



# **Agilent N2620A FrameScope Pro Network Performance Analyzer**

## **User's Guide**



**Agilent Technologies**

# Notices

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## Manual Part Number

N2620-90003

## Edition

Fifth Edition, February 26, 2009

Agilent Technologies, Inc.  
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## Safety Notices

### CAUTION













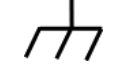



A **CAUTION** notice denotes a hazard. It calls attention to an operating procedure, practice, or the like that, if not correctly performed or adhered to, could result in damage to the product or loss of important data. Do not proceed beyond a **CAUTION** notice until the indicated conditions are fully understood and met.

### WARNING

A **WARNING** notice denotes a hazard. It calls attention to an operating procedure, practice, or the like that, if not correctly performed or adhered to, could result in personal injury or death. Do not proceed beyond a **WARNING** notice until the indicated conditions are fully understood and met.

## Safety Symbols

The following symbols on the instrument and in the documentation indicate precautions which must be taken to maintain safe operation of the instrument.

	Direct current (DC)		Off (supply)
	Alternating current (AC)		On (supply)
	Both direct and alternating current		Caution, risk of electric shock
	Three-phase alternating current		Caution, risk of danger (refer to this manual for specific Warning or Caution information)
	Earth (ground) terminal		Caution, hot surface
	Protective conductor terminal		Out position of a bi-stable push control
	Frame or chassis terminal		In position of a bi-stable push control
	Equipotentiality	<b>CAT II 300 V</b>	Category II 300 V overvoltage protection
	Equipment protected throughout by double insulation or reinforced insulation		

## General Safety Information

The following general safety precautions must be observed during all phases of operation, service, and repair of this instrument. Failure to comply with these precautions or with specific warnings elsewhere in this manual violates safety standards of design, manufacture, and intended use of the instrument.

Agilent Technologies assumes no liability for the customer's failure to comply with these requirements.

You must follow these to ensure safe operation and to maintain the instrument in safe condition.

### WARNING

- **Do not use the device if it is damaged. Before you use the device, inspect the casing. Look for cracks or missing plastic. Do not operate the device around explosive gas, vapor, or dust.**
- **Always use the device with the cables provided.**
- **Observe all markings on the device before establishing any connection.**
- **Turn off the device and application system power before connecting to the I/O terminals.**
- **When servicing the device, use only the specified replacement parts.**
- **Do not operate the device with the cover removed or loosened.**
- **Use only the power adapter provided by the manufacturer to avoid any unexpected hazards.**
- **The N2620A FrameScope Pro is a Safety Class 1 instrument. The N2620A is powered by an AC/DC adapter.**
- **All Light Emitting Diodes (LEDs) used in this product are Class 1 LEDs as per IEC 60825-1.**
- **Verify that the N2620A is set to match the available line voltage, and all the safety precautions are taken.**
- **Do not operate the N2620A in the presence of flammable gases or fumes.**
- **Operating personnel must not remove instrument covers. Component replacement and internal adjustments must be made only by qualified service personnel. Instruments that appear damaged or defective should be made inoperative and secured against unintended operation until they can be repaired by qualified service personnel.**

### CAUTION

- If the device is used in a manner not specified by the manufacturer, the device protection may be impaired.
- Always use dry cloth to clean the device. Do not use ethyl alcohol or any other volatile liquid to clean the device.
- Do not permit any blockage of the ventilation holes of the device.

## Environmental Conditions

This instrument is designed for indoor use and in an area with low condensation. The table below shows the general environmental requirements for this instrument.





Environmental conditions	Requirements
Operating temperature	0 °C to 50 °C
Operating humidity	20% to 85% RH non-condensing
Storage temperature	–20 °C to 70 °C
Storage humidity	5% to 90% RH non-condensing

### NOTE

The N2620A FrameScope Pro complies with the following safety and EMC requirements.

- IEC 61010-1:2001/EN61010-1:2001 (2nd Edition)
- Canada: CAN/CSA-C22.2 No. 61010-1-04
- USA: ANSI/UL 61010-1:2004
- IEC 61326-2002/EN 61326:1997+A1:1998+A2:2001+A3:2003
- Canada: ICES-001:2004
- Australia/New Zealand: AS/NZS CISPR11:2004

## Regulatory Markings

	<p>The CE mark is a registered trademark of the European Community. This CE mark shows that the product complies with all the relevant European Legal Directives.</p>		<p>The C-tick mark is a registered trademark of the Spectrum Management Agency of Australia. This signifies compliance with the Australia EMC Framework regulations under the terms of the Radio Communication Act of 1992.</p>
<p><b>ICES/NMB-001</b></p>	<p>ICES/NMB-001 indicates that this ISM device complies with the Canadian ICES-001. Cet appareil ISM est conforme a la norme NMB-001 du Canada.</p>		<p>This instrument complies with the WEEE Directive (2002/96/EC) marking requirement. This affixed product label indicates that you must not discard this electrical or electronic product in domestic household waste.</p>
	<p>The CSA mark is a registered trademark of the Canadian Standards Association.</p>		

## Waste Electrical and Electronic Equipment (WEEE) Directive 2002/96/EC

This instrument complies with the WEEE Directive (2002/96/EC) marking requirement. This affixed product label indicates that you must not discard this electrical or electronic product in domestic household waste.

Product Category:

With reference to the equipment types in the WEEE directive Annex 1, this instrument is classified as a “Monitoring and Control Instrument” product.

The affixed product label is as shown below.



**Do not dispose in domestic household waste**

**To return this unwanted instrument, contact your nearest Agilent Technologies, or visit:**

**[www.agilent.com/environment/product](http://www.agilent.com/environment/product)**

**for more information.**

**Manufacturer's Name:** Agilent Technologies International sarl  
**Manufacturer's Address:** Rue de la Gare 29  
 CH-1110 Morges  
 Switzerland

**Declares under sole responsibility that the product as originally delivered**

**Product Name:** Framescope Pro - Network Performance Analyzer  
**Product Number:** N2620A

**complies with the essential requirements of the following applicable European Directives, and carries the CE marking accordingly:**

- The Low Voltage Directive 73/23/EEC, amended by 93/68/EEC
- The EMC Directive 89/336/EEC, amended by 93/68/EEC


**and conforms with the following product standards:**

	<b>Standard</b>	<b>Limit</b>
<b>EMC</b>	IEC 61326:1997+A1:1998+A2:2000 / EN 61326:1997+A1:1998+A2:2001 CISPR 11:1997+A1:1999 / EN 55011:1998+A1:1999 IEC 61000-4-2:2001 / EN 61000-4-2:1995+A1:1998+A2:2001 IEC 61000-4-3:2002 / EN 61000-4-3:2002 IEC 61000-4-4:2001 / EN 61000-4-4:1995+A1:2001+A2:2001 IEC 61000-4-5:2001 / EN 61000-4-5:1995+A1:2001 IEC 61000-4-6:2001 / EN 61000-4-6:1996+A1:2001 IEC 61000-4-8:2001 / EN 61000-4-8:1993+A1:2001 IEC 61000-4-11:2001 / EN 61000-4-11:1994+A1:2001 Canada: ICES-001 Australia/New Zealand: AS/NZS 2064.1	Group 1 Class A 4kV CD, 8kV AD 3 V/m, 80-1000 MHz 0.5kV signal lines, 1kV power lines 0.5 kV line-line, 1 kV line-ground 3V, 0.15-80 MHz 30 A/m 1 cycle/100%
<b>Safety</b>	IEC 61010-1:2001 / EN 61010-1:2001 Canada: CAN/CSA-C22.2 No. 61010-1:2004 USA: UL 61010-1:2004	

**Supplementary Information:**

The product was tested in a typical configuration with Agilent Technologies test systems. This DoC applies to above-listed products placed on the EU market after:

2005-February-01  
 \_\_\_\_\_  
 Date

  
 \_\_\_\_\_  
 Name  
 Product Regulations Representative PMD, DVS  
 Agilent Technologies  
 \_\_\_\_\_  
 Title

For further information, please contact your local Agilent Technologies sales office, agent or distributor.



## In This Guide...

### **1 Introducing the FrameScope Pro**

This chapter gives an overview of the N2620A FrameScope Pro Network Performance Analyzer.

### **2 Network Testing with the FrameScope Pro**

This chapter describes how to use your FrameScope Pro as a network performance analyzer.

### **3 Voice Testing with the FrameScope Pro**

This chapter describes how the FrameScope Pro measures and tests the performance of VoIP networks.

### **4 Generating Voice Traffic with the FrameScope Pro**

This chapter provides the information on generating voice traffic with the FrameScope Pro.

### **5 DSL Testing with the FrameScope Pro**

This chapter deals with DSL testing which consists of ADSL and VDSL tests. VIT-A2 and VIT-V2 testers from Vierling are required for DSL testing.

### **6 IP Video Testing with the FrameScope Pro**

This chapter describes how the FrameScope Pro measures the QoS of Internet Protocol Television (IPTV).

### **7 System Operations**

This chapter describes the various system operations of the FrameScope Pro that are accessible from the System menu.

### **8 Network Performance Analyzer Reference**

This chapter describes the various network operations of the FrameScope Pro.

### **9 Specifications**

This chapter describes the specifications of the FrameScope Pro.

### **10 Glossary**

This chapter contains the glossary for the FrameScope Pro User's Guide.



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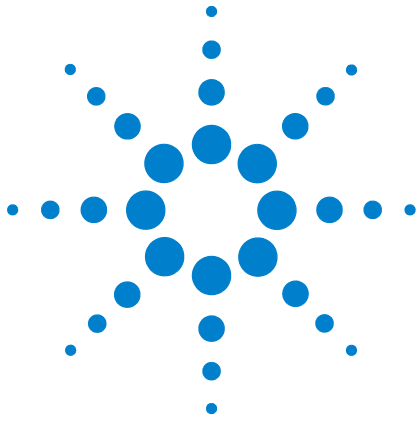
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This chapter gives an overview of the N2620A FrameScope Pro Network Performance Analyzer.



## Introduction

The FrameScope Pro is a powerful handheld instrument that measures the performance of your key network resources and troubleshoots the active network equipment.

The FrameScope Pro allows the performance of Voice over IP (VoIP), IPTV, and DSL network resources to be verified. The FrameScope Pro also integrates network performance analyzer features such as Auto Discovery, network performance testing, traffic generator, and fault finding with wiremap testing feature.

### Laser Safety Information for Optional Optical Transceivers

The laser sources specified by this user’s guide are classified according to the IEC 60825-1 (2001).

The laser sources comply with 21 CFR 1040.10 except for deviations pursuant to Laser Notice No. 50, dated 2001-July-26.

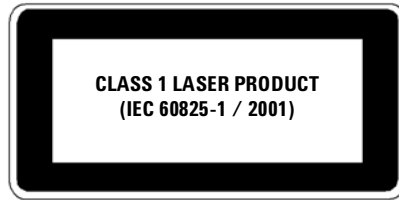
**Table 1-1** Initial laser safety information

	<b>QFBR-5747LP</b>	<b>QFCT-5796LP</b>
• Laser type	850 nm VCSEL	Long wavelength
• Wavelength	830 nm to 860 nm	1270 nm to 1355 nm
• Max. average output power <sup>[1]</sup>	1 mW	500 μW
• Beam waist diameter	50 μm to 62.5 μm	9 μm or 62.5 μm
• Numerical aperture	0.2 to 0.275	0.2 to 0.275
• Laser class according to the IEC 60825-1 (2001)	Class 1	Class 1
• Max. permissible average output power <sup>[2]</sup>	0.8 mW	15.6 mW

[1] Max. average output power means the highest possible optical CW power the laser source can produce at its output.

[2] Max. permissible CW output power is the highest optical power that is permitted within the appropriate IEC laser class.

## Laser Class 1 Label



### **WARNING**

Take note of the following laser safety warnings.

- Under no circumstances should you look into the end of an optical cable attached to the optical output when the device is operating. The laser radiation can seriously damage your eyesight.
  - Do not enable the laser when there is no fiber attached to the optical output connector.
  - The use of optical instruments with this product will increase eye hazard.
  - The laser module has a built-in safety circuitry which will disable the optical output in the case of a faulty condition.
  - Servicing should only be performed by qualified personnels.
-

## The FrameScope Pro at a Glance

### Front Panel



Figure 1-1 FrameScope Pro front panel

## Side Panels

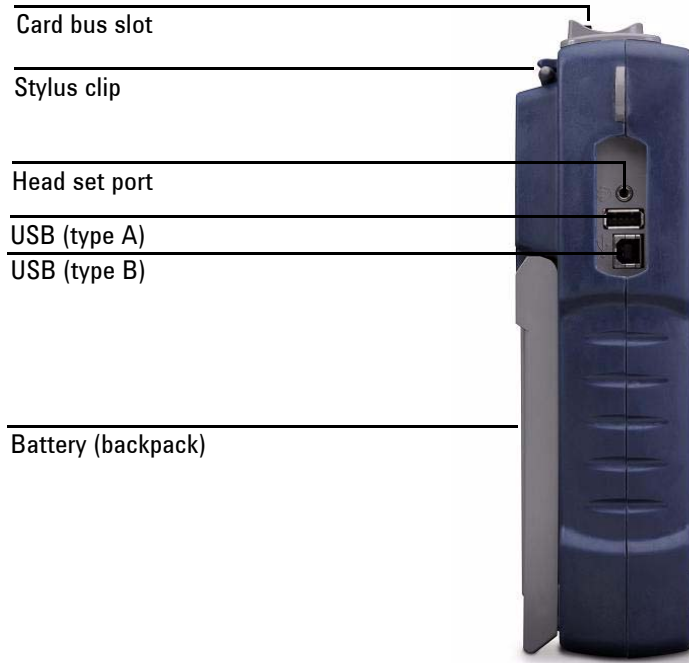


Figure 1-2 Left panel

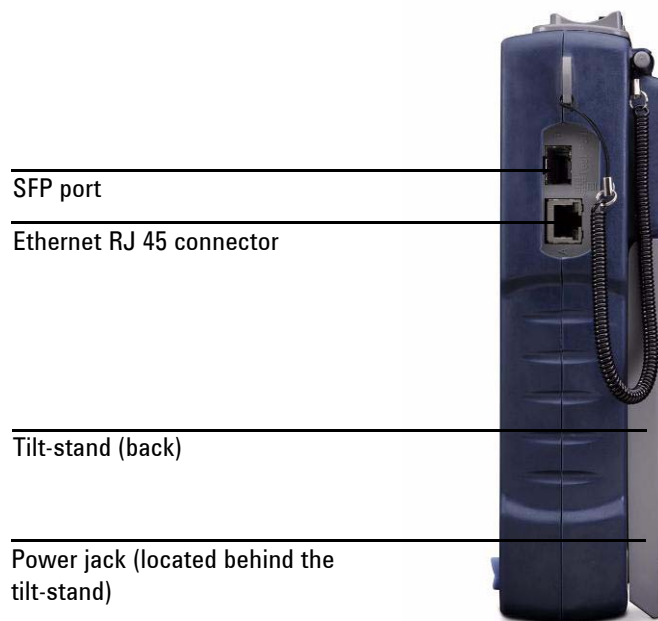










Figure 1-3 Right panel

**Table 1-2** FrameScope Pro front and side panel description

<b>Control</b>	
Color touch screen	The FrameScope Pro touch screen is the main user interface which displays the test controls and results. Press the screen with your finger or a stylus to navigate through the menus and test controls.
Power button	Press  to switch on the FrameScope Pro. To switch off the FrameScope Pro, perform any of the following: <ul style="list-style-type: none"> <li>• Press  twice.</li> <li>• Press  once, wait for 5 s for the FrameScope Pro to power off.</li> <li>• Press  once and press <b>Off</b> on the screen.</li> </ul>
OK button	Press  to activate the currently selected item on the screen. Use  to confirm edits, type in values, and execute selected features.
Scroll button	The  moves the highlight cursor on the screen. Use  to scroll through selected items on the screen.
<b>Port</b>	
CompactFlash slot	This port on the bottom of the FrameScope Pro accepts standard CompactFlash cards for data storage.
USB ports	The FrameScope Pro provides a USB interface port to connect with PCs and peripherals. The FrameScope Pro provides a USB Type A port and USB Type B port.
Headset port	This port allows you to connect the headset to the FrameScope Pro.
DC power input	The DC power input accepts the Agilent 12 V DC power adapter or charger (Agilent part number N2620A-080) that comes together with FrameScope Pro.

**WARNING**

**Use only the 12 V DC adapter or charger (Agilent part number N2620A-080) supplied with the FrameScope Pro. Using an incompatible adapter may violate the FrameScope Pro warranty. The FrameScope Pro draws varying amounts of current depending on the battery charge condition, accessories attached, and type of test executed. An inferior adapter may overheat and damage the FrameScope Pro, or may cause injuries.**



## Standard Purchase Items

There are two options available with the purchase of the FrameScope Pro. The standard purchase items for Option N2620A-001 is listed in [Table 1-3](#), while the standard purchase items for Option N2620A-003 is listed in [Table 1-4](#).

**Table 1-3** Standard purchase items for Option N2620A-001

Agilent part number	Description
5012-1172	FrameScope Pro utility CD kit
5183-8208	AC to DC adapter, input 90 VAC to 240 VAC, 12 V output, 1.5 A with ferrite core clamp
5183-8293	Soft carry case
5185-0974	Strap set
5185-7724	USB cable
5185-7759	IC 1 GB CompactFlash card
5972-2487	RFC 2544 testing license document

**Table 1-4** Standard purchase items for Option N2620A-003

Agilent part number	Description
1150-7851	Headset, 2-ear with mic volume
5012-1172	FrameScope Pro utility CD kit
5183-8208	AC to DC adapter, input 90 VAC to 240 VAC, 12 V output, 1.5 A with ferrite core clamp
5183-8293	Soft carry case
5185-0974	Strap set
5185-7724	USB cable
5185-7759	IC 1 GB CompactFlash card

## Inspection and Maintenance

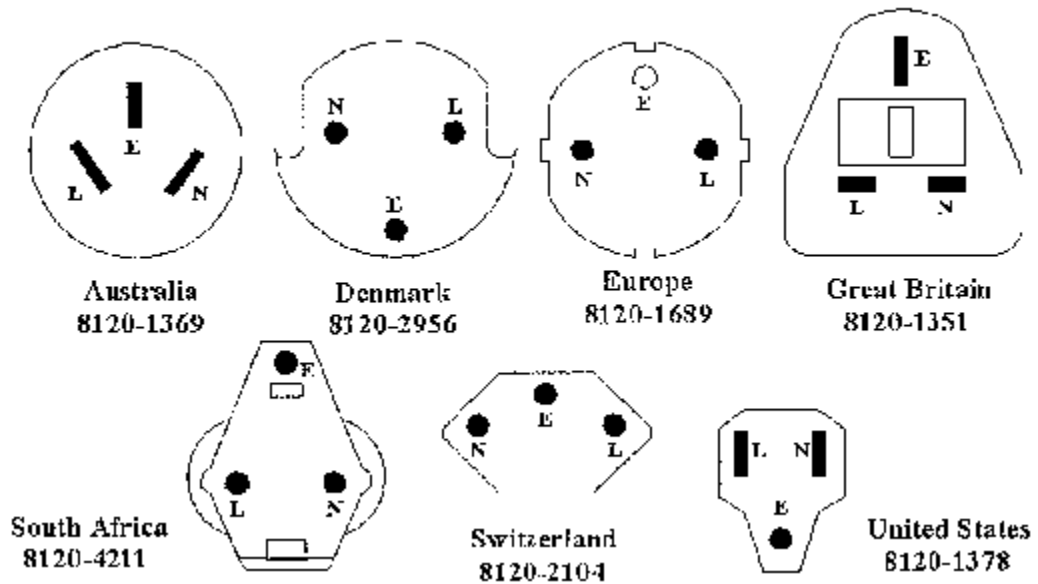
### Initial Inspection

#### AC power supply requirements

The provided AC adapter accepts an input voltage between 90 V and 240 V with a line frequency between 50 Hz to 60 Hz  $\pm$  5%. The AC adapter provides an output of 12 VDC, 1.5 A with a ferrite core clamp.

#### Line power cable

The type of power cable shipped with each FrameScope Pro depends on the country of destination.



#### **WARNING**

To avoid the possibility of injury or death, you must observe the following precautions before switching on the FrameScope Pro.

- If the FrameScope Pro is to be powered via a step-down transformer, ensure that the common terminal connects to the earth pole of the power source.
- Only insert the power cable plug into a socket outlet with a protective earth contact. Do not use an extension cord without a protective conductor.

**Battery requirements**

Do not disassemble or attempt to open the battery under any circumstances.

Do not expose the battery to fire or high temperatures.

Do not short circuit the battery by directly connecting metal terminals. Ensure that no metal objects such as coins and paper clips touch the terminals.

Do not drop the battery or subject it to mechanical shock.

**NOTE**

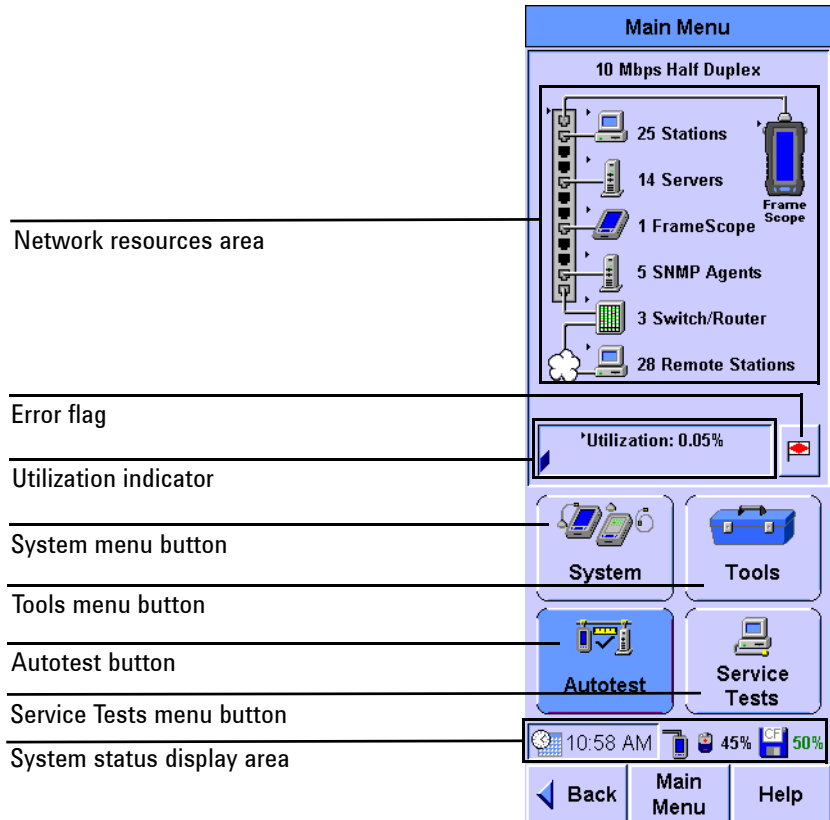
The battery is a consumable part and is not subject to the FrameScope Pro warranty.

---


**Battery disposal**

Lithium-ion (Li-Ion) and nickel-metal hydride (Ni-MH) batteries must be disposed of in a responsible fashion according to the laws in the country where the product is used.

## The Main Menu at a Glance



**Table 1-5** Main Menu description


Display	Description
Network resource area	Shows all of the detected network resources. The FrameScope Pro performs Auto Discovery on the network resources. Resource icons shown with a black triangle icon (see below) can be pressed to display more information. Refer to <a href="#">Chapter 2</a> , “Examining the Network” on page 22.
	 <p>Press icon to view details</p>
Error flag	Displays when an unacknowledged error is in the error log. Refer to <a href="#">Chapter 2</a> , “Viewing the Error Log” on page 78.
Utilization indicator	Displays the current network usage. Press this indicator to display more statistics. Refer to <a href="#">Chapter 2</a> , “Viewing Statistics” on page 41.
System menu button	Calls the System menu. Refer to <a href="#">Chapter 7</a> , “The System Menu” on page 161.
Tools menu button	Calls the Tools menu. Refer to <a href="#">Chapter 2</a> , “Network Testing with the FrameScope Pro” on page 19.

**Table 1-5** Main Menu description

<b>Display</b>	<b>Description</b>
Service Tests button	Calls the VoIP, IPTV, and DSL Test menu. Refer to <a href="#">Chapter 3</a> , “Voice Testing with the FrameScope Pro” on page 91, <a href="#">Chapter 4</a> , “Generating Voice Traffic with the FrameScope Pro” on page 117, <a href="#">Chapter 5</a> , “DSL Testing with the FrameScope Pro” on page 123, and <a href="#">Chapter 6</a> , “IP Video Testing with the FrameScope Pro” on page 139.
Autotest button	Calls the Network Autotest Setup screen. Refer to <a href="#">Chapter 8</a> , “Network Performance Autotest” on page 203.
System status display area	Displays the indicators of the system status. Refer to <a href="#">Chapter 7</a> , “The Status Display Area” on page 160.


## Getting Started

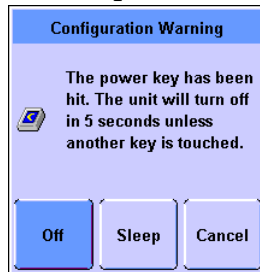
### Switching On and Off the FrameScope Pro

- 1 Press  on the front panel to switch on the FrameScope Pro.




The screen will light up with a brief tone.

- 2 Press  while the FrameScope Pro is switched on to display the Sleep or Shutdown window.



- Press **Sleep** to put the FrameScope Pro in sleep mode.

Press  or the screen when the FrameScope Pro is in sleep mode to reactivate it.

- Press **Off** or wait for 5 s to switch off the FrameScope Pro.
- Press **Cancel** to go back to the Main Menu.

- 3 You can also turn off the FrameScope Pro by pressing  twice.


## Checking Power and Charging the Battery

The FrameScope Pro battery should provide enough power for a typical day of testing. The AC power adapter or charger can be used to power the FrameScope Pro and recharge the battery.

### NOTE

To shorten the charging time, Agilent recommends switching off the FrameScope Pro while charging.

To check the battery charge level, perform the following procedure.

- 1 Switch on the FrameScope Pro, if necessary, by pressing  on the front of the FrameScope Pro.
- 2 Observe the battery icon on the Status display area on the Main Menu screen.

 45%

The battery icon will show the remaining charge in the battery (for example, 45%). If the battery level drops to 10%, a warning message will be displayed. The FrameScope Pro will function normally when the battery level is above 10%.

### WARNING

**Do not operate the FrameScope Pro immediately after charging.**

**When the battery temperature exceeds 55 °C (131 °F), a “FrameScope too hot” warning message will appear.**

- 3 To recharge the battery or power the FrameScope Pro from an AC power source, plug the DC power connector on the adapter or charger into the 12 V DC connector on the side of the battery.







- 4 Observe that the AC power icon is displayed on the Status area.



## Connecting to the Network and Using the FrameScope Pro

Follow these steps to connect the FrameScope Pro to the network and use it for testing.

- 1 Connect the cable to the FrameScope Pro network port. If you want to perform fiber link testing, connect the cable to the SFP port.
- 2 Use the front panel touch screen and control buttons to operate the FrameScope Pro. When testing with the FrameScope Pro, use the following operating tips:
  - a Select the items on the screen by pressing them with your finger, or with a stylus, or by scrolling the highlight bar using . The screen may not detect a quick press, therefore you should press firmly.
  - b Many screens have lists of items that you can navigate using . Press  up or down to scroll through the list of items.
  - c Selected items are highlighted in dark blue. Most screens have a default selected item.
  - d Execute a selected item by pressing the item itself or .
- 3 To return to the Main Menu screen at any time, press **Main Menu** on the bottom of the display.
- 4 To return to the previous screen, press **Back** on the bottom of the display.



## Running a Test

The basic steps for performing a test with the FrameScope Pro are described below. For more information on network testing, refer to [Chapter 2](#), “Network Testing with the FrameScope Pro” on page 19.

- 1 Switch on the FrameScope Pro. Connect power to charge the battery if necessary. Refer to [“Checking Power and Charging the Battery”](#) on page 13.
- 2 Connect the FrameScope Pro to the network-under-test. Refer to [“Connecting to the Network and Using the FrameScope Pro”](#) on page 14.
- 3 Press **Autotest**, **Tools**, or **Service Tests** to choose the desired test.
- 4 Make any required changes to the configuration to match your testing environment.

Most basic FrameScope Pro operations execute automatically and require minimal setup. In most cases, you can skip this step.

- 5 Press **Start Test** to begin the test.

Refer to [Chapter 2](#), “Viewing Details and Statistics” on page 29 for the information on reviewing the network test results.

## Saving a Test

To save any test suites or test results on the FrameScope Pro, it is necessary to insert the CompactFlash card into the CompactFlash card slot. The FrameScope Pro can operate without the CompactFlash card, but no storage is available.

## About Help

The FrameScope Pro comes with a built-in help system, which helps you to operate the FrameScope Pro.

- 1 Press **Help** on the Main Menu screen to access the main screen of the help system.
- 2 Press **Index** to display an overview of the help available on the FrameScope Pro.
- 3 On the Index menu screen, select the desired topic.

Before you call the technical support hotline (refer to [“Technical Support”](#) on page 17), please refer to the online help system.

## Software Upgrade

Agilent will continue to upgrade the FrameScope Pro software to meet your requirements. You may obtain the latest software release from our Web site:

<http://www.framescope.com>

Use the FrameScope Pro Software Upgrade Utility to download the software into the FrameScope Pro. For details about this utility, please refer to the *FrameScope Pro Software Upgrade Utility Guide*.

### CAUTION

Do not interrupt the downloading process. Any interruption may cause software to be corrupted, which requires the FrameScope Pro to be repaired at the Agilent Service Center. To avoid power loss due to a low battery, the FrameScope Pro should be plugged into an AC power outlet during the upgrade.

---

## Localization

The FrameScope Pro may be shipped with the local language already installed.

Localized versions of the software of the following languages are provided in the FrameScope Pro Software Upgrade Utility CD.

- English
- Korean
- French
- German
- Chinese (simplified)
- Italian
- Spanish
- Japanese

To install a language version other than English, use the FrameScope Pro Software Upgrade Utility to upgrade the FrameScope Pro to the desired language via a USB cable.

## Technical Support

If you have questions or comments about your FrameScope Pro, contact your nearest technical support center as listed in the Agilent Technologies Service Locations Worldwide Web site at <http://www.agilent.com/find/assist>

### Before You Call

Try to solve any problems using the FrameScope Pro built-in Help system. Refer to “About Help” on page 15. When contacting the technical support center, be ready to provide the following information.

- Serial numbers and software version of the FrameScope Pro and DualRemote Pro. Refer to [Chapter 7](#), “System Information” on page 162.
- Detailed description of the problem, including the exact wording of any error messages and what was done when the error occurred.
- Company name and street address.
- Contact name and telephone number.

## **1** Introducing the FrameScope Pro



## 2 Network Testing with the FrameScope Pro

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This chapter describes how to use your FrameScope Pro as a network performance analyzer.

## Network Testing Overview

The FrameScope Pro network testing features allow you to create a list of key network resources and evaluate their performance. Active Discovery and detailed metrics allow you to troubleshoot problems and pinpoint network bottlenecks.

The following steps describe the general procedure for performing network analysis testing using the FrameScope Pro.

- 1 Power on the FrameScope Pro. Refer to [Chapter 1](#), “Switching On and Off the FrameScope Pro” on page 12.
- 2 Connect to the network-under-test. Refer to [Chapter 1](#), “Connecting to the Network and Using the FrameScope Pro” on page 14.

The FrameScope Pro automatically starts to poll the network and locate devices. Refer to [“Examining the Network”](#) on page 22.

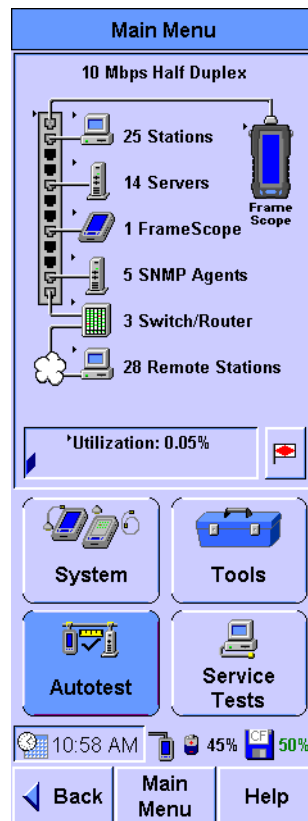
- 3 View the details on the detected network resources. Refer to [“Detailed List”](#) on page 23.
- 4 Perform an Autotest on any or all desired resources. Refer to [“Running an Autotest”](#) on page 24.
- 5 Select any device on the network to perform additional testing, such as:
  - Ping test; refer to [“Performing a Ping Test”](#) on page 30.
  - TraceRoute test; refer to [“Tracing a Route through the Network”](#) on page 32.
  - SNMP Queries; refer to [“Performing SNMP Queries”](#) on page 34.
- 6 Save the results as desired, before performing other tests or functions.

## Examining the Network

### Network Overview

The FrameScope Pro will start the Auto Discovery process on the network upon power-on.

The network resources area of the display will show a list of detected network devices on the Main Menu screen.

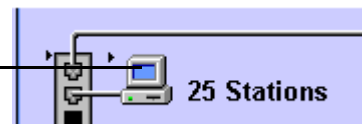





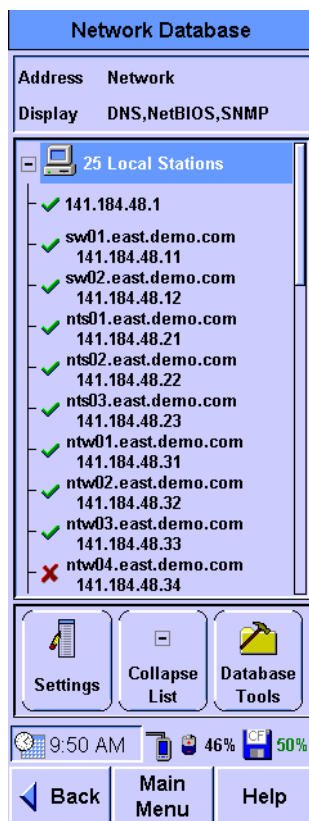
## Detailed List

- 1 Press any category in the network resources area to view a detailed list of network resources. A triangle besides the icon indicates that a list is available for that category.

Press icon to view details



- 2 Use  to select the items in the list. The **Collapse List** or **Expand List** button is renamed **View** when the highlight is on a particular station. Press **View** to display the details of the selected item. A red 'X' indicates that the device was not present the last time it was checked.

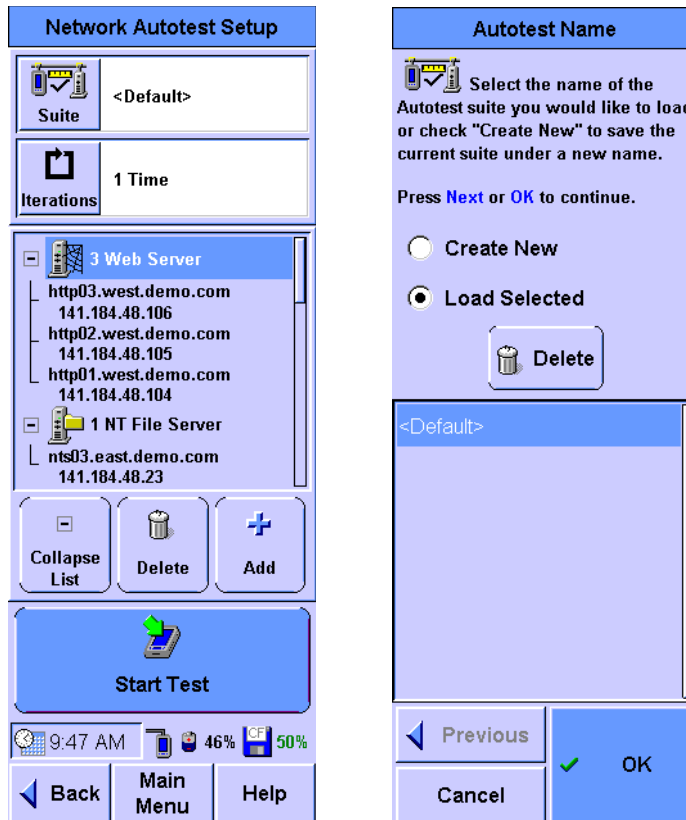


- 3 Press **Back** or **Main Menu** to return to the main screen.

## Running an Autotest

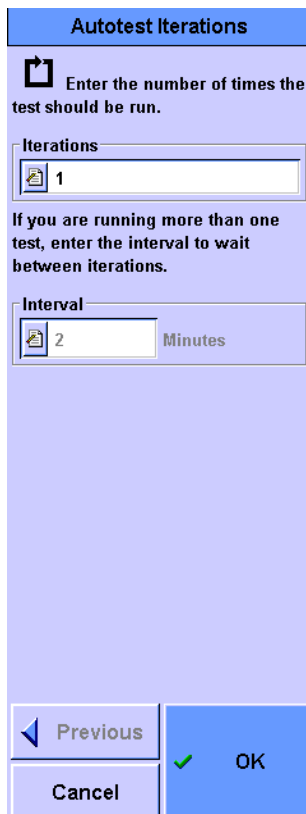
This section describes how to run an Autotest on the network using the FrameScope Pro. The FrameScope Pro can store Autotest *suites* that define which network elements to test.

- 1 Press **Autotest** on the Main Menu screen (refer to [page 22](#)) to display the Network Autotest Setup screen.



- 2 Press **Suite** to save this Autotest suite, or load a previously-stored suite.
- 3 Select a stored suite from the list or select **Create New**, then press **Next**. You can select **<Default>** to reload the default suite.
- 4 If you select **Create New**, you will be prompted to type in a new name.

- 5 Press **Iterations** on the Network Autotest Setup screen to select the number of times to run the test.



**Autotest Iterations**

Enter the number of times the test should be run.

Iterations

1

If you are running more than one test, enter the interval to wait between iterations.

Interval

2 Minutes

Previous

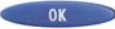
Cancel

OK

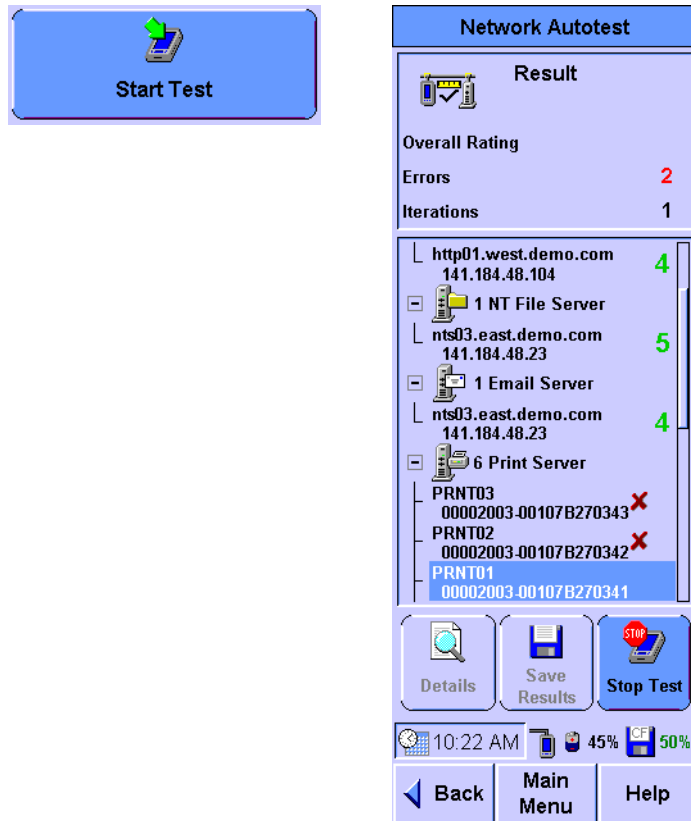
OK

- a Enter the number of times to run the test in the number entry box.
  - b Enter the time in minutes to wait between tests in the **Interval** text box.
  - c Press **OK** when done.
- 6 Use **Delete** and **Add** to remove or insert elements from the resources list on the Network Autotest Setup screen. You can also use **Add** to enter new network resources.
- 7 To change an item on the resources list, select the item and press **Edit**. You will be able to type in new details for that network resource.

For more details, refer to [Chapter 8](#), “Network Performance Autotest” on page 203.

- 8 Press **Start Test** (or ) on the Network Autotest Setup screen once the test setup has completed. The test will begin.

## 2 Network Testing with the FrameScope Pro

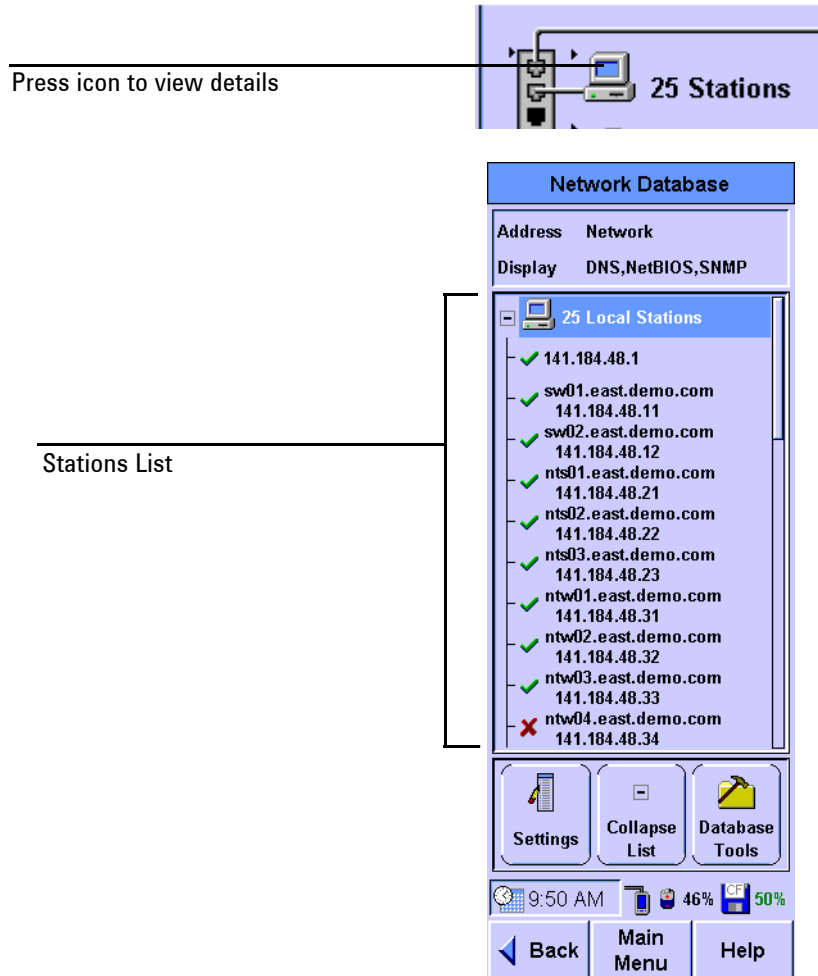



- 9 At the end of the test for each network element, a rating number will appear to the right of the icon. The rating numbers will range from one to five, where one represents the worst and five represents the best result. A red 'X' will be displayed if an error occurs during the test.
- 10 To stop the test at any time, press **Stop Test**.
- 11 To view the network element results, select the element from the list and press **Details**.
- 12 Press **Save Results** to store the test data on the CompactFlash card.

For more details on running an Autotest, refer to [Chapter 8](#), "Network Performance Autotest" on page 203.

## Using the Stations List

- 1 Press the network resource when a network resource on the Main Menu is shown with a black triangle to display the Network Database screen. The Station List includes all the available stations in the network.

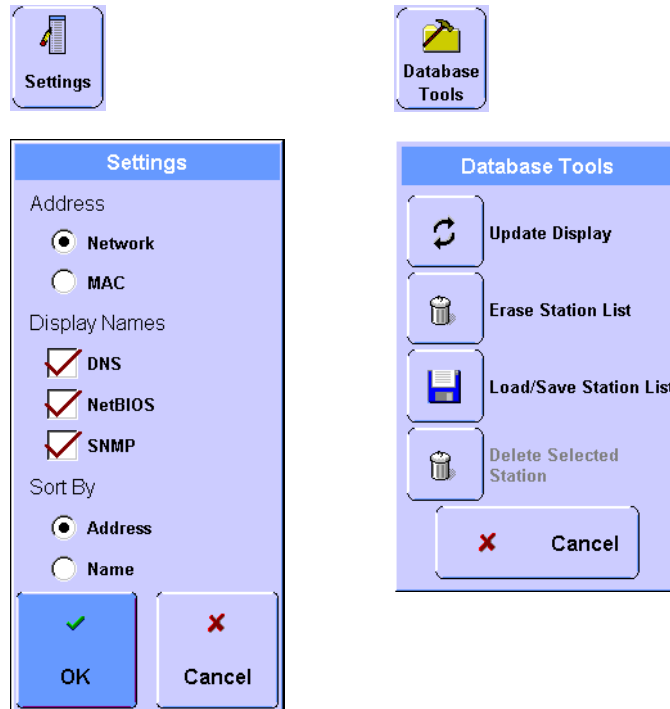


- 2 Use  to navigate through the items on the Station List.
- 3 Press **Expand List** or **Collapse List** to expand or collapse the Station List respectively.

### NOTE

The Collapse List, Expand List, and View functions are accessible by pressing the same button. The current button label will change according to the current context. Refer to “Viewing Details and Statistics” on page 29 for a description of the View function.

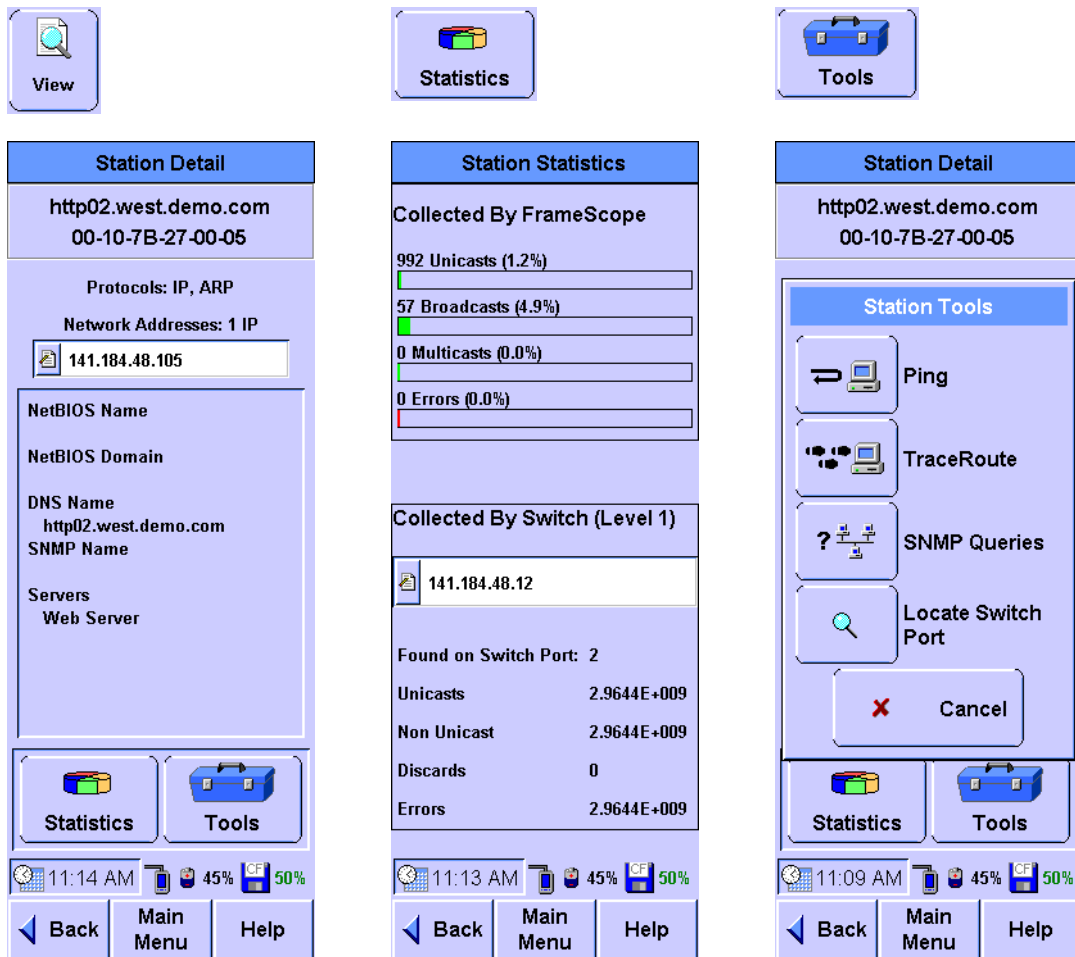
- 4 You can use **Settings** to sort the Station List by address or name and select the information to display.



- 5 You can use **Database Tools** to update, erase, load, or save the Stations List, or delete a resource from the Stations List.

## Viewing Details and Statistics

- 1 Select a station on the Station List and then press **View**.



- 2 Press **Statistics** on the Station Detail screen to view the statistics about the station.
- 3 Press **Tools** on the Station Detail screen to display a list of test tools that can be used on the selected station. These tools are described further in the following sections.

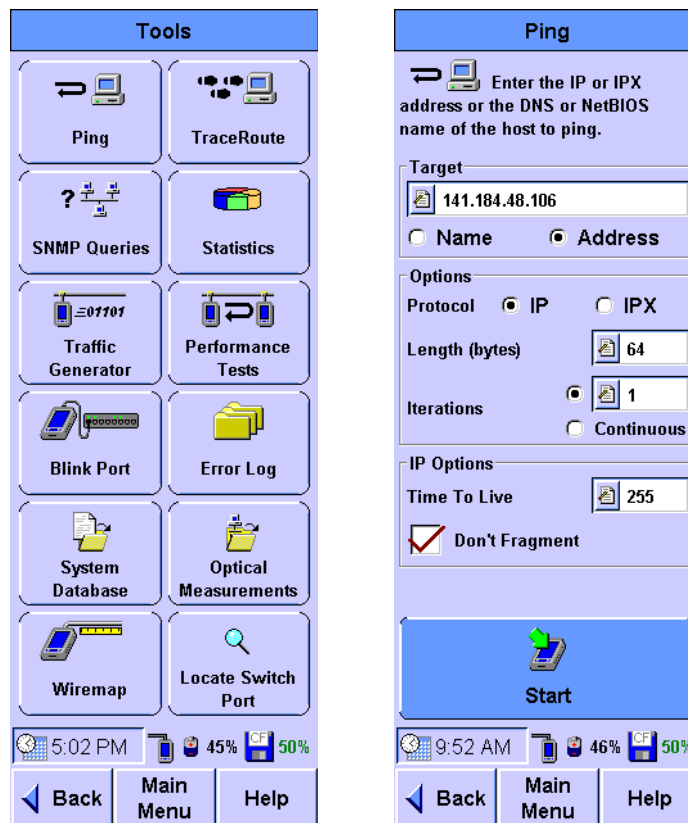
**NOTE** The tools that are displayed on the Station Tools list will vary depending on the station you are viewing. Not all tools are available for every type of station.

## Performing a Ping Test

The Ping test allows you to check if communications can be established with a particular remote node. The FrameScope Pro “pings” a remote node by sending a request message. If the remote device is active and reachable, it will respond.

