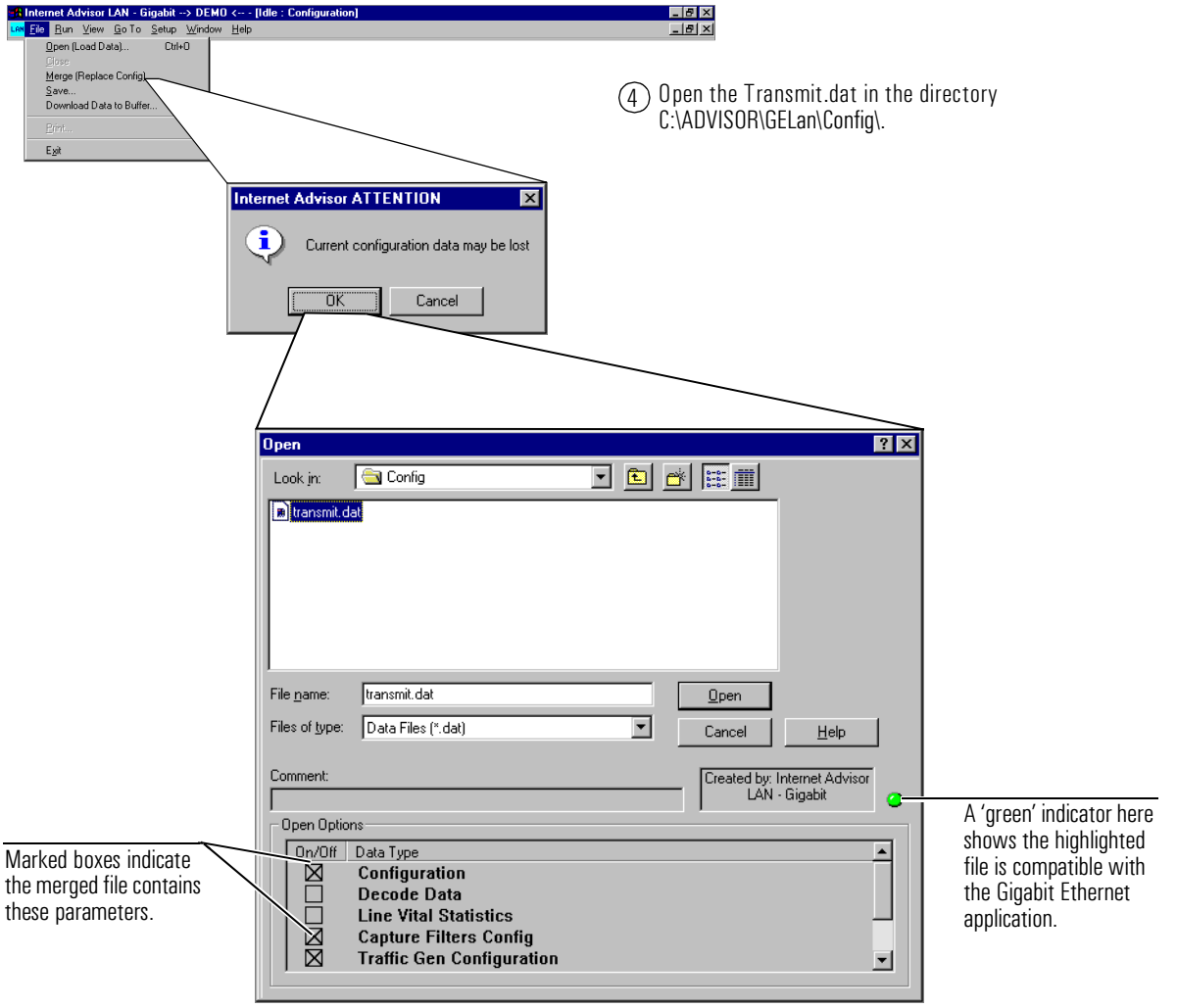
1. Start the Gigabit Ethernet application.



2. Look in the online help for the Rx/Tx: Port A connection diagram. This is the type of connection to use for Traffic Generation.



