

**Agilent N2610A
FrameScope 350
Network Performance
Analyzer**

User's Manual

Version 3.0



Notices

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In This Guide...

This user's guide contains information for using your FrameScope 350 handheld network performance analyzer using software version 3.0.2.

Note that some systems running earlier software may not provide all of the features described in this manual; systems running later versions of software may operate differently than described in this manual. Be sure to refer to any user's manual supplements or release notes that came with the unit or call 800-452-4844.

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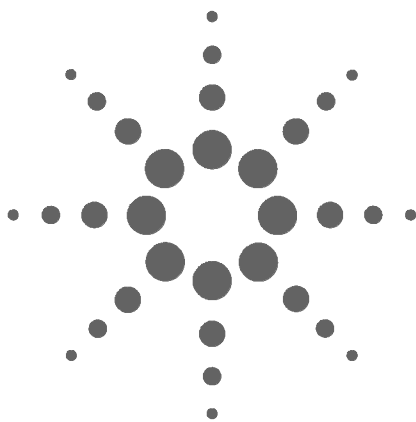
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The Agilent FrameScope 350 Network Performance Analyzer is a powerful handheld instrument that measures the performance of your key network resources and verifies the cabling and active network equipment. The FrameScope 350 integrates network performance analyzer features such as auto discovery, performance autotesting, and fault finding; with versatile cable certification testing for Category 6 (Class E) and category 5E (Class D).



The FrameScope 350 at a Glance

Front View



Figure 1 FrameScope 350 Front View

Side Views

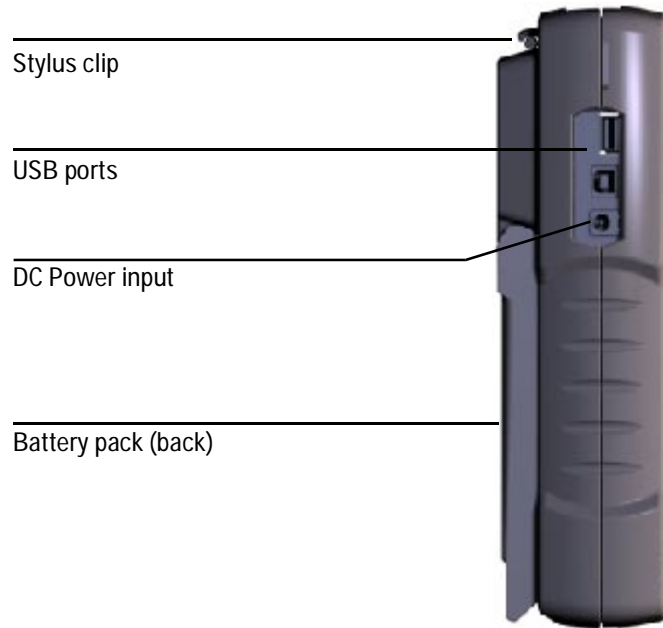


Figure 2 Left Side

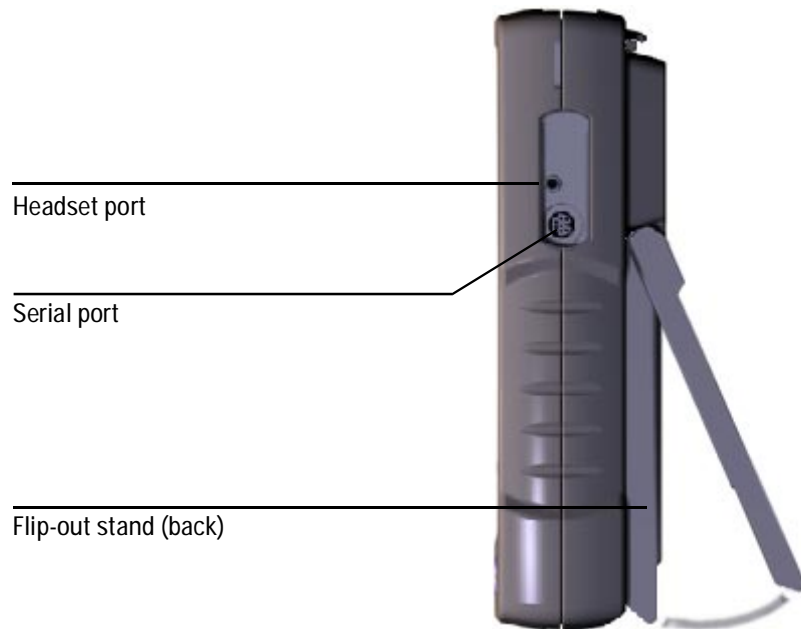


Figure 3 Right Side

Controls

Color Touch Screen The FrameScope 350's touch screen is the main user interface. Test controls and results are shown here. Simply press the screen with your finger or a stylus to navigate through the menus and test controls.