Follow these steps to run a Ping test.

- 1 Press **Tools** on the Main Menu screen to display the menu of the available network testing tools.



- 2 Press **Ping** to display the Ping screen.
- 3 Enter the device to ping in the Target box. You can choose to type in the device name or address.
- 4 For the Ping options, you either select IP or IPX, type in the length of the ping in bytes, and set a fixed number of iterations for the ping or allow it to run continuously.
- 5 Enter the Time To Live and select whether fragmentation is allowed in the IP Options panel. Or if **IPX** is selected, select either **Diagnostic Responder** or **PING Request** in the IPX Request Type panel.



- 6 Press **Start** to begin the Ping test. The Ping Results screen will be displayed.



- 7 Observe the results of the Ping test.

The screen will show the frame length you selected, the number of requests (pings) sent, and number of replies received. Data on the response times are also displayed.

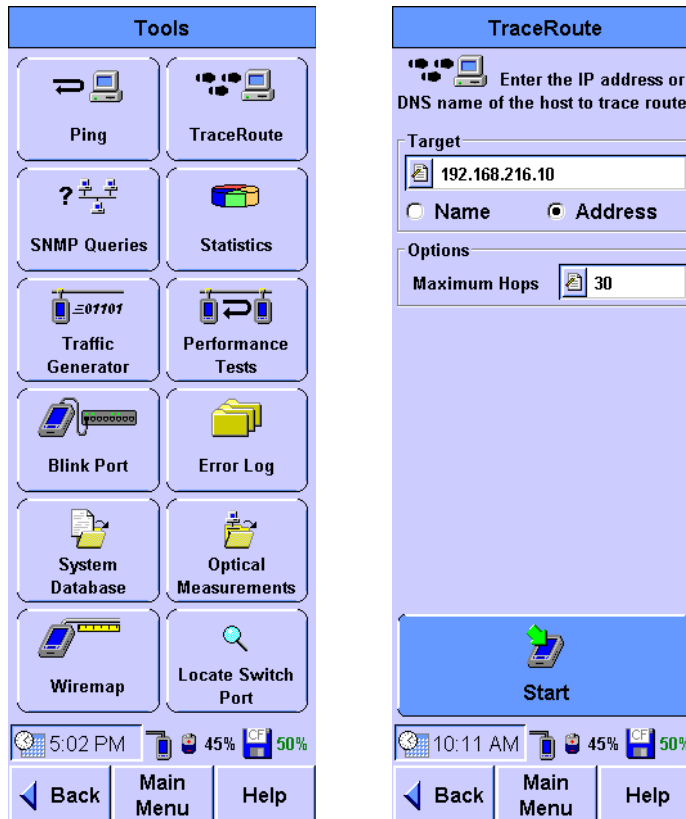
- 8 Press **Start** to run the test again.

## Tracing a Route through the Network

The TraceRoute test allows you to determine the path through the network to a particular device. The FrameScope Pro sends data packets over the network and returns the routers on the path and the time it took for each hop.






The following procedure describes how to run a TraceRoute test.

- 1 Press **Tools** on the Main Menu screen to display the menu of the available network testing tools.



- 2 Press **TraceRoute** to display the TraceRoute screen.
- 3 Enter the device to be traced in the Target box. You can choose to type in the device name or address.
- 4 Select the maximum number of hops to be reported.

- 5 Press **Start** to begin the TraceRoute test. The TraceRoute Results screen will be displayed.

TraceRoute		
 192.168.216.10		
#	Hop	Delay Sec
1	141.184.48.1	0.004500
2	141.184.48.19 nts03.east.demo.com	0.043669
3	141.184.48.20 nts03.east.demo.com	0.079393
4	141.184.48.21 nts01.east.demo.com	0.110871
5	141.184.48.22 nts02.east.demo.com	0.160229
 <b>Start</b>		
10:11 AM  45%  50%		
 Back	Main Menu	Help

- 6 Observe the results of the TraceRoute test.

The screen will show the number and address of each hop. In addition, the delay (in seconds) to each hop is shown. The delay is cumulative, but since each termination is measured individually, an anomaly may exist where an intermediate time is greater than a subsequent time due to network performance.

- 7 Press **Start** to run the test again.

## Performing SNMP Queries

The Simple Network Management Protocol (SNMP) query tool allows you to send a query to the Management Information Database (MIB) and retrieve the available information for that host.

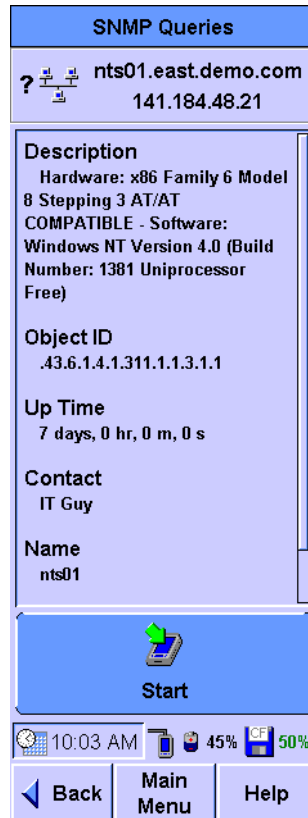
The following procedure describes how to run an SNMP Query using the FrameScope Pro.

- 1 Press **Tools** on the Main Menu screen to display the menu of the available network testing tools.



- 2 Press **SNMP Queries** to display the SNMP Query screen.
- 3 Enter the device to be queried in the Target box. You can choose to type in the device name or address.
- 4 **SNMP Settings** allows you to add the SNMP communities and ports to the default “public” community and default port 161. **SNMP Settings** also allows changes to be done for those set up for Auto Discovery.

- 5 Press **Start** to begin the SNMP Query test. The SNMP Queries Results screen will be displayed.



- 6 Observe the returned information on the SNMP Queries results screen.

The screen will show the description, ID, and other information as returned by the remote host.

- 7 Press **Start** to run the test again.

## Autotest of HTTP and FTP Servers with User Authentication

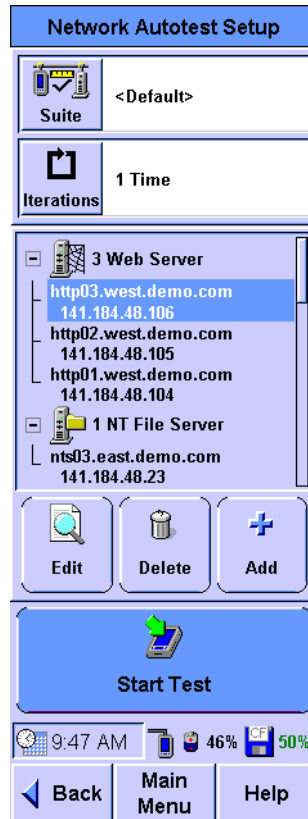
This section describes how to enable and configure user authentication for the Autotest of HTTP and FTP servers according to RFC 2617.

The FrameScope Pro can be configured to perform an Autotest on the HTTP and FTP servers that have basic authentication enabled according to RFC 2617. You type in the user name and password during setup. The FrameScope Pro HTTP and FTP Autotest is able to interpret the HTTP server response codes such as 401; and reports transfer rates after successful downloads, or error messages on failure conditions.

The HTTP Autotest supports the download of the following file types: *.TXT*, *.CSV*, *.ZIP*, *.PDF*, *.EXE*, *.HTML*, *.ASPX*, *.JSPX*, *.XML*, *.BIN*, *.WMA*, *.MP3*, *.WMV*, *.MPEG*, *.MPG*, and *.MOV*.

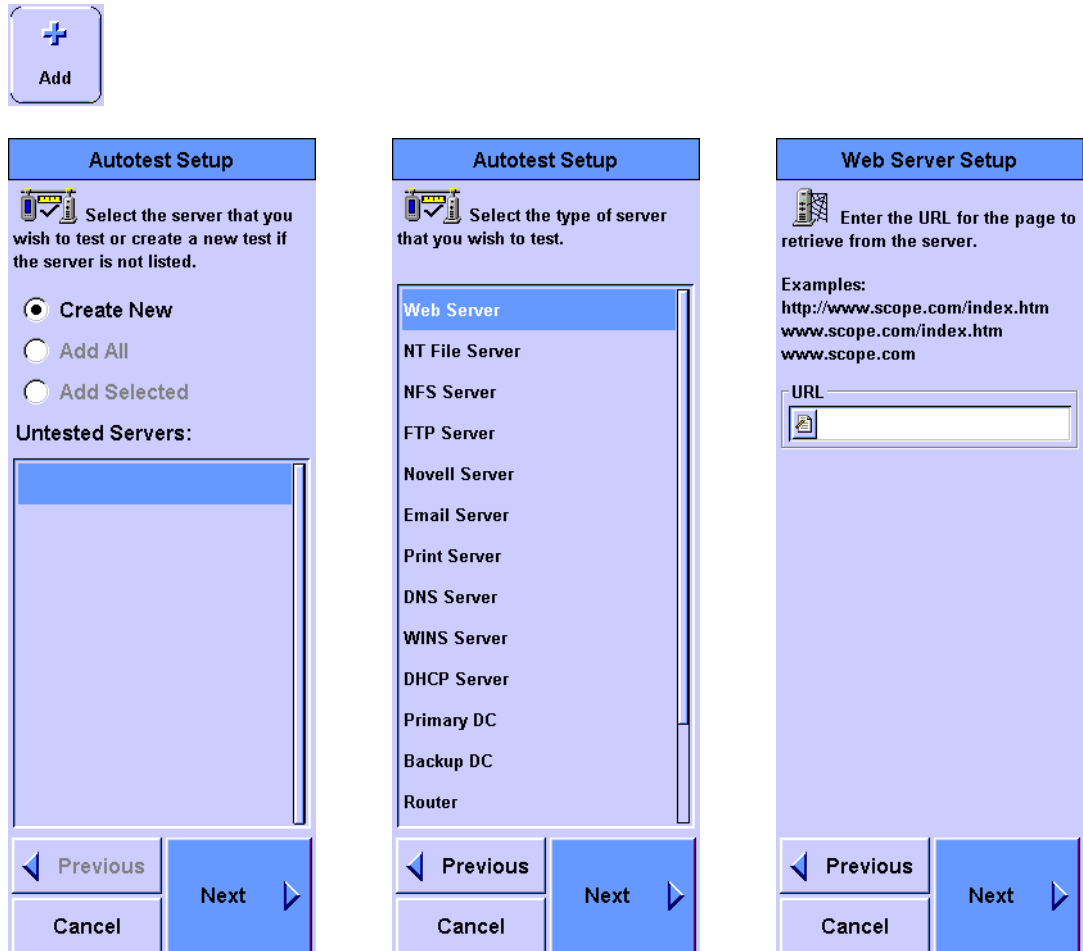
## Setting Up an HTTP server

- 1 Press **Autotest** on the Main Menu to display the Network Autotest Setup screen.
  - If the HTTP server you wish to test is in the list of the available servers, select the server, and press **Edit**.



## 2 Network Testing with the FrameScope Pro

- If the server to be tested is not in the list, you can manually add the server.
  - a Press **Add** to add a new server to the Autotest suite.



- b Select **Create New**. Press **Next**.
- c From the list of available server types, select Web Server. Press **Next**.
- d Enter the URL of the server. Press **Next**.



- 2 The Web Server Setup screen will be displayed.

**Web Server Setup**

To use a proxy server, check 'Use Proxy Server' and enter the port number and the address or name of the proxy server.

Proxy Server

Use Proxy Server

Name  Address

Port

Authentication

Enable

User Name

Password

Previous Next Cancel

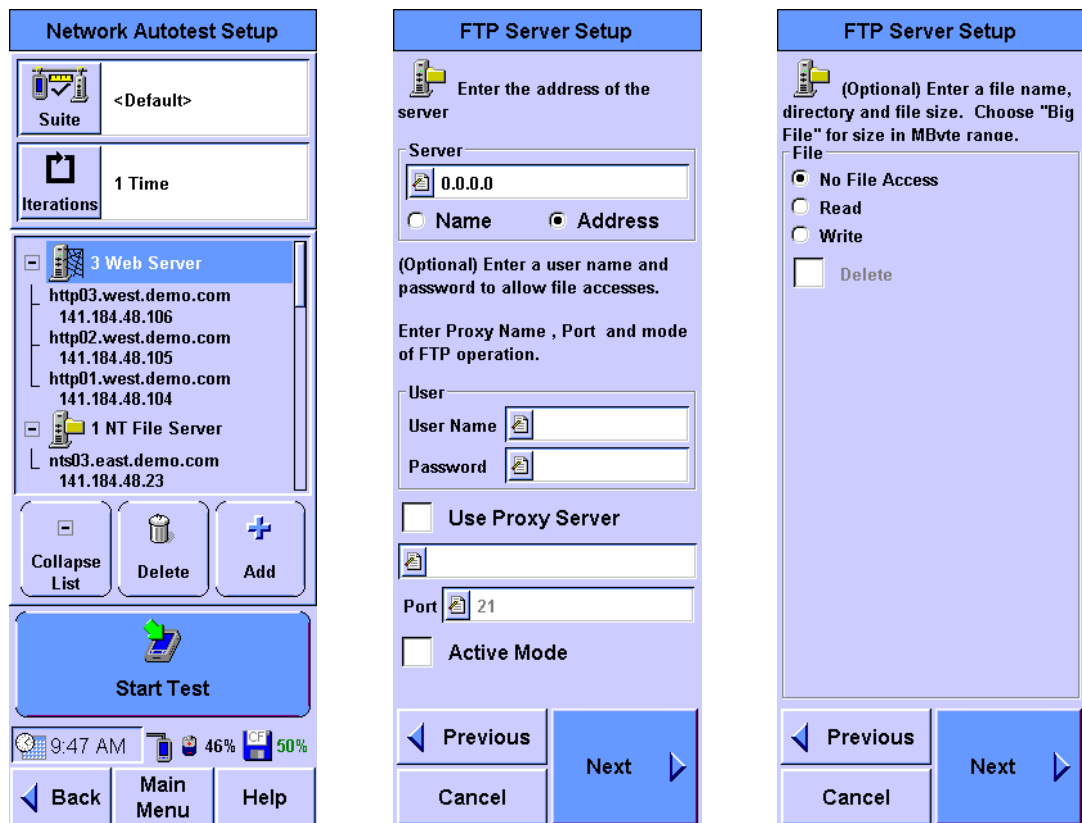
- Enable **Use Proxy Server**, if necessary, and type in the proxy server address or URL.
- If the server-under-test requires the client to send the authentication information, select **Enable** in the Authentication panel and type in the **User Name** and **Password**.

Press **Next**.

- 3 You can set custom thresholds for the service quality score of individual steps such as Name Lookup, PING Response, 1st Response, and Read Rate to proceed. This function is also applicable for the Autotest of other server types, but the measurements are different for each server type.
- 4 Press **OK**.
- 5 Press **Start Test** to begin the test.

## Setting Up an FTP server

- 1 Press **Autotest** on the Main Menu to display the Network Autotest Setup screen.
  - If the FTP server you wish to test is in the list of available servers, select it, and press **Edit**.
  - If the server to be tested is not in the list.
    - a Press **Add** to add a new server to the Autotest suite.
    - b Select **FTP Server** in the list.

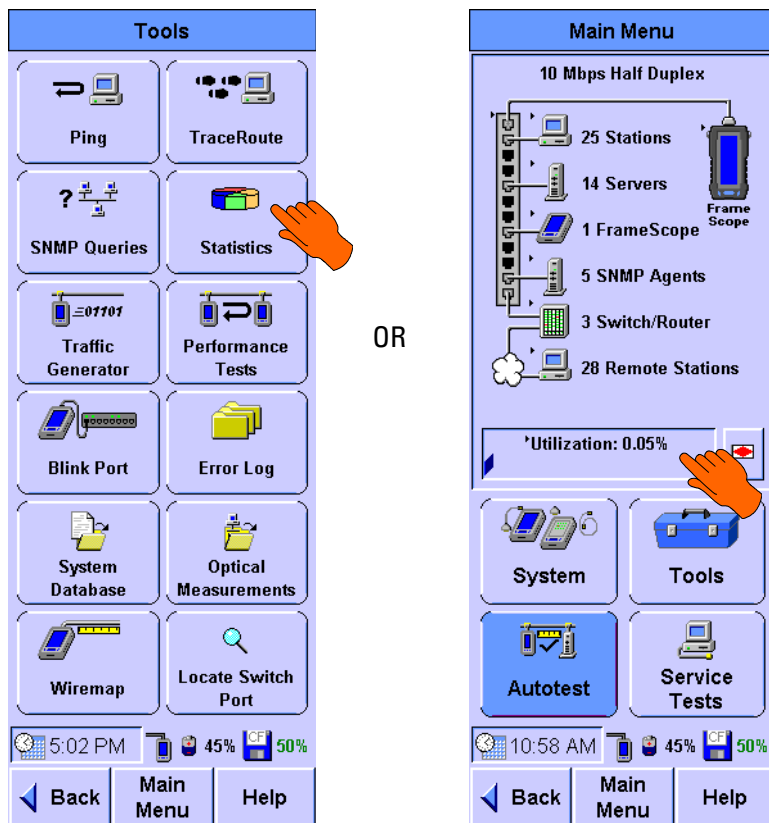


- c Enter the information for the server. Press **Next**.
  - d Enter information about the file operations. When **Read** or **Write** operation is selected, the optional **Delete** operation will be available. Separate directories and filenames can be specified for the **Read**, **Write**, and **Delete** operations. Press **Next**.
- 2 Press **OK**.
  - 3 Press **Start Test** to begin the test.

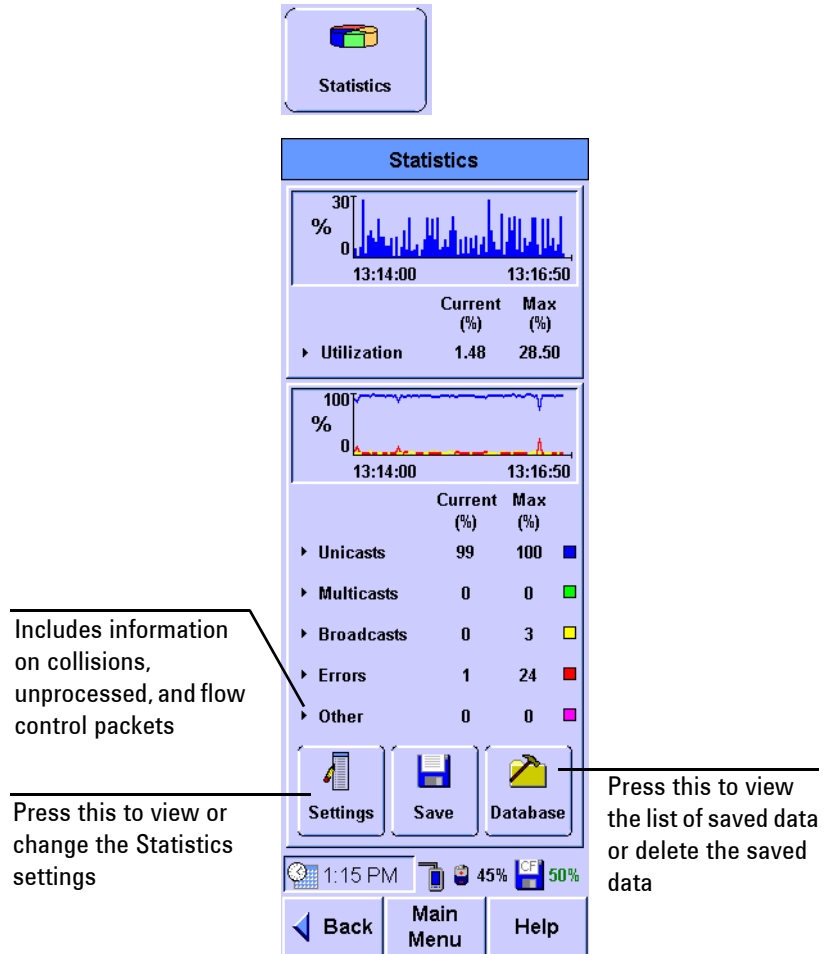
## Viewing Statistics

The FrameScope Pro can be used to view various network parameters and display the performance statistics of these network parameters. The following procedure describe how to use the FrameScope Pro Statistics tool.

- 1 Press **Tools** on the Main Menu screen to display the Tools menu or use the shortcut on the Main Menu screen by pressing **Utilization Indicator**.



2 Press **Statistics** to display the Statistics screen.

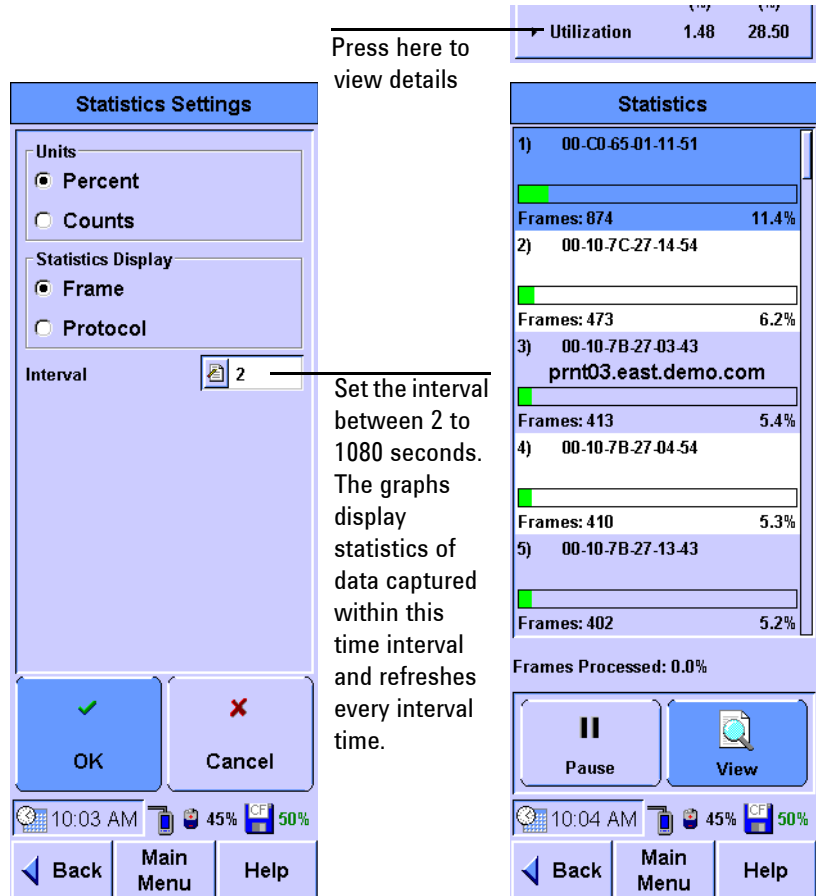


The screen shows the network utilization and other traffic data such as frame counters and protocol counters.

3 To view the additional details, press any item shown with a black triangle.

- Press **Unicasts**, **Multicasts**, or **Broadcasts** to view the top talkers for that frame type.
- Press **Errors** to view a breakdown of the types of errors detected on the network.
- Press **Others** to view a breakdown of Collisions, Unprocessed, and **Flow Control** packets.

- 4 Press **Settings** on the Statistics screen to switch between counts and percentages for the Units panel, and protocols and frames for the Statistics Display panel.



- 5 Press **Utilization** on the Statistics screen to view the top talkers (most active devices) on the network.

## Saving and Retrieving Statistics Data

The Statistics Data can be saved by pressing **Save** on the main screen of the statistics tool. You can view the list of statistics data saved by pressing **Database**.

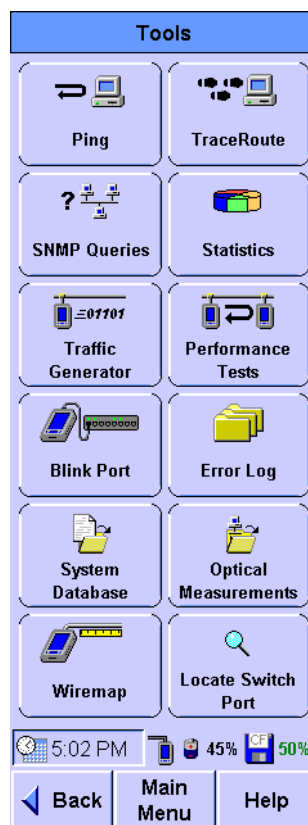
To retrieve the saved data tables, you can either access the CompactFlash card using a card reader or via the FrameScope Pro configured as a web server. Refer to [Chapter 7](#), “Remote Control” on page 189 for how to configure the FrameScope Pro as a web server.

## Generating Network Traffic

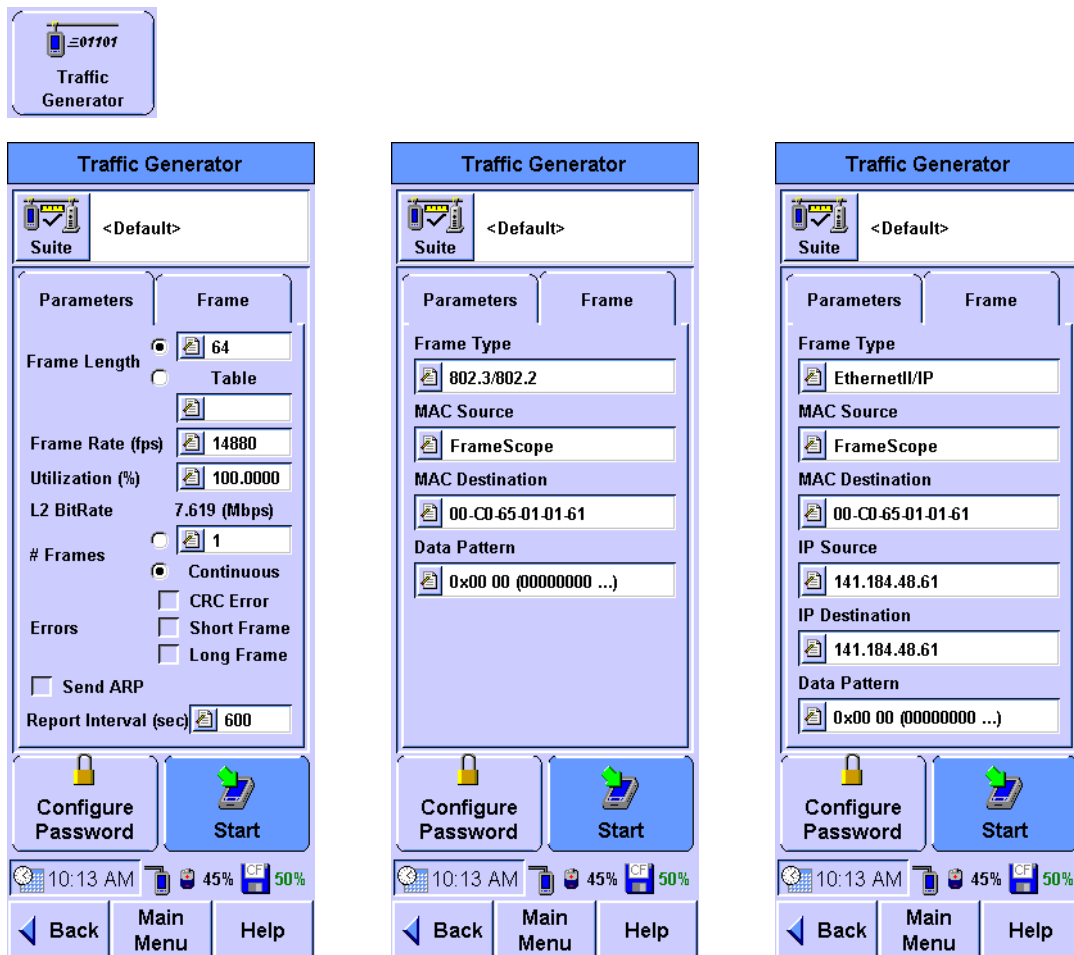
The FrameScope Pro Traffic Generator can be used to create network traffic to induce stress into the network and to observe how the network reacts under different loads.

The following procedure describe how to use the Traffic Generator.

- 1 Press **Tools** on the Main Menu screen to display the Tools menu.

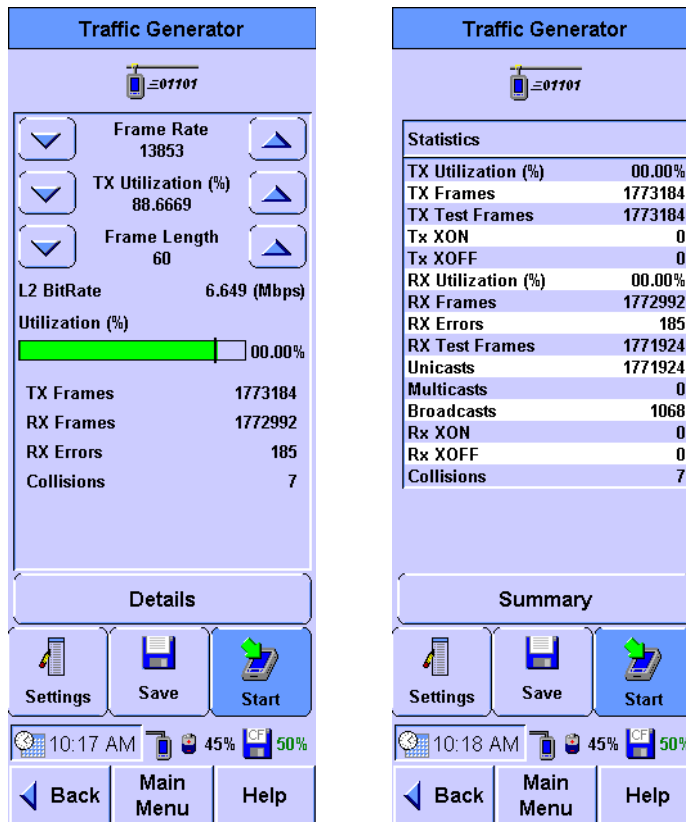


- 2 Press **Traffic Generator** to display the Traffic Generator screen. To prevent network disruption or unauthorized usage for security purposes, a password may be configured.



- 3 On the **Parameters** tab, the desired traffic characteristics can be configured by pressing each parameter box button (for example, **Frame Length** and **Frame Rate**) to type in the desired value using the on-screen keypad. Refer to [Chapter 8](#), “Traffic Generation” on page 239 for further details on these parameters.
- 4 For **Frame Length**, if Table option is selected, you can insert up to 32 different frame lengths.
- 5 Select either **CRC Error**, **Short Frame**, or **Long Frame** for the type of error desired to be injected into the generated traffic. Refer to [Chapter 8](#), “Traffic Generation” on page 239 for further details on these errors.

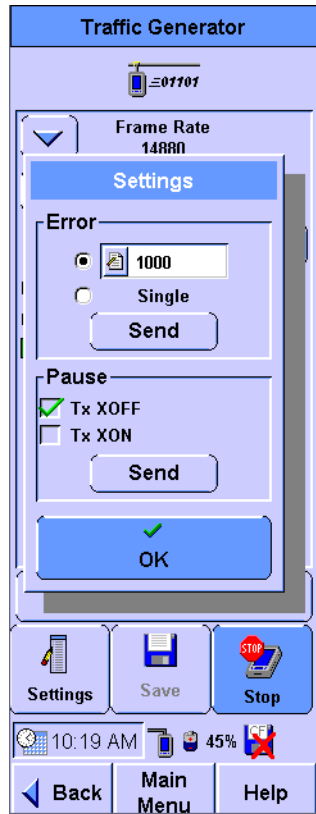
- 6 Press the **Frame** tab to configure the frame characteristics of the traffic.
- 7 Press the box buttons to type in the **Frame Type**, **MAC source**, **MAC Destination**, and **Data Pattern**. Note that if you select an IP frame type, there will be additional selections for IP Source and IP Destination. Refer to [Chapter 8](#), “Traffic Generation” on page 239 for further details on these parameters.
- 8 Press **Start** to start the traffic generation. The summary of the Traffic Generator activity screen is displayed. Press **Details** to view more detailed results of the traffic generation.



The Frame Rate, TX Utilization, and Frame Length can be adjusted using the up and down arrows on the Traffic Generator summary screen.

During traffic generation, press **Settings** to set Error Frame up to 1000 Frames each time, and select Tx or Rx pause frame.





- 9 Observe the traffic statistics. For further information on the results, refer to [Chapter 8](#), “Traffic Generation” on page 239.
- 10 Press **Back** to return to the screen with the **Parameters** and **Frame** tabs if you want to change the traffic parameters. Press **Start** to restart the test

## Performance Tests

Performance tests are used to verify the network performance between two network points. The available types of performance tests to test the network are as listed.

- RFC 2544 Throughput Test – refer to [“RFC 2544 Throughput Test”](#) on page 50.
- RFC 2544 Round-trip Latency Test – refer to [“RFC 2544 Round-Trip Latency Test”](#) on page 50.
- RFC 2544 Frame Loss Rate Test – refer to [“RFC 2544 Frame Loss Rate Test”](#) on page 51.
- RFC 2544 Back-To-Back Test – refer to [“RFC 2544 Back-to-Back Test”](#) on page 51.
- MAC or IP Loopback Test – refer to [“Performing a MAC or IP Loopback Tests”](#) on page 68.
- TCP/UDP Throughput Test – refer to [“Performing UDP or TCP Throughput Tests”](#) on page 71.
- Packet Error Rate Test (PERT) – refer to [“Performing Packet Error Rate Tests”](#) on page 73.

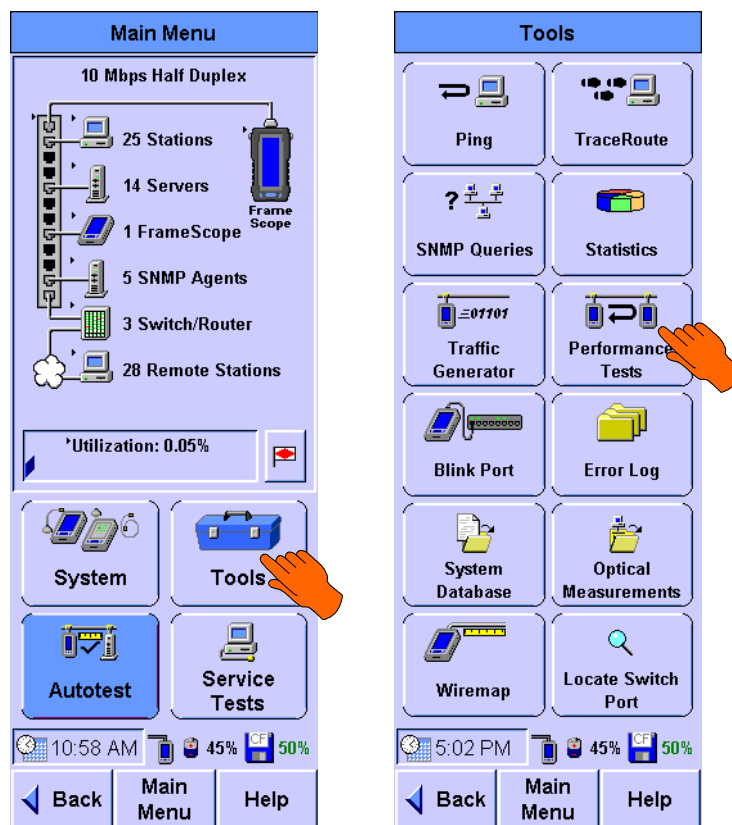
**NOTE**

All performance tests require two FrameScope Pro units or one FrameScope Pro and a loopback device (loopback test mode is only available for RFC 2544 tests and PERT), one at each end of the network circuit to be tested.

## General Settings for the Master FrameScope Pro

Before the start of any performance test, follow the procedure below.

- 1 Connect two FrameScope Pro units or a FrameScope Pro with a loopback device at each end of the desired network. Refer to [Chapter 1](#), “Connecting to the Network and Using the FrameScope Pro” on page 14.
- 2 Press **Tools** on the Main Menu screen of the master FrameScope Pro.



- 3 Press **Performance Tests** on the Tools menu. You can select the desired test from the Performance Test menu.

## Performing RFC 2544 Tests

RFC 2544 tests consist of the round-trip latency test, the point-to-point throughput test, the frame loss rate test, and the back-to-back test.

### NOTE

If the slave FrameScope Pro is in use, an autosearch from the master FrameScope Pro will result in `Search Failed`. A manual search by keying in the IP address of the slave FrameScope Pro on the master FrameScope Pro will result in `Remote Busy`.

### RFC 2544 Throughput Test

This test determine the maximum throughput rate for different frame lengths between two network points with no frame loss in frames/s, bits/s, or percentages.

The test sends frames at a constant rate in either unidirectional or bidirectional, for a fixed number of seconds. A search is conducted to determine the maximum frame rate that can be forwarded by the network with no loss. The search is capped by the maximum data rate, either user-defined or based on the media maximum rate. If the frame is dropped during the bidirectional symmetrical test or the loopback mode, regardless of the direction, the test will rerun at a lower rate and the result will be a single throughput value. On the other hand, the bidirectional asymmetrical test will measure the throughput rate for each direction. If the number of transmitted frames does not match the number of received frames by the other side, the transmit level will be reduced. The test procedure repeat for different range of legal frame lengths to produce a table of maximum throughput versus frame length.

For better results, adjust the duration to load the device under test sufficiently.

### RFC 2544 Round-Trip Latency Test

This test measures the latency experienced by a frame passing and looping back through the network. A tagged frame is sent and the time that the tagged frame exits and loops back to the FrameScope Pro is recorded. Round-trip latency is the difference between the entrance and exit times of the tagged frame. The latency reports an average of at least 20 trials. The test is conducted over a range of frame sizes.

For better results, adjust the duration to load the device under test sufficiently.

## **RFC 2544 Frame Loss Rate Test**

This test measures the percentage of frames that the network devices did not forward due to lack of resources for entire range of frame length and data rates.

For a specific frame length, traffic is sent at the maximum rate (100% load). The number of frames received is compared against the number of frames transmitted and is shown as a percentage of frames forwarded by the network. The data rate is reduced by a step size of 10% (the step size is configurable), until two successive measurements without a single frame loss or until 10% traffic level (the lowest step size) is reached.

The test is conducted over a range of frame lengths. The test can be performed in either loopback, unidirectional, or bidirectional mode. Loopback mode is similar to bidirectional test, with the only difference being the destination is a loopback device instead of another FrameScope Pro.

For better results, adjust the duration to load the device-under-test sufficiently.

## **RFC 2544 Back-to-Back Test**

This test measures the maximum number of back-to-back frames that the network can transfer without loss.

For a specific frame length, a burst of back-to-back frames is sent to a destination device through the network. Similar to the throughput test, a binary search of burst sizes is done to find the maximum burst size that can be forwarded by the network with no frame loss. The trial length must be at least 2 s and the results of at least 50 trials should be averaged for the displayed value. The test is conducted over a range of frame lengths.

The test can perform in either loopback, unidirectional, or bidirectional mode. Loopback mode is similar to bidirectional mode, with the only difference being the destination is a loopback device instead of another FrameScope Pro.

For better results, adjust the duration to load the device-under-test sufficiently.

## Setting the Network for RFC 2544 Tests

The network settings have to be adjusted to ensure that the test can run.

- NAT has to be disabled or the IP and MAC addresses of the FrameScope Pro should be allowed to pass through.
- Firewalls have to be disabled or should allow the IP and MAC addresses of the FrameScope Pro to pass through.
- ICMP ports need to be freed up for the network-under-test (for information request and reply).
- UDP ports 7 (slave UDP port) and 7777 (master UDP port) needs to be vacated for the network-under-test.

**Slave Setup**

Select **FrameScope** or **Loopback** for the remote device and respective target type. Enter password if slave FrameScope is password protected.

**Target**

**FrameScope**

Auto Search

Manual

**Loopback**

141.184.48.51

Name  Address

Password

Timeout (sec.) 60

Previous Next

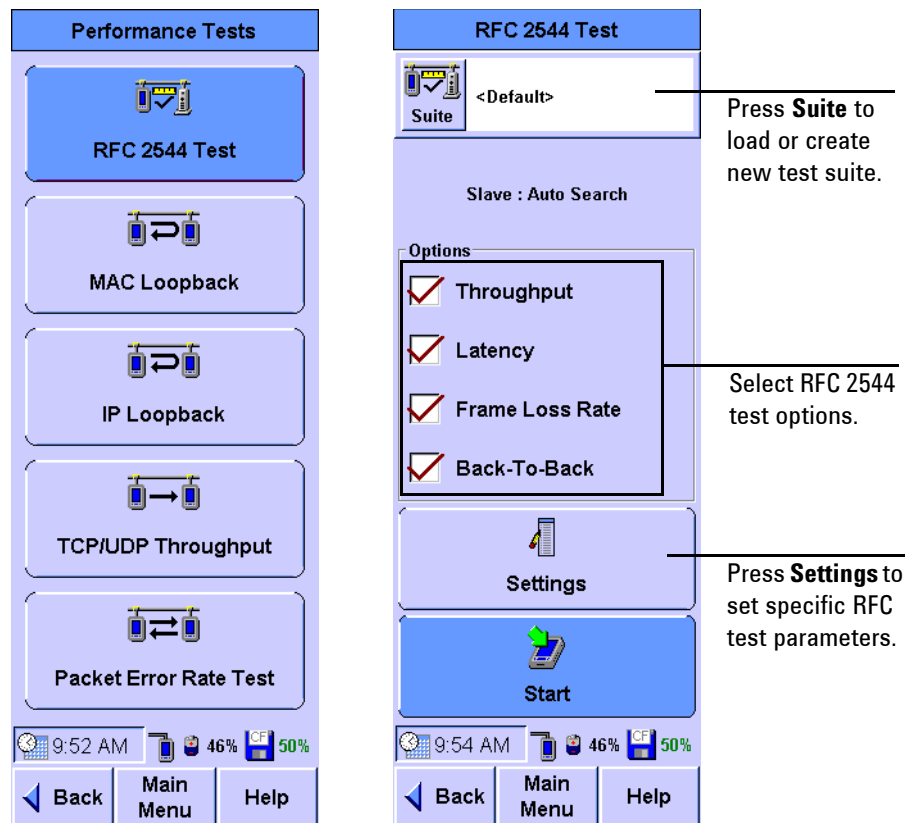
Cancel

- During an RFC2544 test, the FrameScope Pro has a default timeout duration after a MAC reset. If the peer does not respond within the stipulated time, the RFC 2544 test will not start and will result in a timeout. Different switches may have different response times after a MAC reset. You should select a suitable and appropriate timeout period for the switches-under-test with reference to the equipment requirements as supplied by the supplier or vendor.

## Setting Up the Master FrameScope Pro for RFC 2544 Tests

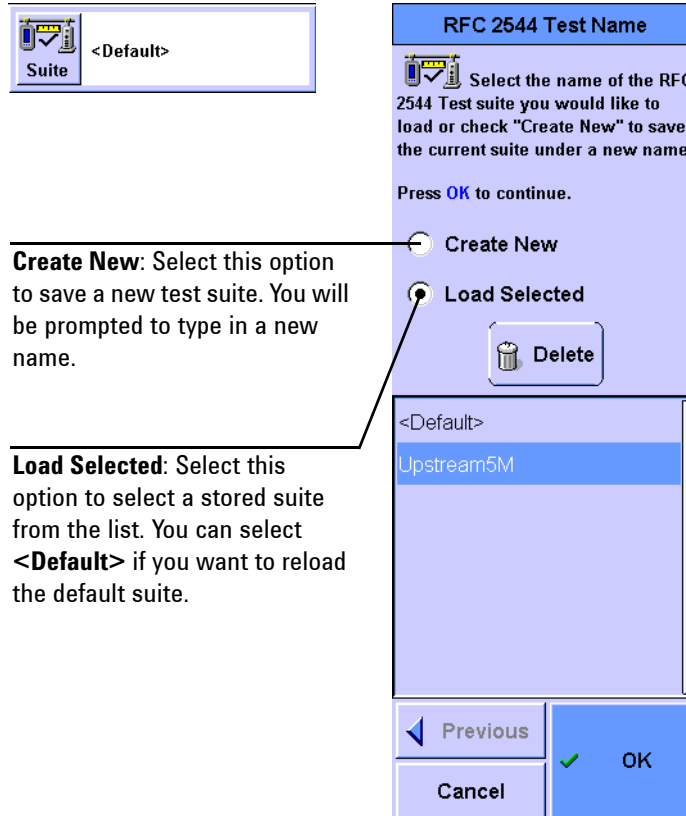
To perform an RFC 2544 test, you will need two FrameScope Pro units, one as master and the other as slave, or a FrameScope Pro and a loopback device. For initial settings on the master FrameScope Pro, refer to “[General Settings for the Master FrameScope Pro](#)” on page 49 before proceeding with the procedure below.

- 1 If the slave destination is a FrameScope Pro, ensure that the slave FrameScope Pro is ready for the RFC 2544 test. For the slave FrameScope Pro settings, refer to “[Setting Up the Slave FrameScope Pro for RFC 2544 Tests](#)” on page 62.
- 2 Select **RFC 2544 Test** on the Performance Tests menu.



- 3 Select **Throughput**, **Latency**, **Frame Loss Rate**, and **Back-To-Back** RFC 2544 test options.

- 4 Optional: Press **Suite** if you want to save the current RFC 2544 test suite or retrieve a previously stored suite.



- 5 The initial setting screen is common for all the RFC 2544 testing, which allows you to type in the destination device, the password, and the timeout as shown in the screens below. In the Target panel, the remote test device can be either another FrameScope Pro or any loopback device.

For the destination device, you have two choices on how to search for the device.



If **Loopback** is selected, you have three options:

**Option 1:** Select **IP Layer** loopback device. You will need to specify the IP address or name of the device.

**Option 2:** Select **MAC Layer** loopback device. You will need to specify the MAC address of the device.

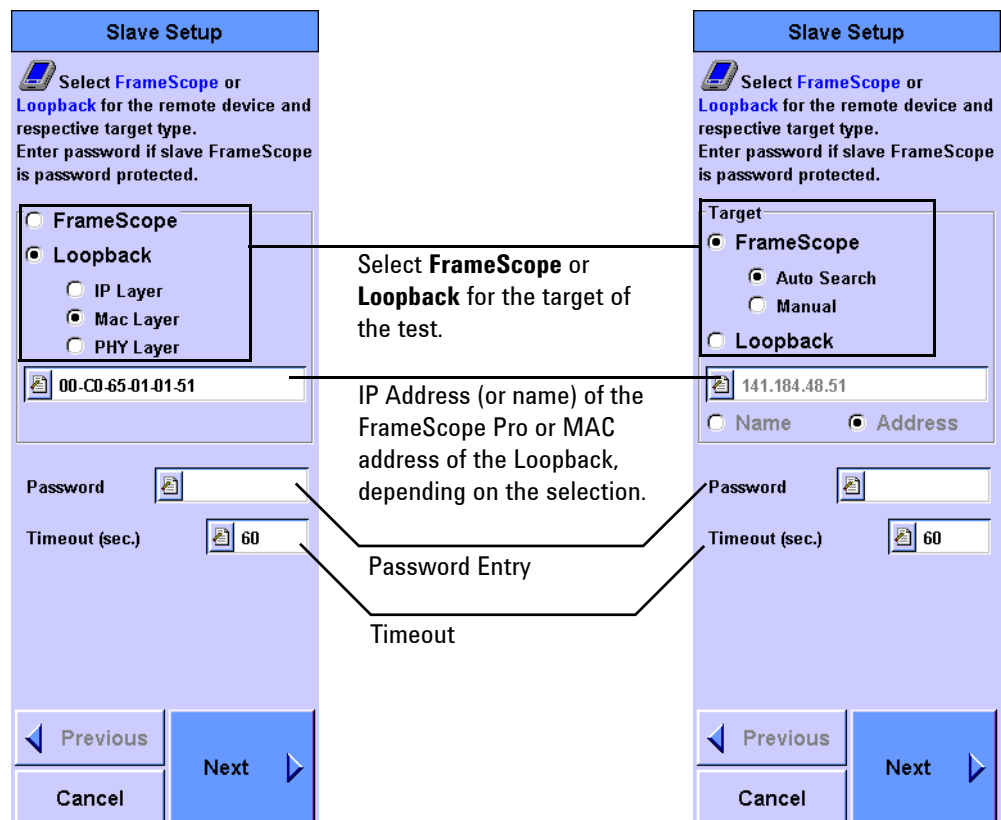
**Option 3:** Select **PHY Layer** loopback device.

If **FrameScope** is selected, there are two options:

**Option 1:** Select **Auto Search** to search for the FrameScope Pro if the IP address or the name of the slave FrameScope Pro is unknown.

**Option 2:** Select **Manual** if the IP address or the name of the slave FrameScope Pro is known and type in the corresponding IP address or name.

Press **Next**.



- 6 The Common Setup screen is common for all the RFC 2544 testing. This screen allows you to type in the master port and slave port numbers and select frame lengths for testing.

**Common Setup**

Use default port settings when slave is FrameScope 350.  
Select frame lengths for custom range.

Master Port

Slave Port

**Custom Range Frame Lengths**

- 64
- 128
- 256
- 512
- 768
- 1024
- 1280
- 1518
- Custom Frame Length

Frame Length

Previous Next Cancel

Specify the UDP port used by the RFC 2544 test on the master unit

Specify the UDP port used by the RFC 2544 test on the master unit

Custom Range: To use the custom range, select the frame lengths to be tested and select **Custom Range** in the subsequent setup screens

- 7 For specific settings for the Throughput, Latency, Frame Loss Rate, and Back-to-Back tests, press **Next**. For details on the parameters for each test, refer to the corresponding sections.
- For the throughput setup refer to “[The Throughput Settings screen](#)” on page 57.
  - For the latency setup refer to “[The Latency Settings screen](#)” on page 58.
  - For the frame loss rate setup refer to “[Frame loss rate settings screen](#)” on page 59.
  - For the back-to-back setup refer to “[Back-To-Back settings screen](#)” on page 60.

**The Throughput Settings screen**

**Throughput Setup**

Select direction and options.

**Direction**

- Upstream
- Downstream
- Sequential

**Frame Rate (fps)**

- Full Range
- Single

Upstream: 1024  
Downstream: 1024

**Options (Link Speed : 10 Mbps)**

Max Data Rate: 10.000

Length:  64,  Full Range,  Custom Range

Duration: 5

Error Tolerance(%): 0.01

Buttons: Previous, Next, Cancel

**Callout 1:** Select the frame direction to measure (If destination is a loopback device, bidirectional option is available)

**Callout 2:** Max Data Rate is used for initial frame speed and performance calculation. Enter the maximum data rate of the network-under-test. If the maximum data rate is unknown, the link speed will be used.

**Callout 3:** Specify the frame length (a minimum of 64 bytes to a maximum of 1518 bytes) or select **Full Range** to collect all frame lengths (64, 128, 256, 512, 768, 1024, 1280, and 1518 bytes)

**Callout 4:** For full duplex networks, you can select bidirectional testing and whether the connection is symmetrical or asymmetrical. For half-duplex networks, upstream and downstream can be tested sequentially.

**Callout 5:** Select to measure full range or specify the upstream and downstream rates

**Callout 6:** Network connection speed

**Callout 7:** Duration is the time taken (in seconds) to transmit frames that could be of different length, at different rates.

**Callout 8:** For better results, adjust the duration to load the device-under-test sufficiently.

### The Latency Settings screen

**Latency Setup**

Select frame length and enter test iterations.