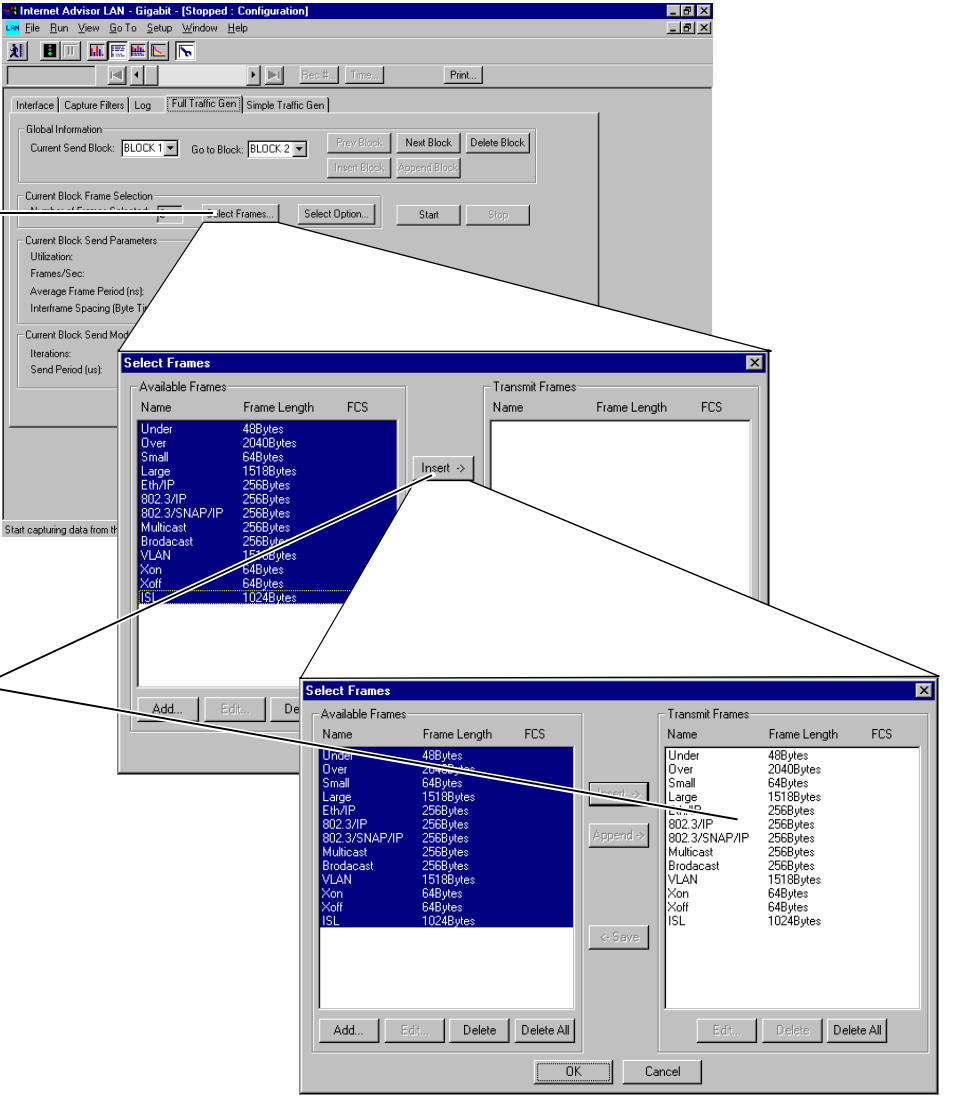
3. Connect the Gigabit Ethernet Advisor to the network.

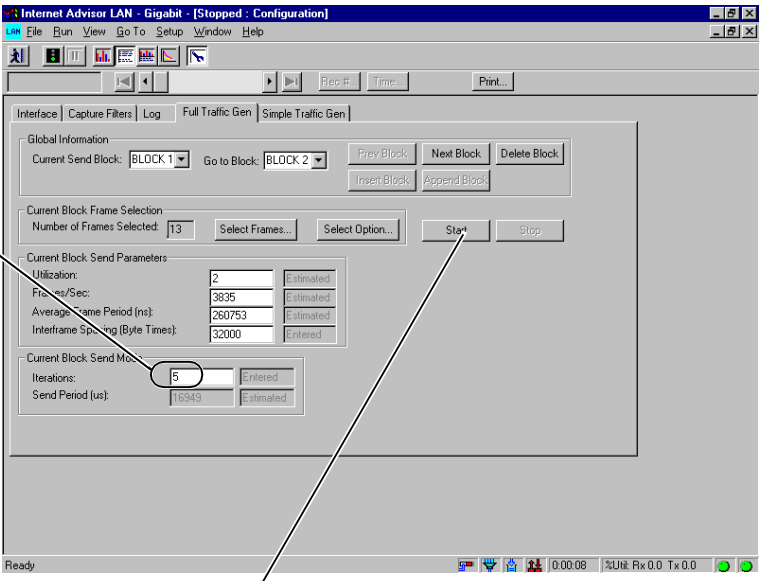

Internet Advisor LAN - Gigabit --> DEMO <-- - [Idle : Configuration]
File Run View Go To Setup Window Help
Open (Load Data)... Ctrl+O
Close
Merge (Replace Config)...
Save...
Download Data to Buffer...
Print...
Exit
4 Open the Transmit.dat in the directory C:\ADVISOR\GELan\Config\.
Internet Advisor ATTENTION
Current configuration data may be lost
OK
Cancel
Open
Look in:
Config
transmit.dat
File name:
transmit.dat
Open
Files of type:
Data Files (*.dat)
Cancel
Help
Comment:
Created by: Internet Advisor LAN - Gigabit
Open Options
On/Off
Data Type
Configuration
Decode Data
Line Vital Statistics
Capture Filters Config
Traffic Gen Configuration
Marked boxes indicate the merged file contains these parameters.
A 'green' indicator here shows the highlighted file is compatible with the Gigabit Ethernet application.

⑤ Select the Full Traffic Gen tab in the Configuration menu.

⑥ Click Select Frames to see the Available Frames.

⑦ Highlight all of the available frames and click on Insert to copy them to the Transmit Frames pane. Click OK.





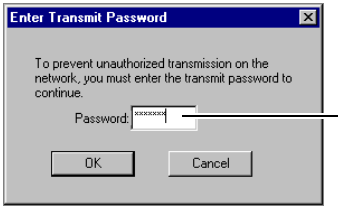
⑧ Change the Current Block Send Mode to have 5 Iterations.

⑨ Select Start to start transmitting frames on the network.