**NOTE** - In HalfDuplex network either the Upstream util(%) or the Downstream Util(%) can be configured. RFC 2544 suggests to use 100% Utilization of Throughput result.

**Latency**

Length  64  Full Range  Custom Range

Iterations

Duration

Upstream Util (%)

Downstream Util (%)

Previous Next Cancel

The Latency test automatically uses values set for the Throughput test.

If a frame length is set for the throughput test, this cannot be changed for the latency test.

Adjust the duration to load the device-under-test sufficiently for better results

Specify the frame length or select **Full Range** to collect all frame lengths

Specify the number of round-trips for the test

Specify the upstream and downstream utilization rates when performing the Latency test.

For half duplex networks, you can only specify the utilization for one direction.

Frame loss rate settings screen

**Frame Loss Rate Setup**

Select direction and enter frame rate, frame length, max data rate, test duration and step size.

**Direction**

- Upstream
- Downstream
- Bi-Directional

**Frame Rate (fps)**

- Full Range
- Single

Step Size (%)

Frame Rate

**Options**  
(Link Speed : 10 Mbps)

Max Data Rate

**Length**

- 
- Full Range
- Custom Range

Duration

Previous Next Cancel

Select the frame direction to measure (bidirectional is only present for loopback)

Select **Full Range** to measure the frame loss rate specified by the step size, or type in a specific rate

Specify the frame length or select **Full Range** to collect all frames

For full duplex networks, you can specify bidirectional testing.

For half duplex networks, upstream and downstream can be tested sequentially.

Max Data Rate is used for initial frame speed and performance calculation. Enter the maximum data rate of the network-under-test. If the maximum data rate is unknown, the link speed will be used.

Duration is the time taken (in seconds) to transmit frames. For better results, adjust the duration to load the device-under-test sufficiently.

**Back-To-Back settings screen**

The screenshot shows the 'Back-To-Back Setup' dialog box. It has a title bar 'Back-To-Back Setup' and a subtitle 'Select direction and enter frame length, burst duration and iteration.' Below this are three sections: 'Direction' with radio buttons for 'Upstream', 'Downstream', and 'Bi-Directional' (selected); 'Options (Link Speed : 10 Mbps)' with 'Length' (radio buttons for '64', 'Full Range' (selected), 'Custom Range'), 'Iterations' (input field '5'), and 'Duration' (input field '2'). At the bottom are 'Previous', 'Cancel', and 'OK' buttons. Callout lines point to the 'Bi-Directional' option, the 'Full Range' option, and the 'Duration' input field.

Select the frame direction to measure (bidirectional is only present for loopback)

For full duplex networks, you can specify bidirectional testing.

For half duplex networks, upstream and downstream can be tested sequentially.

Specify the frame length or select full range to collect all frames

Duration is the time taken (in seconds) to transmit burst frames.

For better results, adjust the duration to load the device-under-test sufficiently.

- 8 If a password is preset in the slave FrameScope Pro, press **Slave Password** on the master FrameScope Pro to type in the password. A `Permission Denied` warning will appear if the password set in the slave FrameScope Pro is not typed in correctly in the master FrameScope Pro.

9 Press **Start** to begin the test.

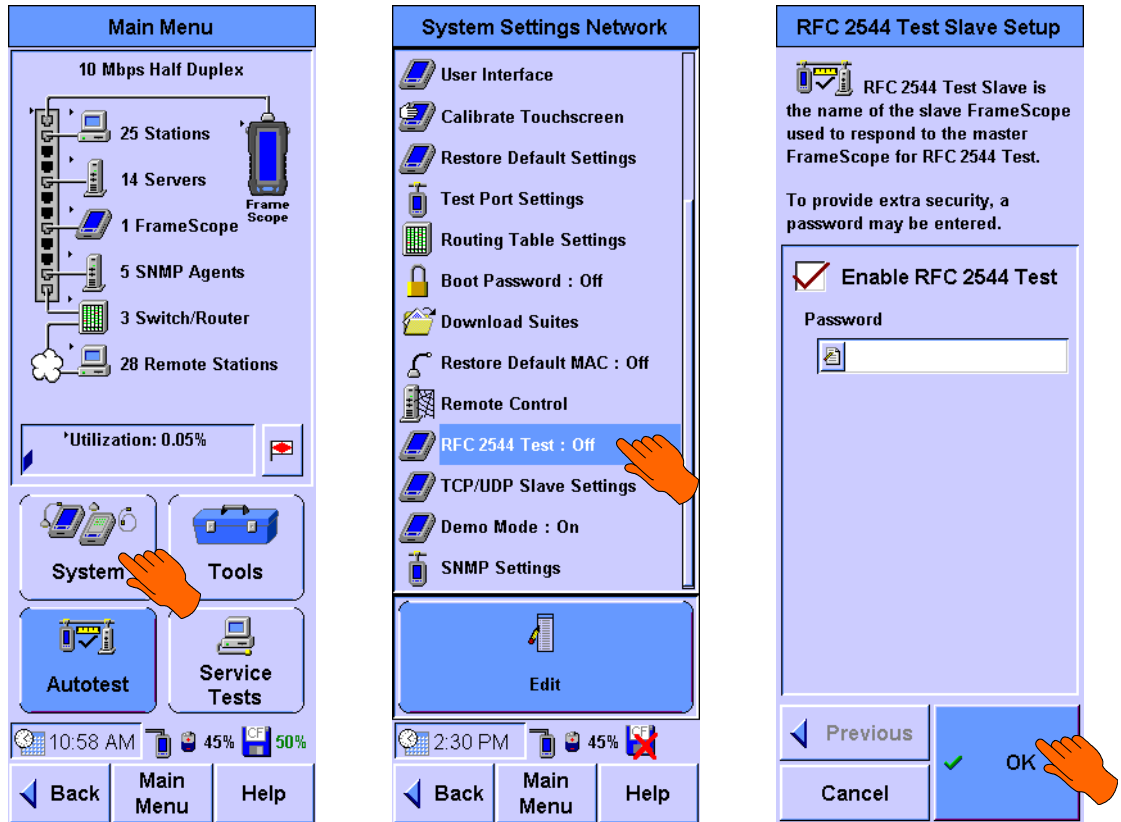
Once **Start** is pressed, the master FrameScope Pro starts the activation and the synchronization procedure with the target FrameScope Pro by doing the following actions.

- a Search (if enabled) and check the status of the slave FrameScope Pro.
- b Activate the slave FrameScope Pro if the device is in idle mode.
- c Authenticate the master FrameScope Pro if a password is enabled.
- d Set up the slave FrameScope Pro parameters by synchronizing the master and slave FrameScope Pro units for the test.
- e Start the test.
- f Query test results at the end of the test.
- g Stop the test.

If the target selected is a loopback device, all test setups are performed in the master FrameScope Pro. There will be no authentication synchronization setup.

## Setting Up the Slave FrameScope Pro for RFC 2544 Tests

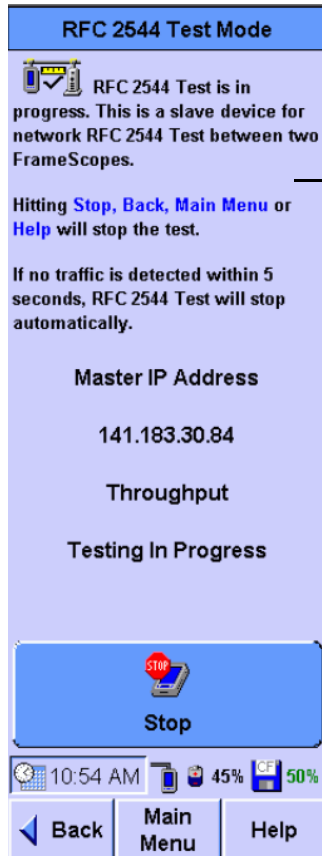
- 1 Press **System** on the Main Menu screen.



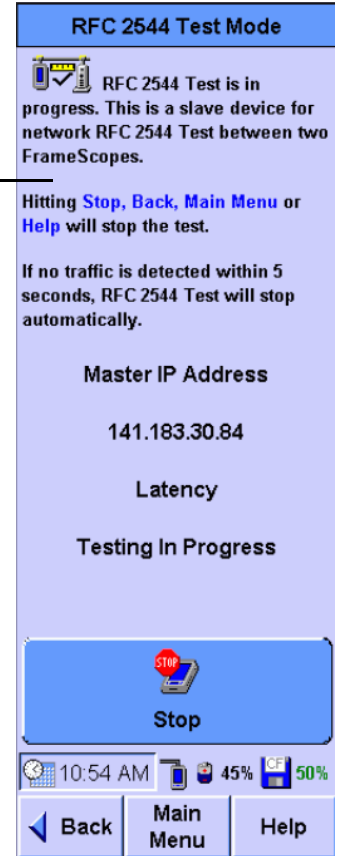
- 2 Select **RFC 2544 Test** on the System Settings Network menu and press **Edit**.
- 3 Select **Enable RFC 2544 Test**. You may set a password in the slave FrameScope Pro to enable the master FrameScope Pro login. Press **OK**.

The slave FrameScope Pro is now ready to perform the RFC 2544 tests. Do not run other tests on the slave FrameScope Pro while the RFC 2544 tests are running.





These are the screens of the slave FrameScope Pro when throughput (left) and latency (right) RFC 2544 tests are running



## RFC 2544 Test Results

For full range testing of the frame length and frame rate throughput, a graph is plotted to display the RFC 2544 test results. The graph performs a quick and efficient analysis of the performance between two points in the network. These results can then be saved to the CompactFlash card for further analysis.

Throughput	
141.184.48.51	
Test Time:	00:00:11
Frame Length:	64 Bytes
<b>Upstream</b>	
Program Rate:	1488095 fps
Actual Rate:	1488095 fps
Frames TX:	7440475
Frames RX:	7440475
Errors RX:	0
Flow Control:	17
<b>Downstream</b>	
Program Rate:	1488095 fps
Actual Rate:	1488083 fps
Frames TX:	7440475
Frames RX:	7440475
Errors RX:	10
Flow Control:	0

Latency	
141.184.48.51	
Test Time:	00:00:45
Frame Length:	512 Bytes
Iterations:	14
Current Delay:	0.000190 Sec
Average Delay:	0.000171 Sec
Minimum Delay:	0.000100 Sec
Maximum Delay:	0.000240 Sec
Tx Xon:	0
Tx Xoff:	2
Rx Xon:	0
Rx Xoff:	1

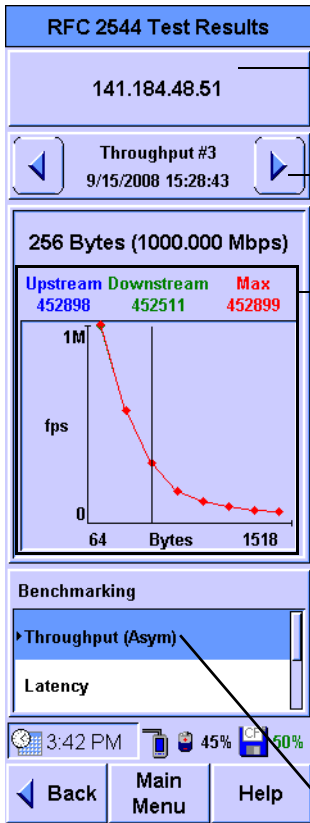
The IP address of the FrameScope Pro. If the name exists, it will be displayed. (For the MAC Loopback, the MAC address is displayed.)

**Actual Rate** is the real frame rate during the test. The rate may differ from Program Rate due to delay or collisions in the network.

**Program Rate** is the user-defined frame rate

Frame Loss Rate		Back-To-Back
141.184.48.51	<p>The IP address of the FrameScope Pro. If the name exists, it will be displayed. (For the MAC Loopback, the MAC address is displayed.)</p>	141.184.48.51
<p>Test Time: 00:00:51</p> <p>Frame Length: 128 Bytes</p> <p>Frame Rate 844594 fps</p> <p>Utilization (%) 100</p> <p><b>Upstream</b></p> <p>Frames TX: 8445940</p> <p>Frames RX: 0</p> <p>Errors RX: 0</p> <p>Frames Loss: 0</p> <p>Flow Control: 6</p> <p><b>Downstream</b></p> <p>Frames TX: 0</p> <p>Frames RX: 8445940</p> <p>Errors RX: 15</p> <p>Frames Loss: 0</p> <p>Flow Control: 0</p>		<p>Test Time: 00:00:15</p> <p>Frame Length: 64 Bytes</p> <p>Iterations: 3</p> <p>Frame Rate 1488095 fps</p> <p>Burst Size 2976190</p> <p><b>Upstream</b></p> <p>Frames TX: 2976190</p> <p>Frames RX: 2976190</p> <p>Errors RX: 0</p> <p>Flow Control: 2</p> <p><b>Downstream</b></p> <p>Frames TX: 2976190</p> <p>Frames RX: 2976190</p> <p>Errors RX: 5</p> <p>Flow Control: 0</p>
<p><b>Upstream</b> - Frames sent by the master FrameScope Pro</p>		
<p><b>Downstream</b> - Frames received by the master FrameScope Pro</p>		
<p>Plots</p> <p>Save Results</p> <p>Stop Test</p>		<p>Plots</p> <p>Save Results</p> <p>Stop Test</p>
<p>2:22 PM</p> <p>45%</p> <p>50%</p>		<p>2:25 PM</p> <p>45%</p> <p>50%</p>
<p>Back</p> <p>Main Menu</p> <p>Help</p>		<p>Back</p> <p>Main Menu</p> <p>Help</p>

## 2 Network Testing with the FrameScope Pro



**RFC 2544 Test Results**

141.184.48.51

Throughput #3  
9/15/2008 15:28:43

256 Bytes (1000.000 Mbps)

Upstream 452898 Downstream 452511 Max 452899

Benchmarking

Throughput (Asym)

Latency

3:42 PM 45% CPU 50%

Back Main Menu Help

The IP address of the FrameScope Pro (For the loopback scenarios, the MAC address will be displayed). If the name exists, it will be displayed.

The throughput or latency test set, with regard to the frame size. Press the left or right button to go to the previous or the next test set respectively.

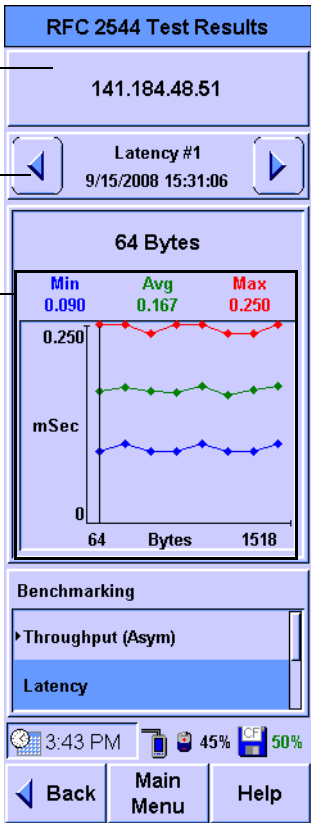
**Upstream** - throughput rates of the frames sent from the master FrameScope Pro

**Downstream** - throughput rates of the frames sent from the slave FrameScope Pro

**Max** - maximum theoretical frame rate

Below frame directions are the frame throughput rates in frames/s for each frame size

Press this to change the Y-axis in the chart display. For example, the display changes in fps, bps, or % (only available for throughput results).



**RFC 2544 Test Results**

141.184.48.51

Latency #1  
9/15/2008 15:31:06

64 Bytes

Min 0.090 Avg 0.167 Max 0.250

Benchmarking

Throughput (Asym)

Latency

3:43 PM 45% CPU 50%

Back Main Menu Help

The minimum, average, and maximum frame delay obtained from the multiple measurements depending on the number of iterations.

### NOTE

For bidirectional, single throughput rates for both direction will be plotted.

**RFC 2544 Test Results**

141.184.48.51

Frame Loss Rate #4  
40% (1000.000 Mbps)

Frame Length  
64 Bytes

Upstream  
0

Loss(%)

100.0

0

10 Load(%) 100

Benchmarking

Frame Loss Rate

Back-To-Back

3:44 PM 45% 50%

Back Main Menu Help

The IP address of the FrameScope Pro. If the name exists, it will be displayed. (The MAC address will be displayed for the loopback device.)

Frame Loss Rate or Back-To-Back tests. For the Frame Loss Rate, the load percentage will be displayed along with the maximum data rate.

Used to display the result screen for different frame length. The graph can be easily traced using the colors of the frame length display.

Press to browse between graphs for the upstream and downstream bidirectional test results (available only for the bidirectional test).

**RFC 2544 Test Results**

141.184.48.51

Back-To-Back #3  
9/15/2008 15:36:40

256 Bytes (1000.000 Mbps)

Bi-Directional  
905796

Frame Rate  
452898

Frames

2M

0

64 Bytes 1518

Benchmarking

Frame Loss Rate

Back-To-Back

3:44 PM 45% 50%

Back Main Menu Help

## Performing a MAC or IP Loopback Tests

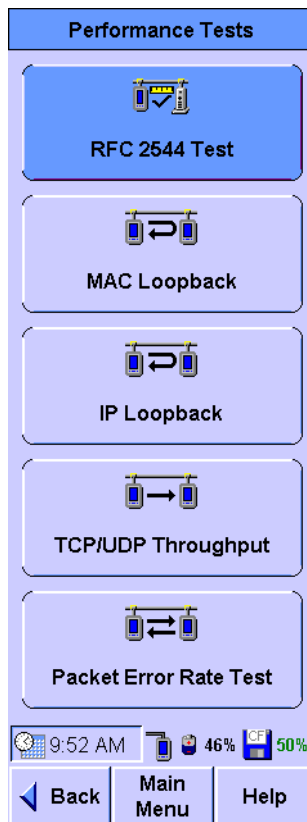
**NOTE**

The MAC loopback test only works within the subnet (not applicable across routers).

The master FrameScope Pro sends periodic MAC-level or IP-level messages to the slave FrameScope Pro with user-defined periodic intervals. The slave FrameScope Pro echoes back each of these messages. The master FrameScope Pro will record the number of transmitted, received, and error frames, as well as the current, average, minimum, and maximum frame delays.

To perform the test, follow the procedure below.

- 1 Press **MAC Loopback** or **IP Loopback** on the Performance Tests menu.



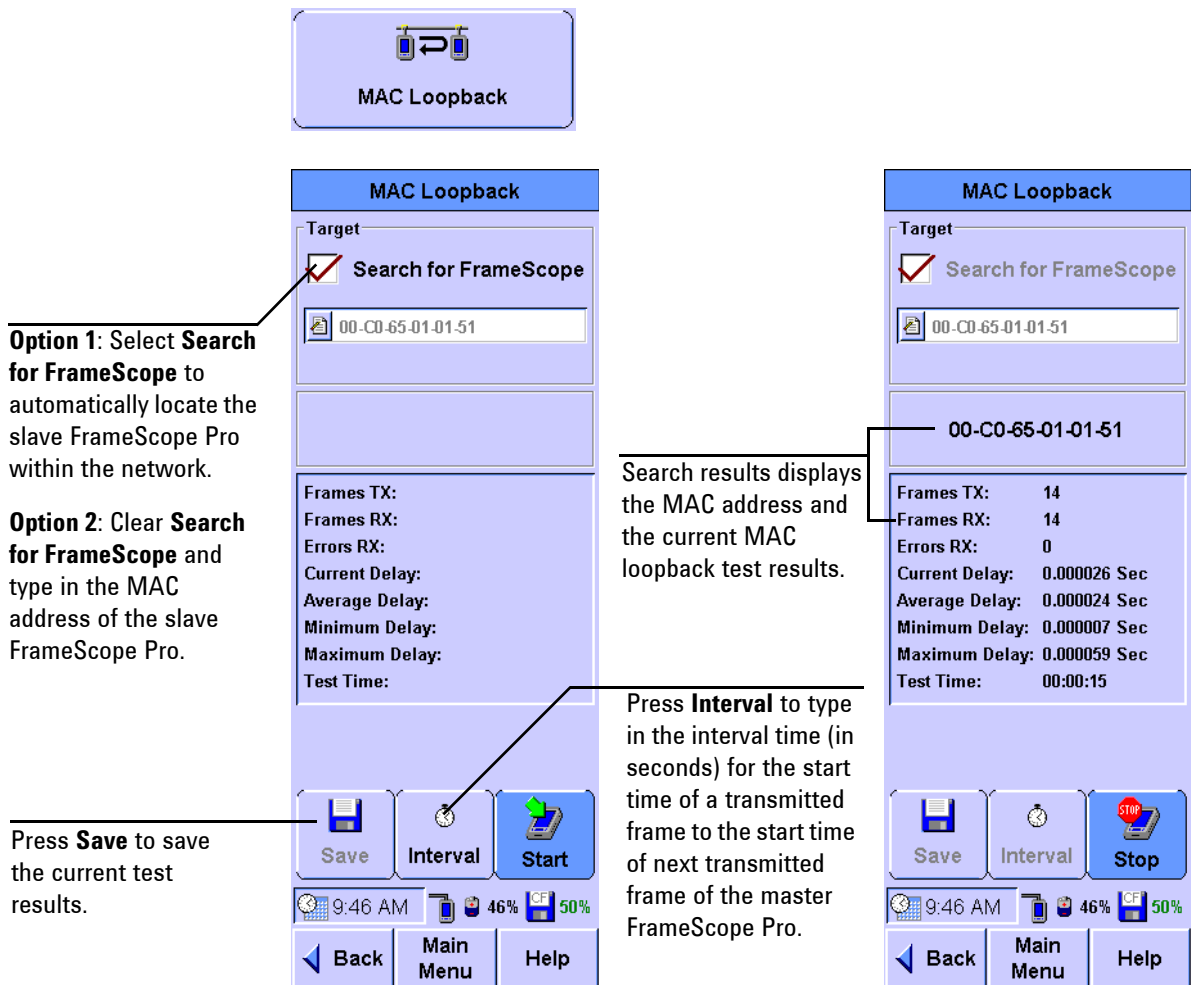
- There are two options to search for the slave FrameScope Pro.

**Option 1:** If you do not know the MAC address, IP address, or name of the slave FrameScope Pro, select **Search for FrameScope** to enable autosearch.

**Option 2:** For the MAC Loopback test, if the MAC address of the slave FrameScope Pro is known, clear **Search for FrameScope** and type in the MAC address. Similarly, for the IP Loopback test, if the IP address or name of the slave FrameScope Pro is known, type in the IP address or name.

- Press **Start** or press  on the MAC or IP Loopback menu to begin the test.

The FrameScope Pro will search for the slave FrameScope Pro on the network and report back the link results.

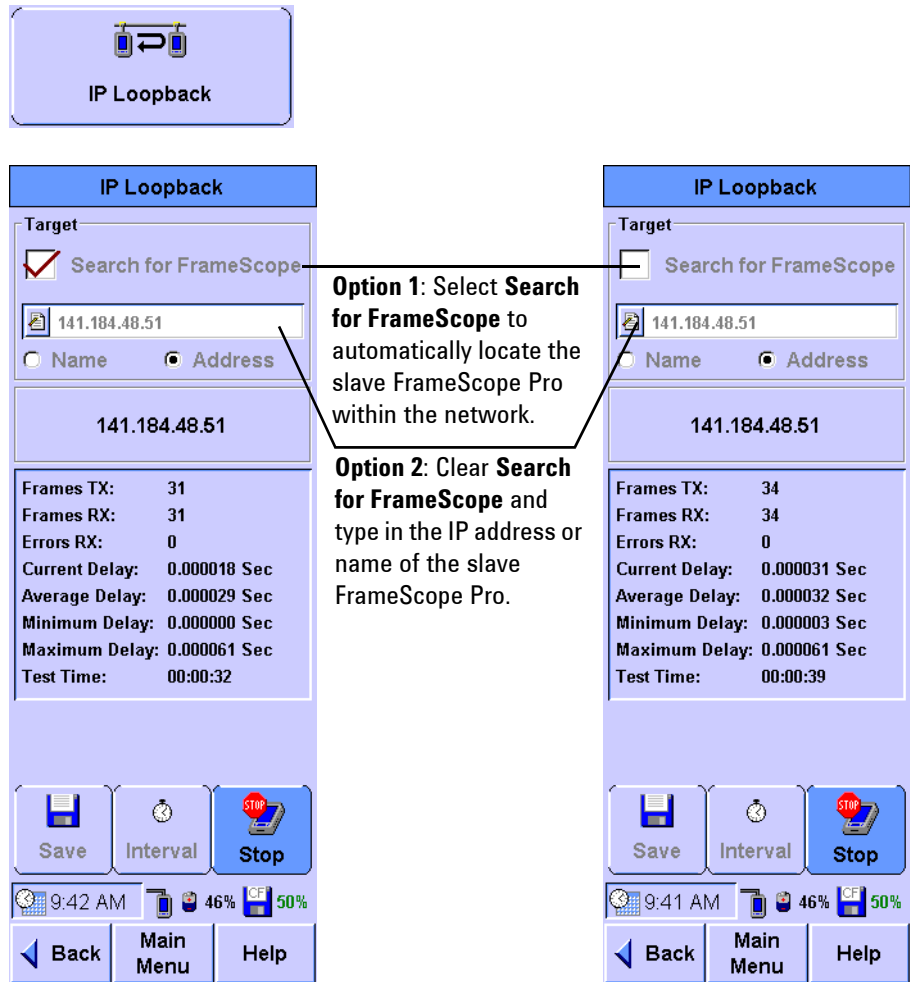


The diagram illustrates the MAC Loopback test process through two screenshots of the device's interface.

**Left Screenshot (Configuration):** Shows the 'MAC Loopback' menu with the 'Search for FrameScope' option checked. A text box points to this option with the instruction: "Option 1: Select **Search for FrameScope** to automatically locate the slave FrameScope Pro within the network." Below this, another text box explains: "Option 2: Clear **Search for FrameScope** and type in the MAC address of the slave FrameScope Pro." The 'Target' field contains the MAC address '00-C0-65-01-01-51'. At the bottom, a text box points to the 'Save' button: "Press **Save** to save the current test results." The 'Interval' button is also visible.

**Right Screenshot (Results):** Shows the 'MAC Loopback' menu with 'Search for FrameScope' checked. A text box points to the '00-C0-65-01-01-51' MAC address field: "Search results displays the MAC address and the current MAC loopback test results." Below this, another text box points to the 'Interval' button: "Press **Interval** to type in the interval time (in seconds) for the start time of a transmitted frame to the start time of next transmitted frame of the master FrameScope Pro." The results section shows: Frames TX: 14, Frames RX: 14, Errors RX: 0, Current Delay: 0.000026 Sec, Average Delay: 0.000024 Sec, Minimum Delay: 0.000007 Sec, Maximum Delay: 0.000059 Sec, and Test Time: 00:00:15. The 'Stop' button is highlighted.

## 2 Network Testing with the FrameScope Pro



- 4 Press **Stop** to cancel the test or review the transmission information on the MAC Loopback or the IP Loopback screen.



## Performing UDP or TCP Throughput Tests

This test measures the UDP or TCP throughput in a given network. A master and a slave FrameScope Pro is needed for the UDP or TCP throughput test. The discovery of the slave FrameScope Pro can be automated.

Select the FrameScope Pro that will be acting as the master FrameScope Pro.

- 1 Press **Tools** on the Main Menu screen, select **Performance Tests**, and then select **TCP/UDP Throughput Test**.

### NOTE

For best results, Active Discovery should be turned off in both FrameScope Pro units.

- 2 Select whether to autosearch for the slave FrameScope Pro, or type in the name or address of the FrameScope Pro manually.

**NOTE**

The measurement for the TCP throughput is limited by the WINCE TCP/IP overhead.

- 3 Select whether to perform the UDP or TCP throughput test.
- 4 Press **Data Size (MB)**.
- 5 Enter the desired amount of data to be transferred.
- 6 Press **Start** to start the test.

Predefined data is transferred across the network repeatedly to achieve the specified data size.

The results include:

- the total amount of data transferred (in MB)
- an instantaneous value for the data transfer rate (in Mbps)
- the instantaneous value for the delay (in seconds)
- the average, minimum, and maximum transfer rates (in Mbps)
- the total test time

### Downloading and Viewing Results with a Web Browser

The results can be viewed in a HTML table in a web browser if the web server in the FrameScope Pro is enabled.

The results can also be downloaded and viewed as a .CSV file, as described in [Chapter 8](#), “Test Database” on page 242.

## Performing Packet Error Rate Tests

The Packet Error Rate Test (PERT) generates traffic to the network and measures frame loss and frame error rate. The test can be performed between two FrameScope Pro units or between one FrameScope Pro and a loopback device. The supported test directions are downstream, upstream, sequential (when the test port is half duplex), or bidirectional (when the test port is full duplex).

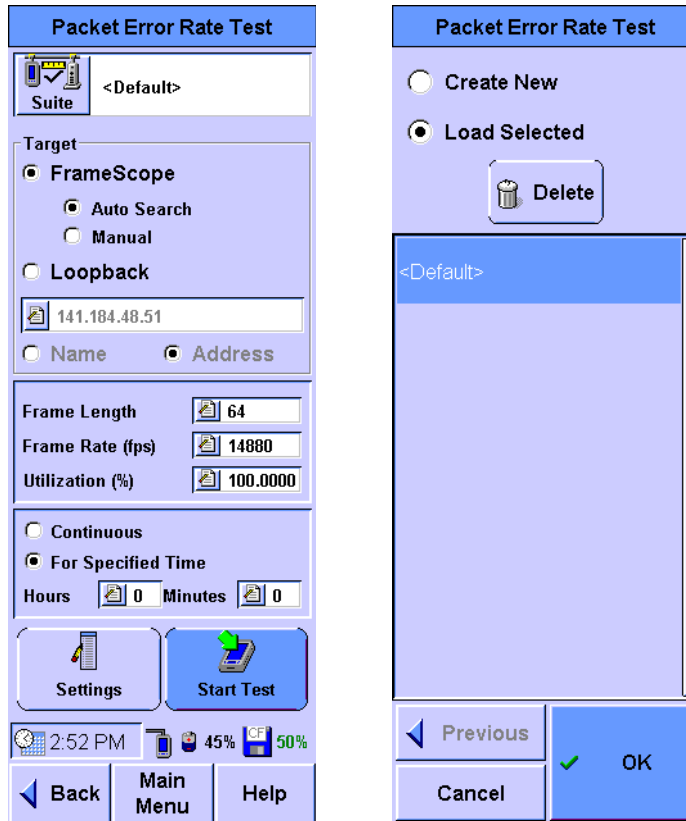
Packets that are received by the receiving side are analyzed for checksum errors and losses. PERT captures errors in all segments of the Ethernet frame, including both the header and payload. PERT can also analyze the network response to the errors by injecting the errors into the network. The configurable parameters for the test are as listed below.

- Target (another FrameScope Pro, or a loopback device)
- Frame length in bytes (64 bytes to 16000 bytes)
- Frame rate
- Utilization percentage of the port speed
- Test duration in hours:minutes, or continuous
- Timeout
- Test direction
- Data pattern (choice of six preconfigured and custom patterns)

The maximum test duration for PERT is typically 24 hours, but may be up to 99 hours.

To perform the test, follow the procedure below.

- 1 Press **Performance Tests** on the Tools screen and select **Packet Error Rate Test**.



- 2 Optional: If you want to save the current PERT suite or retrieve a previously stored suite, press **Suite**. You have two options to choose from:

**Option 1:** Select **Create New** if you want to create and save a new test suite. You will be prompted to type in a new name.

**Option 2:** Select **Load Selected** to choose a stored suite from the list. You can select **<Default>** to reload the default suite.

- 3 The initial screen allows you to type in the destination device, frame length, frame rate (in frames/s), and utilization (in percentage). You can also choose to run the test continuously or just for a specified time range.

For the destination device, you have two choices on how to search for the device.

If **Loopback** is selected, you have three options:

**Option 1:** Select **IP Layer** loopback device. You will need to specify the IP address or name of the device.

**Option 2:** Select **MAC Layer** loopback device. You will need to specify the MAC address of the device.

**Option 3:** Select **PHY Layer** loopback device.

If **FrameScope** is selected, there are two options:

**Option 1:** Select **Auto Search** to search for the FrameScope Pro if the IP address or the name of the slave FrameScope Pro is unknown.

**Option 2:** Select **Manual** if the IP address or the name of the slave FrameScope Pro is known and type in the corresponding IP address or name.

- 4 Selecting **Settings** allows you to set the timeout (in seconds), direction of the test, and the data pattern of the test.

**Packet Error Rate Test**

Timeout (sec.)

Direction

Upstream

Downstream

Bi-Directional

Data Pattern

0x00 00 (00000000 ...)

0xFF FF (11111111 ...)

0xAA 55 (10101010 01010101)

0xAA AA (10101010 ...)

0x00 FF (00000000 11111111)

0x11 11 (00010001 ...)

Custom Configuration

Previous

Cancel

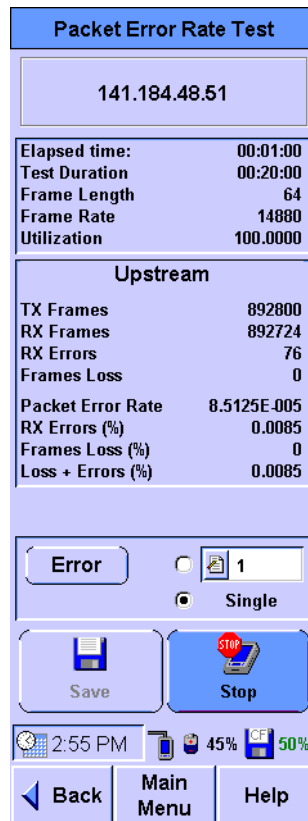
OK

5 Press **Start** to begin the test.

After pressing **Start**, the master FrameScope Pro starts the activation and synchronization procedure with the target FrameScope Pro by doing the following actions.

- a Search (if enabled) and check the status of the slave FrameScope Pro.
- b Activate the slave FrameScope Pro if the device is in idle mode.
- c Set up the slave FrameScope Pro parameters by synchronizing the master and slave FrameScope Pro units for the test.
- d Start the test.
- e Query test results at the end of the test.
- f Stop the test.

If the selected target is a loopback device, all test setups are performed in the master FrameScope Pro. There will be no authentication synchronization setup.



## Locating a Port with Blink Port

You can use the FrameScope Pro test port, located at the side of the FrameScope Pro, to locate a network connection port on a hub or switch. The FrameScope Pro will toggle on or off the port link indicator, causing it to blink.

This section describes how to use the Blink Port feature of the FrameScope Pro.

- 1 Connect the FrameScope Pro to the remote end of the circuit of the hub you want to locate. For example, connecting the FrameScope Pro to the network wall circuit.
- 2 Press **Tools** on the Main Menu screen to display the Tools menu.



- 3 Press **Blink Port** on the Tools menu to display the Blink Port screen.
- 4 Press **Start** to start blinking the port.
- 5 Observe the hub or switch and note which port link indicator is blinking. That will be the port for the test circuit.
- 6 Press **Stop** on the Blink Port screen to stop the test.

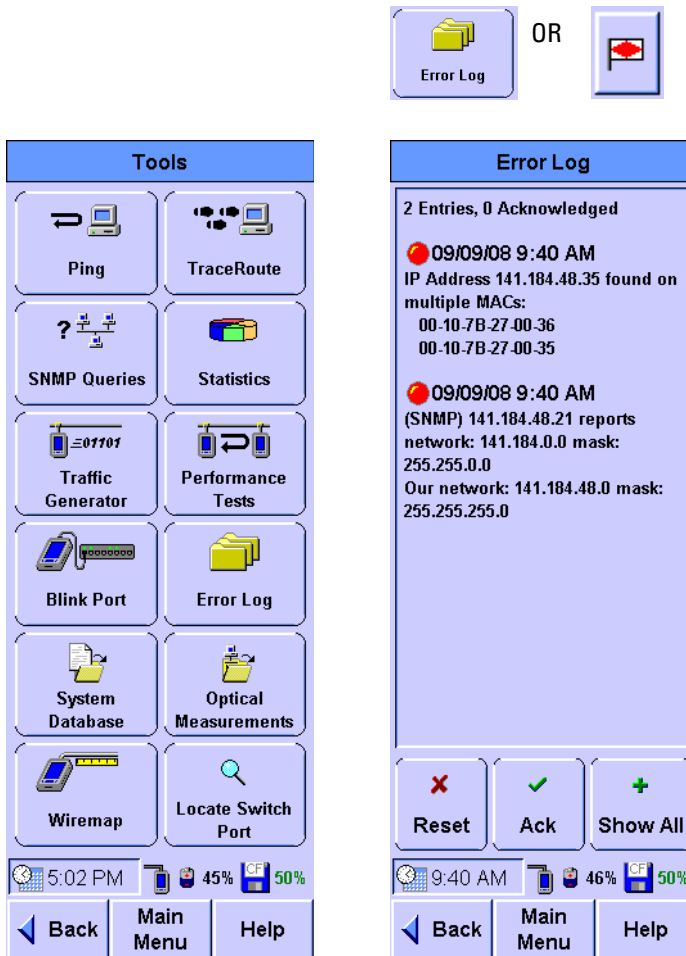
### Viewing the Error Log


This section describes how to view the FrameScope Pro error log. The error log tracks and displays any network problem that is detected by the FrameScope Pro. The list below gives the possible errors that the FrameScope Pro can detect.

- Duplicate IP (same IP on multiple MAC)
- RIPv1 bad network
- Bad network mask
- RIPv2 bad network mask
- SNMP bad network mask
- DHCP bad network mask
- DHCP duplicate IP (offered IP already in use)
- Bad DNS server
- Bad WINS server
- Bad router (not responding)



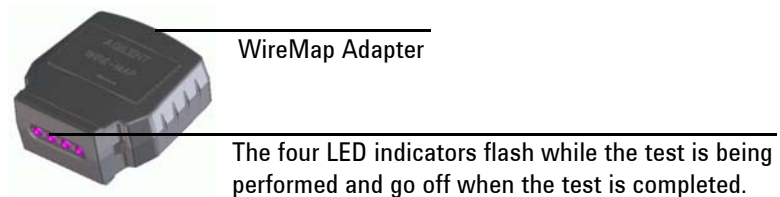
- 1 Press **Tools** on the Main Menu screen to display the Tools menu.



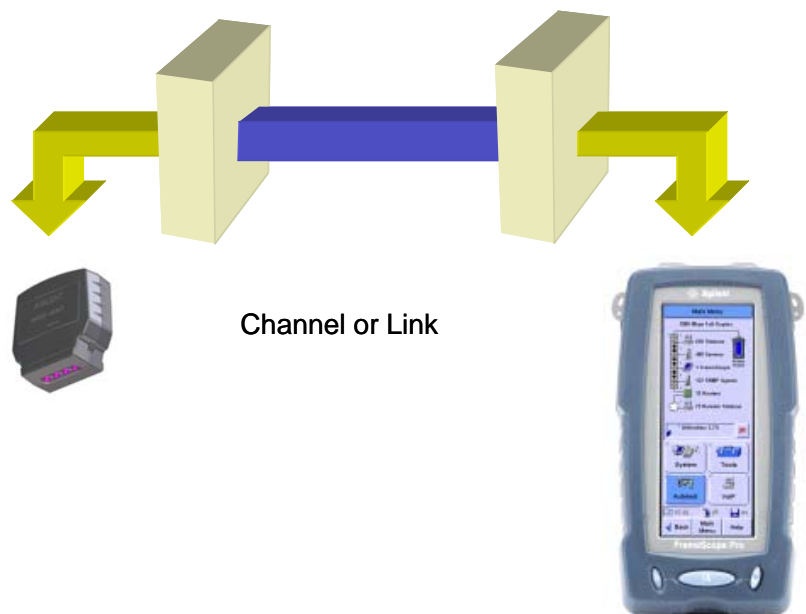
- 2 Press **Error Log** to display the Error Log screen. You can also press the shortcut  on the Main Menu to get to this screen.
- 3 Observe the errors listed in the log.
- 4 Press **Show All** to expand the error list and view all the errors that has been previously acknowledged by using **Ack**.
- 5 Press **Ack** to acknowledge the errors without clearing the log.
- 6 Press **Reset** to clear the log.

## WireMap Testing

WireMap testing checks for proper continuity and termination of cables. It is used together with the WireMap Adapter.



The WireMap Adapter is connected to the far end of a link or channel to display and identify the point-to-point connection of four twisted pairs.



The test identifies the following faults.

- Short circuit
- Open circuit
- Reversed pairs
- Crossed pairs
- Shield continuity faults

## WireMap Adapter Operation

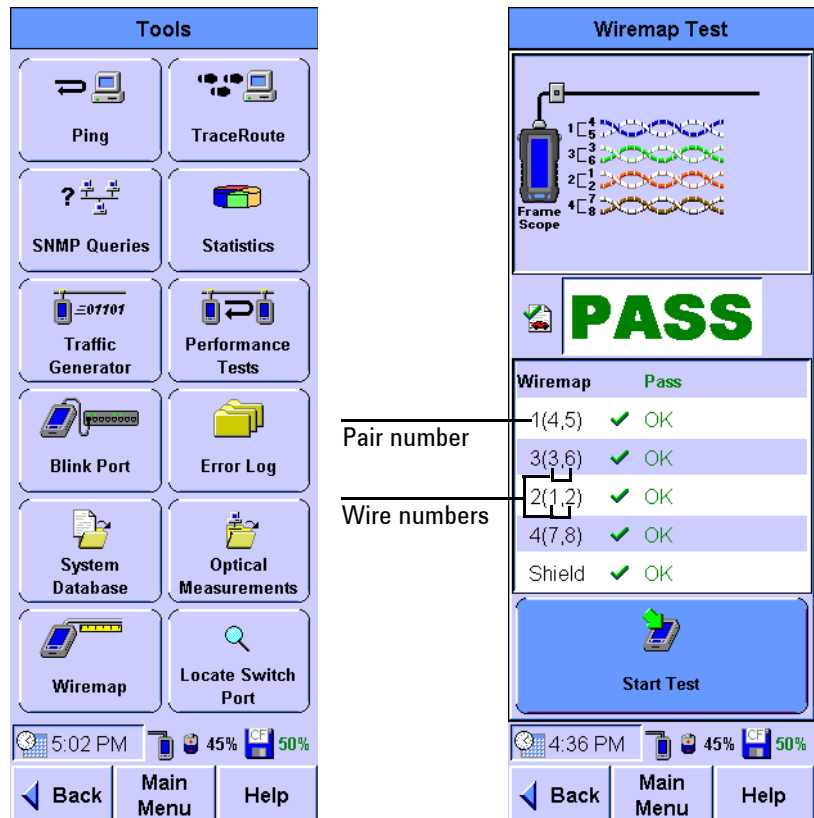
When the WireMap Adapter is connected to the FrameScope Pro, the FrameScope Pro will send a sequence of DC, TTL level signals via the wire pairs in the order of a few hundred milliseconds. For each signalling sequence step, the receiver of the FrameScope Pro measures the DC voltage. The FrameScope Pro software identifies WireMap information based on the readings.

### LED indicators

The WireMap Adapter has four LEDs, each connected to a wire pair. During the test, the LEDs flash. Once the test is completed, the LEDs turn off.

## Procedure for WireMap Testing

- 1 Connect the FrameScope Pro and the cable-under-test to the WireMap Adapter.
- 2 Press **Tools** on the Main Menu screen and select **WireMap**.
- 3 Press **Start Test**.



## 2 Network Testing with the FrameScope Pro

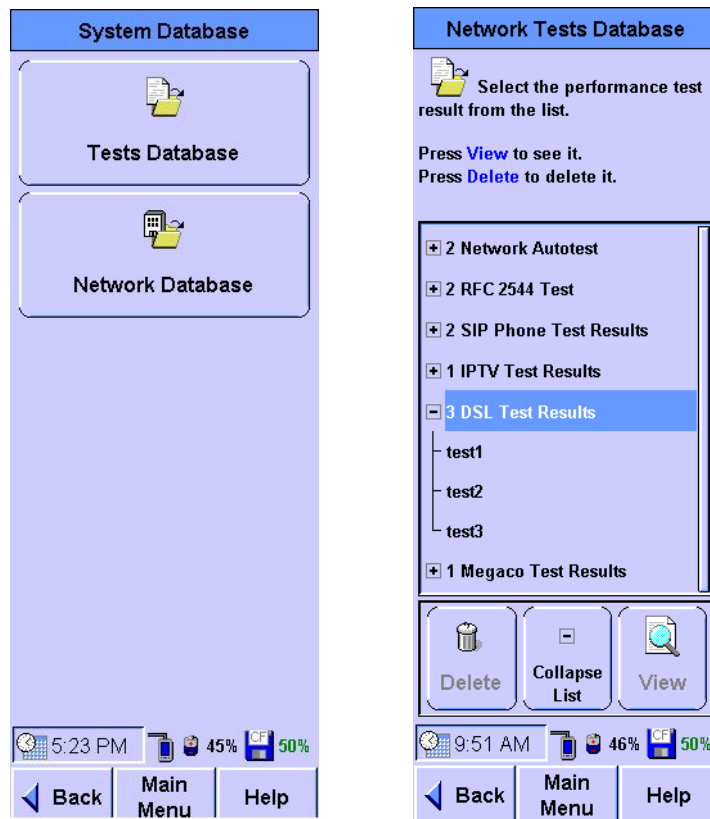
The test will run for a few seconds before displaying the results. If the test passes, the result panel will display “Pass” as shown on the screen shown in the previous page. Otherwise, the panel will display “Fail” with the failure details in red.

## Using the Test Database

The FrameScope Pro allows the Tools, Autotest, and Performance and Service Test results to be stored for later review or download from a web server. To do so, you will need to have a CompactFlash card installed. Previously stored test data can be recalled using the **Tests Database** tool.

This section describes how to view and delete stored tests.

- 1 Press **Tools** on the Main Menu screen to display the Tools menu.
- 2 Press **System Database** and select **Tests Database** on the System Database screen to display the Network Test Database screen.



A folder for each type of test results saved appears in the Network Test Database screen. For example, Autotest results are stored in the **Network Autotest** folder, RFC 2544 test results are stored in the **RFC 2544 Test** folder, and IP and MAC

loopback test results are stored in the **Loopback Tools Results** folder. Stateful test, VoIP, and IPTV test results also appear in their individual folders.

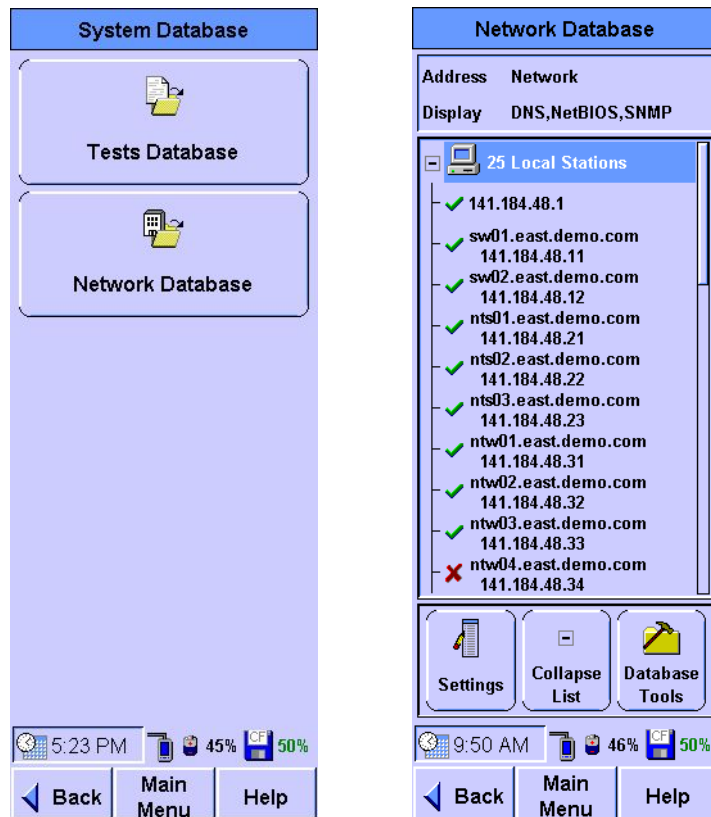
The number before the folder name indicates the number of the stored files in the folder.


- 3 To display the stored test results in the selected folder, select the folder and press the + sign at the left of the folder name or **Expand List**.
- 4 To view the details of a stored test result, select the test file and press **View**.
- 5 To delete a stored test result, select the file and press **Delete**.

## Using the Network Database

The FrameScope Pro allows you to store network topologies for later review and downloading if a CompactFlash card is installed (refer to “Using the Stations List” on page 27). Previously stored network data can be recalled using the Network Database tool. This section describes how to recall and delete stored network data.

- 1 Press **Tools** on the Main Menu screen to display the Tools menu.
- 2 Press **System Database** and select **Network Database** on the System Database screen to display the Network Database screen.



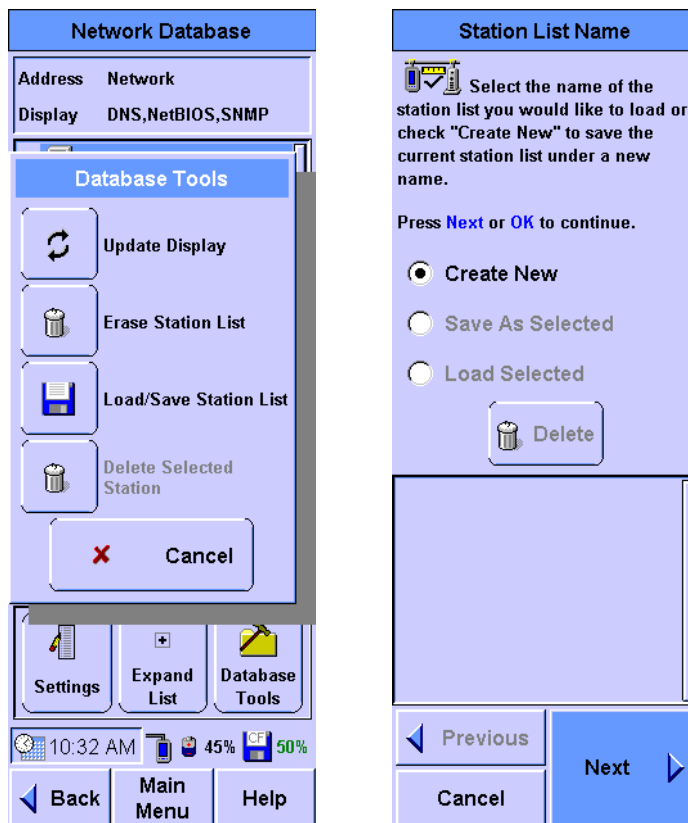
- 3 Network resources are displayed in a list. Use  or a stylus to select the resource you want.
- 4 Use **Expand List** or **Collapse List** to show or hide the resource under the selected resource type.

- 5 Press **View** when a network resource is selected to view detailed information about it.

**NOTE**

The Expand List, Collapse List, and View buttons occupy the same spot on the screen. The button changes depending on what you have selected in the stations list.

- 6 Press **Database Tools** to access the Database Tools menu from the Network Database screen.



- 7 Press **Load/Save Station List** to save the current network or load previously stored network data.
- 8 Use the buttons on the Station List Name screen to store the current network data, load the stored data, or delete the stored data. If you are storing data, you will be prompted to type in a name for the data file.



## Monitoring the Optical Measurements

This section describes how to monitor the real time operating parameters for optical transceivers.