Notice the figures in the Status Bar. Since merging the Transmit.dat file, different icons appear here.

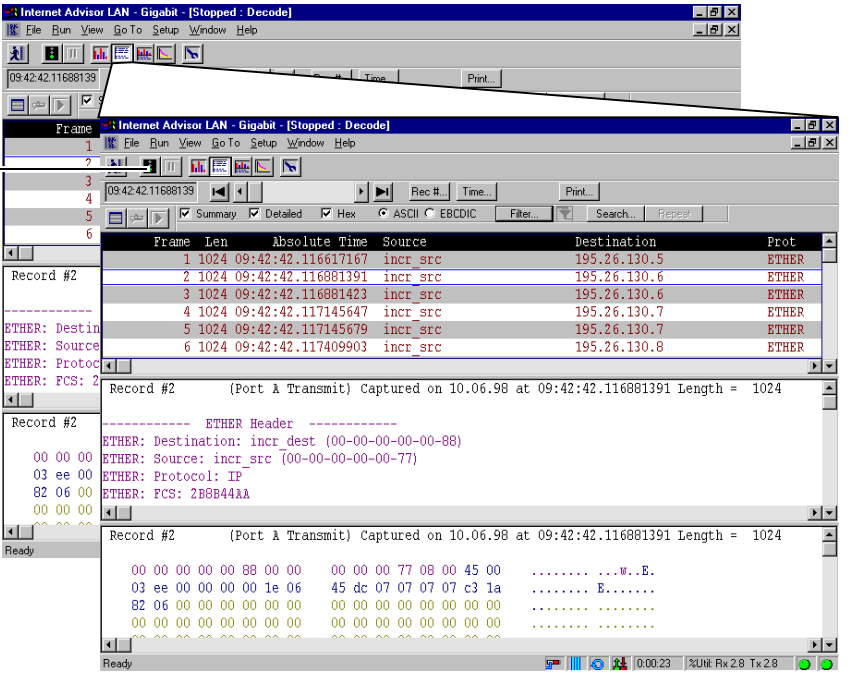
See the online help for more information about the Status bar.

⑩ Type in the password - advisor - and select OK to continue. (See the online help for more information about passwords.)

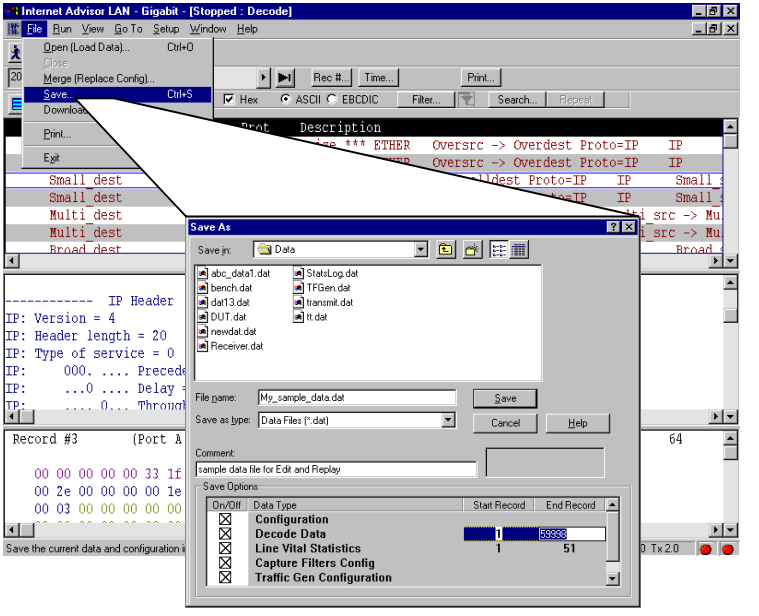


The Advisor prompts you to enter a password before transmitting data on the network.

11 Select Decodes and Start to see the decoded data from the transmitted traffic on the network.



12 Stop the capture and save the decoded date to a file. Save the file name - My_sample_data.dat in the C:\Advisor\GELan\Data directory. Type in a descriptive comment for the file. Click on the Decode Data box and double click on the End Record value. Enter 100 to save only the first 100 records in the file.



Editing and Replaying Captured Frames to Verify Network Operations

Using the Edit and Playback functions in the Gigabit Ethernet Advisor is a feature that lets you

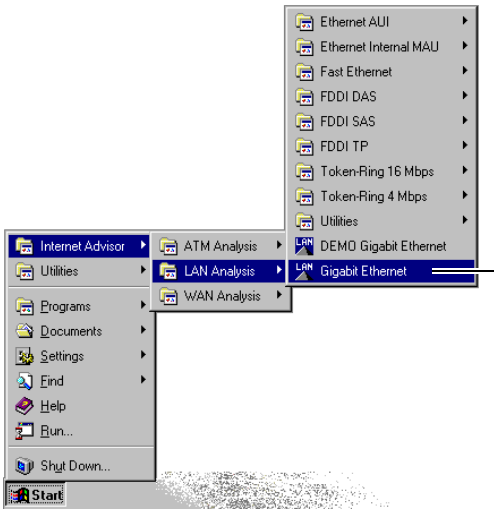
- capture data
- edit that data
- retransmit that data on the network

This example illustrates how you can use the Gigabit Ethernet Advisor to download a previously saved data file, edit existing frames, and play them back onto the network.

Example File

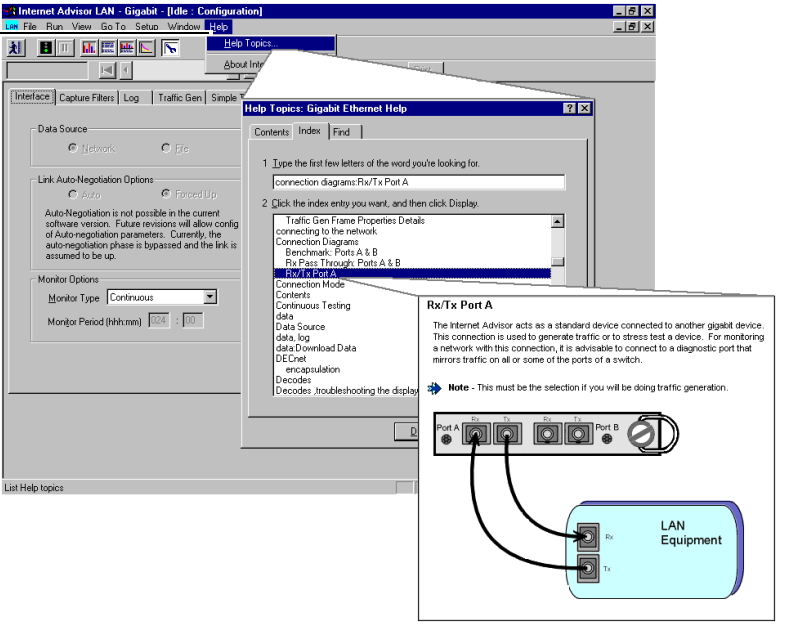
The data file used in this example was created in the previous sample test - *Stress Testing network devices using Traffic Generation.*

To begin, you need to have a Gigabit Ethernet Advisor (and have it plugged in), have the necessary cables, and turned the Advisor on.



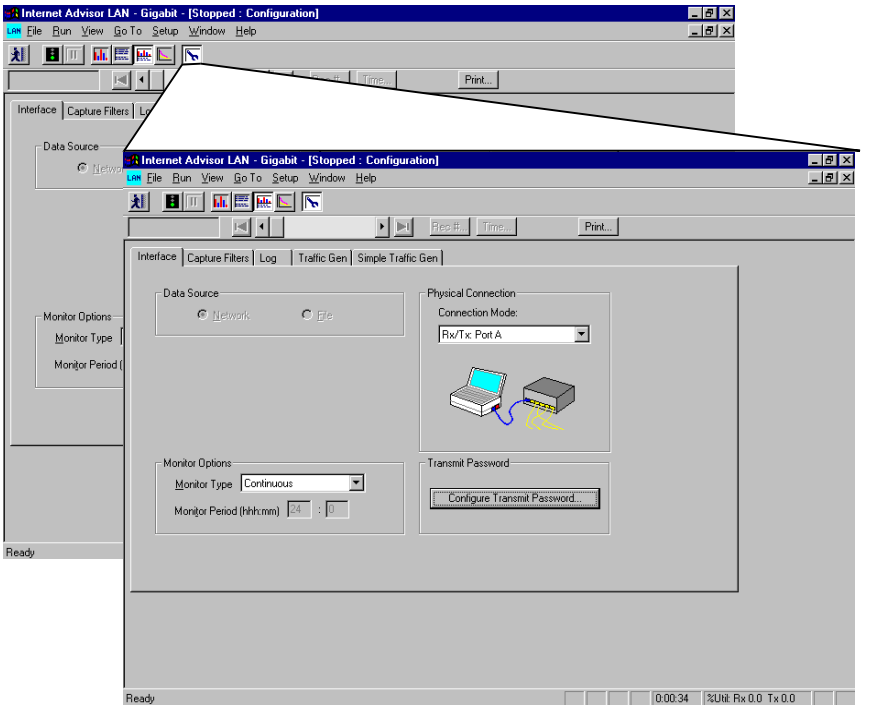
1. Start the Gigabit Ethernet application.

2. Look in the online help for the Rx/Tx: Port A connection diagram. This is the type of connection to use for this test.

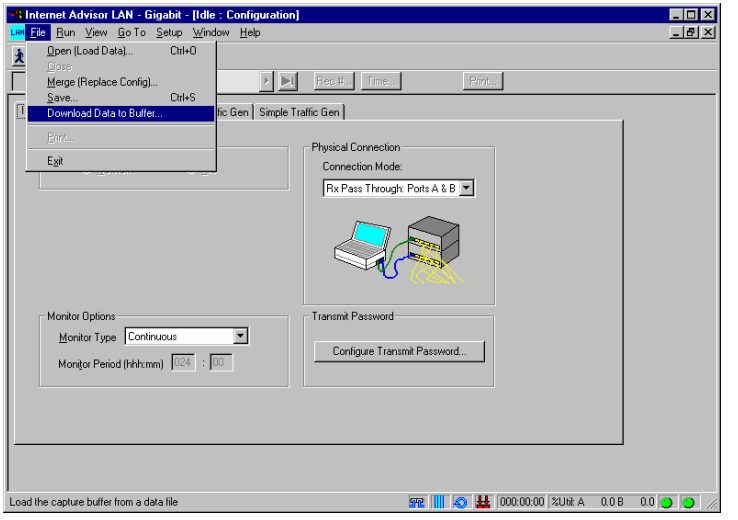


3. Connect the Gigabit Ethernet Advisor to the network.

④ Configure the Gigabit Ethernet Advisor.