- 1 Press **Tools** on the Main Menu screen to display the Tools menu.
- 2 Press **Optical Measurements** on the Tools menu to display the Optical Measurements screen.

The screenshot shows two screens from the FrameScope Pro interface. The left screen is the 'Tools' menu, and the right screen is the 'Optical Measurements' screen.

**Tools Menu:**

- Ping
- TraceRoute
- SNMP Queries
- Statistics
- Traffic Generator
- Performance Tests
- Blink Port
- Error Log
- System Database
- Optical Measurements
- Wiremap
- Locate Switch Port

**Optical Measurements Screen:**

The measurement data is shown only if the SFP supports DMI standard.

TX Power	6.00	dBm
RX Power	0.00	dBm

Vendor Details:

Name	Avago
OUI	075
Transceiver ID	1000LX

Settings

Callouts from the image:

- Measured transmit output power points to the TX Power value.
- Measured receive input power points to the RX Power value.

### NOTE

The values for TX Power and RX Power will be displayed only if the SFP support DMI standard.

3 Press **Settings** to set the refresh interval in seconds.



The table below lists guidelines on the measurement ranges for Receive Power.

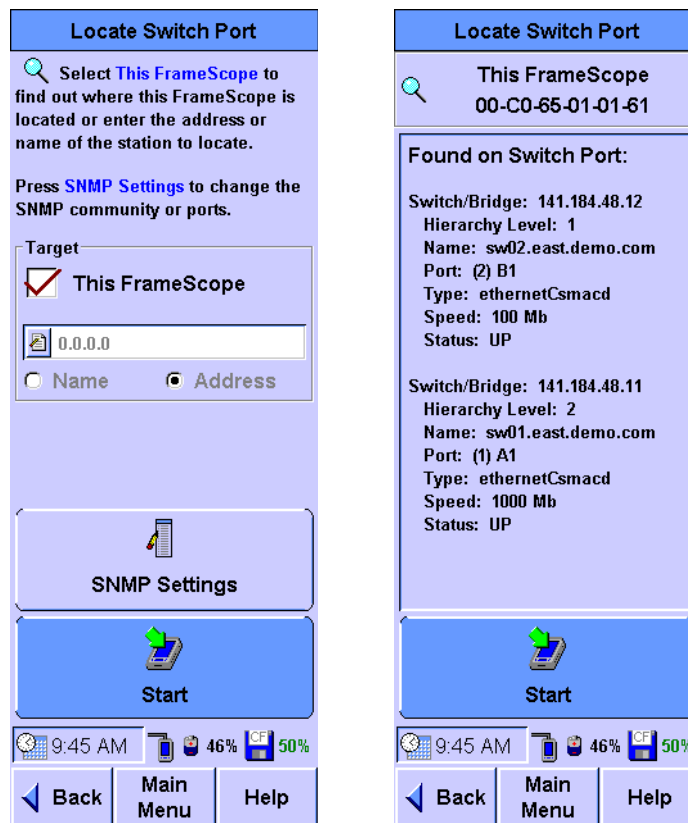
	Receive Power	
	Maximum (dBm)	Minimum (dBm)
1000Base-SX	0	-17
1000Base-LX	-3	-19
1000Base-ZX	-3	-23

## Locating Switch Ports


The FrameScope Pro allows you to identify the switch ports accessed by the FrameScope Pro or any address on the network. The FrameScope Pro will only locate switches that are in the same network. Therefore, you will need to know the correct community string and port.

This section describes how to operate the Locate Switch Port tool.

- 1 Press **Tools** on the Main Menu to display the Tools menu.
- 2 Press **Locate Switch Port** on the Tools menu to display the Locate Switch Port screen.



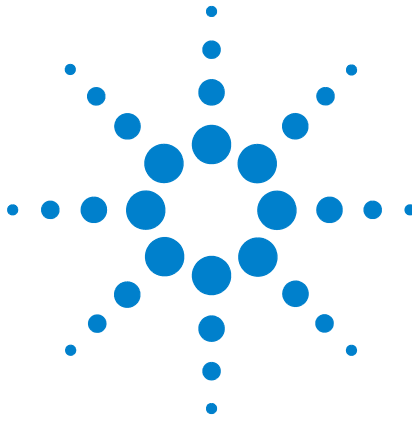
- 3 Select **This FrameScope** in the Target panel to locate the current FrameScope Pro or type in the name or address of the device to locate.

- 4 **SNMP Settings** allows you to add the SNMP communities and ports to the default “public” community and default port 161. **SNMP Settings** is also used to change the setup for Auto Discovery.
- 5 Press **Start** to run the tool and display the results of the Locate Switch Port.
- 6 Use  to scroll through the list if necessary.

### NOTE

The order of the information presented may not be useful and should not be used in interpreting the list.

---



## 3 Voice Testing with the FrameScope Pro

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This chapter describes how the FrameScope Pro measures and tests the performance of VoIP networks.



## Voice Testing Overview

The VoIP Service Quality Testing feature of the FrameScope Pro provides you analysis options for VoIP environments that traditional tests do not. These options are listed as follows.

- Accessing, managing, and running voice quality tests end-to-end across widely deployed voice networks
- Testing VoIP network components such as routers, gateways, PBXs, and switches
- Comparing VoIP quality directly with the existing toll quality networks
- Testing VoIP systems to gather end-to-end voice quality information
- Augmenting other traditional telephony test suites such as the Transmission Impairment Measurement Set (TIMS)
- Measuring fundamental voice quality metrics such as delay, jitter, and Mean Opinion Score (MOS)

### Supported Protocols

The VoIP test feature supports the following protocols.

- Session Initiation Protocol (SIP), RFC 3261, which requires license Option N2620A-030 or N2620A-03E
- Peer-to-peer SIP, RFC 3261, which requires license Option N2620A-030 or N2620A-03E
- STUN, RFC 3489, which requires license Option N2620A-03E
- Megaco/H.248, RFC 3525, which requires license Option N2620A-032
- VoIP traffic generation, which requires license Option N2620A-03G
- Background traffic generation, which requires license Option N2620A-041

Refer to [Chapter 7](#), “License Details” on page 163 for the information on activating this feature.

## How the FrameScope Pro Tests Voice Quality

You can use the FrameScope Pro VoIP test feature to test the voice quality and measure audio circuit characteristics as follows.

- The FrameScope Pro VoIP test feature places and answers one telephone call at a time to establish a voice connection. This voice connection (including the transmission media and equipment of which it is a part of) becomes the *network-under-test*. The FrameScope Pro VoIP works like a telephone or other telephony device positioned at the ends of voice circuits.
- Once the FrameScope Pro VoIP test feature has established a call, it transmits audio RTP packets into the network and measures the effect of the transmitted packets when they travel through the network-under-test.

## Test Port Settings

The FrameScope Pro VoIP Service Quality Testing feature can connect to the network using Point-to-Point-Protocol Over Ethernet (PPPoE) or IP Over Ethernet (IPoE). These settings are available in the Test Port Settings screen, as described in [Chapter 7, “Test Port Settings”](#) on page 171.

## Audio Codec Support

For measurement results which resemble the end-user experience when testing a VoIP service, you need to use the appropriate codec. The FrameScope Pro supports the following codecs.

- G.711 A-law
- G.711  $\mu$ -law
- G.721 (G.726-32K)
- G.723.1
- G.726 with 16 kbps, 24 kbps, and 40 kbps
- G.729A, G.729B

## FrameScope Pro as the Caller

If the FrameScope Pro is configured as the caller, it uses the audio codec according to the user-defined media negotiation on the SIP screen of the SIP test, or the Phone Settings screen of the Megaco test. These screens can be reached by pressing **Settings** on the main screen of either test.

To configure the FrameScope Pro as the caller, clear **Auto Answer Incoming Call**.

If **Headset Call** is not selected, a WAV file with a length of 40 s will be used. The VoIP consortium certifies this file.

If you choose a codec from the G.721 or G.726 family, the **G.726 Stream Properties** panel will be available for configuration.

- Select **A-Law** or **μ-Law**
- Select **Little** or **Big** for the Endian panel

Press **OK** to return to the main screen of either test, where additional settings can be made and where the test can be started.

## FrameScope Pro as the Callee

The FrameScope Pro supports all available codecs when it is configured for the callee mode. The audio codec used is defined during the media negotiation between the caller and callee.

To configure the FrameScope Pro as the callee, select **Auto Answer Incoming Call** on the SIP screen of the SIP test or the Phone Settings screen of the Megaco test. These screens can be accessed by pressing **Settings** on the main screen of the test.

The suitable codec is selected according to the order of preferences of supported audio codecs in the incoming *SIP INVITE* message. For example, if the caller provides the following sequence of supported codecs; G.723.1 → G.729 → G.711 A-law → G.711 μ-law, then the FrameScope Pro as the callee, will select codec G.723.1 in the *SIP RESPONSE* returned message to the caller.

If no common codec is found between the caller and callee based on the media information in the incoming *SIP INVITE* message, the FrameScope Pro will return message *488 Media Not Supported* to the caller side.

In callee mode, choose the preferred stream properties for the G.721 or G.726 codec family in the **G.726 Stream Properties**. The setting is only used if the caller and callee negotiate a codec from the G.721 or G.726 family, otherwise it is disregarded.

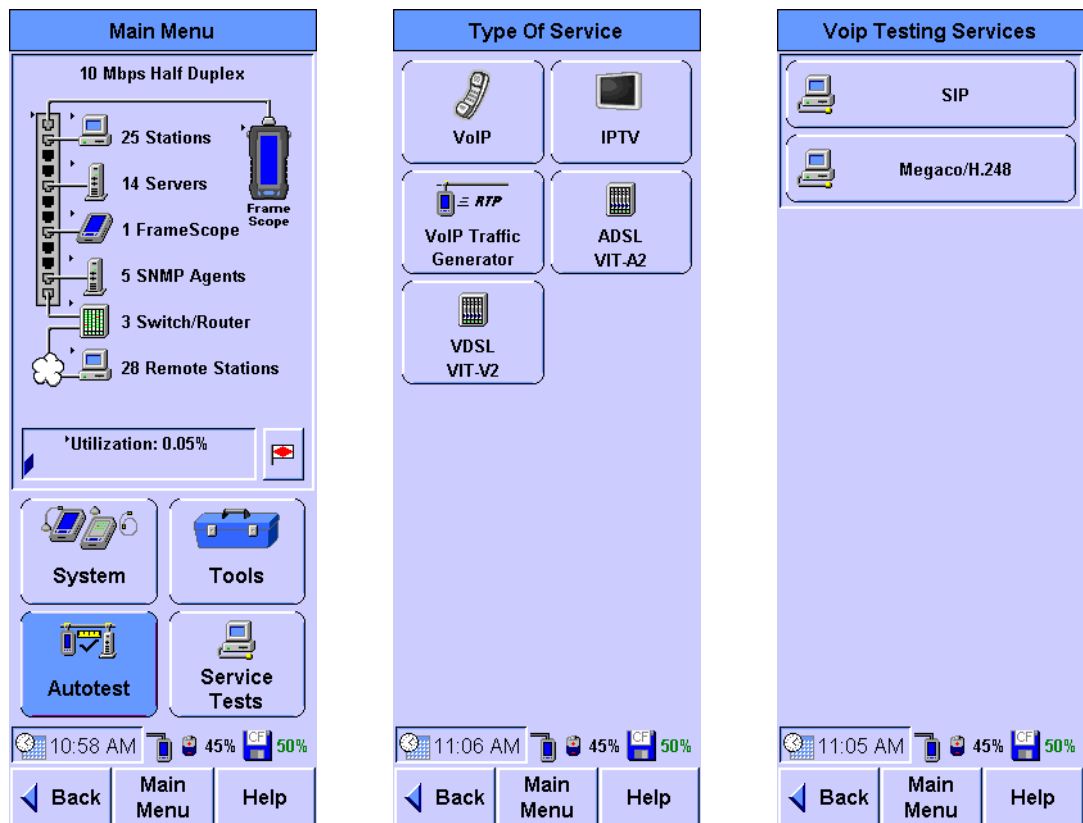


## SIP Voice Testing

This section describes how to run a SIP VoIP Test on the network using the FrameScope Pro.

### Settings Setup for SIP Voice Test

On the Main Menu screen, press **Service Tests**. For VoIP quality testing, press **VoIP** to call the VoIP Testing Services screen. Select **SIP** for a SIP voice test.

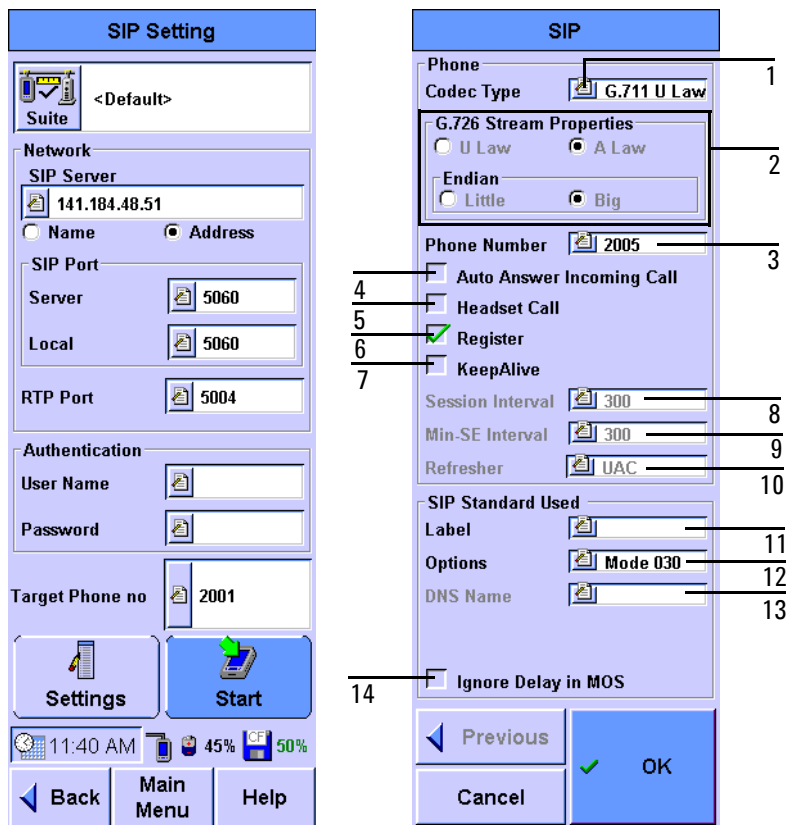


When **SIP** is pressed, the FrameScope Pro will display the SIP Setting screen with the configurable parameters as shown below.

The current settings can be saved or the previous settings retrieved via the Suite screen by pressing **Suite** on the SIP Setting screen. To configure additional settings, press **Settings**.

**NOTE**

The user name for authentication with the SIP server may not have the same unique ID or phone number used for the SIP phone call or test.



- 1 The codec to be used for the data transfer
- 2 Properties for codecs from the G.721 or G.726 family
- 3 The phone number of the current FrameScope Pro
- 4 If selected, the FrameScope Pro will answer incoming call automatically
- 5 If selected, headset call for live audio will be enabled

- 
- 6 If selected, the FrameScope Pro will register with the registrars or SIP Server. Otherwise, the FrameScope Pro will call the IP address specified in the **SIP Server** at the SIP Setting screen directly.

---

  - 7 If selected, the FrameScope Pro will allow the end point to send or answer reinvites and configure the associated **Session Interval**, **Min-SE Interval**, and **Refresher**

---

  - 8 The maximum allowed time between session refresh requests in a dialog before the session times out

---

  - 9 The minimum timer, which is the minimum value that can be set for the session interval

---

  - 10 The entity (for example, UAC and UAS) which initiates reinvites

---

  - 11 User-defined nickname for the mode or option

---

  - 12 Drop-down list that allows the selection of different custom options

---

  - 13 Domain name for SIP server (which requires a name instead of an IP address) when DNS is not present in the network

---

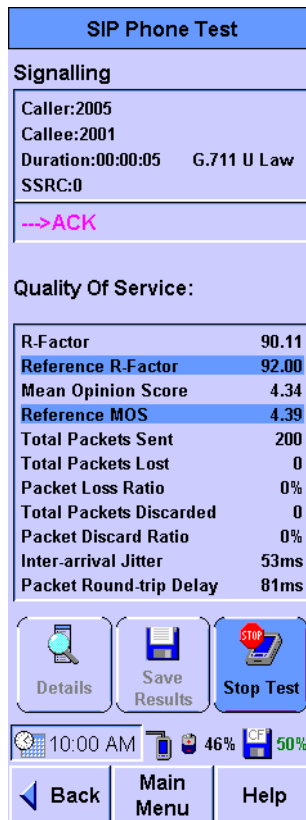
  - 14 If selected, the FrameScope Pro will ignore the round-trip delay when calculating MOS. This may make it easier to reconcile the MOS measurements from different devices. (If the VoIP Option N2620A-030 is selected.)
-

## Running the Test

When **Start** is pressed on the SIP Setting screen, the FrameScope Pro checks if **Register** in the Phone panel on the SIP Setting screen is selected. If **Register** is selected, the FrameScope Pro will register with the registrar or SIP Server using the user-defined options in the SIP setting screen, before placing a call or sending an Invite message.

If **Register** is not selected, the FrameScope Pro will call the IP address specified in the SIP Server box on the SIP Setting screen directly.

The SIP call is placed to the number set in **Target Phone no** with the user-defined audio codec as specified on the SIP screen. After the SIP signaling has completed, data flows across the network and the measurement statistics appear in the SIP Phone Test screen.



The test results can be saved to the CompactFlash card using **Save Results**.

If the sender changes its Synchronization Source (SSRC) identifier, you will be asked whether to ignore this change.

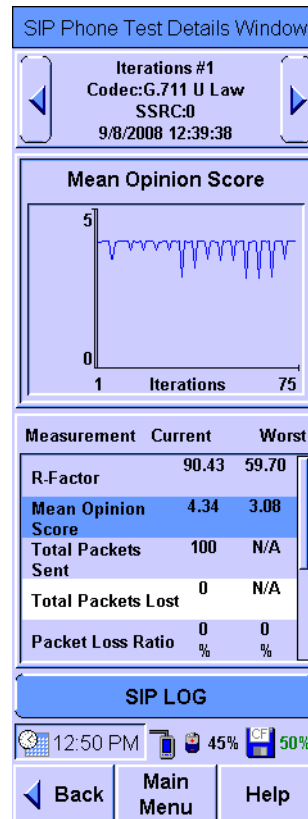
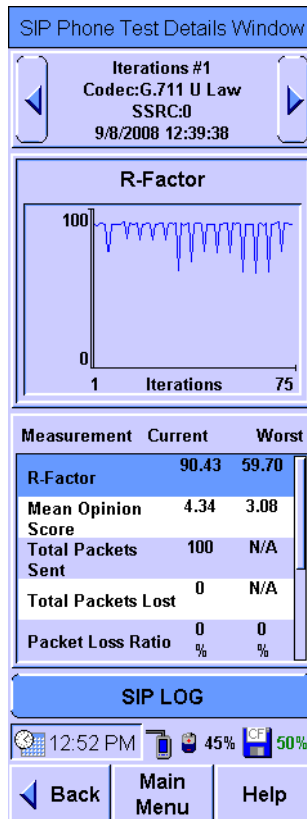
- If you choose **Yes** to ignore the SSRC change, the call will stop.
- If you choose **No** to accept the SSRC change:
  - a** The FrameScope Pro adds the new SSRC to the members and senders tables.
  - b** The FrameScope Pro validates the new SSRC, as described in RFC 3550.
    - If the new SSRC is valid, the FrameScope Pro terminates the current session and starts gathering statistics for the new session. The old SSRC is removed from the members and senders tables.
    - If the new SSRC is not valid, the FrameScope Pro continues to gather statistics for the original session, if the session has not timed out.

Once the test stops, press **Details** to view the SIP signaling log. The graphical plots of the VoIP test results with respect to time can also be viewed offline. For further information, refer to “[Interpreting Results](#)” on page 100.

## Interpreting Results

The statistics measured are plotted in a graphical format. The graph is plotted with the timing information displayed as iterations (in intervals of 500 ms) on the X-axis, and one of the parameters listed below displayed on the Y-axis.

- R-Factor
- Mean Opinion Score
- Total Packets Sent
- Total Packets Lost
- Packet Loss Ratio
- Total Packets Discarded
- Packet Discard Ratio
- Inter-arrival Jitter
- Packet Round-trip Delay



Each iteration shown is based on the RTCP message exchanged during the VoIP test.

- The **Inter-arrival Jitter**, **Total Packet Loss**, and **Packet Loss Ratio** are based on the received RTP packets. **Packet Round-trip Delay** is based on the RTCP packet information.
- **R-Factor** and **Mean Opinion Score** are based on **Inter-arrival Jitter**, **Total Packet Loss**, **Packet Loss Ratio**, and **Packet Round-trip Delay**. If no RTCP packet is sent, then **Packet Round-trip Delay** will be set to zero.
- **Total Packets Sent** reports the number of packets sent from the FrameScope Pro.
- **Total Packet Lost** is based on RFC 1889/3550 “Cumulative Number of Packets Lost”.
- **Packet Loss Ratio** is based on RFC 1889/3550 “Fraction Lost”.
- **Total Packets Discarded** refers to the number of packets dropped at the receiving side if there are errors in the RTP header information.
- **Packet Discard Ratio** refers to the discarded packet ratio for each RTCP interval.

SIP Phone Test Details Window

Iterations #1  
Codec:G.711 U Law  
SSRC:0  
9/8/2008 12:39:38

**Packet Loss Ratio**

Measurement	Current	Worst
Packet Loss Ratio	0 %	0 %
Total Packets Discarded	0	0
Packet Discard Ratio	0 %	0 %
Inter-arrival Jitter	60 mSec	62 mSec
Packet Round-trip Delay	38 mSec	123 mSec

SIP LOG

12:51 PM 45% CF 50%

Back Main Menu Help

SIP Phone Test Details Window

Iterations #1  
Codec:G.711 U Law  
SSRC:0  
9/8/2008 12:39:38

**Packet Round-trip Delay**

Measurement	Current	Worst
Packet Loss Ratio	0 %	0 %
Total Packets Discarded	0	0
Packet Discard Ratio	0 %	0 %
Inter-arrival Jitter	60 mSec	62 mSec
Packet Round-trip Delay	38 mSec	123 mSec

SIP LOG

12:51 PM 45% CF 50%

Back Main Menu Help

SIP LOG Details

Duration:00:03:01  
Callee:2001  
Caller:2005

9/8/2008 12:39:36.0  
← Register Success ≤=|

9/8/2008 12:39:36.0  
⇒ Invite =>|

9/8/2008 12:39:36.0  
← Invite 200 OK ≤=|

9/8/2008 12:39:36.0  
⇒ Ack =>|

9/8/2008 12:42:36.0  
←... Stopping Pls Wait ≤=>|

9/8/2008 12:42:36.0  
⇒ Bye Req =>|

9/8/2008 12:42:36.0  
← Bye 200 OK ≤=|

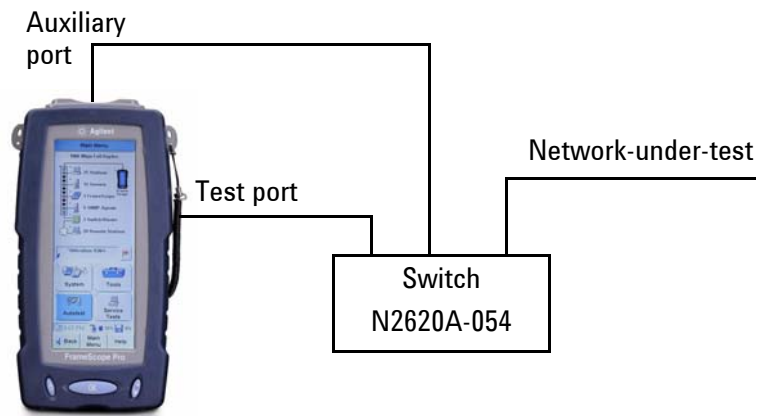
Previous OK

Cancel

## Simultaneous Traffic Generation during VoIP Testing

VoIP systems can respond to increasing traffic load by degrading the Quality of Service (QoS). By generating background traffic during a VoIP test, the FrameScope Pro identifies bandwidth and latency issues that do not appear with single point-to-point VoIP calls.

To perform a VoIP test with background traffic, the FrameScope Pro needs two network connections. If the network connections are unavailable, use a separate hub or switch to combine the background traffic with the VoIP test call. A 10/100 Mbps switch accessory is available for the FrameScope Pro (Option N2620A-054). The power for this switch is supplied from the FrameScope Pro USB port. The network connections are connected as shown below.



FrameScope Pro with Option N2620A-041 (Auxiliary Port)



## Configuring Traffic Generation during VoIP Testing

- 1 If the FrameScope Pro is equipped with Option N2620A-041 (Auxiliary Port), the VoIP on the Aux-Port Settings screen will be available after the SIP screen (refer to “[Settings Setup for SIP Voice Test](#)” on page 95). Press **Next** on the SIP screen to configure the VoIP on Aux-Port for the VoIP SIP test.

If the VoIP on Aux-Port panel options are not selected, the Auxiliary port on the top of the FrameScope Pro is not used. Instead, either the SFP or RJ45 test port on the right side of the FrameScope Pro is used for the VoIP SIP testing. In this case, pressing **OK** will complete the VoIP test setup.

### NOTE

You can configure whether to use the SFP optical interface or RJ45 interface for Gigabit Ethernet connections from the Test Port Settings.

### NOTE

The VoIP call from the Auxiliary port does not share the background traffic IP QoS tagging.

The image displays two sequential screenshots of the 'VoIP on Aux-Port Settings' configuration screen. Both screens have a light blue background and a title bar at the top.

**Left Screenshot:** The title bar reads 'VoIP on Aux-Port Settings'. Below it, there is a section titled 'VoIP on Aux-Port' containing two checkboxes: 'VoIP on Aux-Port' (checked) and 'TG On Test-Port' (unchecked). At the bottom, there are three buttons: 'Previous' (with a left arrow), 'OK' (with a green checkmark), and 'Cancel'.

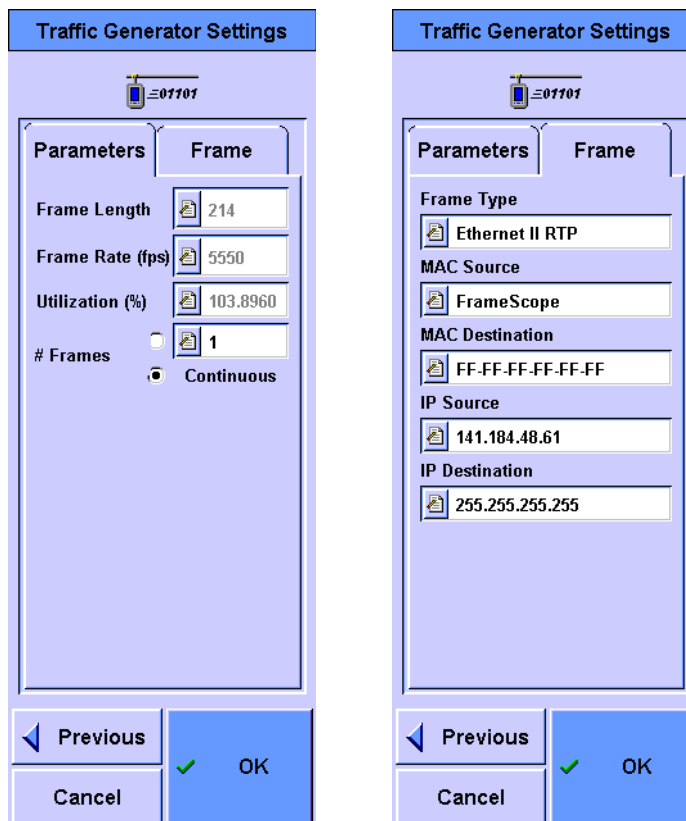
**Right Screenshot:** The title bar also reads 'VoIP on Aux-Port Settings'. The 'VoIP on Aux-Port' section now has both 'VoIP on Aux-Port' and 'TG On Test-Port' checked. Below this is a 'Traffic Generator Settings' section with a 'Simulate' button and a text field containing '111 Calls'. At the bottom, the buttons are 'Previous' (with a left arrow), 'Next' (with a right arrow), and 'Cancel'.

- 2 Select **VoIP on Aux-Port** to use the Auxiliary port.
- 3 Once **VoIP on Aux-Port** is selected, the option **TG on Test-Port** is available. If **TG on Test-Port** is not selected, pressing **OK** will complete the VoIP test setup. If **TG on Test-Port** is selected, the Traffic Generator Settings panel is accessible.
- 4 Enter the amount of background traffic to simulate in the Traffic Generator Settings panel.

The traffic load associated with each call is determined by the VoIP settings, which is equivalent to the traffic generated by the VoIP test call on the Auxiliary Port. A minimum of one call and maximum of 1000 calls are possible.

Press **Next** to continue.

- 5 The Traffic Generator Settings screen has two tabs, **Parameters** and **Frame**.



The **Parameters** settings are set automatically by the FrameScope Pro based on the user-defined background traffic and parameters of the VoIP test call.

In the **# Frames** field, you can choose if the background traffic generation is continuous or if a limited number of frames is to be sent.

On the **Frame** tab, you can choose the MAC source address for the simulated traffic to be the FrameScope Pro itself, or 10, 100, or 200 stations. If you choose to simulate multiple stations, the amount of traffic generated – specified by number of calls – will be distributed among the number of stations selected.

6 Press **OK**.

#### NOTE

VoIP testing with the FrameScope Pro can be done in the following ways.

- Calling a hardware or software SIP phone
- Calling a FrameScope Pro from a SIP phone
- Calling between two FrameScope Pro units

If you are calling between two FrameScope Pro units, repeat the configuration procedure described here for both instruments, depending on the desired test scenario and traffic loading.

7 If you are calling between two FrameScope Pro units, start the callee first, then the caller.

8 Press **Start** to start the test.

To observe the impact of the network traffic on the VoIP quality, use the arrow keys to increase or decrease the amount of background traffic generated on the Test Port while the test is running.

Press **Stop Test** on the FrameScope Pro or hang up the SIP phone to finish the test.

Press **Details** to study the test results.

Press **Save Results** to store the test results on the CompactFlash card.

## Megaco/H.248 Voice Testing

The Megaco/H.248 is a media gateway control protocol that addresses the requirements of decomposed gateways to achieve scalability and flexibility at lower overall cost. The decomposed gateways separate the call and media control intelligence from the packet media processing and transmission. In Megaco/H.248 terms, a Media Gateway Controller (MGC) is the external call and media control entity that handles the signaling and call processing intelligence. A Media Gateway (MG) is the network element that performs media processing and transmission, such as conversion between audio signals carried on telephone circuits and data packets carried over the Internet, or over other packet networks. MGCs use Megaco/H.248 to control MGs to set up media paths through the distributed network.

The Megaco/H.248 Voice Test supports the following details.

- Number of VoIP calls: One VoIP call during a test
- Transport: UDP and TCP

This can be configured in the Media Gateway screen. The default MG Transport is UDP.

- Message encoding type: Text and Binary

This can be configured in the Media Gateway screen. The default Encoding Type is Text.

- Audio transport: RTP

### Features

- Signaling - Decipher the Megaco/H.248 signaling information to view the call setup process and failures between the MG and MGC.
- Voice Play Mode - Live and PlayBack Mode.
  - Live Mode - Enable the caller and callee to talk to each other via a handset and microphone.
  - PlayBack Mode - Similar to an autoanswering machine, except it plays the prerecorded WAV audio signal.
- Voice Quality Measurement - Decipher the RTP/RTCP information to understand the root cause of voice quality, such as jitter, delay, and packet loss. Calculate the R-Factor and MOS values and display the results.
- Logging - Logged results of the tests for review.

## Core Services

### Audio input and output

The Megaco/H.248 Voice Test captures the environment sound or speech as well as the playback network audio data received. The supported audio format is 8 kHz-16 bits-Mono.

### Call setup and call control

The Megaco/H.248 IP Phone MG implementation supports two operating modes.

- Active mode - acts as an IP phone MG and initiates calls to other phone via the MGC on demand
- Passive mode - acts as an IP phone MG and answers incoming calls from other MGC

### Data transmission and receiving

The Megaco/H.248 uses the RTP stack (RFC 1889 or RFC 3550) to transmit and receive audio (speech) data over UDP only.

### Voice quality measurement

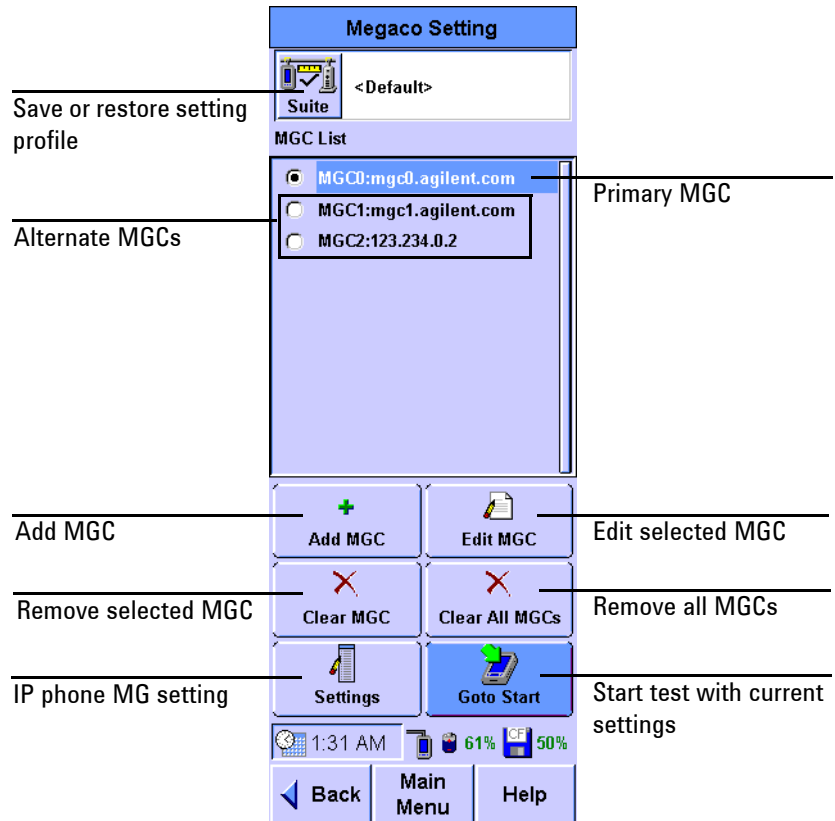
During the VoIP transactions, RTCP (RFC 1889 or RFC 3550) is used to exchange QoS information among the senders and receivers. Some of the information, such as the total packet sent, inter-arrival jitter, packet loss ratio, and network round-trip delay, will be displayed as the reference of the voice quality.

### R-Factor or MOS calculation

During the VoIP transactions, the R-Factor (Network-based) and MOS (CQE) values are periodically calculated based on the RTP/RTCP and audio codec information collected (such as the packet loss ratio, inter-arrival jitter, round trip delay, and used audio codec). The result is displayed to indicate voice quality.

## Settings Setup for Megaco/H.248 Voice Test

Press **Service Tests** on the Main Menu screen. For the VoIP quality testing, press **VoIP** to call the VoIP Testing Services screen. Select **Megaco/H.248** for a Megaco/H.248 voice test.



When **Megaco/H.248** is pressed, the FrameScope Pro will display the Megaco Setting screen.

The current settings can be saved or the previous settings retrieved via the Suite screen by pressing **Suite** on the Megaco Setting screen. Other actions that can be performed from the Megaco Setting screen are listed below.

- Press **Add MGC** to add in a new MGC to the MGC list
- Press **Edit MGC** to edit the configuration of a selected MGC
- Press **Clear MGC** to remove the selected MGC
- Press **Clear All MGCs** to remove all the MGCs in the MGC list
- Press **Settings** to set the parameters for the IP Phone MG
- Press **Goto Start** to start the test

**NOTE**

The first MGC in the MGC list will be configured as the primary MGC by default. You can manually set the primary MGC for testing by selecting the radio button of the desired MGC. If there is no primary MGC for testing, **Start** will be disabled.

Press **Add MGC** to add a new MGC. This will call the Add New MGC screen where the details of the new MGC is configured. Press **Edit MGC** to edit the details of the MGC on the Edit MGC screen. The parameters for the **Add MGC** and **Edit MGC** are the same. Press **OK** when done.

The DNS name or IP address of the MGC

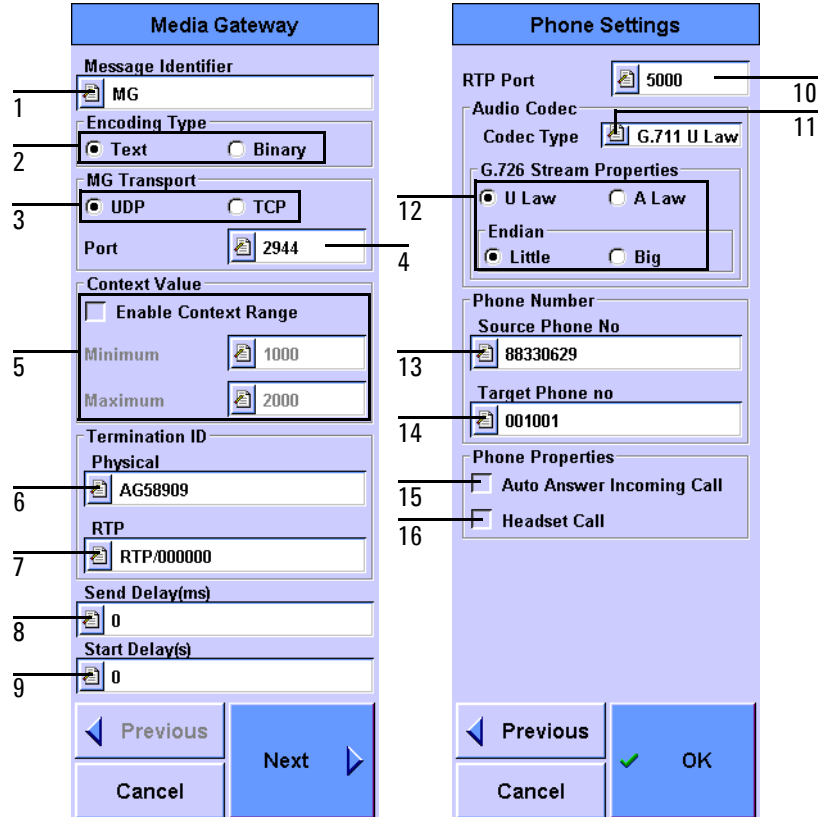
The transport port for binary-encoded operation

The name of the MGC which will be part of the MGC ID in Megaco/H.248 signal

The transport port for text-encoded operation

### 3 Voice Testing with the FrameScope Pro

Press **Settings** to configure additional settings for the Megaco/H.248 test.



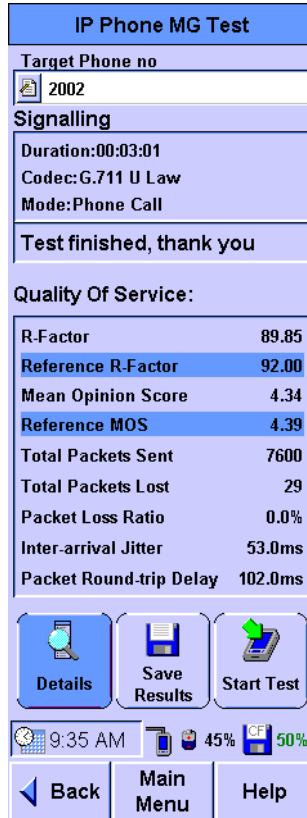
- 1 The MG ID
- 2 The encoding method for Megaco/H.248 signaling with **Text** as the default signaling
- 3 The local MG transport protocol with **UDP** as the default transport protocol
- 4 The local MG port
  - The default value for Text Encoding is 2944
  - The default value for Binary Encoding is 2945
- 5 The configurable value of Context with the range of hexadecimal one to 0xFFFFFFFFD. If this range is not configured, the system will generate a random start context ID between hexadecimal one to 0xFFFFFFFFD, except when NULL, SELECT, or ALL Context ID is selected.
- 6 The local physical termination ID
- 7 The local ephemeral termination ID
- 8 The delay time before sending a transaction to allow other transactions to be sent in the same message from 0 ms to 1000 ms



- 
- |    |   |
|----|---|
| 9  | The MG need to select a random start for delay time with the range from 0 s to 600 s  |
| 10 | The local RTP media port  |
| 11 | The supported audio codec   |
| 12 | The configurable parameters for G.726 audio codec stream type and Endian-bit samples packed scheme  |
| 13 | The phone number of the current FrameScope Pro  |
| 14 | The phone number of the target device   |
| 15 | To configure the call mode <ul style="list-style-type: none"><li>• Select for callee mode</li><li>• Clear for caller mode</li></ul>   |
| 16 | To configure the call for either live audio, or play back recorded WAV file <ul style="list-style-type: none"><li>• Select for live audio</li><li>• Clear for playback of recorded WAV file</li></ul> |
-

## Running the Test

Press **Goto Start** when all the settings have completed to start a Megaco/H.248 test.



The call is placed to the number set in **Target Phone no** with the user-defined audio codec as specified on the Settings screen. The test can be manually stopped by pressing **Stop Test**. After the Megaco/H.248 signaling has completed, data flows across the network and the measurement statistics appear in the IP Phone MG Test screen.

To view more details of the QoS, press **Details**.

To save the test results, press **Save Results**.

To restart the test, press **Start Test**.

## Interpreting Results

The statistics measured are plotted in a graphical format. The graph is plotted with the iterations of the timing info as the X-axis and the values of one of the parameters listed as the Y-axis.

- R-Factor
- Mean Opinion Score
- Total Packets Sent
- Total Packets Lost
- Packet Loss Ratio
- Inter-arrival Jitter
- Packet Round-trip Delay

To view the signaling log details of the test, press **Megaco Log** on the IP Phone MG Test Details screen.

The image displays three screenshots of the FrameScope Pro interface. The first two screenshots show the 'IP Phone MG Test Details' screen with different graphs selected. The third screenshot shows the 'Megaco LOG Details' screen.

**IP Phone MG Test Details (R-Factor Graph):**

Iterations #1  
Codec:G.711 U Law  
9/9/2008 09:31:31

**R-Factor**

Graph showing R-Factor values over 76 iterations. The Y-axis ranges from 0 to 100.

Measurement	Current	Worst
R-Factor	90.64	60.13
Mean Opinion Score	4.35	3.10
Total Packets Sent	100	N/A
Total Packets Lost	0	N/A
Packet Loss Ratio	0 %	0 %

**Megaco LOG**

9:35 AM 46% 50%

Back Main Menu Help

**IP Phone MG Test Details (Packet Round-trip Delay Graph):**

Iterations #1  
Codec:G.711 U Law  
9/9/2008 09:31:31

**Packet Round-trip Delay**

Graph showing Packet Round-trip Delay in mSec over 76 iterations. The Y-axis ranges from 0 to 125.0.

Measurement	Current	Worst
Total Packets Sent	100	N/A
Total Packets Lost	0	N/A
Packet Loss Ratio	0 %	0 %
Inter-arrival Jitter	59.00 mSec	62.00 mSec
Packet Round-trip Delay	20.00 mSec	125.0 mSec

**Megaco LOG**

9:37 AM 46% 50%

Back Main Menu Help

**Megaco LOG Details:**

Duration:00:01:37  
Callee:001001  
Caller:

8/21/2007 11:00:47.0  
=> Service Change Restart(901) 141.183... => |  
8/21/2007 11:00:47.0  
|<= Service Change Restart ok 141.183.30... <=|  
8/21/2007 11:00:47.0  
|<= Modify AG58909 <=|  
8/21/2007 11:00:47.0  
|<= Event: al/of <=|  
8/21/2007 11:00:47.0  
|<= Event: tonedet/std <=|  
8/21/2007 11:00:47.0  
|>= Reply: Modify => |  
8/21/2007 11:00:47.0  
|<= Reply: Service change <=|

Previous OK  
Cancel

Each iterations shown is based on the RTCP message exchanged during the VoIP test.

- The **Inter-arrival Jitter**, **Total Packet Loss**, and **Packet Loss Ratio** are based on the received RTP packets. **Packet Round-trip Delay** is based on the RTCP packet information.
- **R-Factor** and **Mean Opinion Score** are based on **Inter-arrival Jitter**, **Total Packet Loss**, **Packet Loss Ratio**, and **Packet Round-trip Delay**. If no RTCP packet is sent, then **Packet Round-trip Delay** will set to zero.
- **Total Packets Sent** reports the number of packets sent from the FrameScope Pro.
- **Total Packet Lost** is based on RFC 1889/3550 “Cumulative Number of Packets Lost”.
- **Packet Loss Ratio** is based on RFC 1889/3550 “Fraction Lost”.

## How to Save and Retrieve Results

The FrameScope Pro VoIP test results are saved to the CompactFlash card.

You can recall previously stored test data using the Tests Database tool. This section describes how to recall and delete stored tests. Press **Tools** on the Main Menu screen to display the Tools menu. On the Tools menu, press **Tests Database**.

The FrameScope Pro VoIP test results are stored in the SIP Phone Test Results and Megaco Test Results folder respectively. The number before the folder names indicates the number of stored files in the folder.

To view the stored test in a folder, select the folder and press **+** or **Expand List** to expand the folder.

To display the test results details, select the test results file and press **View**.

To delete a stored test, select the test results file and press **Delete**.

The VoIP test results can also be retrieved from the FrameScope Pro when the FrameScope Pro web server is enabled. The results are available in .CSV, HTML, or JAVA format. Refer to [Chapter 7](#), “Remote Control” on page 189 for further information.

## Downloading and Viewing Results with a Web Browser

The results can be viewed in a HTML table or graphical form using a browser. You can also download them as a .CSV file for viewing, as described in [Chapter 8](#), “Test Database” on page 242.

### **3 Voice Testing with the FrameScope Pro**



## 4 Generating Voice Traffic with the FrameScope Pro

VoIP Traffic Overview	118
Dependencies and Assumptions	118
RTP Header	119
Measuring VoIP Parameters	119
Generating Voice Traffic	120

This chapter provides the information on generating voice traffic with the FrameScope Pro.

### VoIP Traffic Overview

The VoIP Traffic Generator can generate from one up to 100 valid RTP streams. These RTP streams have the same source and destination IP addresses but different source and destination ports. Each RTP stream contains a valid RTP header and dummy payload data.

The following codec types are supported by the VoIP Traffic Generator.

- G.711 A-Law
- G.711  $\mu$ -Law
- G.729A

The test duration, QoS, and Type of Service (ToS) can be configured.

The VoIP Traffic Generator feature is controlled by license Option N2620A-03G. Refer to [Chapter 7](#), “License Details” on page 163 for information on activating this feature.

### Dependencies and Assumptions

The generated RTP stream (packets) may have to go through a number of firewalls, proxies, switches, and routers to reach the destination network. These network components should allow the application-generated RTP packets to reach the destination based on the following data.

- The user-defined destination IP address
- The user-defined destination start UDP port
- The source IP address (FrameScope Pro test port address)
- The source UDP port, starting with 50000 and incrementing by two for each subsequent stream
- RTP version: 2



## RTP Header

Each call is represented by an RTP stream with the following properties.

- Header data.
  - Version: 2.
  - The Payload Type (PT) is determined by the codec. It is the same for all packets.
  - The sequence number for the packets in a call starts with a random number, then increments by one for each packet.
  - The timestamp for the packets in a call starts at the current time of the FrameScope Pro, then increments according to the codec type.
  - The SSRC identifier is the same for all the packets for a call, but different for each RTP stream.
  - All other header fields are set to zero.
- The Payload Data is random.

Call number	Packet number	SSRC ID	Sequence	Timestamp (based on codec type)
1	1	SSRC1	2394 (random number)	0
	2	SSRC1	2395	160
	3	SSRC1	2396	320
	...	...	...	...
2	1	SSRC2	3957 (random number)	0
	2	SSRC2	3958	160
	...	...	...	...

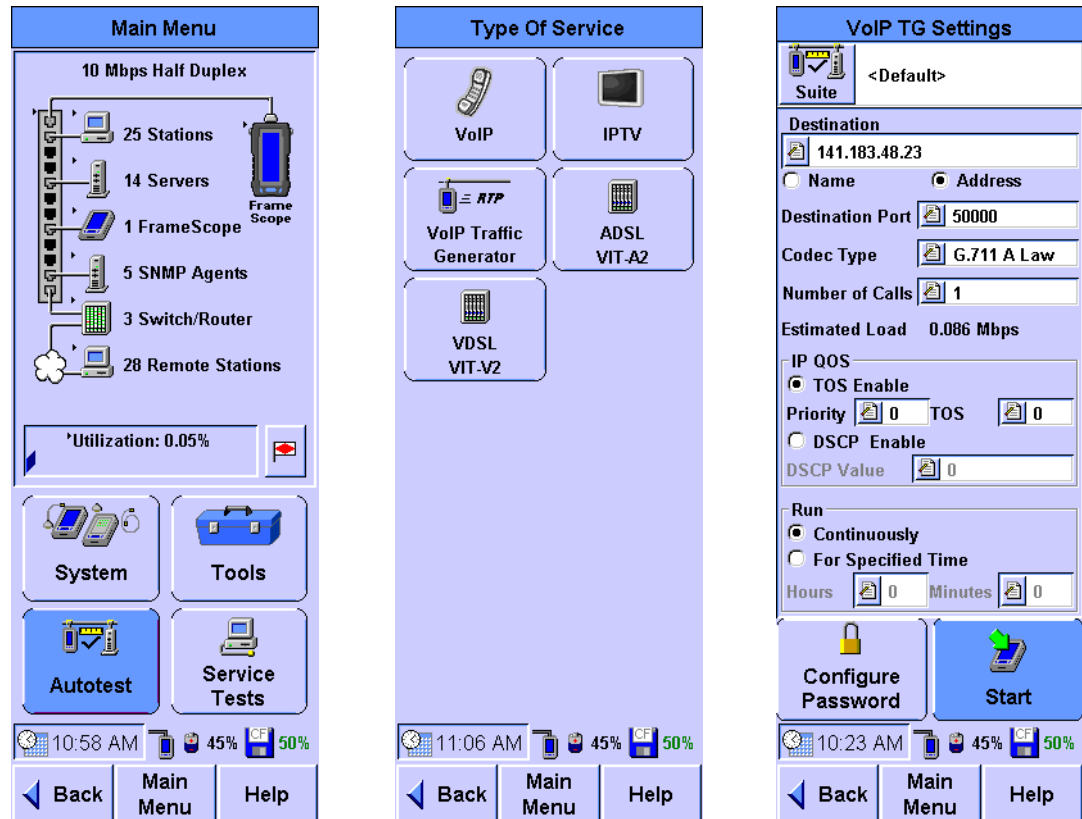
## Measuring VoIP Parameters

Use the Agilent J6844A Telephone Network Analyzer (TNA) to measure MOS and other VoIP related parameters of the traffic generated by the FrameScope Pro.

The TNA does not calculate the MOS silence value which is 0.

## Generating Voice Traffic

Press **Service Tests** on the Main Menu screen to call the Type of Service menu. Press **VoIP Traffic Generator**.



Input the values for the following parameters on the VoIP TG Settings screen.