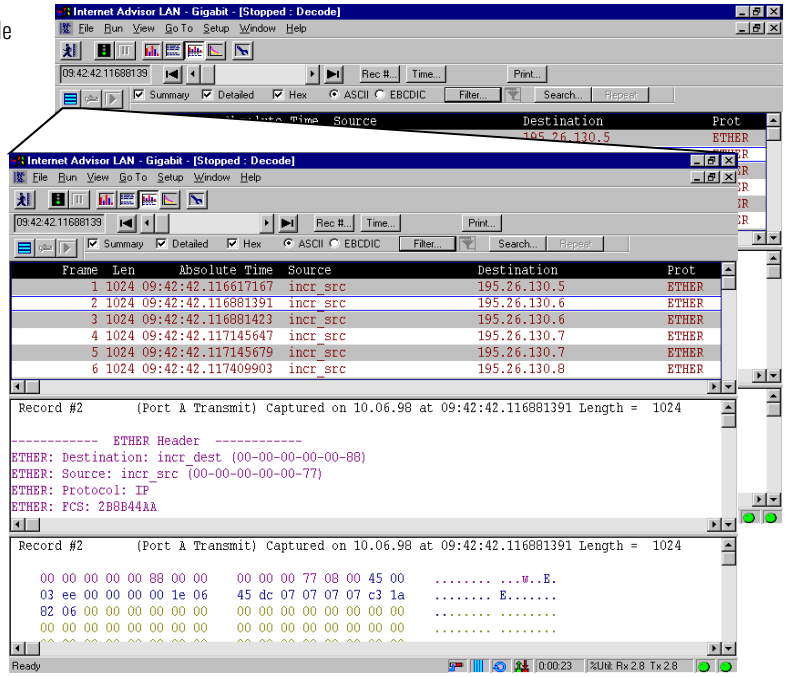


⑤ Download the file - My_Sample_data.dat to the to the buffer.

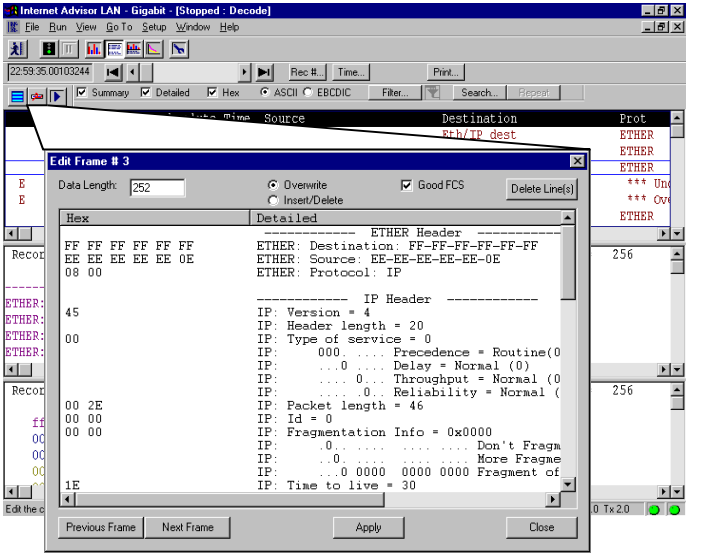


You can find this file in the C:\Advisor\GELan\Data directory if you performed all of the steps in the previous sample test.

⑥ Select the Decode Port.

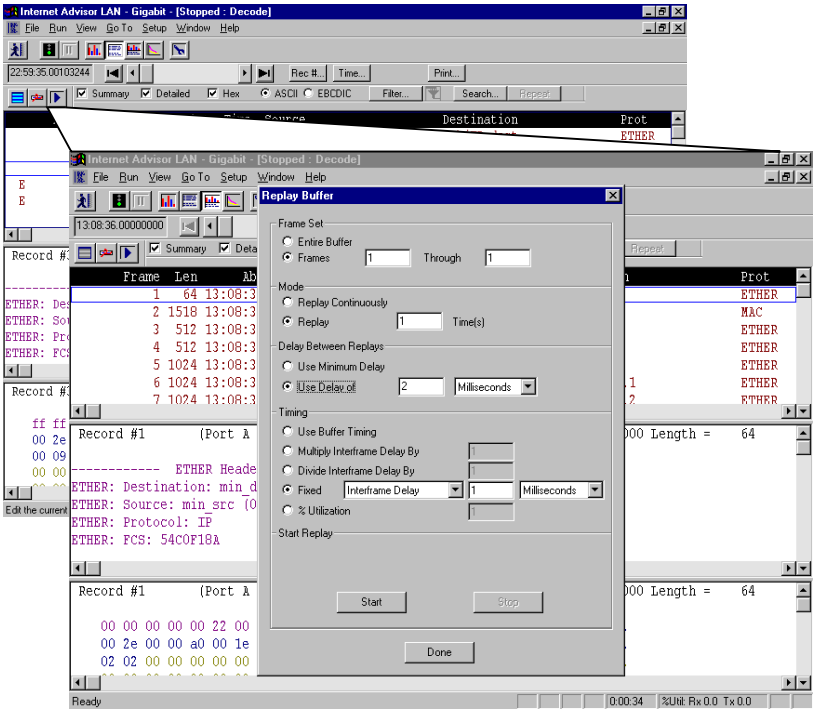


⑦ Edit frames on the Port A transmit side.



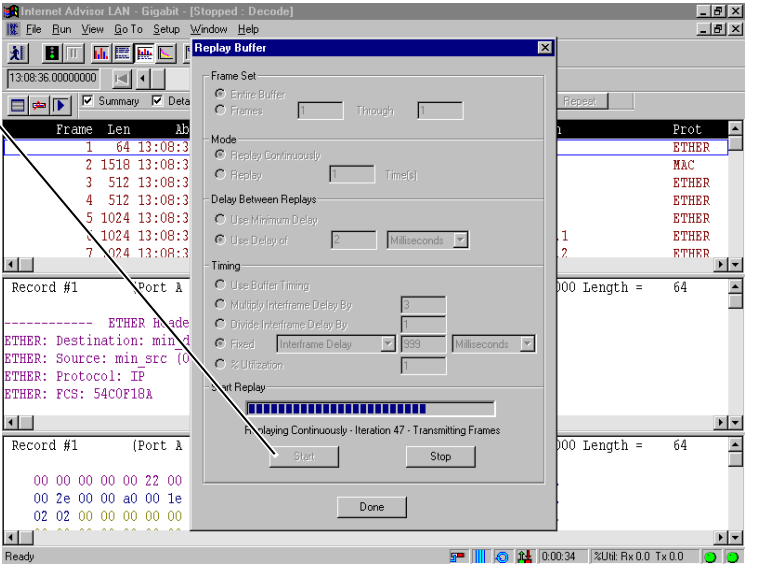
See the online help for more information about editing frames.

8 Set up the replay parameters you want to use.



See the online help for more information about replay parameters.

9 Replay (send) these frames out on the network.



Verifying a new Bridge is operating up to RFC1944 Standards using the Benchmark Measurements

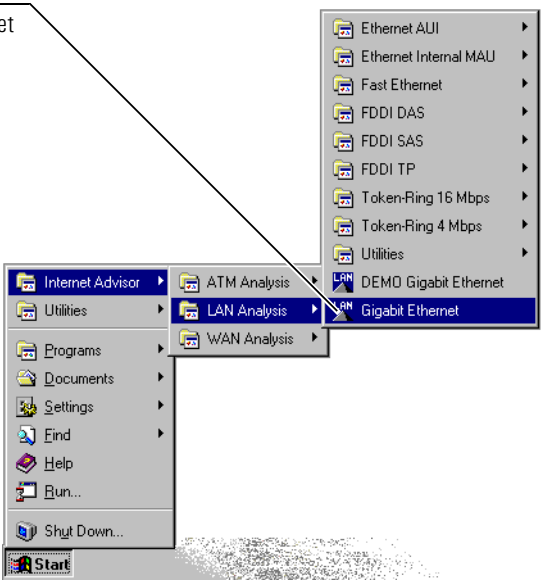
The Benchmarks measurement has been designed to help network equipment manufacturers run repeatable, defined, standardized tests while developing or modifying their equipment.

This example illustrates how you can use the Gigabit Ethernet Advisor to automatically run the RFC1944 tests on a single piece of equipment such as a bridge or router. Some conclusions you want from a measurement like this might include:

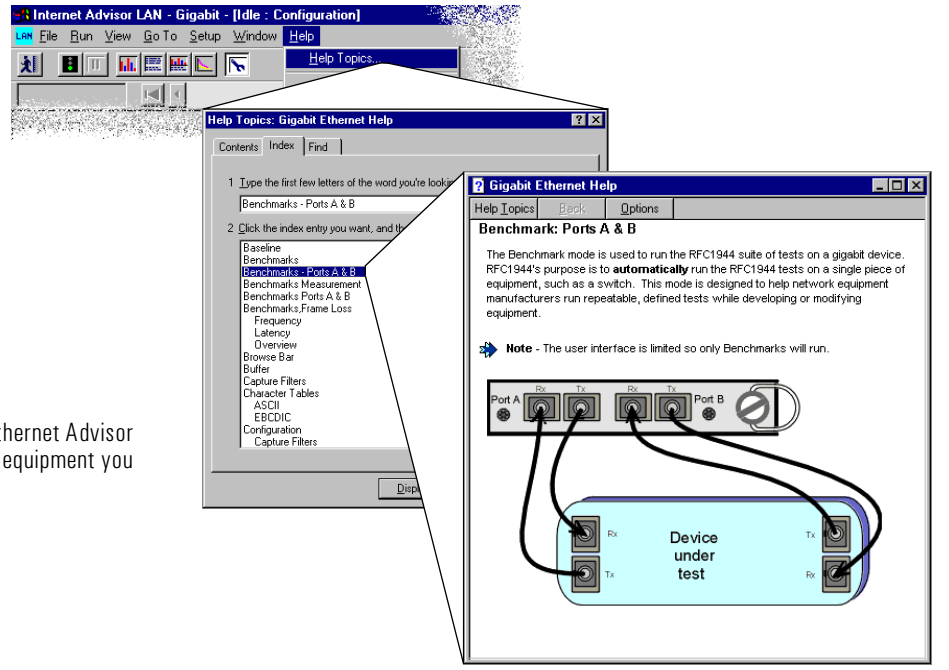
- check for connectivity
- determine the maximum throughput (in frames/sec) for a given device
- measure the time for particular sized frames to go through a device
- look at the percentage of frames lost during a certain amount of time

To begin, you need to have a Gigabit Ethernet Advisor (and have it plugged in), gone to the device you want to test, have the necessary cables, and turned the Advisor on.