- The destination hostname or IP address.
- The first destination port (further calls will be sent to the following port numbers). The destination port needs to be an even number.
- The codec type.
- The number of calls to set up.
- The QOS parameters.
- The test duration, whether the calls are run for a specified time duration or continuously.

**NOTE**

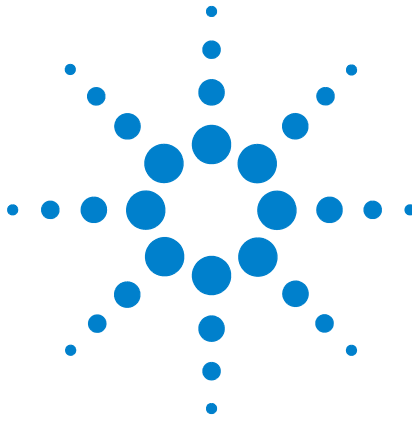
The source IP address and source port cannot be set. The source IP address is the FrameScope Pro test port address. The source port starts at 50000 for the first RTP stream and increments by two for each subsequent RTP stream.

---

Press **Start** once you have configured the settings.

The VoIP Traffic Generator transmits frames until you press **Stop** or when the configured time is reached.

## **4 Generating Voice Traffic with the FrameScope Pro**



## 5 DSL Testing with the FrameScope Pro

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This chapter deals with DSL testing which consists of ADSL and VDSL tests. VIT-A2 and VIT-V2 testers from Vierling are required for DSL testing.



## DSL Testing Overview

The FrameScope Pro can connect to the following points.

- Main Distribution Frame
- Cable Distribution Cabinet
- Customer connection point

The test results are controlled and displayed by the FrameScope Pro.

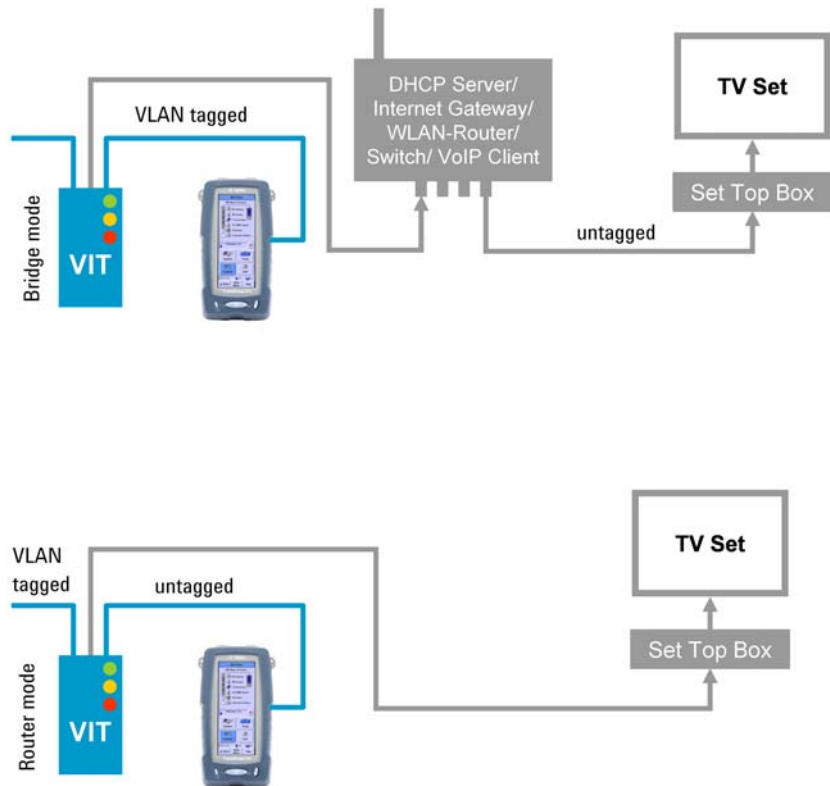
The DSL feature is controlled by the following licenses.

- ADSL/ADSL2+ Annex A, which requires the license Option N2620A-055
- ADSL/ADSL2+ Annex B, which requires the license Option N2620A-056
- VDSL, which requires the license Option N2620A-057

Refer to [“License Details”](#) on page 163 for information on activating this feature.

## Connecting the Test Setup

### Connected between the modem and a gateway or in the network



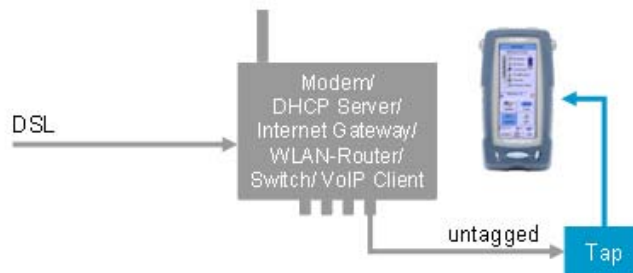
In this connection, the FrameScope Pro connects to and controls a VIT-A2 Layer 1 ADSL tester from VIERLING. It can operate in the bridge or router mode. For further information, consult the documentation supplied with the VIT-A2.

Using a tap device (as described in [“Connecting inside the gateway”](#) on page 126), the FrameScope Pro can perform the following operations.

- Read performance parameters and error counters from the VIT-A2
- Perform all active and passive network tests available on the FrameScope Pro, including Autotest, Auto Discovery, Ping, TraceRoute, network statistics, FTP and HTTP downloads, and VoIP testing

When the VIT-A2 is in the bridge mode, the FrameScope Pro or the router of the system-under-test needs to perform the PPPoE dial-in. When the VIT-A2 is in the router mode, the VIT-A2 will perform the PPPoE dial-in instead.

### Connecting inside the gateway



In this connection, the FrameScope Pro connects to the end customer router – also known as Integrated Access Device (IAD) – which can include a modem, DHCP server, router, WLAN router, VLAN management, VoIP client, switch, print server, and hardware firewall.

The tap device between the IAD and set-top box allows the FrameScope Pro to perform all its available active and passive network tests, particularly Autotest, Auto Discovery, Ping, TraceRoute, network statistics, FTP and HTTP downloads, and VoIP testing.



## xDSL Layer 1 Testing

The FrameScope Pro supports the following standards.

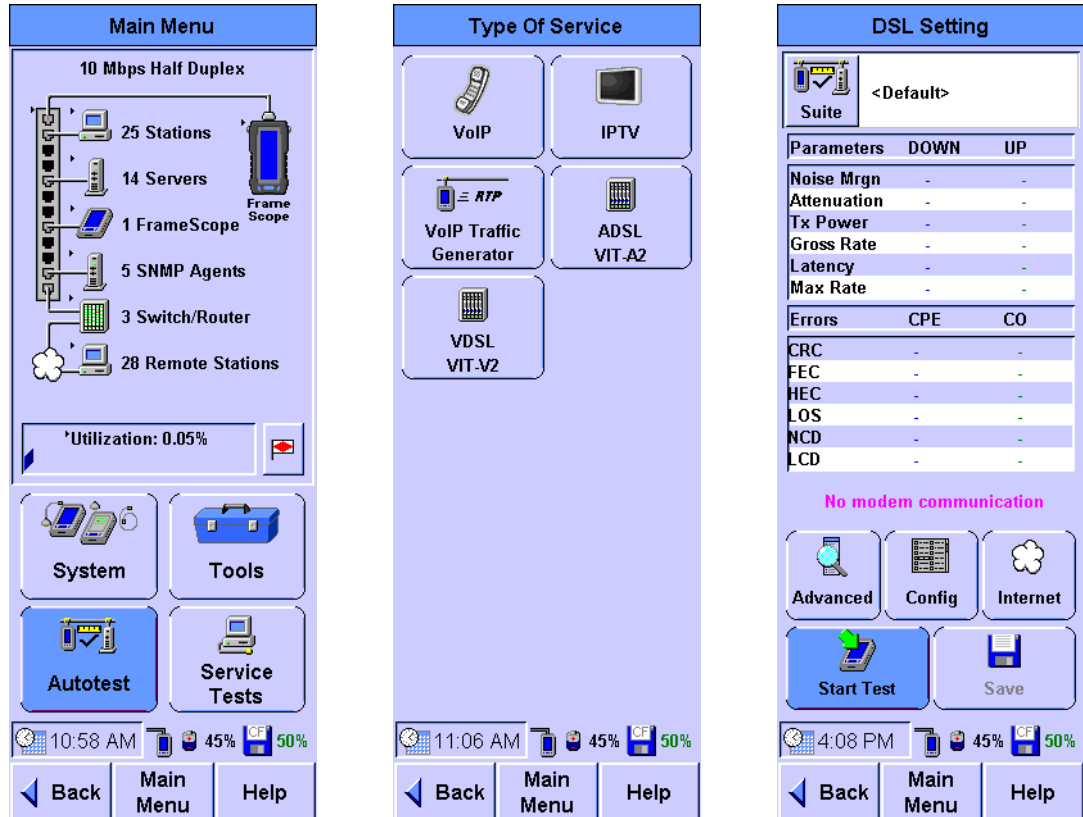
- Option N2620A-055
  - ETSI TS 101 388
  - ITU-T G.994.1 (Handshake)
  - G.992.1 Annex A (ADSL)
  - G.992.3 Annex A (ADSL2)
  - G.992.5 Annex A (ADSL2+)
  - T-Com 1 TR 112 (U-R2)
- Option N2620A-056
  - ETSI TS 101 388
  - ITU-T G.994.1 (Handshake)
  - G.992.1 Annex B (ADSL)
  - G.992.3 Annex B (ADSL2)
  - G.992.5 Annex B (ADSL2+)
  - T-Com 1 TR 112 (U-R2)

The system-under-test needs to perform the following actions.

- Support PPPoE sessions with the PPP protocol. Ethernet frames have to conform to IEEE802.1Q and 802.1ad.
- Support Ethernet frames with the VLAN tags type a and b, according to IEEE802.1Q. These are the Ethernet frames, including the VLAN tag, that is less than 64 bytes.
- Tag the data received at the 10/100 interface. Tags have to be removed for the data in the direction of the end system.

## Getting xDSL Performance Data

Press **Service Tests** on the Main Menu screen to call the Type of Service screen. Press **ADSL VIT-A2**.



The DSL Setting screen will load the the most recently saved test suite. If no test suite was previously saved, the default test suite will be loaded.

Press **Start**.

If the status line shows “No Modem Connection”, the FrameScope Pro is not connected to the VIT-A2. Check that the correct IP address is configured for the VIT-A2 (192.168.0.1 by default). Refer to “[Setting up the network parameters](#)” on page 135.

If the parameters of the test suite in the FrameScope Pro are different from the settings read from VIT-A2, the FrameScope Pro will prompt if the settings in the FrameScope Pro should be activated in the VIT-A2. The test suite settings can be configured in the Modem Network Settings and Test Settings screens. Press **Advance** on the DSL Setting screen and then press **Settings** on the

Advance screen to access **Modem Network Settings** and **Test Settings**. Refer to “[Advanced Settings for VIT-A2](#)” on page 135 for further details.

- If you agree to activate the settings in the VIT-A2, the FrameScope Pro overwrites the VIT-A2 settings with the test suite settings. These settings will then be activated in the VIT-A2.
- If you disagree to activate the settings in the VIT-A2, the VIT-A2 settings are not overwritten. The test suite settings are still shown on the FrameScope Pro but are not activated in the VIT-A2.

Press **Commit** to manually activate these settings.

Press **Cancel** to read the settings from the VIT-A2.

DSL Setting		
Suite	<Default>	
Parameters	DOWN	UP
Noise Mrgn	31 dB	30 dB
Attenuation	22 dB	16 dB
Tx Power	16 dBm	11 dBm
Gross Rate	2304 kbps	224 kbps
Latency	Interleaved	Interleaved
Max Rate	8928 kbps	1132 kbps
Errors	CPE	CO
CRC	3017	3
FEC	11	1
HEC	0	2
LOS	0	0
NCD	0	0
LCD	0	0
Showtime		
Advanced	Config	Internet
Stop Test	Save	
9:12 AM	45%	50%
Back	Main Menu	Help

When the connection is established with the VIT-A2, the FrameScope Pro displays the following parameters.

- The upstream and downstream connection parameters
  - Noise Mrgn: SNR margin (dB)
  - Attenuation: Line attenuation (dB)

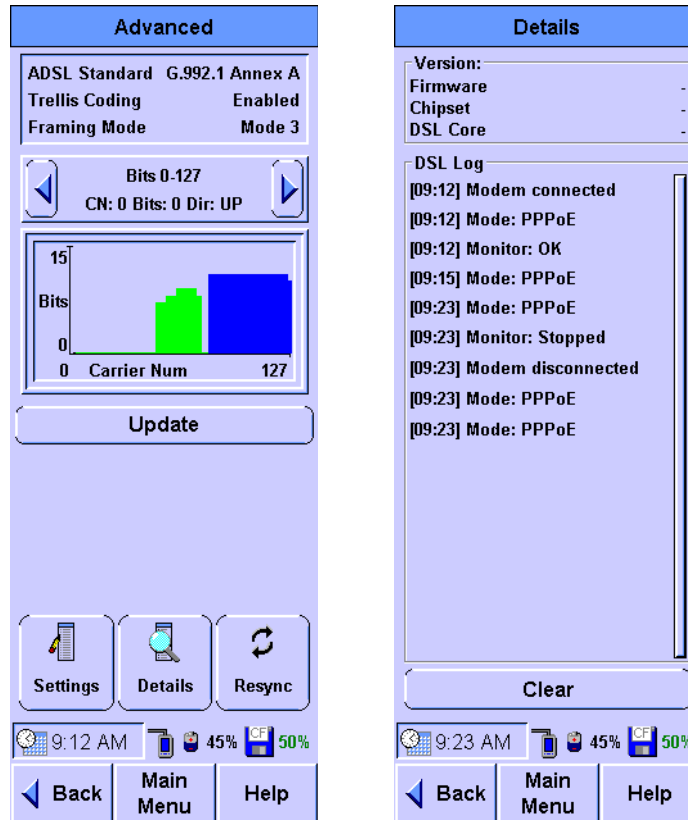
- Tx Power: Transmit power (dBm)
- Gross Rate: Actual data rate (kbps)
- Latency: Latency path
- Max Rate: Maximum data rate (kbps)
- The errors reported by CPE (VIT tester) and CO (DSLAM)
  - CRC: Cyclic redundancy check
  - FEC: Forward error correction
  - HEC: Header error control
  - LOS: Loss of signal
  - NCD: No cell delineation
  - LCD: Loss of cell delineation
- ADSL Status Messages:
  - Idle: Transceiver is initialized but idle
  - Quiet: Awaiting activation request from ATU-R
  - Diagnostic Mode
  - Ready: Standby
  - Fail: Fail due to error
  - Reset
  - GHS: Handshake
  - Full Initialization: Full training
  - Short Initialization: Short training
  - Retrain: Renegotiation
  - Showtime: Active (synchronization is successful)

These parameters are refreshed every 10 seconds. The timing for these updates is fixed and cannot be changed. The results of these updates are logged into the report file. You can set how often the results are logged to the report file, as shown in [“Setting up the report interval”](#) on page 135.

Press **Stop** to stop the test.

## Getting Further Information

Press **Advanced** on the DSL Setting screen to view the performance of the DSL connection and device information.



The Advanced screen shows the current value of the following parameters.

- ITU standard
  - G.992.1: ADSL
  - G.992.3: ADSL2
  - G.992.5: ADSL2+
- Annex
  - Annex A: over POTS
  - Annex B: over ISDN
- Trellis coding
  - Enabled
  - Disabled

- Framing mode (amount of overhead contained in the ADSL data frames)
  - Mode 0: ADSL data frames contain full overhead information
  - Mode 1 to 3: ADSL data frames contain reduced overhead information

The Bit Allocation shows the current range of carriers. Use the left and right navigation buttons to scroll through the subcarriers.

The graph contains information on 32 of the currently selected carriers, the number of bits assigned to each, and the direction (upstream or downstream). Upstream bits are displayed in green while downstream bits are displayed in blue.

Press **Update** to get the current allocation from the VIT-A2.

### **Resynchronizing the VIT-A2 with the DSLAM**

Press **Resync** on the Advanced screen to resynchronize the VIT-A2 with the DSLAM.

### **Getting details on the VIT-A2 and events during testing**

Press **Details** on the Advanced screen to call the Details screen. The Details screen will display the VIT-A2 device version information and a log screen of the events that occurred during the test.

## Configuring the DSL Test

### Setting Up the VIT-A2

Press **Config** on the main DSL screen to set or view the operating mode, bridge, and router settings of the VIT-A2. Select **Bridge** or **Router** for the operating mode on the Config screen.

The left screenshot shows the 'Config' screen with 'Bridge' mode selected. It features a table of interfaces and 'Edit', 'Add', and 'Delete' buttons.

INT	VPI	VCI	Encapsulation	Mode
1	1	32	LLC/SNAP	PPPoE
2	0	35	LLC/SNAP	PPPoE
3	0	38	LLC/SNAP	PPPoE

The right screenshot shows the 'Config' screen with 'Router' mode selected. It features a 'Settings' section with fields for VPI, VCI, Encapsulation, User Name, Password, Confirm Pwd, Dial On Demand, and Inactive Time (sec).

- In the Bridge operating mode, you can select the ATM VC interface. You can also edit or add interfaces. Each interface contains information on the following parameters.
  - VPI: Set the Virtual Path Identifier (between 0 and 255).
  - VCI: Set the Virtual Channel Identifier (between 0 and 6535).
  - Encapsulation: Select between LLC/SNAP or VCMux encapsulation.
  - Mode: Select between DHCP (RFC 2684 Bridged) or PPPoE.

Once you have selected a Bridge interface, press **Commit** to confirm and use the interface.

- In the Router operating mode, you need to configure the following parameters.
  - VPI: Set the Virtual Path Identifier (between 0 and 255).
  - VCI: Set the Virtual Channel Identifier (between 0 and 6535).
  - Encapsulation: Select between LLC/SNAP or VCMux encapsulation.
  - User Name and Password: needed by the Internet Service Provider for authentication.
  - Dial on Demand feature.

Select to enable the VIT-A2 to automatically connect to the Internet when there is a request for Internet access. Clear for manual connection to the Internet.

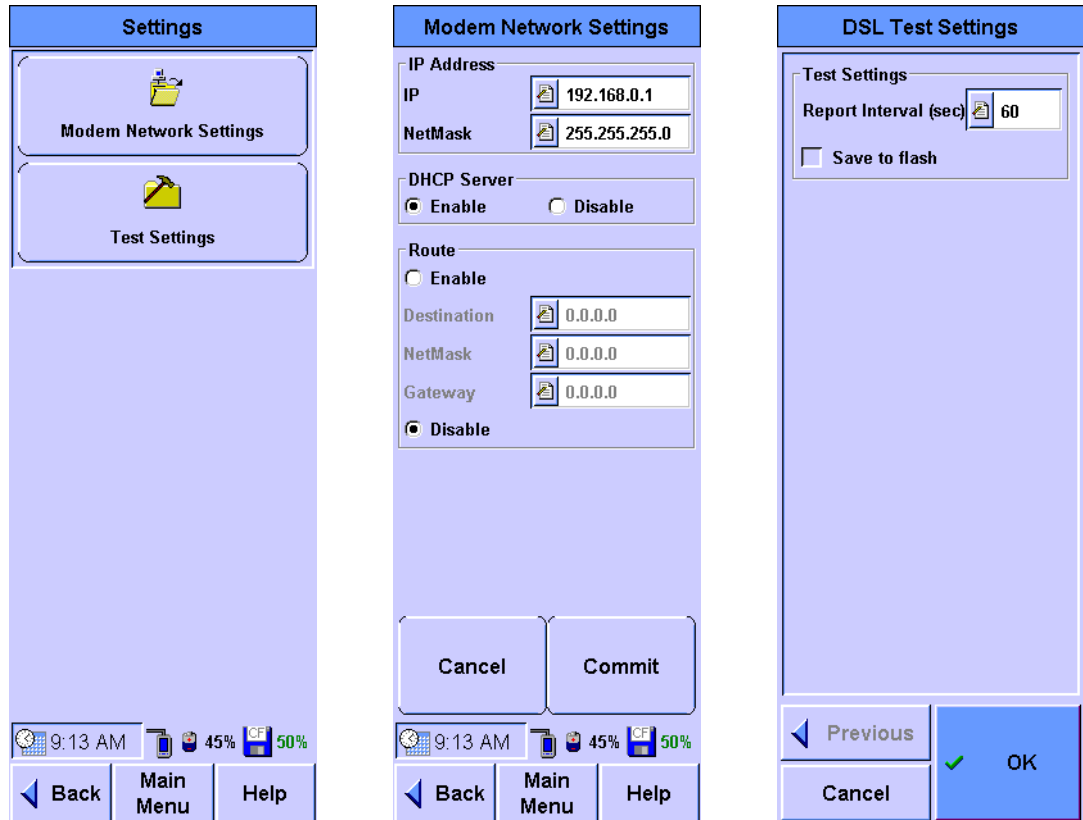
If **Dial on Demand** is selected, you can type in the time interval in seconds after which the Internet connection is automatically disconnected in case of inactivity. (0 to 86400, where 0 turns off this function.)

When you have completed the setup for the Router operating mode, press **Commit** to confirm and use the settings.



## Advanced Settings for VIT-A2

Press **Advanced** on the main DSL screen to call the Advanced screen. Press **Settings** to call the Settings screen.



### Setting up the network parameters

Press **Modem Network Settings** on the Settings screen to set or view the network parameters for the VIT-A2.

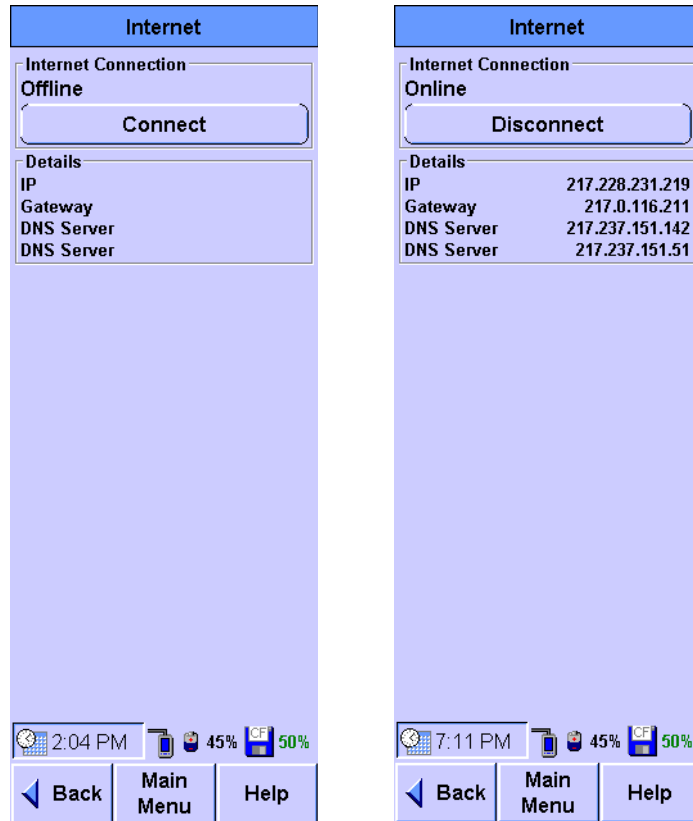
### Setting up the report interval

Press **Test Settings** on the Settings screen to set or view how frequently the connection parameters and error counters are logged to a report file.

## Controlling the Internet Connection

If the VIT-A2 is in the Router mode, you can initiate, disconnect, or view the PPPoE connection.

Press **Internet** on the main DSL screen.



- If there is a connection to the Internet, the connection parameters are displayed. Press **Disconnect** to disconnect from the Internet.
- If there is no connection to the Internet, you can create a connection using the parameters configured in [“Setting Up the VIT-A2”](#) on page 133. Press **Connect** to connect to the Internet.

## How to Save and Retrieve Results

The FrameScope Pro DSL test results are saved to the CompactFlash card when you press **Save Results** on the main DSL screen.

You can recall previous stored test data using the Tests Database tool. This section describes how to recall and delete the stored tests. Press **Tools** to call the Tools menu on the Main Menu screen. On the Tools menu, press **Tests Database** to view the stored test results.

The FrameScope Pro DSL test results are stored in the DSL Test Results folder. The number before the folder names indicates the number of stored files in the folder.

Select the folder and press **+** or **Expand List** to view the stored test results in the folder.

To display the detailed test results, select the desired test result file and press **View**.

To delete a stored test, select the desired test results file and press **Delete**.

The DSL Test results can also be retrieved from the FrameScope Pro if the FrameScope Pro web server is enabled. The results are available in *.CSV*, *HTML*, or *JAVA* format. (Refer to [Chapter 7](#), “Remote Control” on page 189).

### Downloading and viewing results with a web browser

You can view the results in a *HTML* table or graphical form in a web browser, or download the results as a *.CSV* file, as described in [Chapter 8](#), “Test Database” on page 242.

## 5 DSL Testing with the FrameScope Pro



## 6 IP Video Testing with the FrameScope Pro

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This chapter describes how the FrameScope Pro measures the QoS of Internet Protocol Television (IPTV).



## IPTV Testing Overview

The FrameScope Pro IPTV test delivers the network performance measurement solutions that help you install and maintain IPTV.

The IP Video test is designed to help technicians perform the following operations.

- Verify Layer 1 to 3 network connectivity and the connection to the IPTV server
- Initiate IPTV streaming to receive video at the customer premise
- Measure the IPTV QoS and compare the IPTV QoS with the established SLA or internal limits
- Identify the root cause of any service problem
- Generate test reports

The IPTV feature is controlled by license Option N2620A-070 and N2620A-071. Refer to [Chapter 7](#), “License Details” on page 163 for information on activating this feature.

## Supported Protocols

### Signaling

- RTSP (RFC 2326) for Video on Demand (VOD) streams
- IGMP v2 (RFC 2236) and v3 (RFC 3376) for multicast streaming
- Video streams with VLAN tagging, requires Option N2620A-071

### Transport

- RTP/RTCP (RFC 3550)
- UDP
- MPEG-2 Transport Stream
- Unicast or Multicast

### Measurement Parameters

#### **IPTV RTP transport statistics, requires Option N2620A-070**

- RTP transport, as defined in RFC 3550
  - total packets received
  - total packets lost
  - inter-arrival jitter
  - interval packet loss ratio

#### **One-Way Loss Pattern Sample Metrics, requires Option N2620A-071**

- As defined in RFC 3357
  - packet loss distance
  - packet loss period

**IPTV statistics, requires Option N2620A-071**

- MPEG-2 Transport Stream (TS) statistics, as defined in ETSI TR 101 290:
  - TS sync loss
  - Sync byte error
  - PAT error
  - PAT error 2
  - Continuity count error
  - PMT error
  - PMT error 2
  - Transport error
  - PCR repetition error
  - PCR discontinuity indicator error
- Service transaction quality
  - IGMP join latency
  - IGMP leave latency
  - IGMP channel zapping time
- Media Delivery Index (MDI, RFC 4445)
  - MDI:MLR (media loss rate), requires transport over RTP
  - MDI:DF (delay factor)
- Average throughput

**Test Reporting**

- Log the results of all tests for review
- Signaling events (IGMP or RTSP)
- Video quality measurements

**Configurable Parameters**

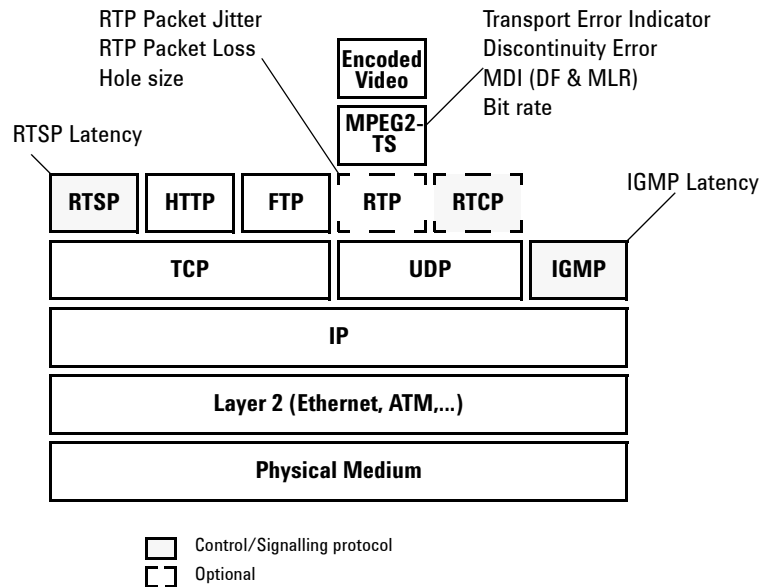
- Multicast address or port
- RTSP URL
- RTSP server port
- RTP port
- Threshold for the 3-level scoring of key parameters (requires Option N2620A-071)



## How the FrameScope Pro Tests IP Video Quality

### Measurement Overview

The FrameScope Pro supports either RTSP or IGMP and IPTV QoS analysis on the IP and MPEG layers as shown in the diagram.



### IPTV Channel Setup and Control

Both RTSP and IGMP are supported to control IPTV channel setup. The FrameScope Pro acts as an RTSP client and can establish an RTSP session with the media server, specifying the acceptable user-defined transport parameters. The media server is expected to confirm the selected parameters and to reply with the server-side parameters (port numbers).

Once the setup has completed, the FrameScope Pro tells the server to start or stop sending media data using the user-defined mechanism.

For multicast streaming, the FrameScope Pro uses IGMP to join or leave the multicast addresses to which the media data are sent.

## Stream Receiving

The video may consist of one or two RTP channels (one for video and one for audio). In the latter case, the FrameScope Pro measures and collects the results for both RTP streams.

In certain network configurations with the firewalls, the stream data may be interleaved with the RTSP. This interleaving is not supported. The media server must send the stream data on the transport channels that are separated from the RTSP channel.

## Stream Quality Measurement

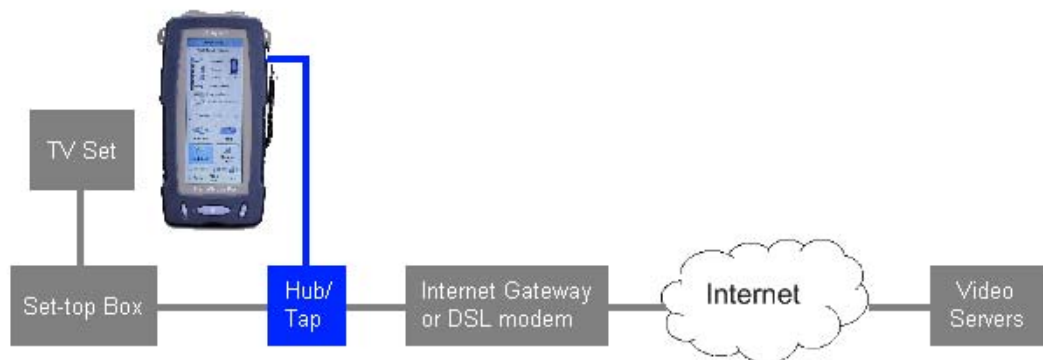
The IPTV test software performs video quality measurement by calculating the total packet loss, packet loss ratio, and jitter by using the sequence and timestamp information in the RTP header.

Other measurements performed by the IPTV test software are listed in “[IPTV statistics, requires Option N2620A-071](#)” on page 142.

## Test Modes

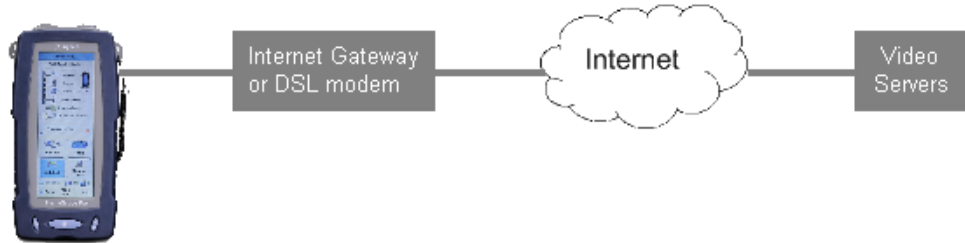
The FrameScope Pro supports two test modes, the Monitor test mode and the Terminate test mode.

### Monitor mode



In Monitor mode, a set-top box is used to initiate the IPTV channel setup and to change channels while the FrameScope Pro is analyzing the IPTV traffic parameters.

### Terminate mode

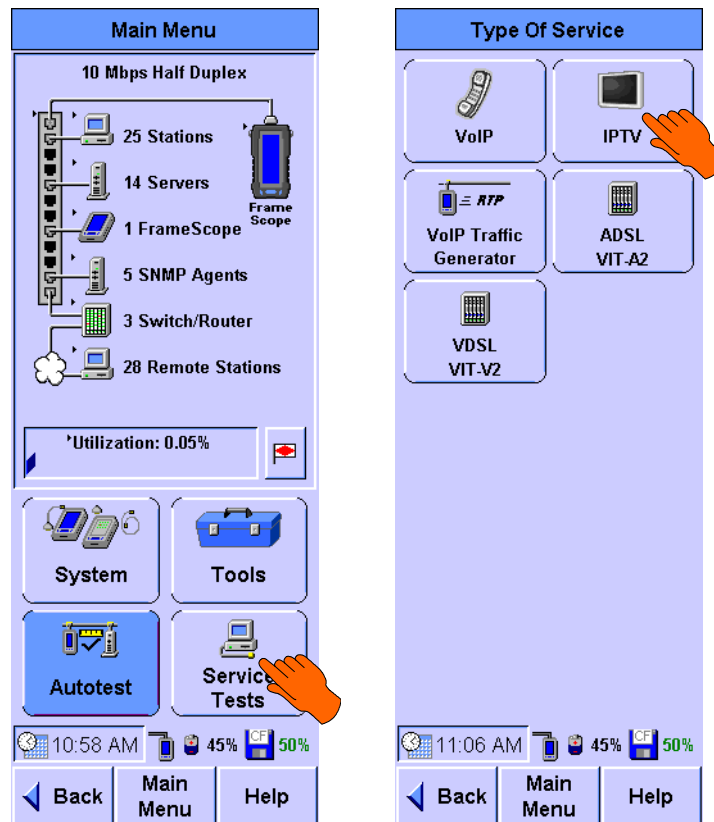


In Terminate mode, the FrameScope Pro supports both RTSP and IGMP to control the IPTV channel setup. For the test of multicast video streaming, the FrameScope Pro uses IGMP to join and leave those multicast addresses to which the content is streamed. The Terminate mode is the default setting for the IPTV test.

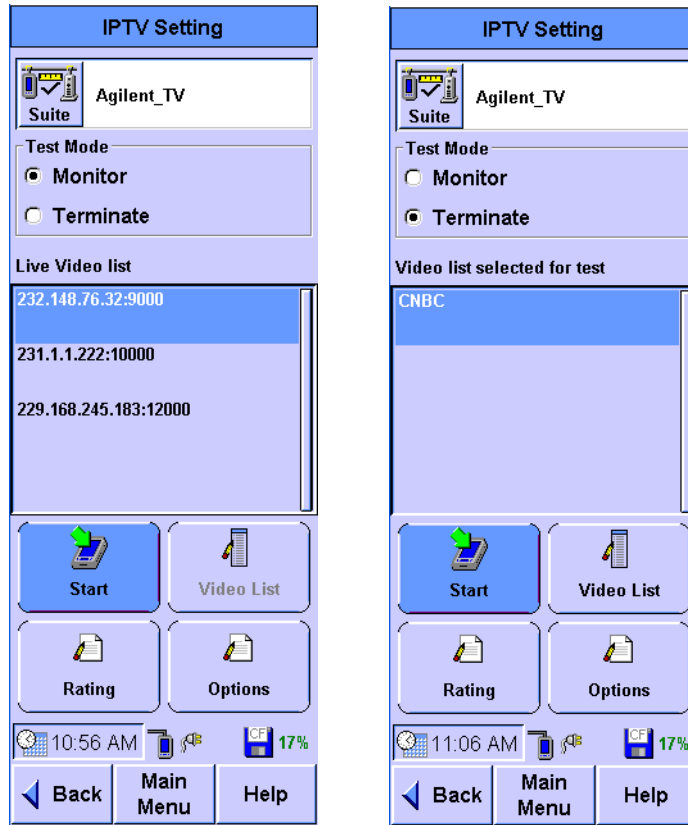
## Running an IP Video Test

Before running the IP Video Test, network settings for the FrameScope Pro has to be configured. Refer to [Chapter 7](#), “Test Port Settings” on page 171.

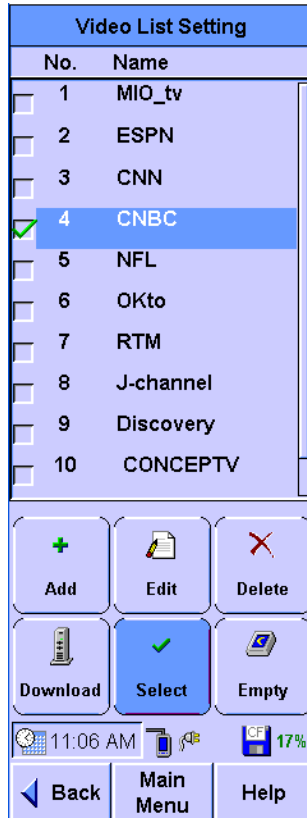
- 1 Press **Service Tests** on the Main Menu screen to call the Type Of Service screen. Press **IPTV**.



- 2 Select a default profile or press **Suite** on the IPTV Setting screen to select a previously-saved IPTV test suite.
- 3 The default setting runs the test in **Terminate** mode. Select **Monitor** test mode if you want to tap into a live video stream initiated by the set-top box. In live monitor mode, you can monitor up to 10 channels.



- 4 If a video channel is selected for the test, the first screen from the right shown above will be displayed.



- 5 If you want to change the selected channel, press **Video List** to view the list of channels available.
- 6 Select one channel in the Video List, then press **Select**. Press **Add** or **Download** if you want to add new channels to the list. Refer to “[Configuring and Adding Video Channels](#)” on page 149 for further details.
- 7 Press **Start** on the IPTV Setting screen to start the IPTV test.

Press **Suite** if you want to save this Network Settings suite or load a previously-stored suite.

- a Select a stored suite from the list or select **Create New**, then press **Next**. You can select **<Default>** if you want to reload the default suite.
- b If you select **Create New**, you will be prompted to type in a new name.

## Configuring and Adding Video Channels

The screenshot shows a 'Video Details' dialog box with the following fields and options:

- Video Number:** 3
- Video NAME:** CHNL 3
- Video Server IP Address:** 0.0.0.0
- RTP Port:** 10000
- Signaling Protocol:**  IGMP,  RTSP
- RTSP settings:**
  - Video File Path:** (empty)
  - RTSP Server Port:** 554
- Navigation:** Previous, Cancel, OK

- 1 To change the configuration of a channel, highlight the channel in the video list and press **Edit**.  
To add a new channel instead, press **Add**.
- 2 Type in **Video Number**, **Video Name**, **Video Server IP Address**, and **RTP Port**.
- 3 Select the signaling protocol (**IGMP** or **RTSP**).
- 4 If **RTSP** is selected, type the RTSP server IP address in **Video Server IP Address** and the file path in **Video File Path**. Update **RTSP Server Port** if necessary.
- 5 Press **OK** when the settings have completed.

## Downloading Video Channels

If common video lists need to be used on multiple FrameScope Pro units without the risk of operator errors, predefined lists can be provided for download from an FTP server. This feature also supports FTP authentication.

- 1 Press **Download** on the Video List Setting screen.

The screenshot shows a 'Download' dialog box with the following fields and sections:

- FTP Server Information:**
  - Server: 0.0.0.0
  - Radio buttons for 'Name' and 'Address' (selected).
  - Port: 21
  - Proxy Server: (empty)
- FTP Authentication:**
  - User Name: anony...
  - Password: (empty)
- Video List File Path:** (empty text box)
- Download Status:** Download yet to begin.
- Buttons:** Previous, Cancel, OK.

- 2 Type in the IP address or URL of the FTP server, the port number, and the proxy server to use the FTP service.
- 3 Type in the user name and password, if the FTP server requires FTP authentication.

If no authentication information is typed in, the FrameScope Pro will attempt to connect to the FTP server as an “anonymous” user.

- 4 Type in the full path, including the filename of the test suite to be downloaded, in the Video List File Path box.
- 5 Press **OK** to start the download.

After pressing **OK** and following a successful download, the Video List screen will be displayed.



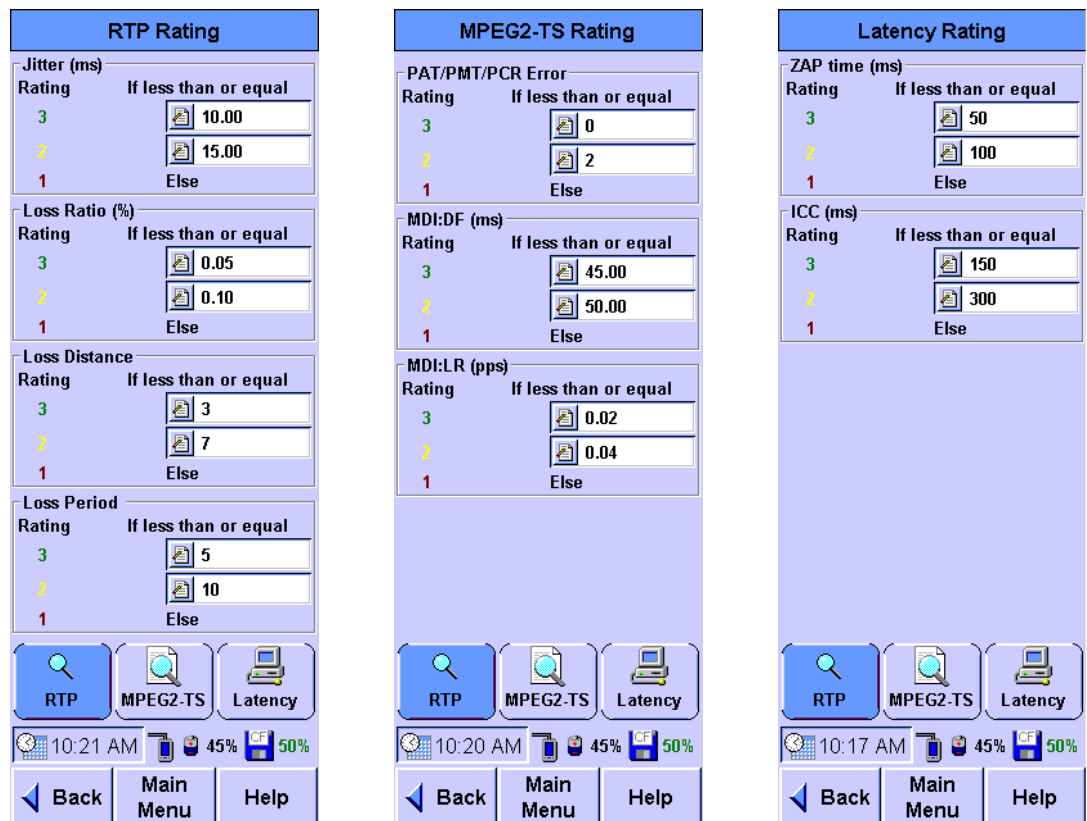
## Setting Pass or Fail and Rating Criteria for Results

The pass or fail criterion for each test parameter can be configured. The FrameScope Pro supports the following ratings.

- **1 (Poor)**: If a measurement value is greater than the user-defined value for RATING 2
- **2 (Marginal)**: If a measurement value is less than or equal to the user-defined value for RATING 2, and greater than the user-defined value for RATING 3
- **3 (Good)**: If a measurement value is less than or equal to the user-defined value for RATING 3

To set the ratings, perform the following procedure.

- 1 Press **Rating** on the main IPTV Setting screen.



- 2 The FrameScope Pro will display the RTP Rating screen for the RTP measurements. Type in the rating values for the following RTP measurements.

- Jitter (in ms)
- Loss ratio (in %)

- Loss distance
  - Loss period
- 3 Press **MPEG2-TS** to set the rating values for the MPEG2-TS measurements. Type in the rating values for the following MPEG2-TS measurement.
- PAT/PMT/PCR error count
  - Media delivery index delay factor (MDI:DF in ms)
  - Media delivery index loss rate (MDI:LR in pps)

The following parameters have fixed ratings for the MPEG2-TS measurements.

Sync Loss	Rating 3:	0
	Rating 2:	1
Sync Byte Error	Rating 3:	0
	Rating 2:	2
Transport Error	Rating 3:	0
	Rating 2:	1
Continuity Error	Rating 3:	0
	Rating 2:	1

- 4 Press **Latency** to set the rating values for Latency measurements. Type in the rating values for the following Latency measurement.
- ZAP time (in ms)
  - ICC (in ms)

## Configuring Settings for IPTV Test

Before running the IP Video Test, you can configure special settings for the IPTV test.

Press **Options** on the IPTV Settings screen to call the IPTV Options screen.

No.	Description
1	Allows the device to interpret incoming video packets in little endian format
2	Configures the VOD server port where the FrameScope Pro needs to connect
3	Allows you to choose the network that the IPTV test will connect to. If selected, the FrameScope Pro will use the configured global network setting of the device for IPTV test. If not selected, the FrameScope Pro will use the configured network setting on the IPTV Options screen for IPTV test.
4	Enables VLAN and specify VLAN Tag and VLAN Priority for IPTV streams

## 6 IP Video Testing with the FrameScope Pro

- 
- |   |  |
|---|--|
| 5 | Obtains IP settings automatically from a DHCP server     |
| 6 | Allows you to manually configure the IP network settings |
-

## Interpreting Results

The FrameScope Pro will show the results on the IPTV Test screen while the test is running.

**IPTV Test**

IGMP CHNL (VOD)  
Overall Rating **1**  
IN TEST 00:00:07

**RTP**

Total Packets	202
Jitter (ms)	15.0 <b>1</b>
Loss Ratio (%)	15.0 <b>1</b>
Loss Packets	213

**MPEG2-TS**

Total Packets	1799
Sync Loss	13 <b>1</b>
Transport Error	6 <b>1</b>
Cont. Error	1 <b>2</b>
PCR Error	14 <b>1</b>
MDI:DF (ms)	1.0 <b>3</b>
MDI:LR (pps)	14.0 <b>1</b>

**IGMP**

ZAP time (ms)	3.0 <b>3</b>
---------------	--------------

Details Save Stop Test

7:32 PM 45% CPU 50%

Back Main Menu Help

RTP results with ratings

MPEG2-TS results with ratings.

Only shown if the MPEG2-TS measurements are made.

IGMP results with ratings.

Only shown if the IGMP measurements are made.

Video information.

Use the left and right arrows to view the IP address, RTP port, test status, test duration, and so forth.

### Detailed Test Result Screen

The test stops when **Stop** is pressed or when the video reaches its end.

Press **Save Results** to save the entire test results to the CompactFlash card.

Press **Details** on the main IPTV Setting screen to check the RTP test results.

Use the left and right arrow keys to click through the data points, one by one

Scroll through the pages of the test results (one page can hold 128 iterations)

Graphical result of the selected measurement

Use the left and right arrow keys to click through the data points, one by one

Go to a particular screen of the test results

Selects a row in the table to view that result as a graph

Press to view the protocol events, errors, and other information

Measurement	Current	Maximum
Total Packets Received	202	22078
Total Packets Lost	98	20960
Interval Pkt Loss Ratio	27.1 %	38.4 %
Inter-arrival Jitter	36.7 mSec	40.4 mSec

Measurement	Current	Maximum
Total Packets Received	1942	349383
Sync Loss	8	1276
Transport Error	10	1267
SyncByte Error	4	1239

Press **MPEG2-TS** to call the MPEG2-TS screen to check the MPEG2-TS results.

Press **Latency** to call the Latency screen to check the Latency results.

Use the left and right arrow keys to click through the data points, one by one

IGMP	
ZAP (ms)	11.0 <b>1</b>
IGMP Join	190.0
IGMP Leave	0.0

Press to view the protocol events, errors, and other information

## Saving and Retrieving Results

The IPTV test results are saved to the CompactFlash card.

Previously stored test data can be reviewed using the **Tests Database** tool.

- 1 Press **Tools** on the Main Menu screen.
- 2 Press **Tests Database** on the Tools screen.

IPTV test results are stored in the **IPTV Test Results** folder.

The number on the left of the folder name indicates the number of stored files in that folder.

- 3 Select the folder and press + or **Expand List** to view the stored test results under that folder.
- 4 Select the desired test results file.
- 5 Press **View** to display the detailed test results of the selected file.

Select the test results file and press **Delete** to delete a stored test.

## Downloading and Viewing Results with a Web Browser

You can view the results in a HTML table or graphical form in a web browser, or download them as a .CSV file, as described in [Chapter 8](#), “Test Database” on page 242.





## 7 System Operations

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This chapter describes the various system operations of the FrameScope Pro.

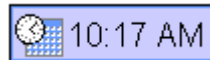


## The Status Display Area



The status display area shows the status of the following parameters.

### Clock display



The clock shows the time of day. It can be set in the **Time and Date** of the System Settings Network menu. Refer to [“Time and Date Setup” on page 167](#).

### Network connection status



The FrameScope Pro icon displays the network connection of the FrameScope Pro. If a red ‘X’ is shown on the connection, it indicates that the FrameScope Pro is not connected to the network.

### Power display



The AC power icon appears when the AC power adapter is connected to the FrameScope Pro and an AC power source.



When the FrameScope Pro operates using battery power, the battery charge icon shows the current battery state. The percentage value shows the amount of charge remained in the battery.

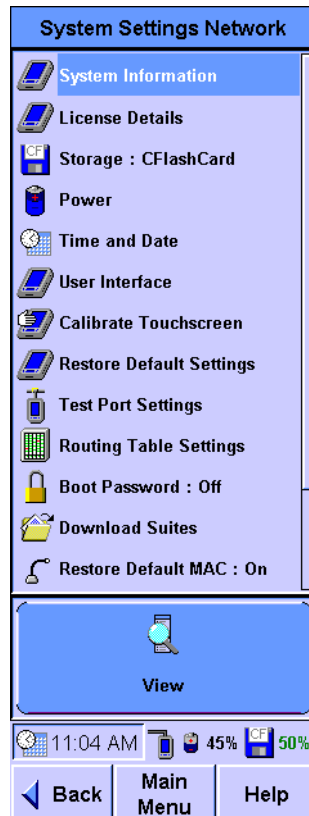
### Storage status



The storage icon indicates the status of the CompactFlash card. If the CompactFlash card is installed, an icon as shown by the left image is displayed with the percentage of storage available in it. If there is no CompactFlash card installed, a red ‘X’ will be marked on the icon.

## The System Menu

Press **System** on the Main Menu screen to display the System Settings Network menu of the FrameScope Pro.

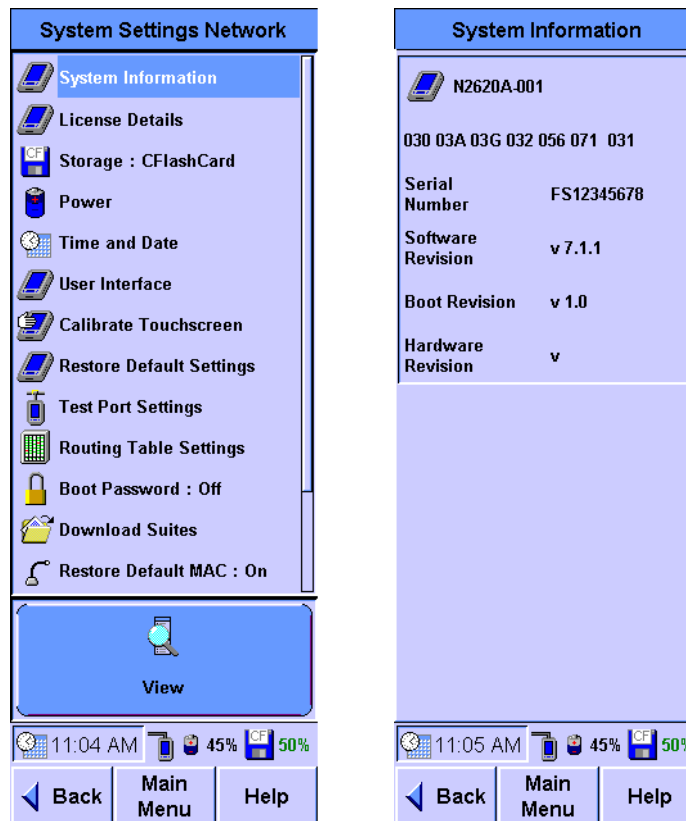


The items not shown on the screen can be accessed by using .

## System Information

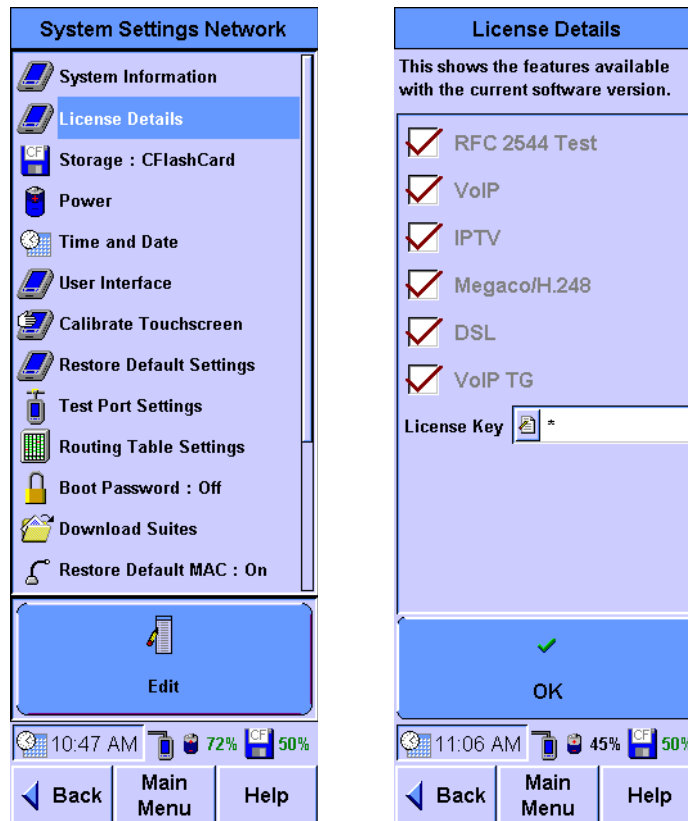
Select **System Information** and press **View** to call the System Information screen. The System Information screen will display the following details of the current FrameScope Pro.

- FrameScope Pro purchase option (Option N2620A-001 or Option N2620A-003)
- Activated license options
- Serial number
- Software revision number
- Boot revision number
- Hardware revision number



## License Details

The License Details option lists the features available in the current version of the software. Select **License Details** and press **Edit** to call the License Details screen to display all the available features.



To acquire a license key for a new option, contact your nearest technical support center or your Agilent representative.

### NOTE

Each license number matches the serial number of the FrameScope Pro for which it is bought.

You need a valid license key to enable an option on the FrameScope Pro. The license key is preinstalled for the test options bought with the FrameScope Pro.

If you bought a license to upgrade the FrameScope Pro, you will have to type in the license number manually. Follow the following procedure to type in the license key.

- 1 Press the **License Key** box. Press **Clear** on the onscreen keypad to clear the number on the display panel.



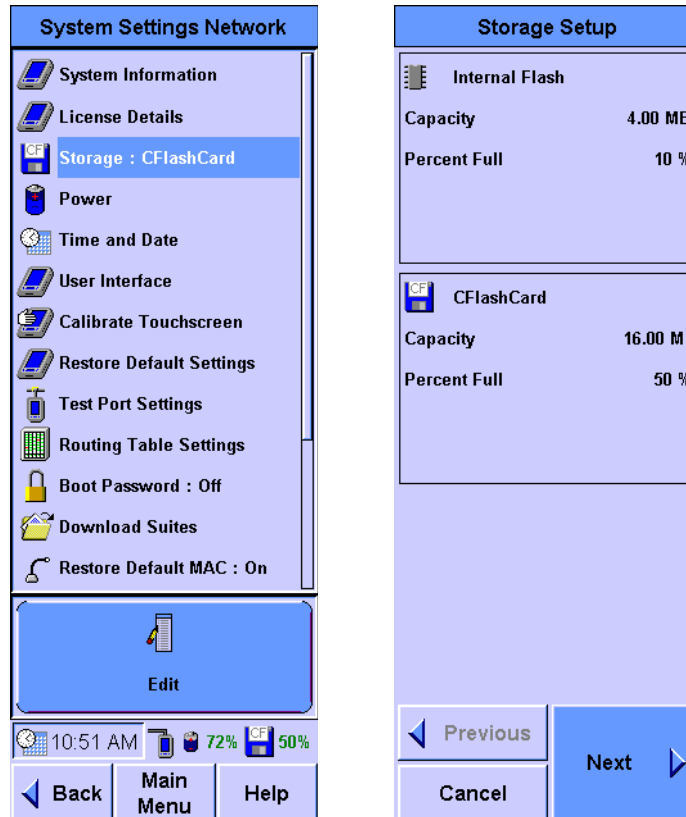
- 2 Type in the new license number.
- 3 Press **OK**.

If the license key is accepted, the option for that license becomes active.

## Storage Setup

### NOTE

You need a CompactFlash card for the storage of any test results. It is recommended that a CompactFlash card is always inserted into the FrameScope Pro.

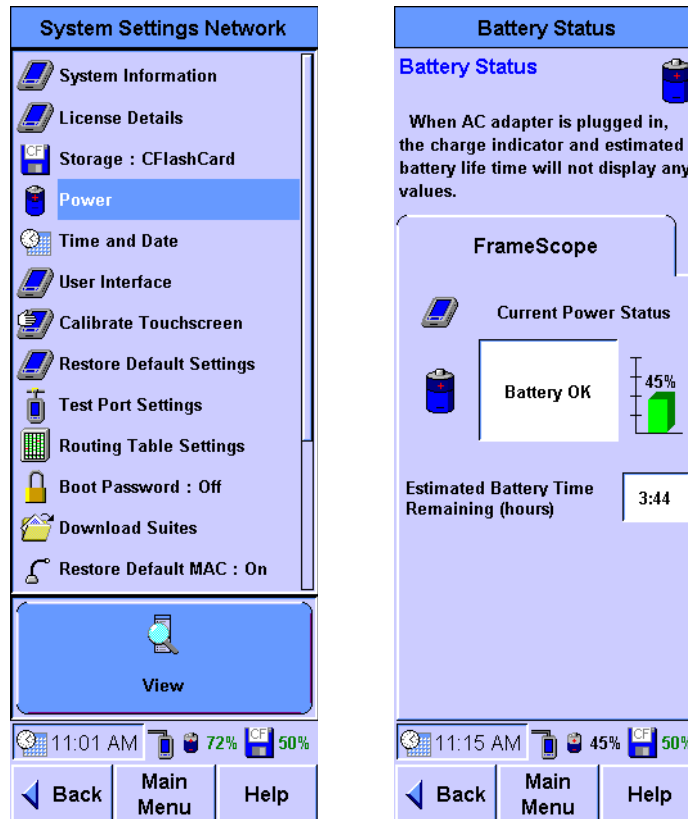


Select **Storage : CFlashCard** and press **Edit** to view the capacity and percentage of usage of the internal flash and CompactFlash card. Press **Cancel** to return to the System Settings Network screen.

If you press **Next** on the Storage Setup screen and a CompactFlash card is inserted in the FrameScope Pro, the option window to format the CompactFlash card appears. You can press **Yes** to proceed with the format or **No** to reject the formatting and return to the System Settings Network screen.

## Battery Status

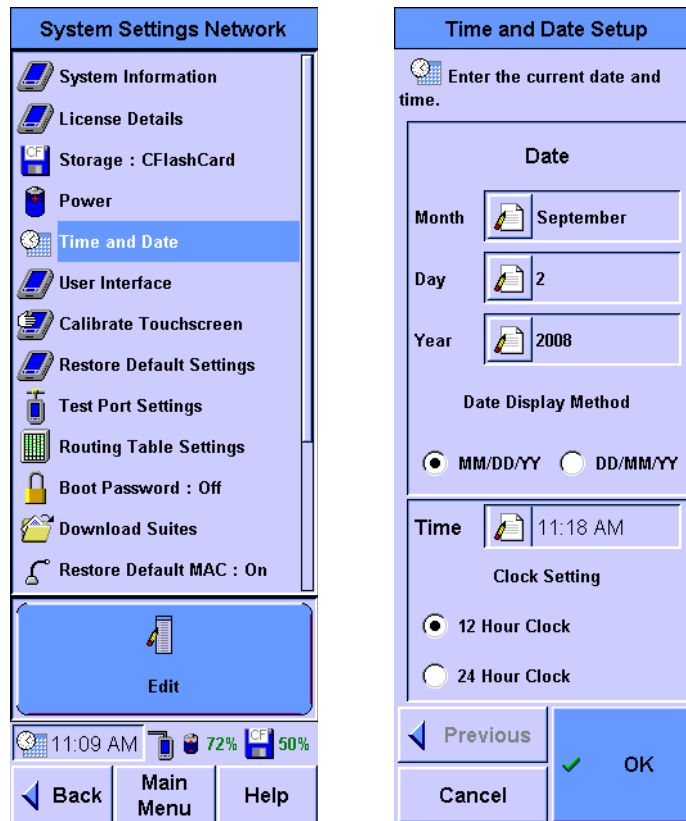
Select **Power** and press **View** to view the current power status. The Battery Status screen also shows the estimated remaining battery time.





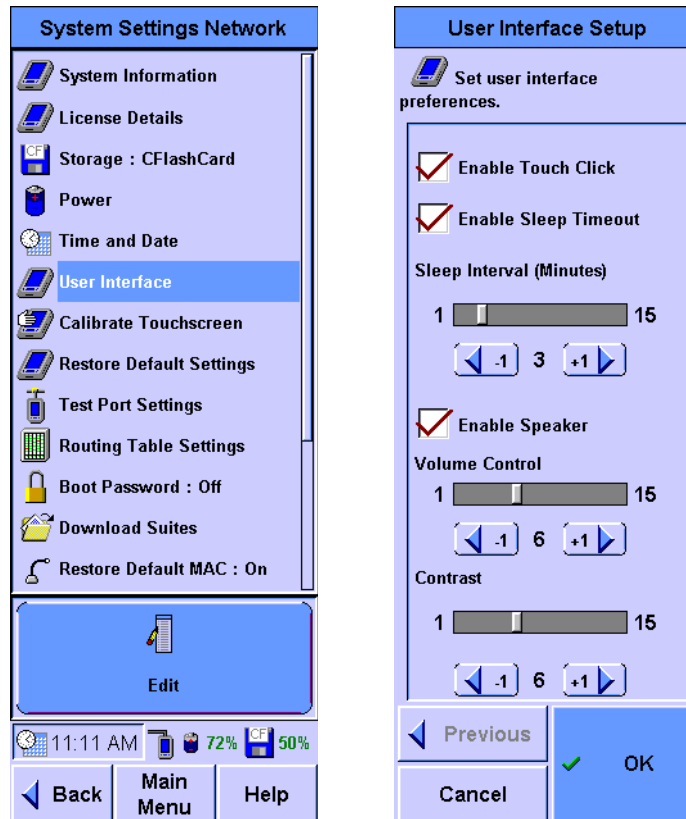
## Time and Date Setup

Select **Time and Date** and press **Edit** to set the time and date on the FrameScope Pro. The Time and Date Setup screen allows you to set the **Month**, **Day**, **Year**, and **Time**. You can also select the display method of the date and time.



## User Interface Setup

Select **User Interface** and press **Edit** to set the user interface preferences. The User Interface Setup screen allows you to set the following preferences.



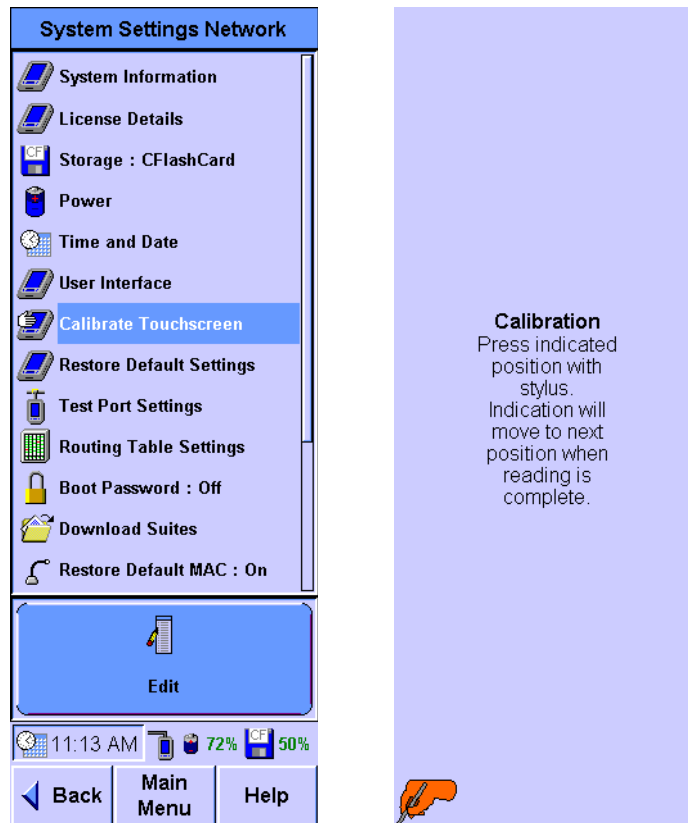
- Enable Touch Click: Select on or off.
- Enable Sleep Timeout: Select on or off.

A screen touch will wake the screen. When enabled, the Sleep Interval setting bar is displayed.

- Sleep Interval (in minutes): The time interval (1 to 15 minutes) without a screen touch or button press before the unit goes to sleep.
- Enable Speaker: Select on or off.
  - Volume Control: Scale of 1 to 15.
  - Contrast: Scale of 1 to 15

## Touchscreen Calibration

If it seems that the FrameScope Pro is not responding correctly to the taps on the touch screen, the touch screen may need to be calibrated to bring the taps back into alignment with the underlying display.



Follow the following procedure to calibrate the touch screen.

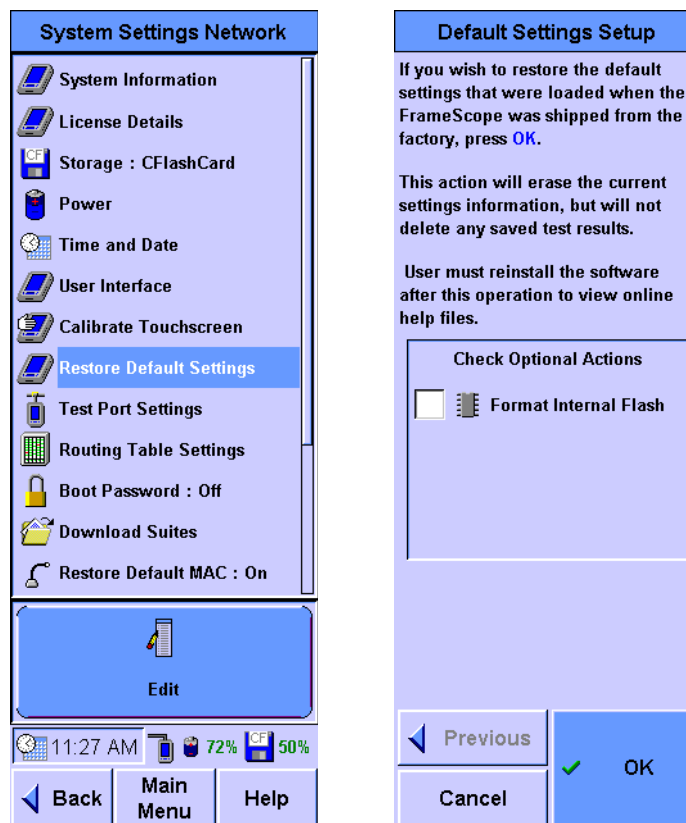
- 1 Ensure that you have the stylus available.
- 2 Select **Calibrate Touch Screen** and press **Edit** on the System Settings Network screen. The Calibration screen will be displayed.
- 3 Using the stylus, press the screen as directed by the onscreen instructions. Since the coordinate readings are very sensitive, you should tap on the exact point of the screen as indicated by the drawing of the stylus.
- 4 The FrameScope Pro will return to the System Settings Network screen when the calibration has completed.

## Restore Default Settings

The following procedure describes how the FrameScope Pro restores the configuration values that were set when the unit was shipped from the factory.

The **Restore Default Settings** is performed when you want to delete all user-configured system settings or before upgrading the software.

- 1 Select **Restore Default Settings** and press **Edit** to call the Default Settings Setup screen.



- 2 Select **Format Internal Flash** if you want to clear the data in the internal flash and return to the default settings and profiles of the FrameScope Pro.
- 3 Press **OK** to restore the factory default settings.
- 4 As this action will erase all current settings, you are asked to confirm before proceeding. In the subsequent confirmation windows, press **Yes** to accept the resets or **No** to cancel the resets and return to the System Settings Network screen.

- 5 If **Format Internal Flash** is selected, you must reinstall the FrameScope Pro software.


Refer to the *FrameScope Pro Upgrade Utility Manual* for details on how to upgrade or reinstall.

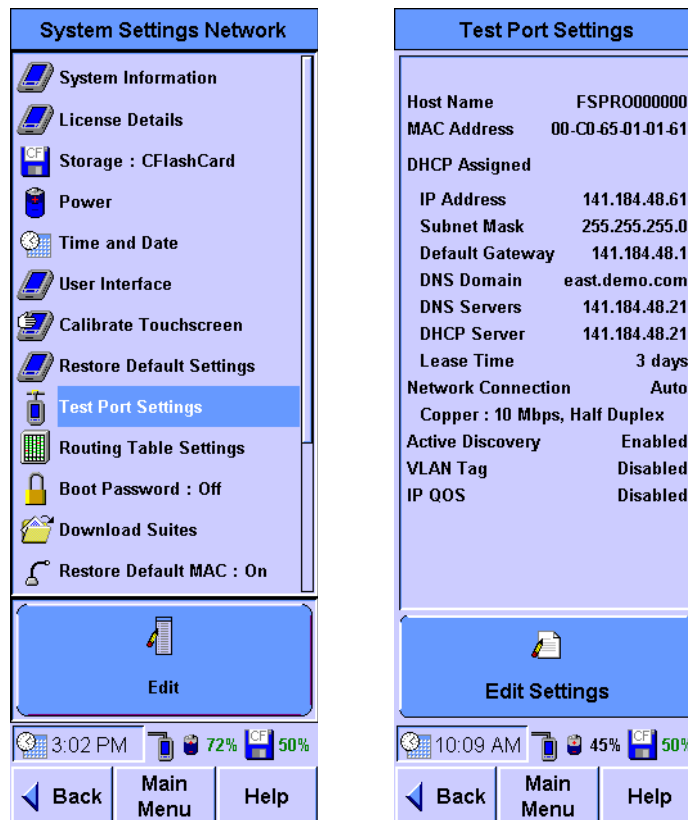
## Test Port Settings

The Test Port Settings screen shows a summary of the network configuration.

### NOTE

For the Test Port Settings of the FrameScope Pro with VoIP Option, refer to [Chapter 3](#), “Voice Testing with the FrameScope Pro” on page 91.

Press  on the Main Menu screen or select **Test Port Settings** on the System Settings Network screen and press **Edit** to access the Test Port Settings screen.

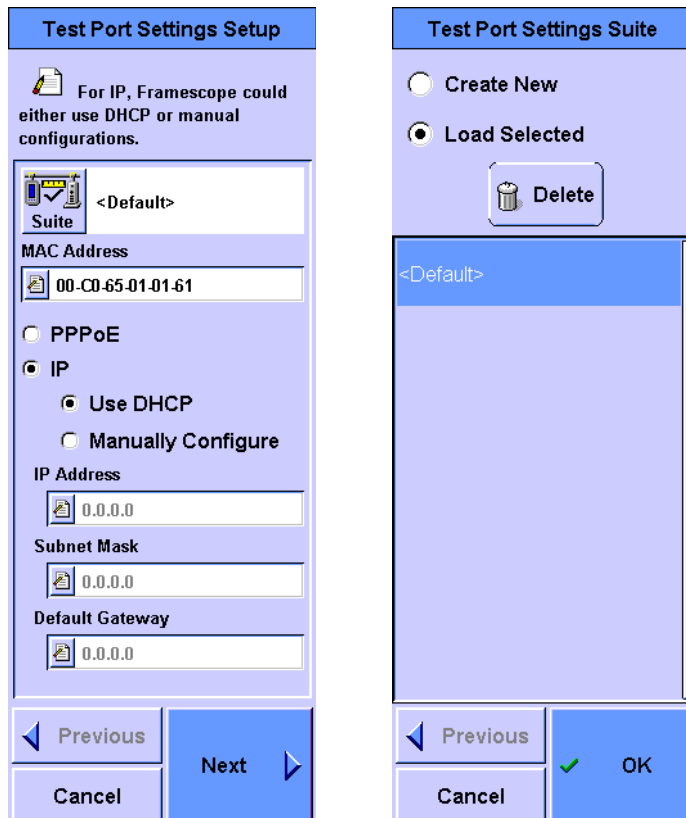


The following information is displayed on the Test Port Settings screen.

- Host Name (the FrameScope Pro name, by default FRSCOPE followed by the three last hexadecimal bytes of the MAC address, but it can be changed to any desired name)
- MAC address of the FrameScope Pro (the factory setting that identifies the FrameScope Pro among the Ethernet devices)
- Information assigned by DHCP or manually
- Network Connection (auto or manual)
- Active Discovery (enabled or disabled)
- VLAN (enabled or disabled)
- IP QoS (enabled or disabled)

Press **Edit Settings** to change any of these settings. The first Test Port Settings Setup screen allows you to select the addressing mode. Press **Suite** if you want to save this Test Port Settings suite, or load a previously stored suite.

Select a stored suite from the list or select **Create New**, then press **Next**. You can select **<Default>** if you want to reload the default suite. If you select **Create New**, you will be prompted to type in a new name.



**CAUTION**

MAC address modification is not advisable. If a modification is unavoidable, the changes should be done with extreme care so that it will not conflict with any MAC address that is in use.

The MAC Address of the FrameScope Pro is displayed in the MAC Address box. Usually the box contains the factory default value. But this field can be used to change the MAC address if this is necessary for a specific case or to meet the security requirements.

The MAC address can be reset to the factory default on the next power-on as described in “[Restoring the Default MAC Address](#)” on page 188.

There are two types of addresses for the Test Port Settings.

- If **PPPoE** is selected, you must type in the user name, password, domain, and service name for the PPPoE after you press **Next** for the screen shown below.

**Test Port Settings Setup**

This mode enables Framescope to connect using PPP Over Ethernet into the network. This feature requires user to provide username and password for the PPPconnection.

User Name

Password

Domain

Service Name

Previous Next Cancel

**NOTE**

PPPoE has no manual configuration of the IP address, subnet mask, or default gateway.

- If you select **IP**, you can select **Use DHCP** to automatically configure the FrameScope Pro when connected to the network, or select **Manually Configure**. If you choose to manually configure the IP settings, you have to at least type in a valid IP address and subnet mask.
  - IP Address - This value identifies the FrameScope Pro in the TCP/IP network
  - Subnet Mask - This value is combined with the IP address to define the subnet of the FrameScope Pro
  - Default Gateway - This is the default gateway (router) that the FrameScope Pro will use to communicate with devices on the other subnets

Press **Next** when done.

**Test Port Settings Setup**

Set the parameters used for name lookups in NetBIOS and DNS

**NOTE:** If DHCP is used, it may provide some of these items.

Host Name  
FSPRO000000

DNS Domain

DNS Servers  
0.0.0.0  
0.0.0.0  
0.0.0.0

WINS Servers  
0.0.0.0  
0.0.0.0

Previous Next Cancel

The second Test Port Settings Setup screen allows you to change the Host Name from the default, type in a Domain Name System (DNS) Domain, and provide DNS and WINS server addresses.

- Host Name - This name will be used to identify the FrameScope Pro in NetBIOS and FrameScope Pro protocols. The default name is 'FRSCOPE' followed by the three last hexadecimal digits of the MAC Address. It may be changed to any name as desired.



- DNS and NetBIOS Settings - Devices on the network may be referred to by name. In the DNS, the FrameScope Pro asks the DNS servers to convert the name to an IP address. When NetBIOS names are used, the FrameScope Pro asks the WINS servers to convert the name to an IP address. The DNS Domain and the DNS and WINS servers can be obtained through the DHCP and may be typed in manually. If you type in a DNS Domain, it will be used in place of the DHCP supplied value. If you type in DNS or WINS servers, they will be used in preference over the DHCP supplied values.

Press **Next** when done to access the third Test Port Settings Setup screen.

**Test Port Settings Setup**

The speed and mode (half or full duplex) of the network connection can be automatically negotiated or manually set.

**Interface**

Copper  
 Fiber

**Link**

Auto Detect  
 Manually Configure

**Link Speed**

10 Mbps  
 100 Mbps  
 1000 Mbps

**Link Mode**

Half Duplex  
 Full Duplex

Flow Control

- Network Connection - Since the network hardware may function at a variety of speeds and modes, the FrameScope Pro has the ability to autonegotiate its speed and mode when it is connected to the network. The autonegotiation attempts to configure the devices for the fastest supported network connection. If necessary, you can manually set the FrameScope Pro for 10 Mbps, 100 Mbps, or 1000 Mbps and full or half duplex mode (for Gigabit Ethernet, only full duplex mode is available). This may be used, for example, to prove that a 10/100 switch can properly support the 10 Mbps speed. You can also select whether to use a fibre or copper interface.
- Flow Control (enable or disable) - If Flow Control is enabled, the FrameScope Pro will transmit flow control packets (XON and XOFF frames) based on the MAC FIFO fullness.

Press **Next** when done to access the fourth Test Port Settings Setup screen.

- VLAN Support - The FrameScope Pro supports C-VLAN (IEEE 802.1q) and P-VLAN (IEEE 802.1ad) tagging.

Enabling C-VLAN allows sending and receiving of Q-tagged frames. Set the appropriate C-VLAN Identifier and C-VLAN Priority. These values are dependent on the C-VLAN setting of the network-under-test. Q-tagging is normally used to group different host traffic in enterprise networks similar to a single LAN even if they are geographically separated from each other.

Enabling P-VLAN allows sending and receiving of AD-tagged frames (also know as Stacked VLAN). Set the appropriate P-VLAN Identifier and P-VLAN Priority. These values are dependent on the P-VLAN setting of the network-under-test. AD-tagging is normally used in the service provider network to separate different client traffic. Set a 4-hexadecimal digit value for the P-VLAN Tag Protocol ID (TPID) when testing on the service provider network. This value will be used by FrameScope Pro as the TPID field to be inserted and stripped when enabling P-VLAN support. This field indicates that the packet is a P-VLAN packet in a service provider network. This field is dependent on the P-VLAN settings of a service provider, so you should set this value appropriately. It can be set even if the P-VLAN is not enabled to indicate to the FrameScope Pro that the packet is a P-VLAN packet and should be interpreted as such by the device.

Press **Next** when done to access the last Test Port Settings Setup screen.

**Test Port Settings Setup**

The FrameScope can actively or passively probe the network to discover devices. It can also be configured to set IP TOS or erase station list when the link goes down.

Active Discovery

Erase Station List

IP QOS

TOS Enable

DSCP Enable

IP Priority

TOS Value

DSCP Value

Previous    OK

Cancel

- **Active Discovery** - Select to enable or clear to disable. When the FrameScope Pro is attached to a switch port, it only sees the broadcast traffic and traffic targeted for the FrameScope Pro. When Active Discovery is enabled, the FrameScope Pro requests information from the devices on the network to increase the amount of information the FrameScope Pro can learn from the network.

**NOTE**

Active Discovery will affect the network and, in some cases, trigger some alarms. For a list of the activity, refer to [Chapter 8](#), “Active Discovery Process” on page 201. Take extreme care when using Active Discovery.

- **Erase Station List** - Select to enable or clear to disable. The FrameScope Pro automatically discovers stations on the network it is connected to and shows these stations on the Main Menu screen. You can refresh this station list by removing and reconnecting the physical link (for example, fiber or copper cable) when the Erase Station List feature is enabled.

- **IP QoS** - Select to enable or clear to disable. If QoS is enabled, the FrameScope Pro will send IP packets with the IP TOS field set. You can select to use either IP TOS or IP Differential Service field (DSCP). If IP TOS is used, you can set the IP Priority along with TOS value. If DSCP is used, you can set the DSCP value to be used in the IP packets.

Press **OK** when done.

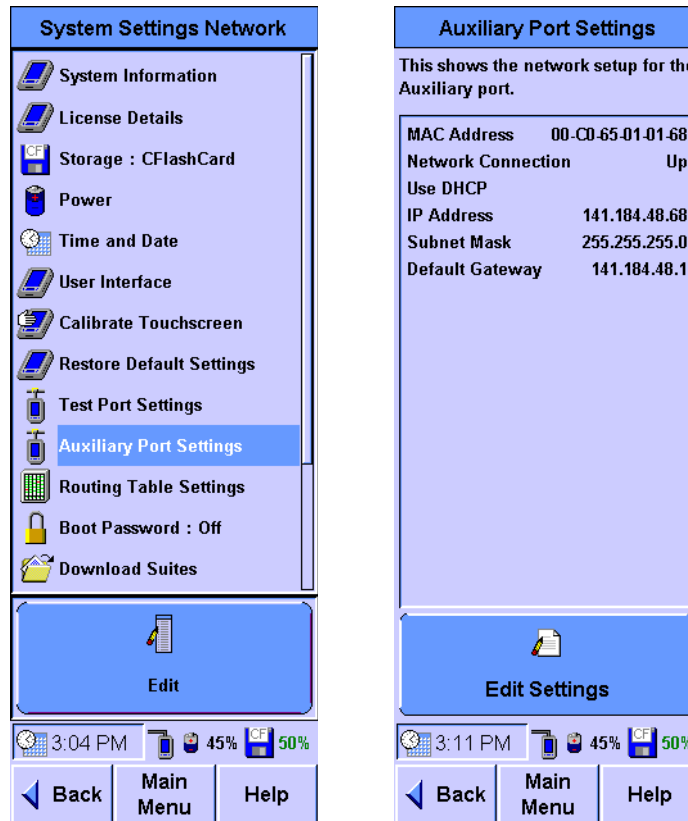
## Setting Up the Optional Auxiliary Port

The Auxiliary Port of the FrameScope Pro provides an additional 10/100 Mbps Ethernet interface. It allows you to remotely control and access the FrameScope Pro through a network different from the network-under-test.

The Auxiliary Port can also be used for VoIP tests if the test port is being used for background traffic generation at the same time. For further details, please refer to [Chapter 3](#), “Simultaneous Traffic Generation during VoIP Testing” on page 102.

The Auxiliary Port cannot be used for network performance testing or with the troubleshooting tools available for the RJ45 and SFP Gigabit Ethernet test ports.

Select **Auxiliary Port Settings** on the System Settings Network menu and press **Edit** to call the Auxiliary Port Settings screen to view the status of the Auxiliary port or to make changes to it.



The screen shows the status of the Auxiliary port link and the IP address, subnet mask, and default gateway configured for the port.

Press **Edit Settings** to call the Auxiliary Port Setup screen to change the network settings of the Auxiliary port.

The image shows two sequential screenshots of the 'Auxiliary Port Setup' configuration screen. The left screenshot displays the initial configuration options, including a choice between 'Use DHCP' (selected) and 'Manually Configure'. The right screenshot shows the advanced configuration options, including fields for Host Name, DNS Domain, DNS Servers, WINS Servers, and VLAN Tag.

### CAUTION

MAC address modification is not advisable. If a modification is unavoidable, the changes should be done with extreme care so that it will not conflict with any MAC address that is in use.

- **MAC Address** - The MAC Address panel of the FrameScope Pro usually contains the value set in the factory. But this field can be used to change the MAC address if it is necessary for a specific case or to meet the security requirements.

Enable **Restore Default MAC** in the System Settings Network menu to reset the MAC address to the factory default on the next power-on.

### NOTE

The FrameScope Pro supports only one default gateway. If you need to configure the test and auxiliary ports in different subnets and the gateways to these subnets are different, add the interface and gateway for accessing the second remote network to the routing table, as described in [“Add Routes Using Routing Table Settings”](#) on page 183.

You can select **Use DHCP** to automatically configure the FrameScope Pro when the FrameScope Pro connects to the network, or select **Manually Configure**. If you choose to manually configure the IP settings, you have to at least type in a valid IP address and a valid subnet mask.

- **IP Address** – This value uniquely identifies the FrameScope Pro in the TCP/IP network.
- **Subnet Mask** – This value is combined with the IP Address to define the subnet mask of the FrameScope Pro.
- **Default Gateway** – This is the default gateway (router) the FrameScope Pro will use to communicate with devices on other subnets.

Press **Next** to proceed to the network client settings, which allows you to specify the host name, DNS domain, DNS servers, and WINS servers.

- To configure the Auxiliary Port to use VLAN tagging, select the **VLAN Tag** and type in the VLAN Identifier and VLAN priority according to the parameters of the network and service the Auxiliary Port is connected to on the second setup screen.

Press **OK** to finish the Auxiliary Port setup.

If changes are made, a window will appear asking you to restart the FrameScope Pro for the new settings to take effect.



## Add Routes Using Routing Table Settings

The Routing Table Settings option allows you to view, delete, and add new routes to the FrameScope Pro network routing table.

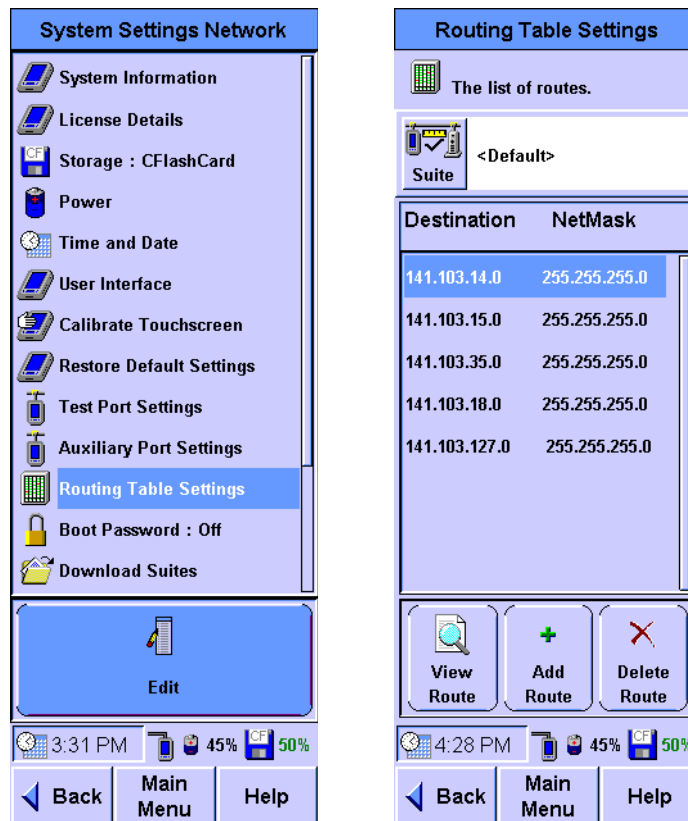
You can use routes in the FrameScope Pro routing table to access a network which is normally unreachable if the Test Port and Auxiliary Port had to use the same gateway, for example, to remotely control the FrameScope Pro from a separate subnet.

Before adding routes to the routing table, make sure that the following information is known.

- Default gateway address of the FrameScope Pro access port
- IP address of the subnet of the FrameScope Pro access port

The following procedure describes how to view and add routes to the routing table.

- 1 Select **Routing Table Settings** on the System Settings Network menu and press **Edit** to call the Routing Table Settings screen.



- 2 The Routing Table Settings screen shows all the currently configured routes. Select the route and press **View Route** to view the details for a particular route.
- 3 Press **Add Route** on the Routing Table Settings screen to add a new route to the routing table.

The screenshot shows a mobile application screen titled "Add Route". The screen is divided into several sections for inputting route details. At the top is a blue header with the text "Add Route". Below this, there is a "New Route" section containing five input fields: "Destination" (0.0.0.0), "NetMask" (0.0.0.0), "Gateway" (0.0.0.0), "Interface" (with radio buttons for "Aux Port" and "Test Port", where "Aux Port" is selected), and "Metric" (0). At the bottom of the screen, there are three buttons: "Previous" with a left-pointing arrow, "Cancel", and "OK" with a green checkmark.

- 4 Fill in the details about the new route in the Add Route screen.
- 5 Press **OK**.

The new route is added to the route list.

To verify if the new route is valid, select the route and press **View** to see the route details.

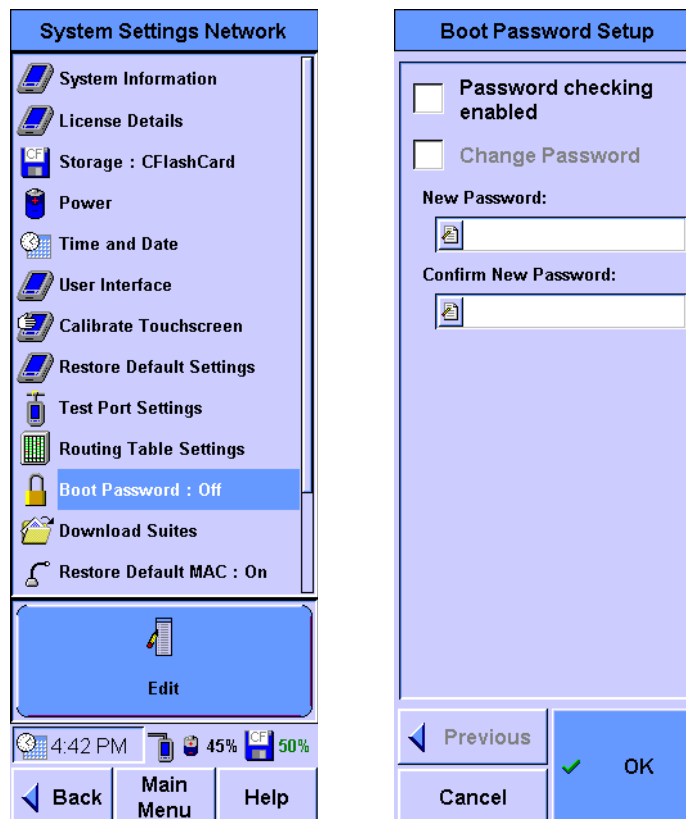
To delete a route, select the route from the list and press **Delete Route**.

## Boot Password

To protect the FrameScope Pro from unauthorized use, you can set a password. The correct password must be typed in before the FrameScope Pro powers up. By default, the FrameScope Pro is not password-protected.

To enable the boot password, perform the following procedure.

- 1 Select **Boot Password** and press **Edit** on the System Settings Network menu.



- 2 Select **Password checking enabled** to enable the password security.
- 3 If you want to type in a new password or change the existing password:
  - a Select **Change Password**.
  - b Type in the password in the **New Password** and **Confirm New Password** fields.
- 4 Press **OK**.

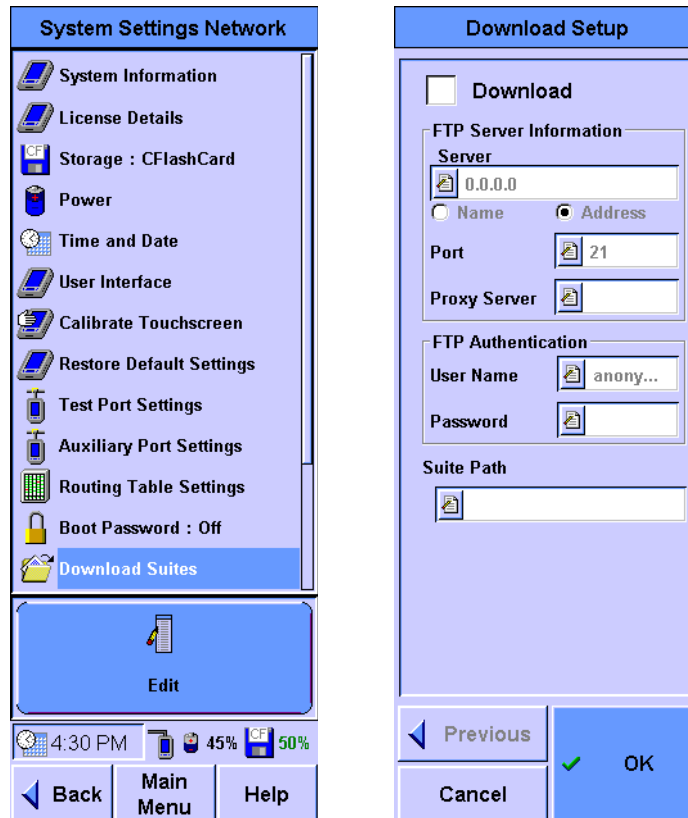
## Download of Test Suites from an FTP Server

If you need to use common test settings on multiple FrameScope Pro units without the risk of operator errors, you can provide predefined test suites for download from an FTP server. This feature also supports FTP authentication.

The test suites are stored on the CompactFlash card of the FrameScope Pro under an indexed test suite filename. On the FrameScope Pro, the test suites are listed under their profile name for easier handling. The profile name is user-configurable and is stored inside the test suite file.

Test suite files are simple text files (*.txt* extension). Advanced users can create new test suite files based on the test suite templates for the various test types.

- 1 Select **Download Test Suites** on the System Settings Network screen and press **Edit**.



- 2 Select **Download** on the Download Setup screen to turn on the download function.
- 3 Type in the IP address or URL of the FTP server, the port number to be used for the FTP service, and the proxy server

(if required). If the FTP server requires **FTP Authentication**, type in the user name and password. If authentication information is not entered, the FrameScope Pro will attempt to connect to the FTP server as an “anonymous” user.

- 4 Type in the address for the **Suite Path** which includes the filename of the test suite to be downloaded. The test suite filename must have a valid prefix as shown in the table below.

Test Suite type	Destination	Test Suite filename prefix
Autotest	WSDData1.0\ntst	ntst
Aux Port Setting	WSDData1.0\aux_suite	aux_suite
DSL test	WSDData1.0\dsl_tst	dsl_tst
PERT	WSDData1.0\pert_tst	pert_tst
RFC 2544	WSDData1.0\ltst	ltst
Routing Table Setting	WSDData1.0\routingtbl_suite	routingtbl_suite
Test Port Setting	WSDData1.0\net_suite	net_suite
Traffic Gen	WSDData1.0\tg_tst	tg_tst
Video Test	WSDData1.0\iptv_test	iptv_tst
VoIP (Megaco) test	WSDData1.0\megaco_tst	megaco_tst
VoIP (SIP) test	WSDData1.0\vtst	vtst

- 5 Press **OK** to start the download.

- If there are invalid entries or the CompactFlash card is missing, a warning message window will appear. If all entries are correct and the CompactFlash card is available, a message box appears to confirm the start of the download process.
- A notification window appears when the download has completed, or if a failure happens during the download.
- If a test suite with the same profile name already exists, you will be prompted to allow overwriting the existing profile. If you choose not to overwrite the existing profile, the downloaded test suite is aborted.

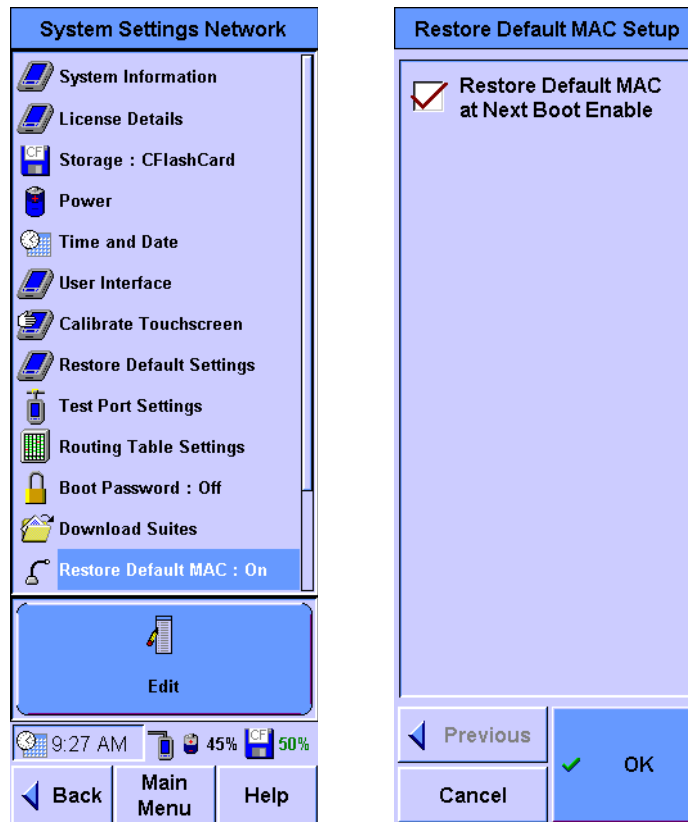
After pressing **OK** following a successful download, you are returned to the System Settings Network screen. To verify that the download was successful, enter the setup dialog of the related test and press **Suite**. The downloaded test suite should appear under its profile name in the listing of available test suites.

Because of renaming, you will not be able to identify the indexed filename in the CompactFlash card easily.

## Restoring the Default MAC Address

If the MAC address of the FrameScope Pro is unknown and you want to restore it back to the original MAC address, follow the following procedure.

- 1 Select **Restore Default MAC** and press **Edit** on the System Settings Network menu.



- 2 Select **Restore Default MAC at Next Boot Enable** to restore the hardware MAC address.

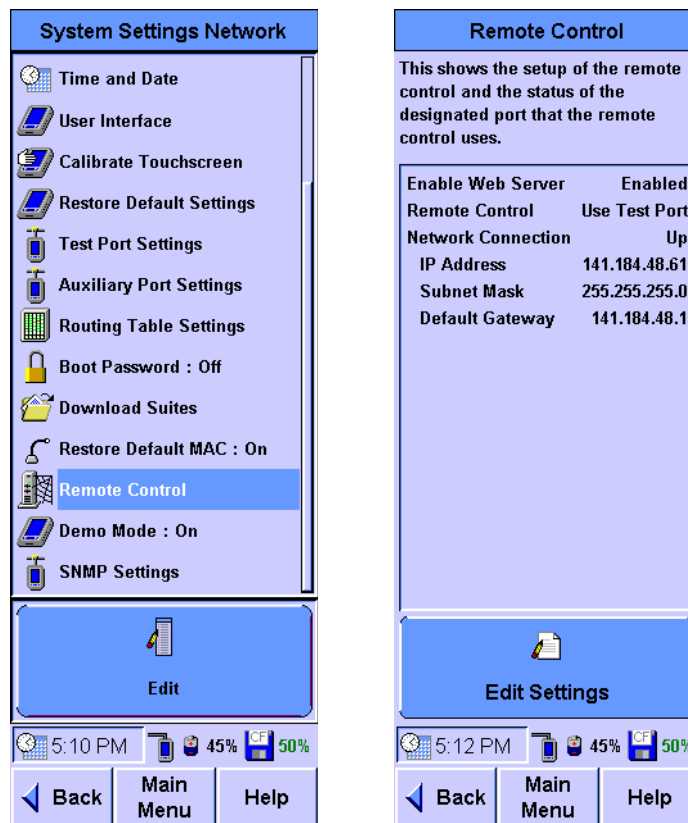
Clear **Restore Default MAC at Next Boot Enable** if you do not want to restore the MAC address on the next power-up.

## Remote Control

The FrameScope Pro can be controlled via a web interface. This can be done using the standard Test Port on the side of the FrameScope Pro or with the optional Auxiliary Port on the top of the FrameScope Pro.

For both methods, the latest FrameScope Pro Upgrade Utility has to be installed. The essential files for the remote control are installed using this installer. This can be found in the CD supplied. You can also download these files from <http://www.framescope.com>

Select **Remote Control** and press **Edit** on the System Settings Network screen to call the Remote Control screen.



The status of the web server and status of the remote control (the port used by the remote control application) is shown on the screen. It also shows the IP address, subnet mask, and default gateway of the designated port.

This screen will also indicate whether the link for the remote control is working.

### Enabling and setting the remote control web server

Press **Edit Settings** on the Remote Control screen to enable or disable the web server for remote control. You can choose whether to use the test port or auxiliary port (if available) for remote control. Refer to “[Setting Up the Optional Auxiliary Port](#)” on page 180 if the auxiliary port is to be used.

**Remote Control Setup**

The remote control is used to monitor and control the FrameScope from anywhere on the network.

To provide extra security for the web server, a user name and password may be entered and the port used by a browser to connect to the FrameScope can be changed.

Use Test Port  
 Use Auxiliary Port  
 Enable Web Server

User Name

Password

Port

If the port used for remote control is changed, the FrameScope Pro will have to be restarted for the change to take effect.

You can choose to enhance the web access security by adding a **User Name** and **Password**.

You can also change the default port (80). You will need to specify the port number to access the FrameScope Pro if you change the **Port** number. For example, if the FrameScope Pro address is 209.6.108.253, the URL would be *http://209.6.108.253*. If Port 8080 is used, the URL would become *http://209.6.108.253:8080*

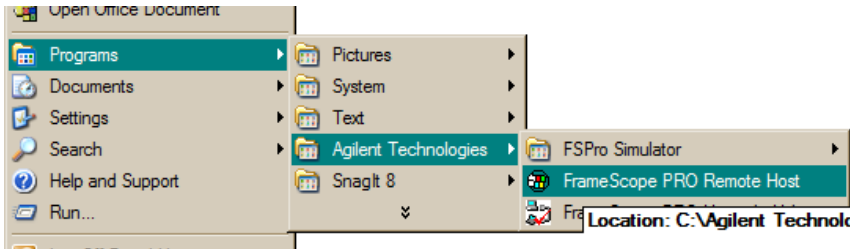
Whenever the Remote Control settings are changed, the FrameScope Pro must restart before the new settings can take effect.