① Start the Gigabit Ethernet application.

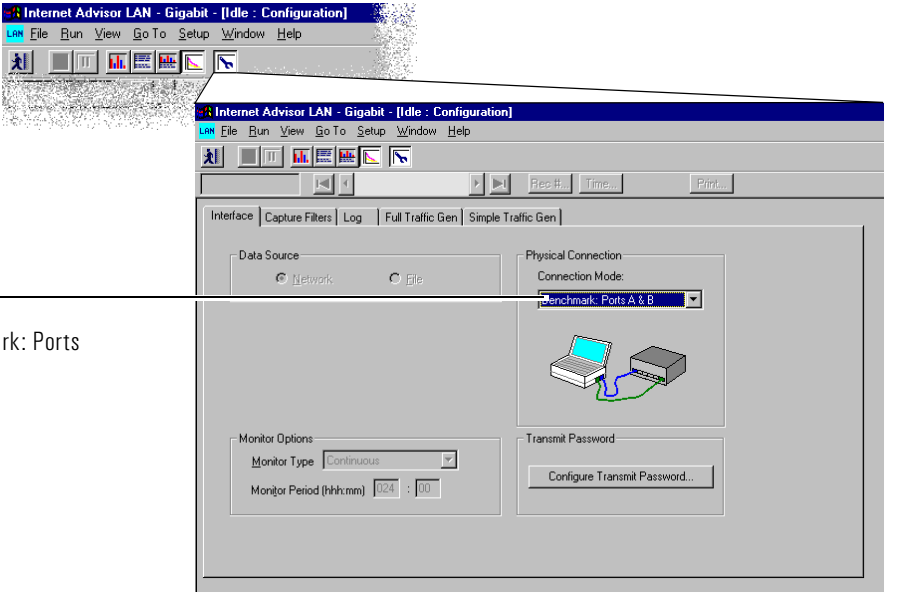


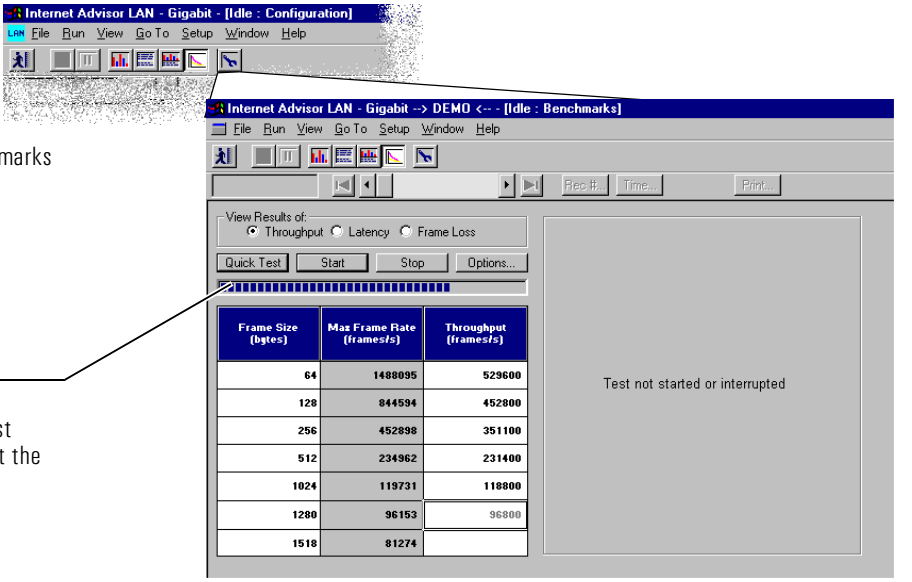
② Look in the online help for the Benchmarks: Ports A & B connection.



③ Connect the Gigabit Ethernet Advisor to the network and/or equipment you want to verify.

④ Configure the physical connection to Benchmark: Ports A & B.