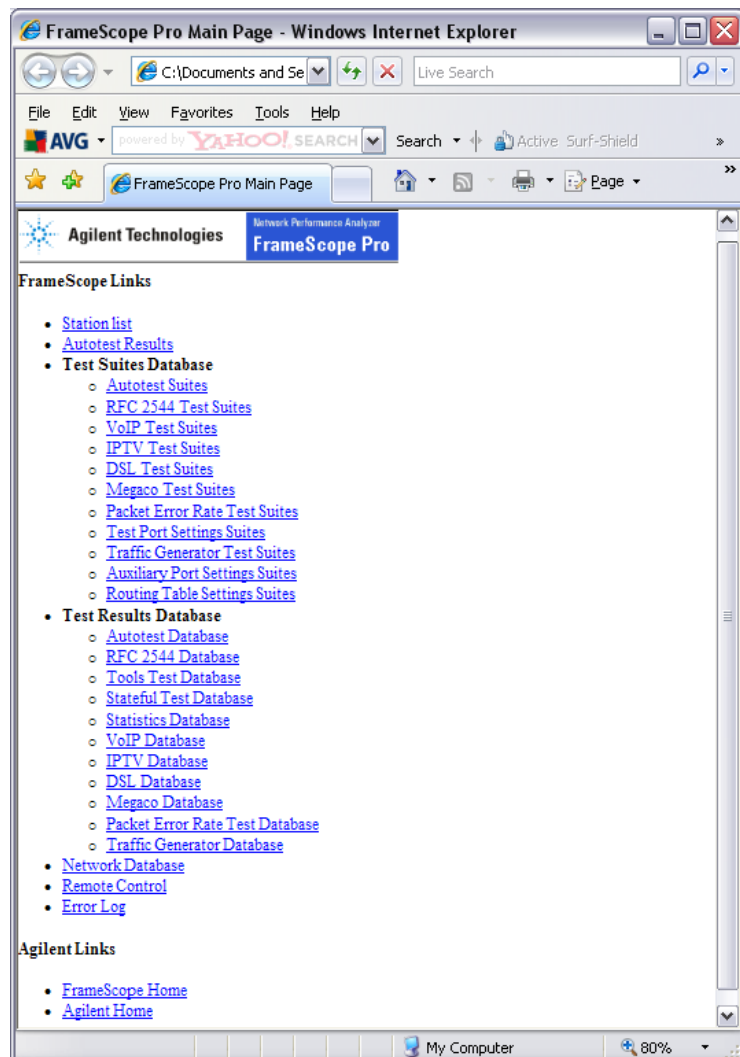
## Starting remote control

The FrameScope Pro Remote Control can be invoked by either using the FrameScope Pro Remote Host or from the FrameScope Pro Web Page hosted by the FrameScope Pro.

The FrameScope Pro Remote Host can be launched from the Windows Start menu, or from the web page on the FrameScope Pro, by pressing the “Remote Control” link.



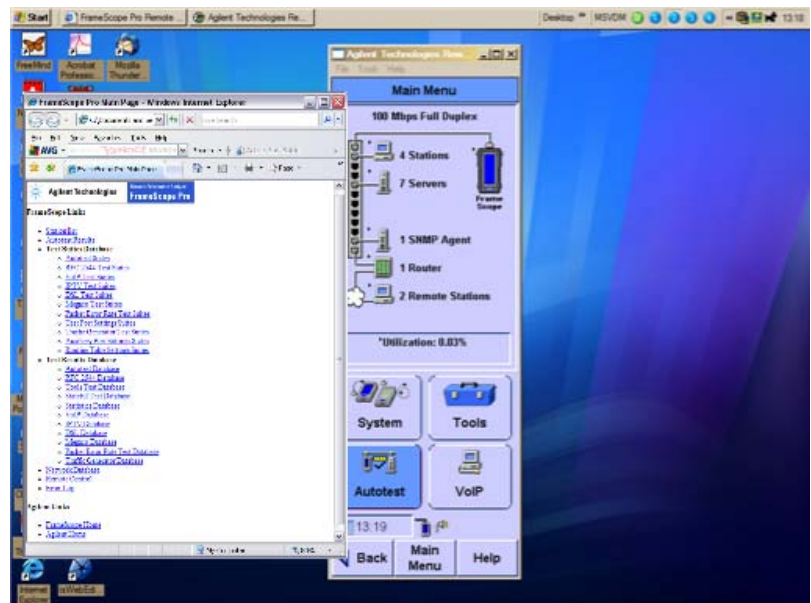
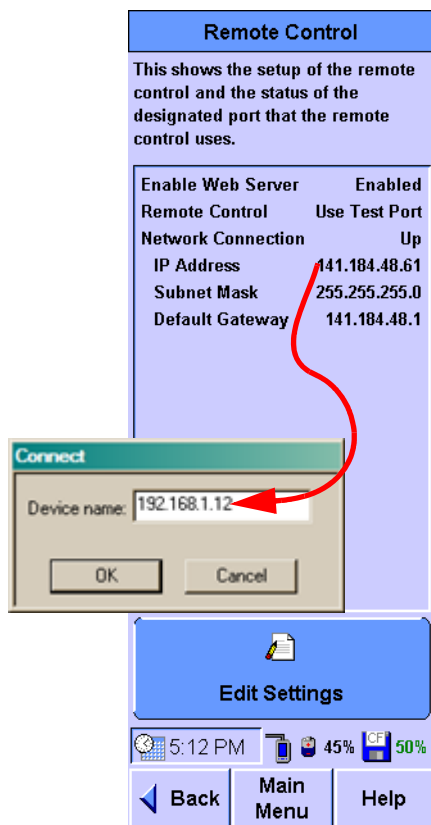
OR



For the FrameScope Pro Remote Control Client to work correctly, the following changes need to be implemented in the Internet Explorer settings.

- 1 Edit the Security settings in the Internet Options on either the Control Panel or Tools.
- 2 Select Internet, click Custom Level, and search for “Initialize and script ActiveX controls not marked as safe”.
- 3 Select “Enable” and click **OK**.

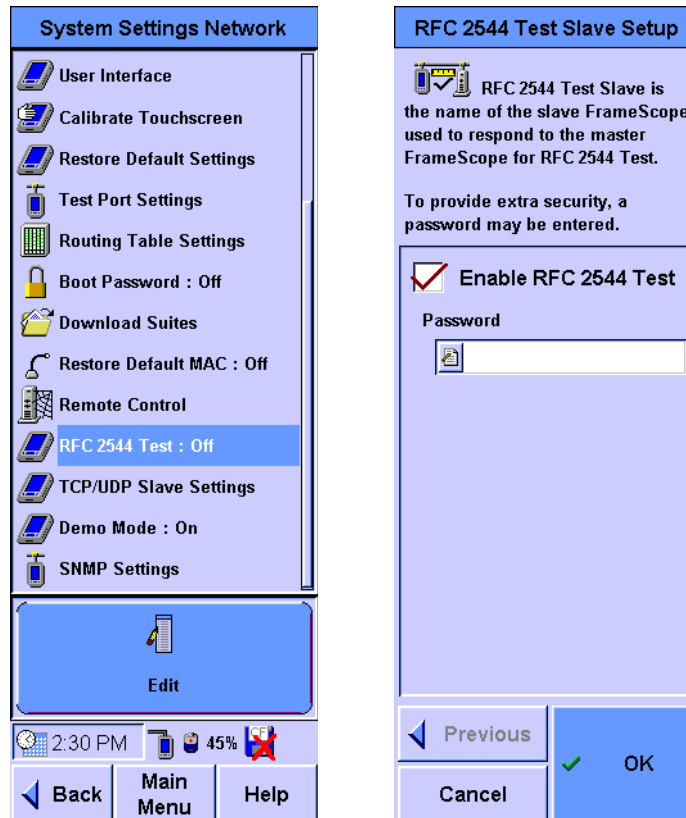
Once the Remote Host is running, you need to enter the IP address of the FrameScope Pro to be controlled. This IP address of the FrameScope Pro can be obtained from the Remote Control Settings screen of the FrameScope Pro.



Once the remote host connects to the FrameScope Pro, the screen of the FrameScope Pro can be viewed in the Remote Host Control application as shown above. You can now control the FrameScope Pro with the PC mouse.

## RFC 2544 Test

Two FrameScope Pro units or one FrameScope Pro and a loopback device are needed for the RFC 2544 tests: round-trip latency test, point-to-point throughput test, frame loss rate tests, and back-to-back tests. One FrameScope Pro will be the master and the other the slave (if two FrameScope Pro units are used), which are placed in the network-point-under-test. The slave FrameScope Pro has to be preset for the RFC 2544 tests.



The RFC 2544 Test Slave Setup screen allows you to enable the FrameScope Pro to take the part as the slave device in RFC 2544 tests.

A password can also be assigned for extra security.

Refer to [Chapter 2](#), “Setting Up the Slave FrameScope Pro for RFC 2544 Tests” on page 62 for the procedure to set up the slave FrameScope Pro.

## Demo Mode

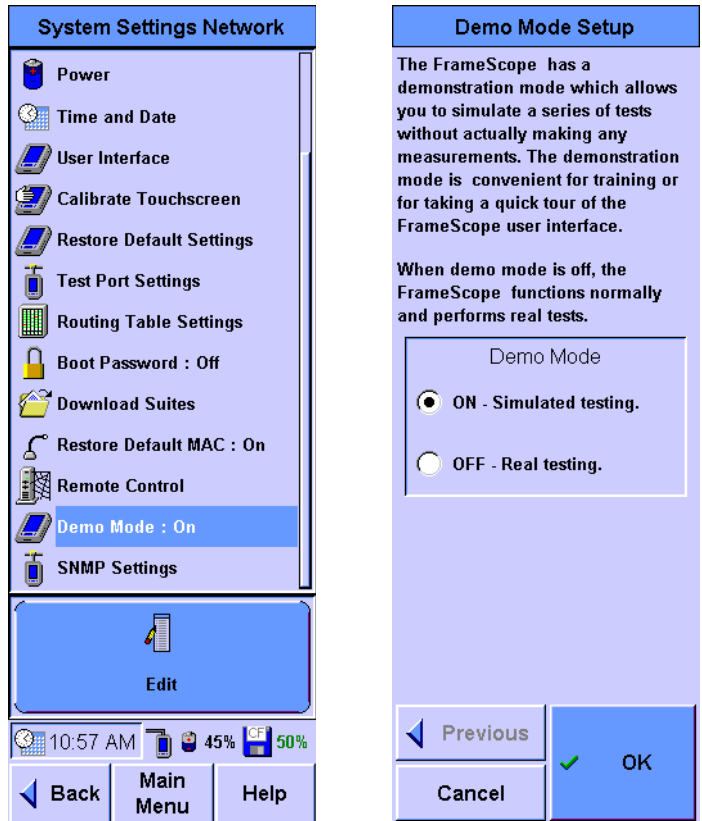
The FrameScope Pro may be set in the Demo Mode for training or demonstration purposes. The Demo Mode provides a network consisting of several stations, servers, a router, two switches or bridges, and five SNMP agents. All functions can be demonstrated without connecting to a live network. Autotests of all functions are simulated.

**NOTE**

Make sure that the DHCP is set in the network settings to ensure that the Demo Mode works properly.

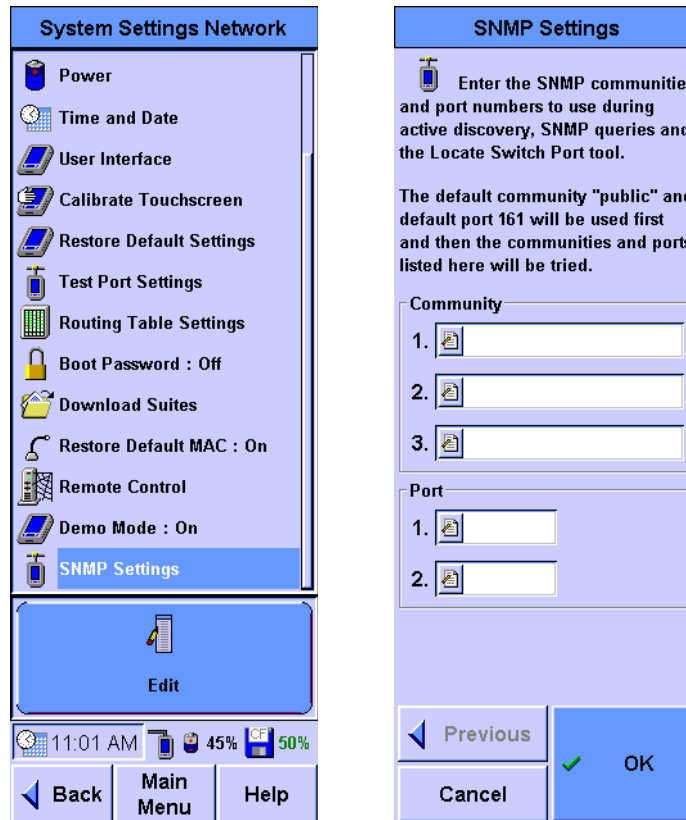
Select **Demo Mode: Off/On** on the System Settings Network menu and press **Edit** to enable or disable the Demo Mode. Select whether to turn on or off the Demo Mode in the Demo Mode panel on the Demo Mode Setup screen.

Press **OK** when done.

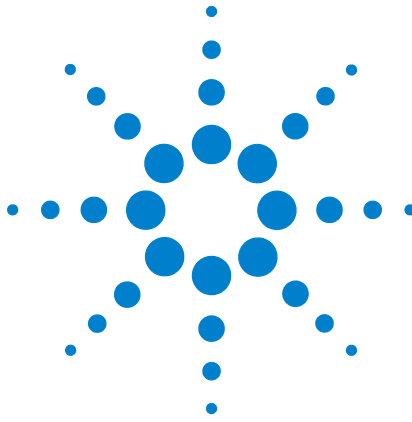


## SNMP Settings

The FrameScope Pro uses the default community “public” and the default port 161 for SNMP access. You may expand the SNMP communities and port numbers for use during Active Discovery, SNMP queries, and Locate Switch Tool. Select **SNMP Settings** on the System Settings Network screen and press **Edit**. Type in the additional information to the SNMP Settings screen and press **OK**.



## **7 System Operations**



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This chapter describes the various network operations of the FrameScope Pro.



## Network Connection

Before the FrameScope Pro is connected to a network, it constantly checks for a connection. When the FrameScope Pro detects the network connection, it performs the following actions.

- Listens for a link pulse or traffic to determine which cable pairs are being used for transmitting and receiving data. If this operation fails, an error appears while the FrameScope Pro continues to listen for a link. This condition indicates that the network device is not turned on, or the connection from the FrameScope Pro to the device is faulty.
- Autonegotiates wire speed and mode (optional). You can manually set the speed and mode (half duplex or full duplex) via the Test Port Settings wizard. The wire speed and mode are displayed on the network map on the Main Menu screen and Test Port Settings screen.
- Uses the DHCP to obtain the following (optional) parameters.
  - IP address
  - IP subnet mask
  - Default gateway
  - DNS server
  - NetBIOS node type
  - NetBIOS name server (WINS)

You can manually set these parameters via the Test Port Settings wizard. These parameters are displayed on the Test Port Settings screen. An error appears if the DHCP fails, prompting the DHCP to retry the process. The DHCP may fail if the DHCP server is not accessible from the FrameScope Pro connection point or if the DHCP server security is configured to deny access to unknown devices.

- Test the default gateway and the DNS and WINS servers. An error is reported to the Error Log if any of these devices is not working. The default gateway is tested by ARPing for its MAC address. The DNS and WINS servers are tested by looking up the FrameScope Pro host name.

When these actions have completed, the FrameScope Pro is ready to monitor the network and perform network testing.

## Network Database

The FrameScope Pro listens to the network traffic and actively interrogates the network device to learn about attached hosts, servers, switches, and routers. This information is stored in the Network Database. The database may be saved to or retrieved from the CompactFlash card or may be uploaded to a PC via the web interface.

### Station List

The Network Database is organized in the following groups where each station is identified by name (if known) and address.

**Local Stations** Lists the stations with any of the following parameters.

- IP addresses on the same subnet as the FrameScope Pro
- IPX addresses in the same broadcast domain
- MAC address, but no IP or IPX address

**Remote Stations** Lists the stations with any of the following parameters.

- IP addresses not on the same subnet as the FrameScope Pro
- IPX addresses on the other side of a router

**Servers** Lists the stations that provide services. These stations are further grouped by the service type.

**Routers** Lists the stations that promote routing capabilities or transmit traffic from remote stations.

**FrameScopes** Lists the other FrameScope Pro units found.

**Switches/Bridges** Lists the stations which support bridge MIBs through SNMP.

**SNMP Agents** Lists the stations that run the SNMP agents.

Select any network device from one of these lists to obtain more detailed information on a device.

## Device Details

The Network Database includes the details for each device. The detailed information contains the following parameters.

- DNS, NetBIOS, and SNMP system name
- MAC address
- Network addresses: IP and IPX
- Services provided by the device (for example, DHCP and DNS)
- Protocols used by the device (for example, IP and IPX)

While the device details are displayed, the following statistics pertaining to the device are also available. Press **Statistics** on the Tools menu to view these statistics.

- Unicasts, where % is the percentage of all unicasts
- Broadcasts, where % is the percentage of all broadcasts
- Multicasts, where % is the percentage of all multicasts
- Errors, where % is the percentage of all errors

The FrameScope Pro detailed view provides the following set of tools.

- Ping
- Locate Switch Port
- TraceRoute (IP Only)
- SNMP Queries (IP Only)
- Performance Tests (loopback tests)

## Active Discovery Process

The actions performed during Active Discovery are as listed below.

- Every 60 seconds
  - Obtain the SNMP name and bridge info
- Done once
  - Broadcast PING
- Every 600 seconds
  - Broadcast a DHCP discover message
- Every 60 seconds
  - Broadcast a FrameScope Pro announcement (UDP to or from port 52341)

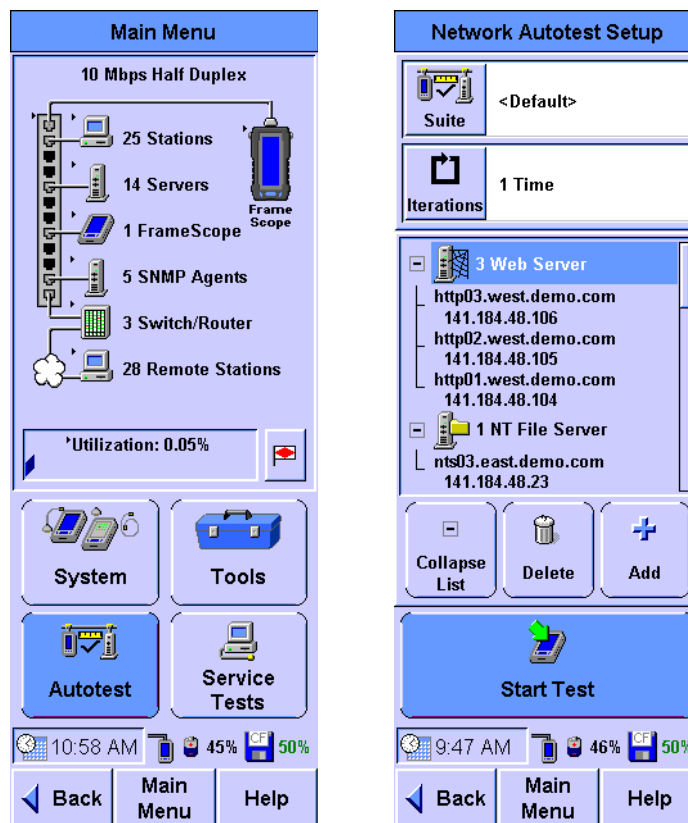
- Broadcast RIP v1 and v2 routing table requests
- Every 300 seconds
  - Send an ARP for each IP address in the subnet range
  - For every ARP response received, send an ICMP echo request
- Every 300 seconds
  - Reset IP services
- Every 30 seconds (and whenever a new IP address is detected)
  - Discover the IP services
    - 1 Discover the Domain Controller.
    - 2 Discover the Domain Browsers.
    - 3 For each IP station in the station list which has yet to be probed:
      - a Query the DNS servers to obtain the hostname for the IP address.
      - b Perform an ARP query on the IP address.
      - c Initiate a TCP connection to the LPD port to check for an IP printer server.
      - d Use SNMP to request the system name.
      - e Use SNMP to request the subnet mask.
      - f Initiate a TCP connection to the HTTP port to check for a web server.
    - 4 For each MAC in the station list, any MAC that has more than one associated IP address will be marked, where one of which is marked as remote, the other as router.
- Every 60 Seconds
  - Broadcast an IPX SAP request

## Network Performance Autotest

Autotest is used to measure the connectivity and response time of vital network resources. Each network resource is tested using target-specific access methods to communicate with these resources. The test results are compared to predefined metrics and rated on a scale of 1 to 5, with 5 indicating the best performance. The criteria for the ratings can be adjusted to detect fluctuations in network performance tuned to the best possible resource performance.

### Autotest Setup

Press **Autotest** on the Main Menu screen to access the Network Autotest Setup screen.



The Autotest contains a suite of tests that can verify multiple features on multiple devices. Each test within the Autotest suite verifies a specific feature on a specific device. For instance, a device may act as both a DHCP server and a DNS server. An

Autotest suite used to test this device would contain a DHCP server test and a DNS server test for this device. The same Autotest suite can also contain tests for other devices.

### The Default Autotest Suite

The FrameScope Pro powers up with the selected **<Default>** suite. When the **<Default>** suite is selected, the FrameScope Pro automatically creates an Autotest suite from the servers listed in the Network Database.

### Editing Tests

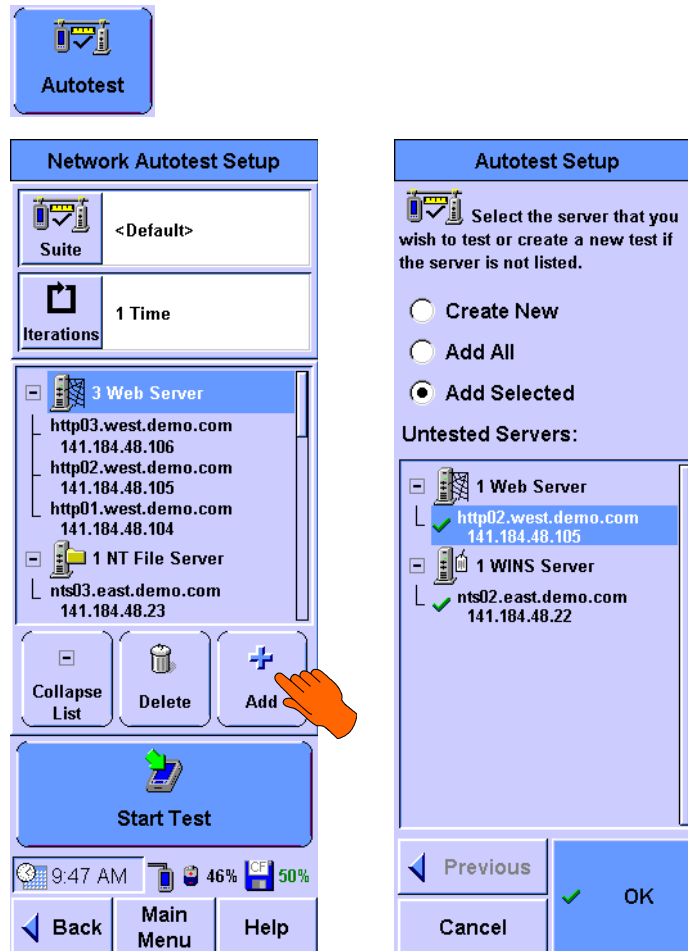
Each test has parameters that specify the test behavior and coverage. For instance, there is a well-known port for web servers to listen on, but a web server may have been configured to listen at a different port. So, the different port number is provided as a parameter with the well-known port number as the default. User names and passwords are also included as parameters for tests that can provide extra coverage by logging into a server. The extra coverage may include reading a file or retrieving an email. Each server has a default test that can be performed without the user-defined setup information so that a new test can be configured with minimal effort. After selecting a specific name or address, press **Edit** to start up the wizard which allows the test parameters to be modified. Refer to the description of each test below for more information.

### Deleting Tests

The **Delete** button operates on the selected test or test heading. If a test is selected and **Delete** is pressed, the test is removed from the Autotest suite. If a heading such as **6 Print Server** is selected, all the print servers listed under the heading will be removed from the suite.

## Adding Tests

Press **Add** to add tests to the test suite.

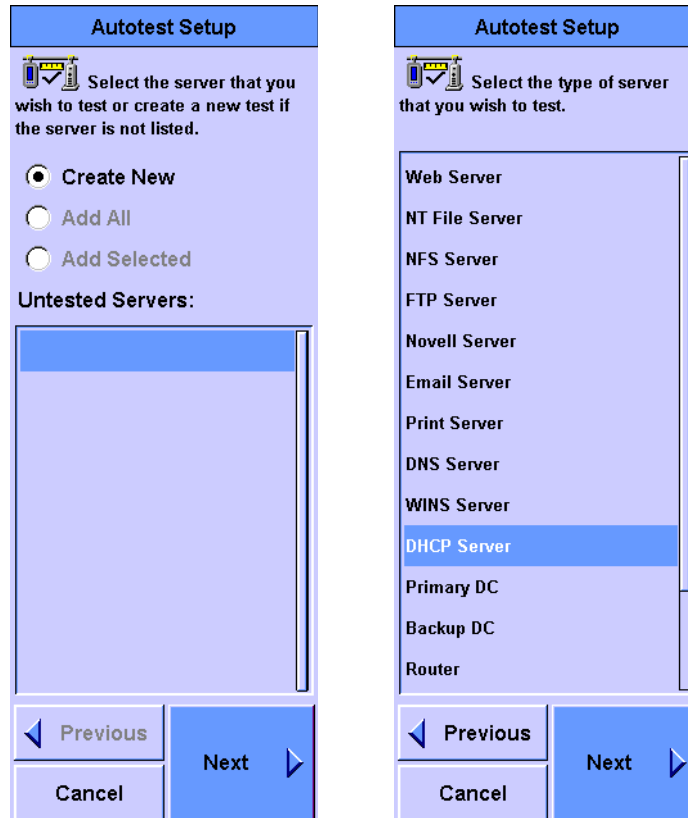


If the Network Database contains devices with features not covered by any test in the test suite, tests for these features will be listed under **Untested Servers**.


To add the tests one-by-one to the Autotest suite, select a test and press **OK**.

To add all tests to the suite, select **Add All** and press **OK**.

If the desired test is not listed in the Untested Servers panel, select **Create New** and press **Next**.



- 1 A list of test types is presented on the next screen.

The list is longer than the screen can display. You can access the other entries using .

- 2 Select the test type and press **Next**.

Specific test parameters may be edited on the following screens as discussed below under each test heading.



## Web Server

The Web Server test verifies that the server is accessible and measures the download time of the first HTTP access operation.

### Test setup

The first setup screen is used to type in the URL of the web server. The second setup screen is used to request a proxy server and to name the server. The last setup screen provides a list of measurements performed during the test. Select a measurement from the list and press **Edit** to view and modify the thresholds used to rate the performance of the measurement.

The figure displays three sequential screenshots of the 'Web Server Setup' wizard:

- Screen 1:** 'Web Server Setup'. Instruction: 'Enter the URL for the page to retrieve from the server.' Examples: `http://www.scope.com/index.htm`, `www.scope.com/index.htm`, `www.scope.com`. A text input field for 'URL' is shown.
- Screen 2:** 'Web Server Setup'. Instruction: 'To use a proxy server, check 'Use Proxy Server' and enter the port number and the address or name of the proxy server.'
  - Proxy Server:**  Use Proxy Server. Input fields for Name (radio selected), Address (radio), and Port (80).
  - Authentication:**  Enable. User Name: http Test. Password: [masked].
- Screen 3:** 'Web Server Setup'. Instruction: 'The server rating is calculated from the following measurements.' To view or change the performance rating thresholds for any of these measurements, select it and hit **Edit**.
  - Measurements:**
    - Name Lookup
    - PING Response
    - 1st Response
    - Receive Rate
  - Edit** button.

The following measurements are taken during the test.

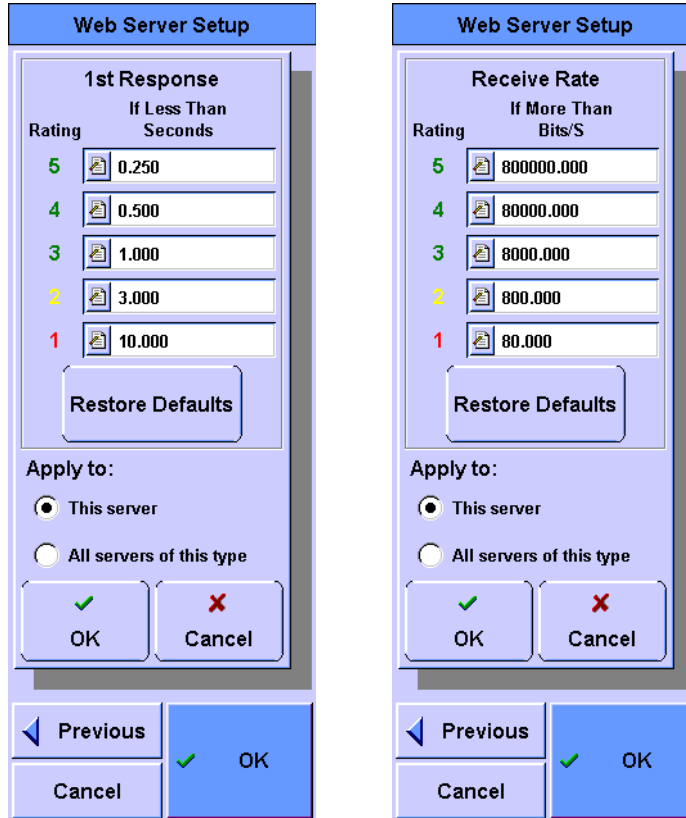
**Name Lookup** The request or response time for converting a name into an address.

**PING Response** The time taken to perform an ICMP Echo test on the server.

**1st Response** The time taken to acknowledge the GET command.

**Receive Rate** The rate in bytes/s for the download of the first data in response to the GET command.

Examples of the rate screen modifications are shown below.



## NT File Server and NFS Server

The File Server tests provide the following basic operations.

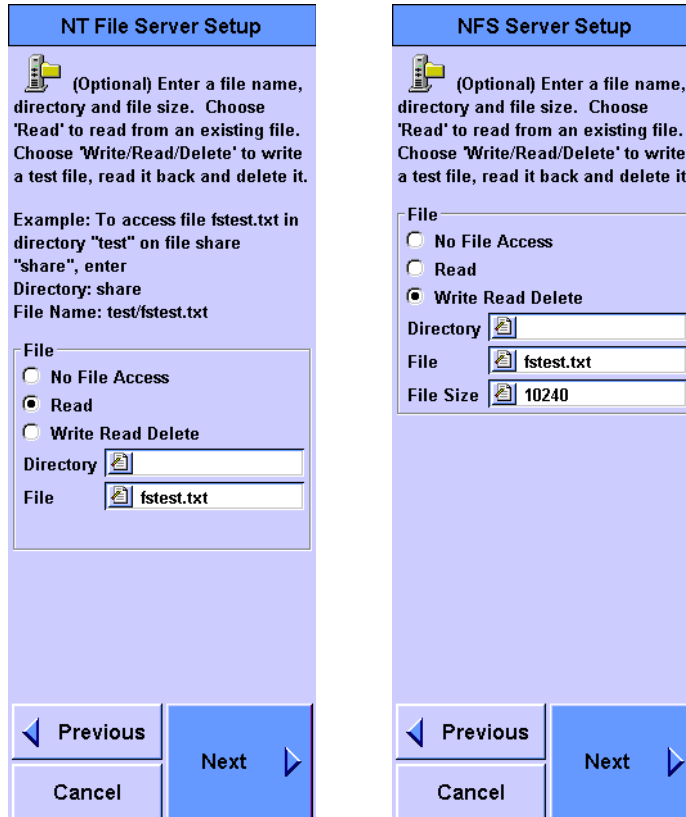
- Check the server availability by logging in to the server. If the user name and password have been configured for login but are unknown to you, you can perform a partial login to the server.
- The following operations are optional. If any of these operations is requested, you must type in the full path name to the file (or directory) on the server.
  - Log in to the server
  - Read from an existing file
  - Write, read, and delete a file


### Test setup

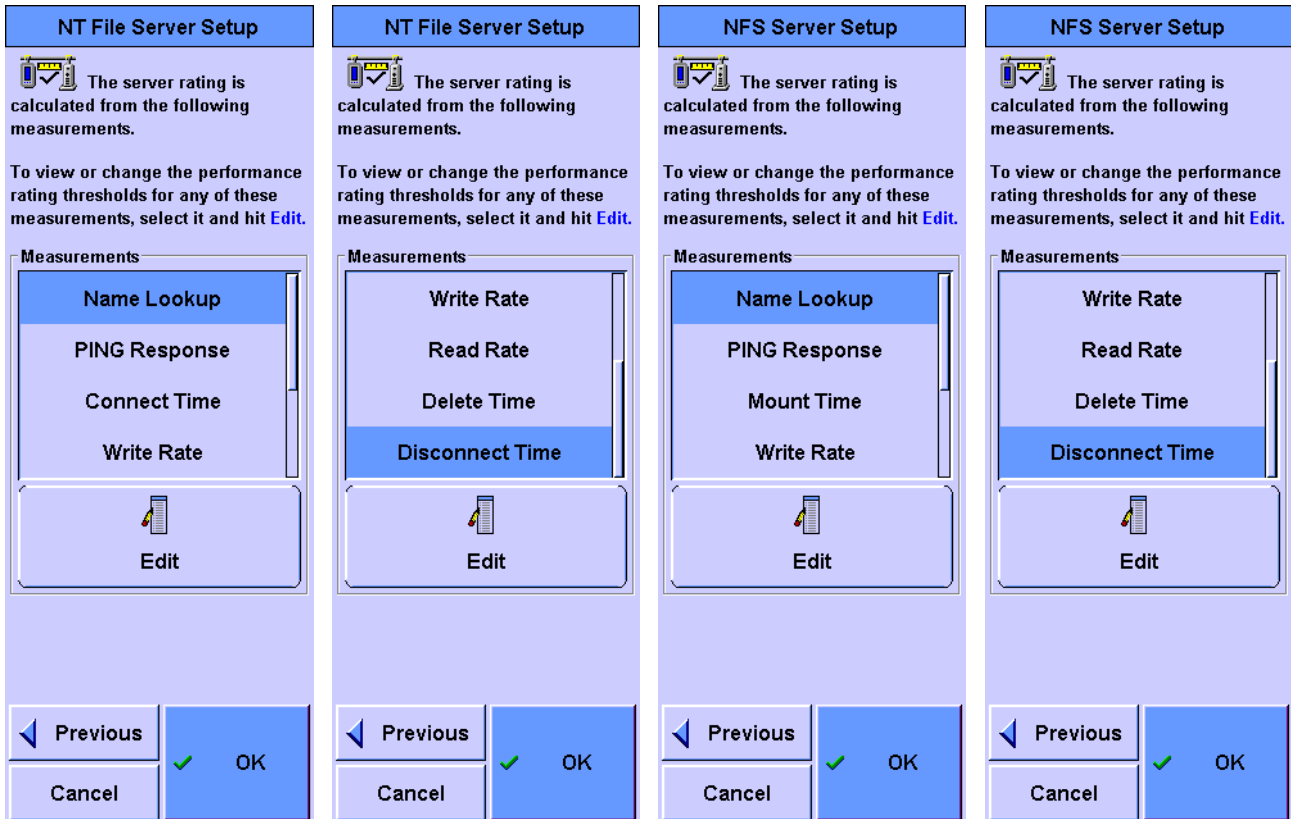
The first File Server setup screen requests a name or address as well as the login information required to access the server.

Include domain name in the **User Name** entry, for example:  
abc@agilent.com

The next setup screen allows the selection of the file actions to be tested. If the **Read** or **Write Read Delete** option is selected, you will need to type in the name of the file and directory where the file will be read from or written to. The **Write Read Delete** option has an additional file size value option.



The last setup screen, as shown on the next page, provides a list of measurements performed during the test. Select a measurement from the list and press **Edit** to view and modify the thresholds used to rate the performance of the measurement. Note that the list of measurements shown is not the complete list. Use  to scroll through the list. The time responses are modified as shown in the DHCP server.



The following measurements are taken during the test.

**Name Lookup** The request or response time for converting a name into an address.

**PING Response** The time taken to perform an ICMP Echo test on the server.

**Connect Time/Mount Time** The time taken to connect to the NT file server or to mount the NFS server.

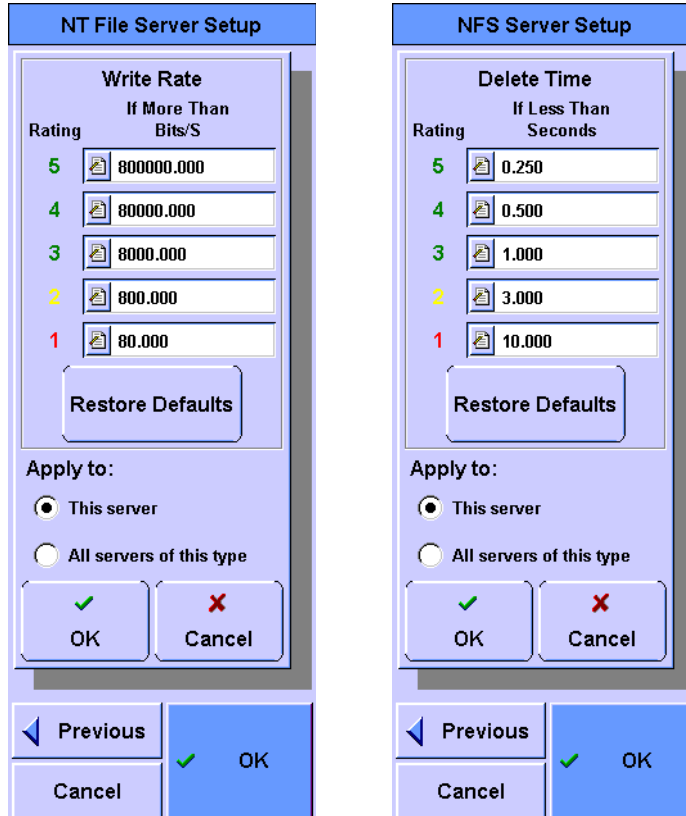
**Write Rate** The write operation rate, in bytes/s.

**Read Rate** The read operation rate, in bytes/s.

**Delete Time** The time taken to delete the file.

**Disconnect Time** The time taken to disconnect from the file server.

Examples of the rate and time modification screens are shown below.



## FTP Server

The FTP Server Test allows you to test the designated server in three ways.

- No File Access
- Read
- Write

The name look-up time, connect time, disconnect time, read time, read rate, write time, write rate, and file size results are presented accordingly.

### Test setup

If Active Discovery does not detect the FTP server-under-test, then it can be manually added. You can type in the user name and password to access the FTP server. If the user name and password fields are left blank, anonymous login is used.

**FTP Server Setup**

Enter the address of the server

Server  
141.183.30.99  
 Name  Address

(Optional) Enter a user name and password to allow file accesses.

Enter Proxy Name, Port and mode of FTP operation.

User  
User Name user  
Password

Use Proxy Server  
proxy-server  
Port 21

Active Mode

Previous Next Cancel

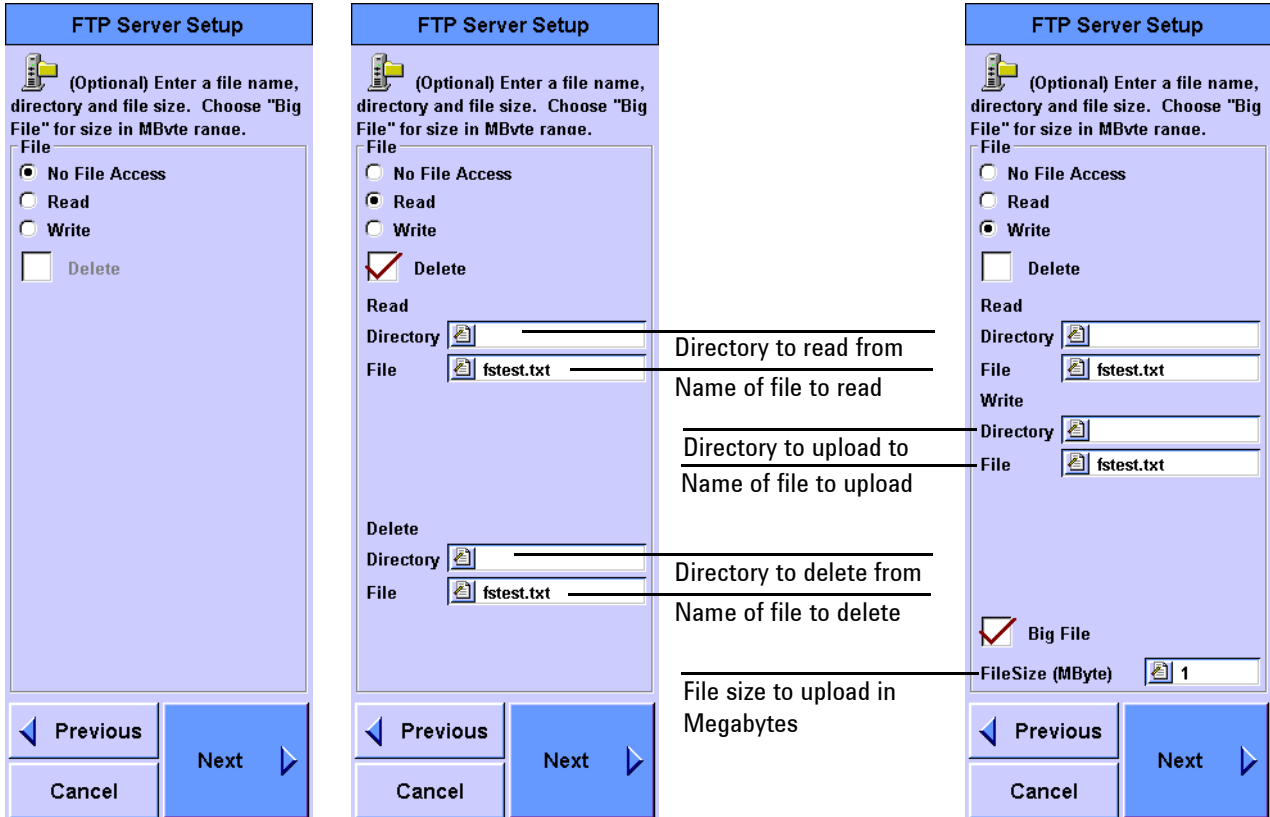
If required, type in the user name and password here. For anonymous login, leave these fields blank.

If required, type in the name of proxy server and port number here

Select the check box if the Active FTP transaction mode is used. Clear for Passive transaction mode.

Type in the name of the proxy server and port if required. Both Active and Passive FTP transaction modes are supported. Press **Next** to continue the setup.

Three types of tests; No File Access, Read, and Write are available.



**No File Access** This mode locates the FTP server, connects to the server, and then disconnects from it.

Parameters tested for **No File Access** consist of **Name Look-up**, **Tests Connect** and **Disconnect Time**.

**Read** This mode tests the FTP server by reading the specified file on the FTP server. The Delete option is available when the Read option is selected.

Parameters tested for **Read** are **Name Lookup**, **Connect Time**, **Read Time**, **Read Rate** and **Disconnect Time**.

**Write** This mode uploads a test file generated by the FrameScope Pro to the FTP server-under-test. The test will read back the test file before the FrameScope Pro deletes the uploaded file. You can select the default file size or any size from 1000 bytes. The Delete option is available when the Write option is chosen.



Alternatively, you can select **Big File** to specify the files sizes in MB and a file size up to 1000 MB can be uploaded, read back, and deleted.

The measurement parameters and ratings can be changed and customized accordingly in the next screen. Select a measurement from the list and press **Edit** to view and modify the thresholds used to rate the performance of the measurement. The following measurements are taken during the test.

**Name Lookup** The request or response time for converting a name into an address.

**PING Response** The time taken to perform an ICMP Echo test on the server.

**Connect Time** The time taken to connect to the NT file server, or mount the NFS server.

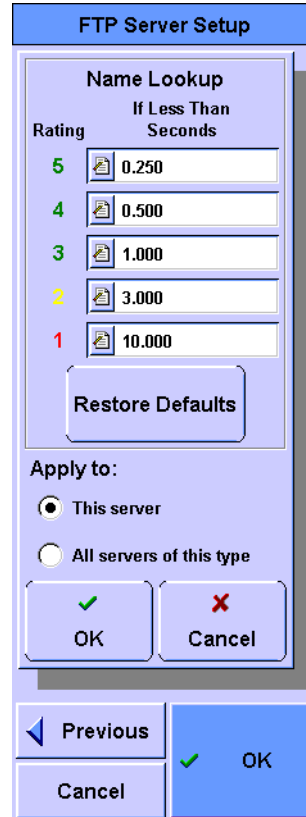
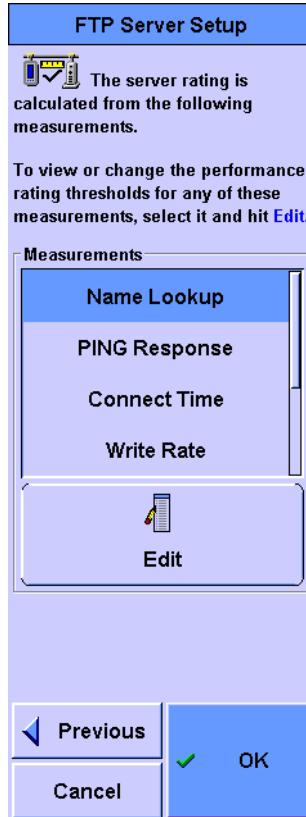
**Write Rate** The write operation rate, in bytes/s.

**Read Rate** The read operation rate, in bytes/s.

**Delete Time** The time taken to delete the file.

**Disconnect Time** The time taken to disconnect from the file server.

Examples of the rate and time modification screens are shown below.

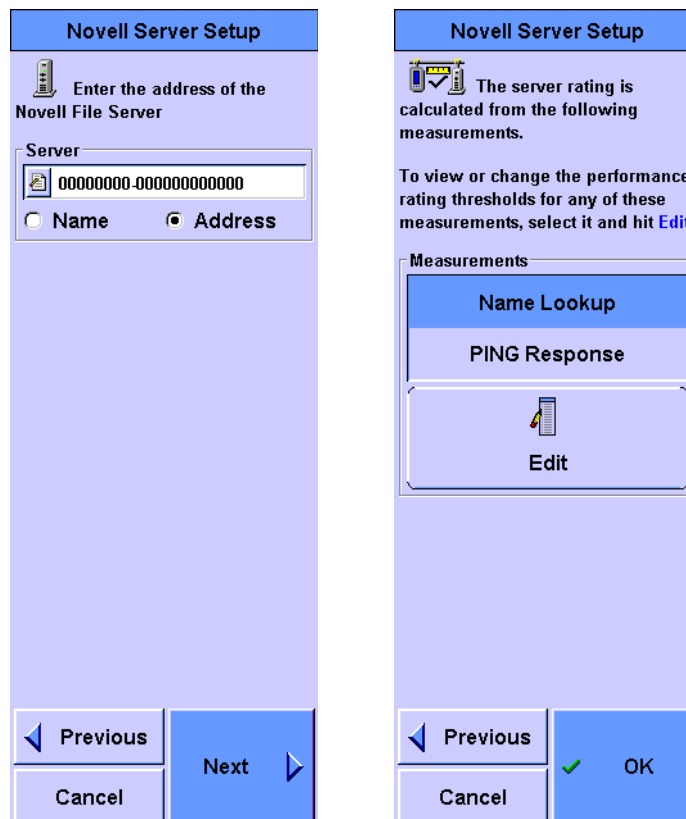


## Novell Server

The Novell Server allows you to add and test a Novell-based server.

### Test setup

If Active Discovery does not detect the Novell server-under-test, then it can be manually added. The first setup screen is used to type in the name or address of the server. The next setup screen provides a list of measurements performed during the test. Select a measurement from the list and press **Edit** to view and modify the thresholds used to rate the performance of the measurement.



The following measurements are taken during the test.

**Name Lookup** The request or response time for converting a name into an address.

**PING Response** The time taken to perform an ICMP Echo test on the server.

## E-mail Server

The E-mail Server test verifies that the email server is accessible and measures the access time and download rate of the email.

### Test setup

The first setup screen is used to type in the name or address of the email server and the user name and password, if required. The second setup screen is used to select the method of operations, and configure the send and receive methods. The default port addresses are provided.

The last setup screen provides a list of measurements performed during the test. Select a measurement from the list and press **Edit** to view and modify the thresholds used to rate the performance of the measurement.

The image displays two sequential screenshots of the 'Email Server Setup' configuration interface. Both screens have a blue header with the title 'Email Server Setup'.

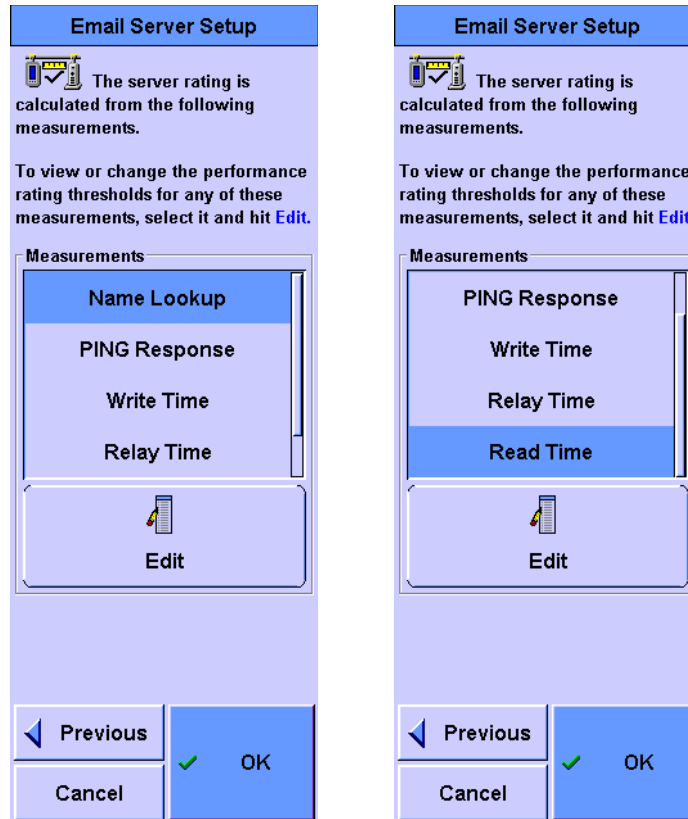
**Left Screenshot:** The main instruction is 'Enter the address of the e-Mail server'. It features a 'Server' field with a dropdown icon and the value '0.0.0.0'. Below this are radio buttons for 'Name' and 'Address', with 'Address' selected. An optional section asks for 'User Name' and 'Password' with corresponding input fields. Navigation buttons at the bottom include 'Previous', 'Next', and 'Cancel'.

**Right Screenshot:** The main instruction is 'Please make sure to configure domain name in network settings page as it will be used in the "From" field of the test mail.' It includes a note: 'Configure the Delay to take care of relaying delays to POP Server.' The 'Email' section has radio buttons for 'No Operation' (selected), 'Log In Only', and 'Send & Receive Mail'. The 'Send Method' section has an 'SMTP Port' field with a dropdown icon and the value '25'. The 'Receive Method' section has a 'Delay' field with a dropdown icon and the value '5', and radio buttons for 'POP3 Port' (selected, with a dropdown icon and value '110') and 'SMTP Port' (with a dropdown icon and value '25'). Navigation buttons at the bottom include 'Previous', 'Next', and 'Cancel'.

#### NOTE

If the email server and email domain names differ, the entry for **User Name** has to include its domain name. For example, if the email server name is *pop3.agilent.com.sg* and the email domain name is *agilent.com.sg*, type in *abc@agilent.com.sg* in the **User Name** field.

The following measurements are taken during the test.



**Name Lookup** The request or response time for converting a name into an address.

**PING Response** The time taken to perform an ICMP Echo test on the server.

**Write Time** The time taken to write to the server.

**Relay Time** The time taken to relay through the server and be available to read.

**Read Time** The time taken to read the email using either POP3 or SMTP.

## Print Server

The Print Server allows you to add and test a Print Server.

### Test setup

If Active Discovery does not detect the Print server-under-test, then it can be manually added. The first setup screen is used to type in the name or address of the server. The next setup screen provides a list of measurements performed during the test. Select a measurement from the list and press **Edit** to view and modify the thresholds used to rate the performance of the measurement.

The image shows two sequential screenshots of the 'Print Server Setup' interface. The left screenshot displays a form where the user enters the server address. The 'Server' field contains '0.0.0.0', and the 'Address' radio button is selected. The right screenshot shows the 'Measurements' section with a list of 'Name Lookup' and 'PING Response', and an 'Edit' button below them.

The following measurements are taken during the test.

**Name Lookup** The request or response time for converting a name into an address.

**PING Response** The time taken to perform an ICMP Echo test on the server.

## DNS Server

The DNS Server test verifies that the server can look up a name or IP address.

### Test setup

The first setup screen is used to type in the IP address of the DNS server and the name or address that will be sent to the DNS server in the request. If no name or address is provided, the DNS server is requested to look up its own address and return a name.

The last setup screen provides a list of measurements performed during the test. Select a measurement from the list and press **Edit** to view and modify the thresholds used to rate the performance of the measurement.

The image shows two sequential screenshots of the 'DNS Server Setup' dialog box. The left screenshot is the initial setup screen, titled 'DNS Server Setup', with a server icon and the instruction 'Enter the address of the DNS server'. It features a 'Server' text box containing '0.0.0.0'. Below this is an optional field for a 'Name/Address to Look Up' with radio buttons for 'Name' (selected) and 'Address'. An example shows 'www.agilent.com' and '192.006.143.010'. At the bottom are 'Previous', 'Next', and 'Cancel' buttons. The right screenshot is the final setup screen, also titled 'DNS Server Setup', with a checkmark icon and the instruction 'The server rating is calculated from the following measurements.' It lists 'Measurements' as 'PING Response' and 'Server Response', with an 'Edit' button below. At the bottom are 'Previous', 'OK', and 'Cancel' buttons.

The following measurements are taken during the test.

**PING Response** The time taken to perform an ICMP Echo test on the server.

**Server Response** The request or response time for converting a name or address into an address or name.

## WINS Server (NetBIOS Name Server)

The WINS Server test verifies that the server can convert a name to an IP address.

### Test setup

The first setup screen is used to type in the IP address of the WINS server and the name that will be sent to the WINS server in the request.

The last setup screen provides a list of measurements performed during the test. Select a measurement from the list and press **Edit** to view and modify the thresholds used to rate the performance of the measurement.

The image shows two sequential screenshots of the 'WINS Server Setup' dialog box. The left screenshot is the first setup screen, titled 'WINS Server Setup'. It contains the instruction 'Enter the address of the WINS server' and a 'Server' text box with '0.0.0.0' entered. Below it is the instruction '(Optional) Enter the name which will be looked up by the server.' and an empty 'Name to Look Up' text box. At the bottom are 'Previous', 'Next', and 'Cancel' buttons. The right screenshot is the second setup screen, also titled 'WINS Server Setup'. It contains the instruction 'The server rating is calculated from the following measurements.' and 'To view or change the performance rating thresholds for any of these measurements, select it and hit Edit.' Below this is a 'Measurements' list with 'PING Response' and 'Server Response' selected. An 'Edit' button is visible below the list. At the bottom are 'Previous', 'OK', and 'Cancel' buttons.

The following measurements are taken during the test.

**PING Response** The time taken to perform an ICMP Echo test on the server.

**Server Response** The request or response time for converting a name into an address.

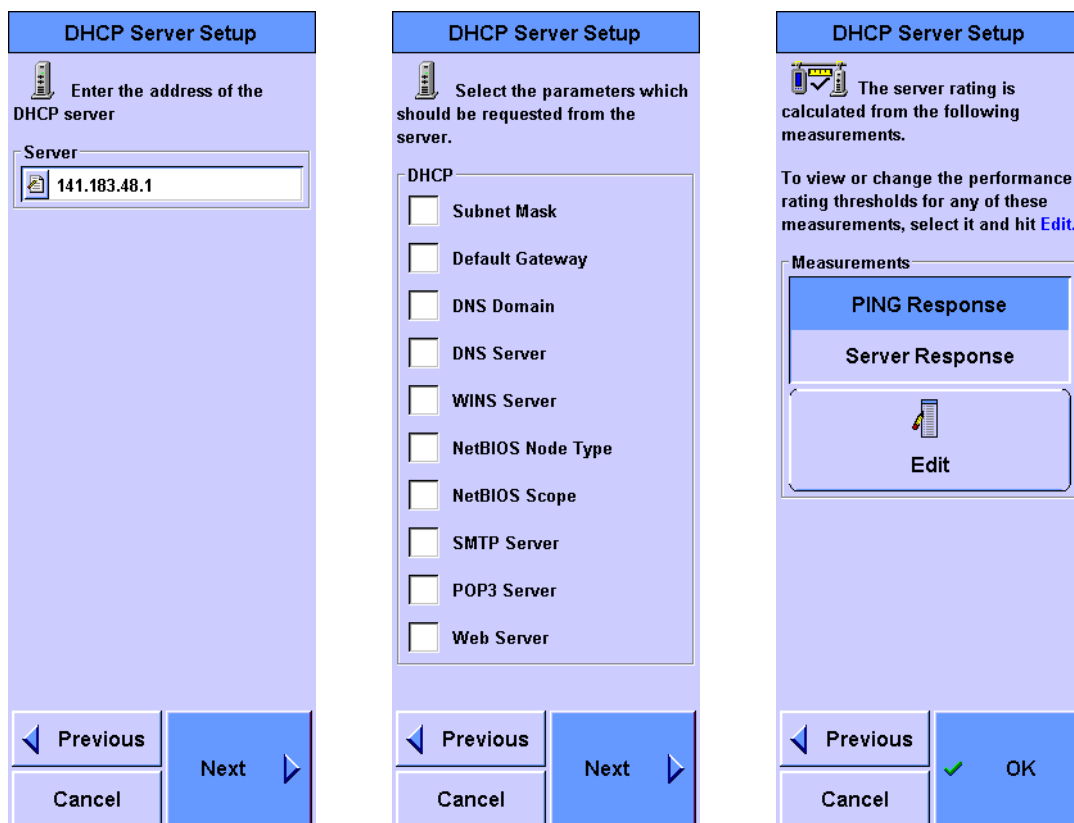


## DHCP Server

The DHCP Server test verifies that the DHCP server responds to a request for an IP address and other optional items. If any optional information is requested, the server response will be checked for all the requested information.

### Test setup

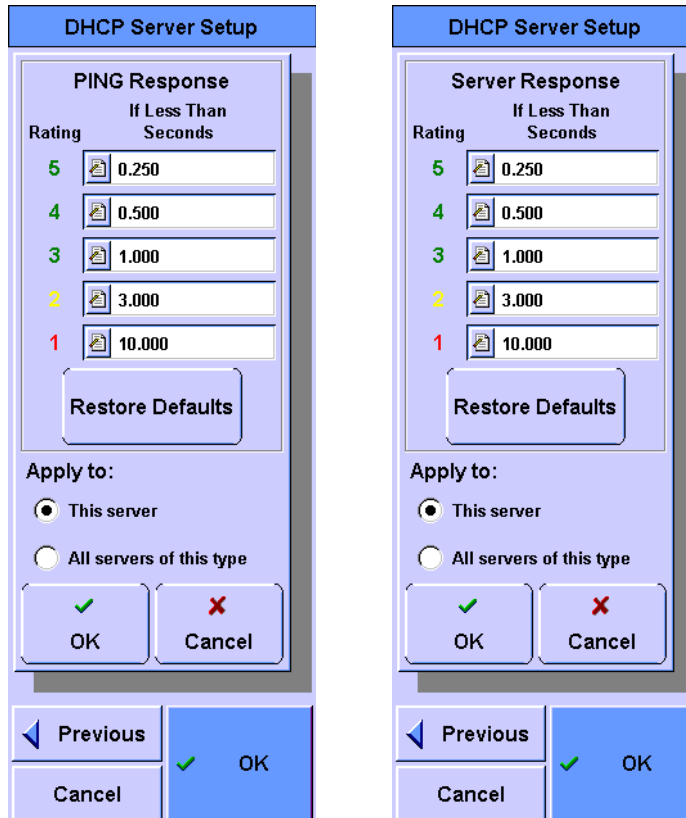
The IP address of the DHCP Server is typed in on the first DHCP Server test setup screen. All DHCP responses received during the test are compared to this address to verify that responses are received from this server. The next setup screen is used to specify which optional items should be requested from the DHCP server. The last setup screen provides a list of measurements performed during this test.



Select a measurement from the list and press **Edit** to view and modify the thresholds used to rate the performance of the measurement. The following measurements are taken during the test.

**PING Response** The time taken to perform an ICMP Echo test on the server.

**Server Response** The total time for negotiating for an IP address from the DHCP server.



## Primary Domain Controller

A test is performed on the Primary Domain Controller (PDC) that manages the security for its local domain.

### Test setup

If Active Discovery does not detect the PDC-under-test, then it can be manually added. The name or address of the PDC is typed in at the first setup screen. The next setup screen provides a list of measurements performed during the test. Select a measurement from the list and press **Edit** to view and modify the thresholds used to rate the performance of the measurement.

The image shows two sequential screens of the 'Primary DC Setup' wizard. The first screen, titled 'Primary DC Setup', prompts the user to 'Enter the address of the Primary Domain Controller'. It features a 'Server' label above a text input field containing '0.0.0.0'. Below the input field are two radio buttons: 'Name' (unselected) and 'Address' (selected). At the bottom, there are 'Previous', 'Next', and 'Cancel' buttons. The second screen, also titled 'Primary DC Setup', informs the user that 'The server rating is calculated from the following measurements.' It lists 'Name Lookup' and 'PING Response' under a 'Measurements' header. Below the list is an 'Edit' button with a pencil icon. At the bottom, there are 'Previous', 'OK', and 'Cancel' buttons.

The following measurements are taken during the test.

**Name Lookup** The request or response time for converting a name into an address.

**PING Response** The time taken to perform an ICMP Echo test on the server.

## Backup Domain Controller

A test is performed on the Backup Domain Controller (BDC) which acts as a backup for the PDC and provides fault tolerance.

### Test setup

If Active Discovery does not detect the BDC-under-test, it can be manually added. The name or address of the BDC is typed in at the first setup screen. The next setup screen provides a list of measurements performed during the test. Select a measurement from the list and press **Edit** to view and modify the thresholds used to rate the performance of the measurement.

The image shows two sequential screenshots of the 'Backup DC Setup' wizard. The left screenshot displays the 'Server' input field containing '0.0.0.0' and the 'Address' radio button selected. The right screenshot displays the 'Measurements' list with 'Name Lookup' and 'PING Response' items, and an 'Edit' button below them.

The following measurements are taken during the test.

**Name Lookup** The request or response time for converting a name into an address.

**PING Response** The time taken to perform an ICMP Echo test on the server.

## Router

This test verifies that the Router is accessible and in working condition.

### Test setup

If Active Discovery does not detect the Router-under-test, then it can be manually added. The name or address of the Router is typed in at the first setup screen. The next setup screen provides a list of measurements performed during the test. Select a measurement from the list and press **Edit** to view and modify the thresholds used to rate the performance of the measurement.

The image shows two sequential screenshots of the 'Router Setup' interface. The first screenshot, titled 'Router Setup', prompts the user to 'Enter the address of the Router'. It features a 'Server' section with a text input field containing '0.0.0.0' and two radio buttons: 'Name' (unselected) and 'Address' (selected). At the bottom, there are 'Previous', 'Next', and 'Cancel' buttons. The second screenshot, also titled 'Router Setup', displays a list of 'Measurements' including 'Name Lookup' and 'PING Response'. Below the list is an 'Edit' button with a pencil icon. At the bottom, there are 'Previous', 'OK', and 'Cancel' buttons.

The following measurements are taken during the test.

**Name Lookup** The request or response time for converting a name into an address.

**PING Response** The time taken to perform an ICMP Echo test on the server.

## SNMP Agent

A test is performed on the SNMP Agent that reports the activities of devices such as workstation, switches, and routers to the console that oversees the network.

### Test setup

If Active Discovery does not detect the SNMP Agent-under-test, then it can be manually added. The name or address of the SNMP Agent is typed in at the first setup screen. The next setup screen provides a list of measurements performed during the test. Select a measurement from the list and press **Edit** to view and modify the thresholds used to rate the performance of the measurement.

The image shows two sequential screenshots of the 'SNMP Agent Setup' wizard. The first screenshot is titled 'SNMP Agent Setup' and contains the instruction 'Enter the address of the SNMP agent'. It features a 'Server' label above a text input field containing '0.0.0.0'. Below the input field are two radio buttons: 'Name' (unselected) and 'Address' (selected). At the bottom are 'Previous', 'Next', and 'Cancel' buttons. The second screenshot is also titled 'SNMP Agent Setup' and contains the instruction 'The server rating is calculated from the following measurements.' Below this is a list of measurements: 'Name Lookup' and 'PING Response'. An 'Edit' button with a pencil icon is positioned below the list. At the bottom are 'Previous', 'OK', and 'Cancel' buttons.

The following measurements are taken during the test.

**Name Lookup** The request or response time for converting a name into an address.

**PING Response** The time taken to perform an ICMP Echo test on the server.

## Workstation

This test verifies that the selected device is accessible and measures the name lookup time and the ping response time of that device.

### Test setup

The first setup screen is used to type in the name or address of the workstation. The last setup screen provides a list of measurements performed during the test. Select a measurement from the list and press **Edit** to view and modify the thresholds used to rate the performance of the measurement.

The image shows two sequential screenshots of the 'Workstation Setup' dialog box. The left screenshot is titled 'Workstation Setup' and contains the instruction 'Enter the address of the workstation'. It features a 'Server' text box with '0.0.0.0' entered and a radio button selection for 'Name' (unselected) and 'Address' (selected). At the bottom are 'Previous', 'Next', and 'Cancel' buttons. The right screenshot is also titled 'Workstation Setup' and contains the instruction 'The server rating is calculated from the following measurements.' Below this is a 'Measurements' list with 'Name Lookup' and 'PING Response' items. An 'Edit' button is located below the list. At the bottom are 'Previous', 'OK', and 'Cancel' buttons.

The following measurements are taken during the tests.

**Name Lookup** The request or response time for converting a name into an address.

**PING Response** The time taken to perform an ICMP Echo test on the device.

## TCP Test

A test is performed on the Transmission Control Protocol (TCP) of a certain port of the server.

### Test setup

The first setup screen is used to type in the name or address of the TCP port. The TCP port number to be tested is required to be typed in as well. The last setup screen provides a list of measurements performed during the test. Select a measurement from the list and press **Edit** to view and modify the thresholds used to rate the performance of the measurement.

The image shows two screenshots of the 'TCP Setup' interface. The left screenshot is the initial setup screen. It has a title bar 'TCP Setup' and a server icon. Below the title bar, it says 'Enter the address of the Server'. There is a text input field for 'Server' containing '0.0.0.0'. Below this, there are two radio buttons: 'Name' (unselected) and 'Address' (selected). Below that, it says 'Enter the TCP port number. For example: FTP Control: 21, Telnet: 23, HTTP (web): 80'. There is a text input field for 'TCP Port' containing '0'. At the bottom, there are four buttons: 'Previous', 'Next', 'Cancel', and 'Next'.

The right screenshot is the final setup screen. It has a title bar 'TCP Setup' and a server icon with a checkmark. Below the title bar, it says 'The server rating is calculated from the following measurements.' Below that, it says 'To view or change the performance rating thresholds for any of these measurements, select it and hit Edit.' There is a list of measurements: 'Name Lookup', 'PING Response', and 'Server Response'. Below the list, there is an 'Edit' button. At the bottom, there are four buttons: 'Previous', 'Next', 'Cancel', and 'OK'.

The following measurements are taken during the tests.

**Name Lookup** The request or response time for converting a name into an address.

**PING Response** The time taken to perform an ICMP Echo test on the device.

**Server Response** The total time for negotiating for an IP address from the DHCP server



## Running Autotest

Press **Start Test** on the Network Autotest Setup screen to run the Autotest once all the necessary editing, deleting, and adding are done. The FrameScope Pro will then test each listed server one-by-one and list out the rating level for each server, or display a red 'X' if the server is not working or inaccessible. The five-level rating scale is listed below.

- 1 – Bad
- 2 – Poor
- 3 – Fair
- 4 – Good
- 5 – Excellent

The rating threshold values can be viewed or changed via the **Edit** menu. Refer to “[Changing the Autotest Metrics](#)” on page 232 on how to change these values.

**Network Autotest**

**Result**

Overall Rating

Errors **2**

Iterations **1**

http01.west.demo.com 141.184.48.104	4
1 NT File Server	4
nts03.east.demo.com 141.184.48.23	5
1 Email Server	4
nts03.east.demo.com 141.184.48.23	4
6 Print Server	
PRNT03 00002003-00107B270343	X
PRNT02 00002003-00107B270342	X
PRNT01 00002003-00107B270341	

Details Save Results Stop Test

10:22 AM 45% 50%

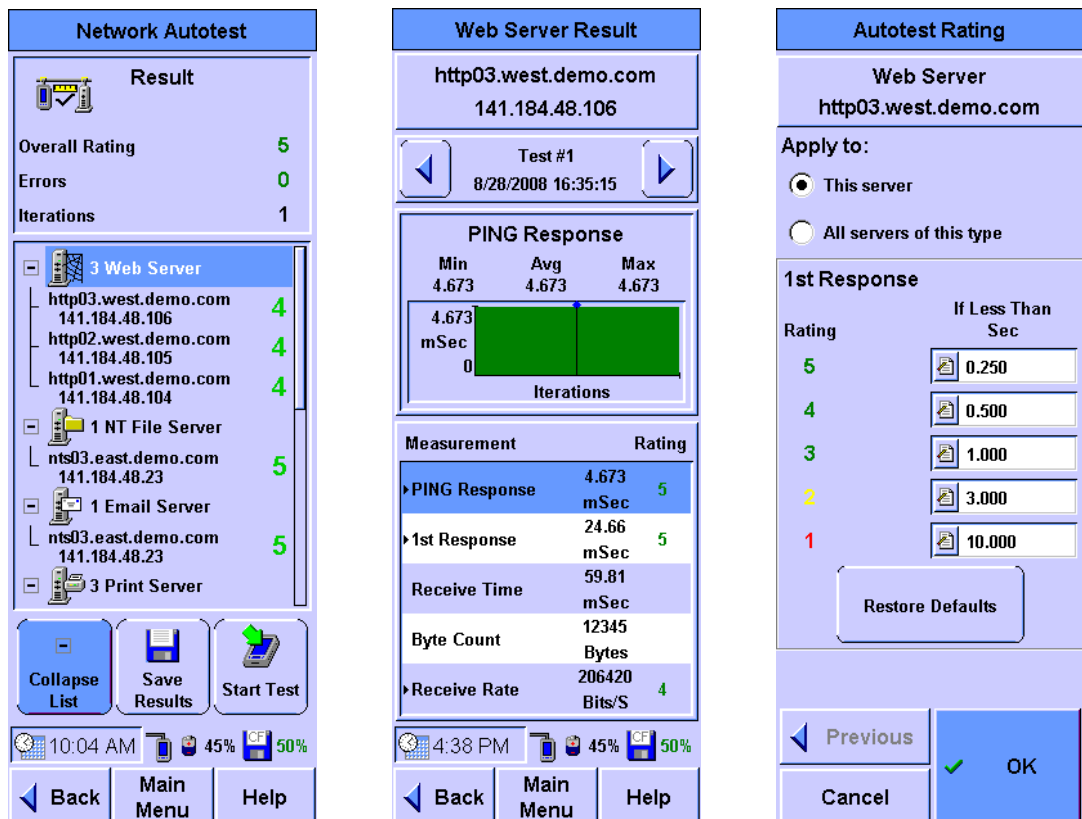
Back Main Menu Help

## Changing the Autotest Metrics

The FrameScope Pro provides a measure of service speed and efficiency by emulating a client device in the network. A rating of the service is provided by making a request for service to a key device and comparing the results to reasonable expectations. However, the default numbers used to determine the rating may not apply to the network-under-test.

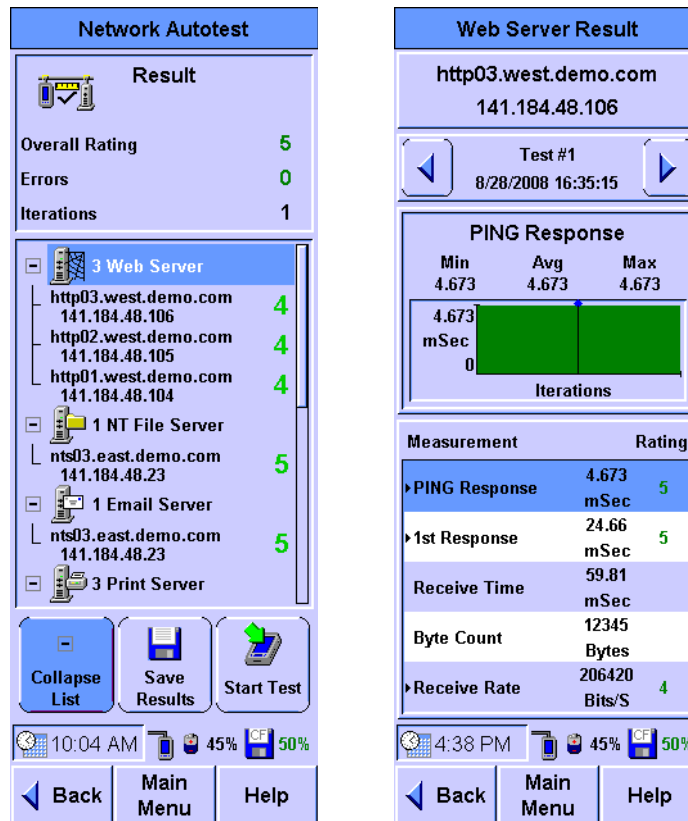
For example, you may know that the connection to the available domain name server is over a slow link and this link cannot be upgraded.

Consequently, it may be more important to have a test that is less sensitive but provides meaningful results that can be compared over time. The FrameScope Pro rating can be changed. After you have run the test and received a result, such as shown below on the left, you can highlight the server address and press **Details**. The screen shown in the middle provides the measured results of the test. If you double click on **1st Response**, you can change the rating scale to whatever values you choose as shown on the right. This can be done for all rated measurements.



## Autotest Results

While the test is running, the overall status of each server test is displayed. Once each test has completed, a performance metric value is provided for the test. When all tests have completed, the overall performance metric is calculated and presented. Details on each test result may be viewed. For example, a web server test may consist of a DNS lookup, PING response, first response, and page read operation. The status and time for each of these operations are shown.



The Autotest may run continuously in a loop with a programmable delay between each iteration of the Autotest. This feature may be used to detect problems that may only occur at certain times of the day. In this case, the response times for each test are recorded and the current, average, minimum, and maximum response times for each test are displayed. When the Autotest has completed, the response times for any test is plotted.

## Statistics

The first view into statistics provides the overall network health. The statistics can be reviewed to obtain more detailed information. Some of the information gathered by the software may not have enough bandwidth to process 100% of the frames. Therefore, a value is presented for the percentage of frames processed in these cases. Refer to [Chapter 2](#), “Viewing Statistics” on page 41 on how to view the statistics.

### Overall Statistics

The current and maximum values of each statistic are displayed. Graphs of each statistic are also displayed in strip charts. The interval at which the graph is updated is programmable so that the graph can cover the details from the last five minutes up to 24 hours. You can obtain more information on any of these statistics by selecting it.

The image displays three screenshots of the Network Performance Analyzer software interface, illustrating different views of network statistics.

**Left Screenshot: Overall Statistics**

This view shows two strip charts at the top, each with a time range from 13:14:00 to 13:16:50. Below the charts are two tables. The first table shows Utilization statistics:

	Current (%)	Max (%)
Utilization	1.48	28.50

The second table shows traffic type statistics:

	Current (%)	Max (%)
Unicasts	99	100
Multicasts	0	0
Broadcasts	0	3
Errors	1	24
Other	0	0

At the bottom, there are buttons for Settings, Save, and Database. The system tray shows the time as 1:15 PM and various status icons.

**Middle Screenshot: Detailed Statistics**

This view shows a list of five stations with their respective MAC addresses and frame counts. The first station is highlighted:

Station	MAC Address	Frames	Percentage
1)	00-C0-65-01-11-51	874	11.4%
2)	00-10-7C-27-14-54	473	6.2%
3)	00-10-7B-27-03-43 prnt03.east.demo.com	413	5.4%
4)	00-10-7B-27-04-54	410	5.3%
5)	00-10-7B-27-13-43	402	5.2%

Below the list, it shows "Frames Processed: 0.0%". There are buttons for Pause and View. The system tray shows the time as 10:04 AM.

**Right Screenshot: Station Detail**

This view shows detailed information for a specific station:

- Station: http02.west.demo.com (00-10-7B-27-00-05)
- Protocols: IP, ARP
- Network Addresses: 1 IP (141.184.48.105)
- NetBIOS Name
- NetBIOS Domain
- DNS Name: http02.west.demo.com
- SNMP Name
- Servers: Web Server

At the bottom, there are buttons for Statistics and Tools. The system tray shows the time as 11:14 AM.

**Utilization** Utilization values are displayed as the percentage of the total network bandwidth. Press this statistic to switch to a list of Top Transmitters.

**Unicasts** The number of unicasts frames or the percentage of the utilization used up by unicasts frames. Press this statistic to switch to a list of Top Unicasts Transmitters.

**Multicasts** The number of multicast frames or the percentage of the utilization used up by multicast frames. Press this statistic to switch to a list of Top Multicast Transmitters. Press any of the Top Transmitters to call the Station Detail screen for that station.

**Broadcasts** The number of broadcast frames or the percentage of the utilization used up by broadcast frames. Press this statistic to switch to a list of Top Broadcast Transmitters. Press any of the Top Transmitters to call the Station Detail screen for that station.

**Errors** The number of frames with the errors or the percentage of the utilization used up by frames with errors. Press this statistic to switch to the Error Mix. Press one of the Error Mix to switch to a list of the Top Transmitter of that error type. Press any of the Top Transmitters to call the Station Detail screen for that station.

**Others** This shows the collisions, unprocessed frames, and flow chart frames. Press this statistic to view the details of the collisions, unprocessed frames, and flow chart frames or the percentage of the utilization used up by these three parameters.

## Top Transmitters

A list of stations which is sorted by a specific statistic is displayed. The statistic used for sorting is set when the list is created. For instance, if you enter the Top Transmitters by pressing the Jabbers statistic in the Statistics screen, the Top Jabber Transmitters is displayed. Press any of the Top Transmitters to call the Station Detail screen for that station.

## Error Mix

**CRC/Alignment Errors** This refers to any valid sized frame with CRC or alignment error. Press this statistic to display the Top Transmitters with an invalid CRC or alignment.

**Short Frames** This refers to any frame under 64 bytes length with valid CRC and alignment. Press this statistic to display the Top Short Frame Transmitters.

**Long Frames** This refers to any frame over 1522 bytes with valid CRC and alignment. Press this statistic to display the Top Long Frame Transmitters.

**Jabbers** This refers to any frame over 1522 bytes with CRC or alignment error. Press this statistic to display the Top Jabber Transmitters.

## Protocol Mix

Select the protocol option to display the Top Transmitters of that protocol. Press any of the Top Transmitters to call the Station Detail screen for that station.

- IP
- IPX
- ARP
- RARP
- Banyan
- DECnet
- SNA
- AppleTalk
- NetBIOS
- Spanning Tree
- Other

## Saving and Retrieving Statistics Data

The Statistics Data can be saved on the main screen of the statistics function. Press **Database** to view the list of statistics data saved.

To retrieve the saved data tables, you can either access the CompactFlash card using a card reader or via the FrameScope Pro configured as a web server. Refer to [Chapter 7](#), “Remote Control” on page 189 for further details.

## Network Tools

### Ping

The Ping tool is used to verify the access to devices on a network. The current, minimum, maximum, and average response times are displayed along with a count for the number of times with no response.

This tool may be run in the IP or IPX mode. The IP Ping sends the ICMP Echo frames to the target device. The IPX Ping can use either the Diagnostic Responder or Ping frames.

The operator may alter the following parameters.

- **Target Device Address** - The target device may be selected from a list or typed in as a name or address. If an IP device is specified by name, DNS and WINS are used to translate the name into an IP address. Names in the IPX mode are translated using the SAP protocol.
- **Frame Size** - Length of the frame, in bytes, including the FCS.
- **Number of Frames** - Number of frames to send. If **Continuous** is selected, the FrameScope Pro sends frames until the tool is stopped.
- **Time to Live (IP Only)** - The maximum number of routers to traverse to the target device.
- **Don't Fragment (IP Only)** - Selecting this option sets the Don't Fragment flag in the IP frame. This flag informs the routers along the path that this frame should not be divided into smaller fragments.

### TraceRoute

**NOTE**

The times shown in the TraceRoute are cumulative and not grouped to segment times.

The TraceRoute tool is used to determine the route taken to a slave device. A list of routers detected along the path to the slave device is displayed along with a count of the number of hops to each router and the response time for each router.

The operator may alter the following parameters.

- Slave device IP address - The slave device may be selected from a list or typed in as a name or IP address. If the device is specified by name, DNS and WINS are used to translate the name into an IP address.
- Maximum Hop Count - The maximum number of routers to traverse while tracing out the route.

## SNMP Query

This tool uses the SNMP to retrieve the following information from the device. This information is usually provided by IT services.

- MIB II System Group:
  - System description
  - Up time
  - Contact
  - System name
  - Location

## Locate Switch Port

This tool is used to determine the switch port to which a device is connected. The SNMP is used to search for switches in the network. Each of these switches are probed to see if the device appears in the switch tables. The MAC address of all the devices which are mapped to the switch port are displayed. There is no order to the list for multiple results, therefore, the results cannot be interpreted as a direct path.

## Performance Tests

The Performance Tests tool is used to verify the network performance between two network points. These tests are IP and MAC Loopback tests, RFC 2544 Throughput, Latency, Frame Loss Rate and Back To Back tests, TCP/UDP Throughput test, and Packet Error Rate Test. For details on each test, go to [Chapter 2](#), “Performance Tests” on page 48. Note the following points:

- All loopback and RFC 2544 tests require a second FrameScope Pro as a slave device.
- The MAC loopback test only works within the subnet (does not work across routers).



## Traffic Generation

A hardware-based traffic generation tool is provided to enable network testing under heavily loaded conditions. Hardware-based timers control the transmission of user-defined frames into the network.

The operator may change any of the following properties of the traffic being generated.

- **Frame Length** - The number of bytes in the frame, including the FCS. This number ranges from 64 to 1518, unless long or short frames are specified. If the **Short Frames** is selected, the frame size ranges from 40 to 63. If the **Long Frames** is selected, the frame size ranges from 1519 to 16000.
- **Frame Rate** - The rate at which the frames are transmitted by the FrameScope Pro. Changing the Frame Rate causes the Utilization to be recalculated.
- **Utilization** - The percentage of the Ethernet bandwidth which the FrameScope Pro should fill up. This value ranges from zero (which causes no frames to be transmitted) to 100, (which causes the FrameScope Pro to completely load the network connection). Changing the Utilization causes the Frame Rate to be recalculated.
- **# Frames or Continuous** - Specifies the number of frames required to be generated by the FrameScope Pro when **Start** is pressed. If **Continuous** is selected, the FrameScope Pro starts to generate the frames when **Start** is pressed and does not stop until **Stop** is pressed or the Traffic Generator tool is exited.
- **Errors** - Frames with errors may be generated. The error types include CRC error, short frame, or long frame.
- **Frame Type**
  - 802.3/802.2
  - Ethernet/IP
  - SNAP/IP
  - Ethernet/IPX
  - 802.3/IPX
  - 802.2/IPX
  - SNAP/IPX
- **Source MAC** - Choices include this FrameScope Pro MAC or simulate multiple (10, 100, or 200) stations. The simulated MACs use the values of 00-0C-65-01-00-XX where XX increments from 01 to C8 (hex).

- **Destination MAC** - To send a frame to a station on the local LAN, type in its MAC address. If the destination address is set to FF-FF-FF-FF-FF-FF, the frame will be received by all devices on the LAN. To send a frame across a router, the router MAC address should be used.
- **Source IP or IPX** - The source network address, if required. If the Source MAC is set to simulate multiple stations, then the Source IP increments along with the MAC. For example, if the FrameScope Pro is set up to generate the Ethernet or IP frames from multiple simulated stations with the IP Address set to 209.6.108.202, then the first two frames would be addressed as follows.

Frame number	MAC address	IP address
1	00-0C-65-01-00-01	209.6.108.202
2	00-0C-65-01-00-02	209.6.108.203

- **Destination IP or IPX** - Destination network address, if required.

## Remote Control

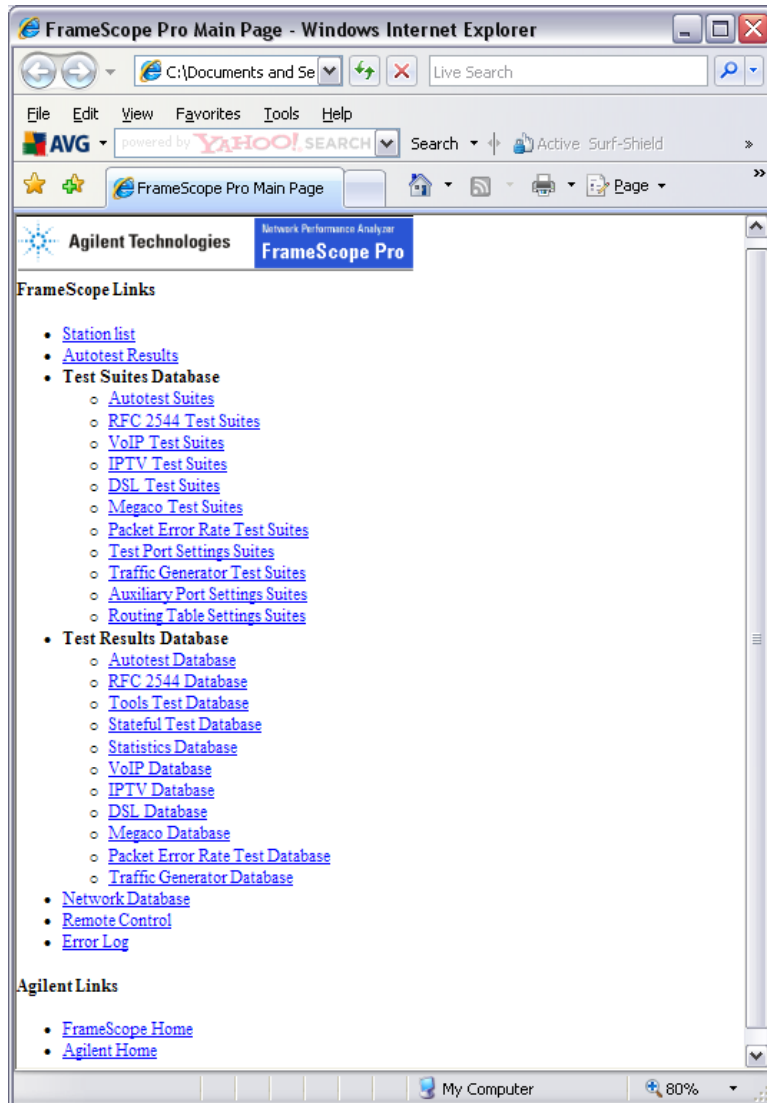
A web server is implemented in the FrameScope Pro to provide the means to control and monitor the FrameScope Pro using a web browser.

To use the web server, the web server must first be enabled in the FrameScope Pro.

- 1 Press **System** to call the System Settings Network screen.
- 2 Select **Remote Control** and press **Edit Settings** on the System Settings Network screen.
- 3 Select **Enable Web Server** to enable the web server in the FrameScope Pro.

Note the port ID, either the test port or auxiliary port, on which the web server is running.

- 4 The web server can now be connected to from the web browser by entering the IP address of the port in the form of *http://141.x.x.x*.



The FrameScope Pro homepage provides the links to the following FrameScope Pro functions.

**Station List** Links to the current list of stations. This is the same list that is accessible on the FrameScope Pro by pressing **Network Database** on the Tools menu.

**Autotest Results** Links to the current autotest results.

**Test Suites** Links to the saved configuration files for the various test.

**Test Database** Links to a list of stored test results from the following test tools.

**Autotest Database** Links to a list of stored Network Autotest results.

**RFC 2544 Test Database** Links to a list of RFC 2544 Throughput, Latency, Frame Loss Rate, and Back-To-Back test results.

**Tools Test Database** Links to a list of MAC and IP loopback test results.

**Statistics Database** Links to a list of saved statistics data.

**Stateful Test Database** Links to a list of TCP/UDP Throughput Test results.

**VoIP Database** Links to a list of VoIP test results.

**DSL Database** Links to a list of DSL test results.

**IPTV Database** Links to a list of IPTV test results.

These results may be viewed directly as web pages or the result file may be uploaded to a PC. The result file contains all of the results for the test in Comma Separated Value (CSV) format to be used in spreadsheet programs.

Java generated reports are available for the RFC2544, VoIP, Stateful, and IPTV Tests.

A user-defined logo can now be included into the Java Test Reports, using the CompactFlash card.

To display the logo in the Java report, save the image file of the logo, in the size of 250 pixels wide by 40 pixels high, as a *.GIF* file with the name *customer.gif* in the `<drive>\WSDATA1.0\logo\` directory on the CompactFlash card.

The report will automatically scale the logo if it is larger. However, providing an image with the recommended resolution will provide a better effect.

By default, when **Save** is pressed, the FrameScope Pro creates a logo directory and "*customer.gif*" logo file with the logo of Agilent Technologies.

### NOTE

If the FrameScope Pro is currently running one of the tools (Autotest, RFC 2544, IP/MAC Loopback, or Statistics) in any of the FrameScope Pro screens, its respective stored data or test results in the FrameScope Pro cannot be displayed. For example, if you are running Statistics on the FrameScope Pro, you cannot view the Statistics database from the remote screen.

---

- Network Database - Links to a list of stored station lists. These station lists may be uploaded to the PC. The station lists are stored in the CSV format to be used in the spreadsheet or database programs.
- Remote Control - Links to a page which shows an image of the FrameScope Pro display. Pressing this image has the effect of pressing the FrameScope Pro display. The display is updated when you click on the web interface onscreen or every 10 seconds if no screen operations are performed.
- Error Log - Links to a list of errors found on the network.

## Memory Requirements

The FrameScope Pro requires a CompactFlash card to store the test results and network station lists. The amount of memory taken up by each Autotest result depends on the number of test and number of iterations that you set before starting the test. The results require about 600 bytes per test plus 150 bytes per iteration for each test. There is a limit of 100 tests and 100 iterations. Therefore, the maximum results size is about 1.5 MB.

The Autotest suite storage requirement is only 350 bytes per test, so the maximum size is about 35 kB.

The station list storage requirement is 250 bytes per station with a maximum of about 1500 stations, so the maximum size is 375 kB.

The FrameScope Pro does not use any of the 4 MB of internal Flash memory for network test result storage.

The following table lists the approximate record storage capacities when configured for a 32 MB removable CompactFlash card and a 192 MB card for comparison purposes. All sizes of CompactFlash card will act as the FrameScope Pro Network Autotest results storage.

**Table 8-1** Saved Test Results Capacities, assuming 1 MB is used for test suites and station lists

Autotest number	Iteration	Size of record	Capacity (number of records)	
			32 MB CompactFlash card	192 MB CompactFlash card
10 Autotests	1	60 kB	516	3183
10 Autotests	100	156 kB	198	1224
100 Autotests	1	600 kB	51	318
100 Autotests	100	1.56 MB	19	122







## 9 Specifications

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This chapter describes the specifications of the FrameScope Pro.

## Physical

The FrameScope Pro physical characteristics are:

<b>Size</b>	9.256" x 4.944" x 2.959" HWD (234.2 x 126.0 x 75.2 mm)
<b>Weight</b>	2.53 lbs. (1.15 kg)

## Environmental

<b>Indoor / Outdoor</b>	Intended for indoor use
<b>Operating temperature range</b>	0 °C to 40 °C (32 °F to 104 °F)
<b>Storage temperature range</b>	-10 °C to 55 °C (14 °F to 131 °F) -20 °C to 55 °C (-4 °F to 131 °F)
<b>Maximum humidity</b>	80% for temperatures up to 31 °C (88 °F)
<b>Altitude</b>	Up to 2000 m
<b>Pollution degree</b>	2

## Electrical

<b>Battery</b>	A removable rechargeable lithium-ion (Li-Ion) battery pack typically provides four to six hours of operation between charges, depending on the usage and power management settings. The battery has a built-in charger, that recharges the Li-Ion pack in less than five hours. Extra battery packs are available. Battery pack specification: (Part number N2595A-096) 7.4 VDC 3800 mAh
<b>External power</b>	Power converter: External AC to DC power converter (5183-8208) supplies 12 VDC, 1.5 A to the FrameScope Pro power connector. Power connector polarity: Positive (+) on the outer sleeve; Negative (-) on the tip.
<b>Mains supply voltage</b>	Must be within 10% of nominal voltage
<b>Installation overvoltage</b>	Category II

### **WARNING**

**Use only the AC adapter supplied in the FrameScope Pro Kit. Using other power adapters may damage the unit and will void its warranty.**

## Ports

### USB Host and Client Ports

The USB Type B port allows the FrameScope Pro to connect to a PC equipped with a USB port or USB host.

### Card Bus Slot

A Card Bus Slot is provided to cater for future enhancements.

## Display

6.625" (16.83 cm) diagonal backlit color touch sensitive LCD. Resolution: 240 (H) x 640 (V). The display is capable of displaying text and graphics resolution up to 256 colors.

## 9 Specifications



## 10 Glossary

Glossary [252](#)

This chapter contains the glossary for the FrameScope Pro User's Guide.



## Glossary

**ARP** Address Resolution Protocol - A broadcast protocol used to discover the low level (MAC) address that corresponds to the higher level (IP, IPX, and so forth) address.

**Auto Discovery** Proactively requesting information about the network. Also called Active Discovery.

**Auto Negotiation** The process of querying a switch or hub port to connect at the highest possible rate. The options include 10 or 100 Mb Ethernet at half or full duplex.

**Back-to-back** Fixed length frames presented at a rate such that there is the minimum legal separation for a given medium between frames over a short to medium period of time.

**Bridge** A device used to expand a local area network by forwarding frames between data link layers associated with two separate cables. See also **router**.

**Broadcast** A transmission addressed to all stations on a network.

**Collision** The error that occurs when two stations attempt to transmit at the same time on an Ethernet network.

**CRC Error** Cyclic Redundancy Check - An error detection scheme using a number derived from the data that is transmitted in the packet. The number is calculated by the sending station and stored in the packet. The receiving station, upon receipt of the packet recalculates the number and compares it to the stored value. If they are not the same, then the packet has changed erroneously during the transmission.

**Community** A string or password for retrieving SNMP data from a station or device.

**Default Gateway** The preferred system for providing access outside the local subnet. A gateway is a form of **Router**. In order for a station to access the stations on other subnets or the Internet, it must know the address of the system that controls access, this system is the Default Gateway.

**Default Router** The router to which a packet will be sent if no specific entry in its route table directs it elsewhere.

**DHCP** Dynamic Host Configuration Protocol - a procedure which allows devices that are entering or re-entering the network to request that certain parameters are automatically assigned to them. DHCP assigns a unique IP address. A device may request a subnet mask, default router address, name server address, and other parameters and addresses.

**DHCP Server** Any of several kinds of devices that provide DHCP services. These commonly include file servers and routers.

**Diagnostic Responder** IPX echo tool (ping).

**DNS** Domain Name Server or Domain Name Services. A capability used widely within both the Internet and corporate networks that resolves (or matches) names with IP addresses. For example, if a workstation needs to retrieve a web page from *abc.com*, a request containing the name *abc.com* is sent to a domain name server. That server, or another acting on its behalf, will respond with the IP address of the host at which the web page is stored.

**DNS Domain** An Internet naming hierarchy such as *Agilent.com*.

**Domain Controller** In an NT environment, the domain controller has the responsibility for storing certain information about users, resources and devices on the network. There will be a Primary Domain Controller and a Backup Domain Controller. These are referred to as the PDC and BDC, respectively.

**DSCP** Differentiated Services Code Point - a field in the IP Packet which is used in the network for packet classification and traffic conditioning functions.

**E-Mail** Electronic Mail - A system of sending messages and files across the network from one user to another.

**E-mail Server** A device that stores incoming and outgoing E-mail messages. The protocol most often used for retrieving messages from the E-mail server to a user's workstation is POP3 (Post Office Protocol #3). Conversely, the protocol most often used to send E-mail messages from the workstation to the E-mail server is SMTP (Simple Mail Transfer Protocol.) SMTP is also used in order that the source and destination E-mail servers may exchange E-mails.

**File Server** A generic term for a device that provides files upon request. It overlaps other commonly used terms such as Novell server, NT server, and Unix server, which are more specific because they indicate the operating system running in the file server. File servers often provide other functions such as remote access, DHCP, or security related services.

**Frame** Data organized in bytes encapsulated with a header and a trailer containing information regarding the data. Frame and packet are sometime used interchangeably.

**Frame Loss Rate** Percentage of frames that should have been forwarded by a network device under steady state (constant) load that were not forwarded due to lack of resources.

**Frame Type** The format of the frame. Some examples are: SNAP/IP, SNAP/IPX, 802.3/802.2, EthernetII/IP, EthernetII/IPX, 802.3/IPX, 802.2/IPX.

**FTP** File Transfer Protocol - Internet protocol for transferring files from one computer to another.

**Hop** A data link through a bridge or router between stations on a network. For example: *Agilent.com* is 6 hops away from my PC.

**ICMP** Internet Control Message Protocol - The IP layer protocol for handling errors and control messages.

**IP** Internet Protocol - The protocol developed and used in the Internet. It is now used in nearly all public and private networks. It provides an addressing structure that allows relaying of packets in a manner that is logically separated from the underlying physical network. It is a connectionless, best effort protocol designed to work across dissimilar networks.

**IP Address** A four-byte address always written in decimal with each byte separated by dots. This is an address normally assigned through software and associated with a hardware address of a network interface card. It can also be associated with a resource on the network such as an SNMP agent.

**IPX** Internetwork Packet Exchange - Novell Netware's network layer protocol, it handles network addressing, routing and packets.



**Latency** The time interval starting when the last bit of the input frame reaches the input port and ending when the first bit of the output frame is seen on the output port.

**Locate** Using SNMP, report the switch or hub port that a station is connected to.

**MAC Address** The unique address of each hardware component, NIC card, hub, switch, and so forth, on a network. These are assigned by the manufacturer of the networking equipment when the hardware is produced.

**MAC Loopback** The process of transmitting and receiving packets at the MAC layer and reporting delay, the quantity transmitted and received as well as any errors that occur.

**MIB** Management Information Base - A set of parameters that are available and sometimes customizable that an SNMP management station can query. Used to report status or configuration information of components of a network.

**Multicast** A subset of a Broadcast where a packet is only delivered to a subset of all possible destinations that share a multicast address.

**NFS Server** Network File System - A Sun Microsystems protocol allowing computers on the same network use data stored on other computers as if it were on local disks. An NFS server is usually a UNIX server.

**Novell Server** A device that provides services such as file services and print services in a network where a Novell operating system is being used.

**Ping** A commonly used test which determines whether a device can be reached. Generally, from a command line a user types `ping a.b.c.d <type in>` to determine whether the device at IP address `a.b.c.d` can be reached. The response is often an indication of the success of the test and a timestamp designating the length of the query-response, usually in milliseconds. The ping tests reachability by sending an ICMP echo request to the destination and waiting for a reply.

**POP** Post Office Protocol - E-mail post office protocol that allows a single user host system to connect and download E-mail.

**RFC 2544** This RFC defines specific set of tests to measure and report the performance characteristics of network devices.

**RIP** Routing Information Protocol - An interior gateway protocol that allows groups of hosts on a LAN share routing information.

**Router** A device that forwards traffic between subnets or connected networks.

**RMON** Remote Monitoring - Using SNMP to read or control remote probes for network monitoring and troubleshooting.

**SAP Request** Service Advertisement Protocol - A Netware protocol for publicizing the current network address of available services.

**Server** A computer or service that is shared among stations on the network. Any device in the network that provides services upon request.

**SMTP** Simple Mail Transfer Protocol - The Internet electronic mail protocol used to transfer mail between hosts.

**SNMP** Simple Network Management Protocol - A standard protocol used to manage nodes on an IP network.

**SNMP Agent** Devices that are being managed in a network can contain an SNMP agent. A network management program or device sends a query to the agent. The agent retrieves the requested value from a database stored in the managed device and sends the reply. SNMP agents often retrieve and reply with statistics about the managed device. Examples include utilization values on ports, address tables that are stored, and vendor profiles. The protocol used to communicate the information is the Simple Network Management Protocol (SNMP).

**Station** A computer on the network.

**Statistics** The measurement of key network parameters such as utilization, frame and protocol traffic.

**Subnet** A portion of the network that shares a network address with other subnets.

**Subnet Mask** A bit mask used to identify which bits in an IP address apply to the subnet.

**Time To Live** A field in an IP packet which indicates how long the packet should be allowed to exist before being discarded.

**TraceRoute** A Ping like tool that reports the number of hops to the destination as well as the time delays to each hop along the way. TraceRoute is useful for locating bottlenecks in network traffic.

**Type of Service** A field in an IP packet that controls the quality of service that the packet requires. The Internet is a “best effort” network, by using the Type of Service bits, higher grades of service can be requested. If the network equipment supports better service, for example VoIP, the better service will be provided.

**Unicast** A frame sent to a specific single destination.

**UNIX Server** A device providing services in a network and running a version of the Unix operating system. A UNIX server is usually an NFS server.

**Utilization** A measure of how much of the network’s bandwidth is being used. It is usually expressed as a percentage of the maximum line speed in the network. For example, if the network’s current usage is at 2 Mbps and the bandwidth available (line speed) is 100 Mbps, we say the utilization is 2%.

**Web Browser** The program running in a client host when someone is interacting with a web server. It is the software used to browse the Internet.

**Web Server** A network server that contains files that describe Internet pages. The pages are usually developed in a language named Hypertext Markup Language (HTML). A company’s home page is an example of an HTML file that can be retrieved from a web server.

**WINS Server** A type of name server used in the Microsoft NT environment. WINS stand for Windows Internet Name Services. It is a variation of DNS.



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Fifth Edition, February 26, 2009  
N2620-90003