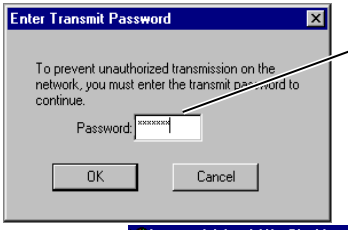




5 Open the Benchmarks measurement.

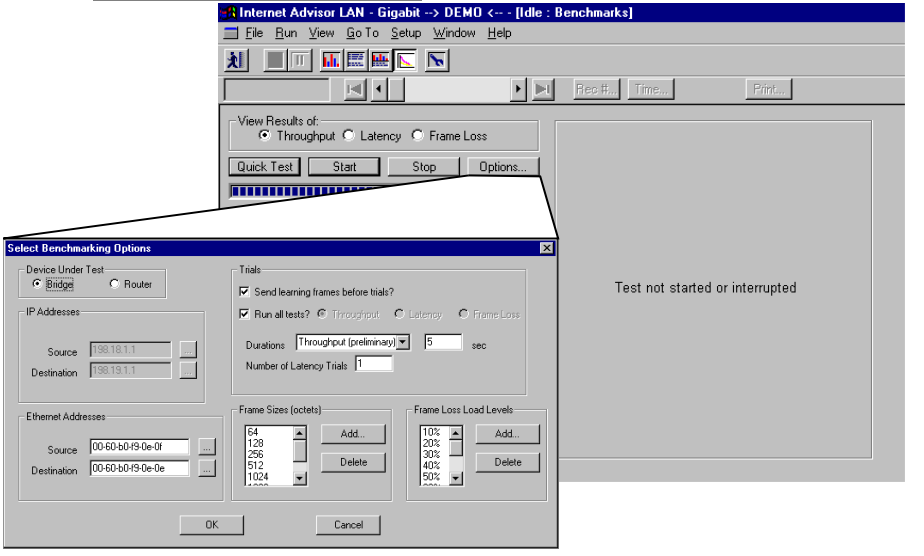
6 Perform a fast connectivity test before you start the full Benchmark measurement.

7 Type in the password - advisor - and select OK to continue. (See the online help for more information about passwords.)

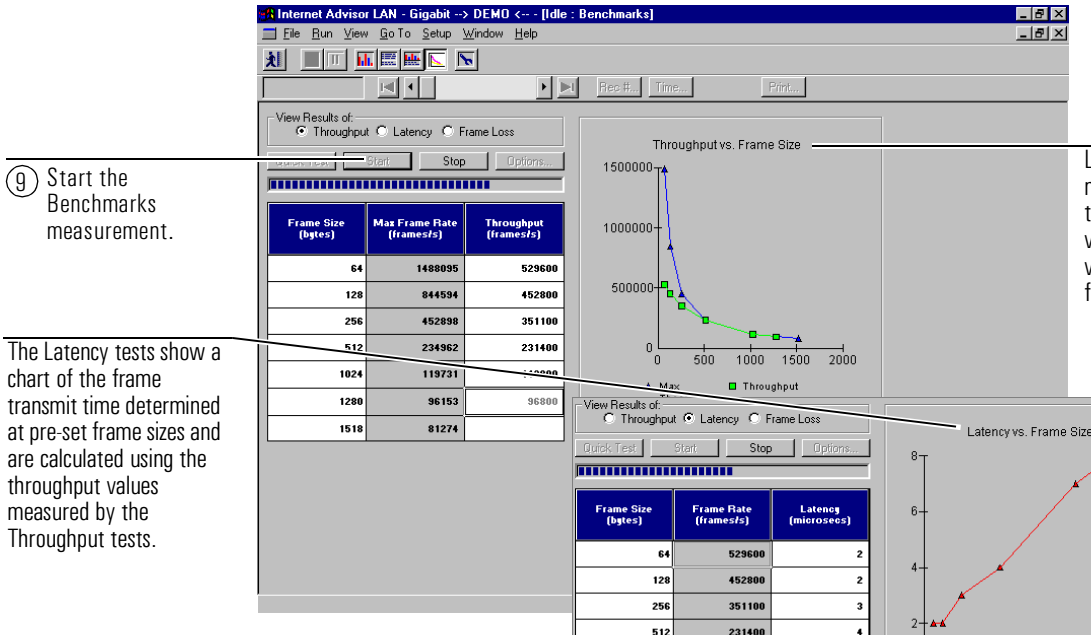


The Advisor prompts you to enter a password before transmitting data on the network.

8 The Options menu is where you change any of the test parameters.



9 Start the Benchmarks measurement.



Look at the measured throughput versus the various frame sizes.

The Latency tests show a chart of the frame transmit time determined at pre-set frame sizes and are calculated using the throughput values measured by the Throughput tests.

The Frame Loss tests show a chart of the frame loss determined at pre-set frame sizes and traffic loafs as specified by RFC1944.

A

Declaration of Conformity

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DECLARATION OF CONFORMITY

according to ISO/IEC Guide 22 and EN 45014

Manufacturer's Name:	Hewlett-Packard Co.
Manufacturer's Address:	Network Systems Test Division 5070 Centennial Boulevard Colorado Springs, Colorado 80919

declares that the product

Product Name:	Gigabit Ethernet interface undercradle for Internet Advisor LAN
Model Number(s):	HP J2901A
Product Option(s):	001, 1A3, 250, 8ZE

conforms to the following Product Specifications:

Safety:	EN 61010-1:1993 / IEC 1010-1:1990 + A1+ A2	
EMC:	EN 55011:1991 / CISPR 11:1990 (Group 1, Class A) [1]	
	EN 50082-1:1992	
	IEC 801-2:1991	4 kV CD, 8 kV AD
	IEC 801-3:1984	3 V/m
	IEC 801-4:1988	0.5 kV Signal Lines, 1 kV Power Lines

Supplementary Information:

The product herewith complies with the requirements of the Low Voltage Directive 73/23/EEC and the EMC Directive 89/336/EEC and carries the CE marking accordingly.

[1]The product was tested in a typical configuration.

Colorado Springs, CO 12 March 1998

Bob Eaton / Quality Manager
(acting)

European Contact: Your local Hewlett-Packard Sales and Service Office or Hewlett-Packard GmbH, Department ZQ / Standards Europe, Herrenberger Strasse 130, D-71034 Boeblingen, Germany (FAX +49-7031-14-3143)