Power Button Press the **Power** button briefly to switch the unit on. To switch the unit off, do one of the following:

- Press **Power** twice.
- Press **Power** once, wait 5 seconds and the unit powers off.
- Press **Power** once and hit the **Off** button on the screen.

OK Button Press the **OK** button to activate the currently selected item on the display. Use the OK button to confirm edits, enter values, and execute selected features.

Scroll Button The scroll rocker button moves the highlight cursor on the screen. Use this button to scroll through selected items on the display.

Ports

SmartProbe Port The SmartProbe test port on the top of the FrameScope provides the network test interface. This port accepts any of the Agilent SmartProbes such as:

- Channel SmartProbe for testing twisted pair using patch cords.
- Link SmartProbe for testing twisted pair at network outlets.
- Fiber SmartProbe for testing optical fiber.

CompactFlash™ Slot This port on the bottom of the unit accepts standard CompactFlash™ cards for data storage.

USB Ports The FrameScope provides two universal serial bus (USB) interface ports to connect with PCs and peripherals. The unit provides a USB Type A (Host) port and a USB Type B (Hub) port. See "USB-A port" on page 227.

Serial Port The Serial port provides an 8-pin RS-232 interface for connecting a PC. See "Serial port" on page 227.

Talkset Port This port allows you to connect Agilent's FrameScope talkset (N2605A-137) for two-way voice communication between the FrameScope and DualRemote over copper cabling.

DC Power Input The DC power input accepts any of the Agilent 12 Vdc power adapter/chargers.

CAUTION

Use only the 12 Vdc adapter/charger supplied with your FrameScope 350. Using an incompatible adapter/charger can damage your FrameScope equipment.

The DualRemote 350 at a Glance

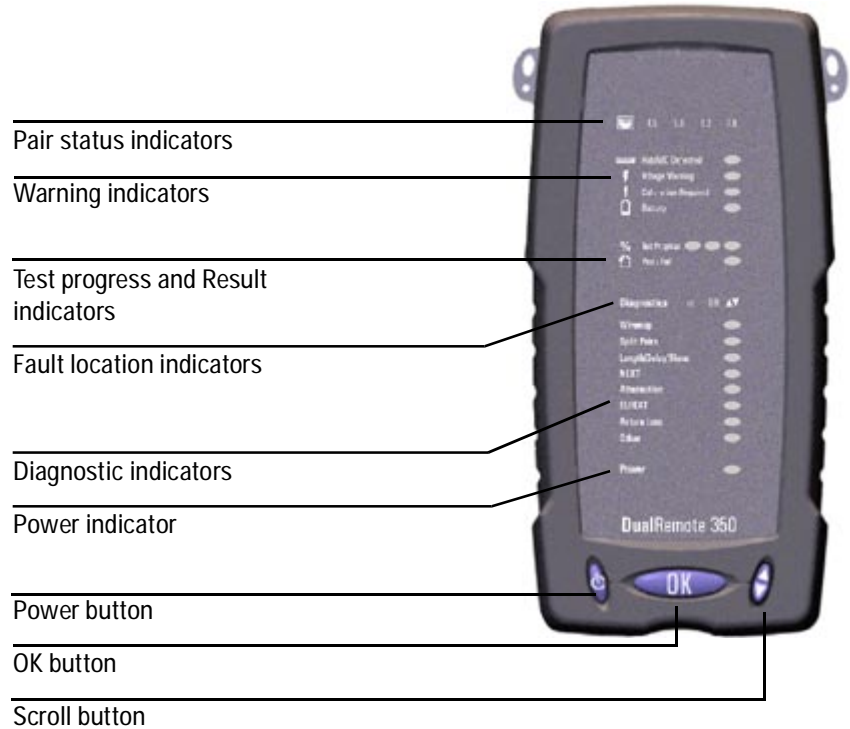


Figure 4 DualRemote Front View

The Agilent DualRemote 350 is used with the FrameScope 350 when performing cable testing. The DualRemote is positioned at the far end of the cabling run being tested. This unit is controlled by the FrameScope, and shows the results of the cable tests.

Figure 4 shows the indicators and controls of the DualRemote. For complete information on the DualRemote, see Chapter 10, “DualRemote 350 Reference”.

The Main Menu at a Glance

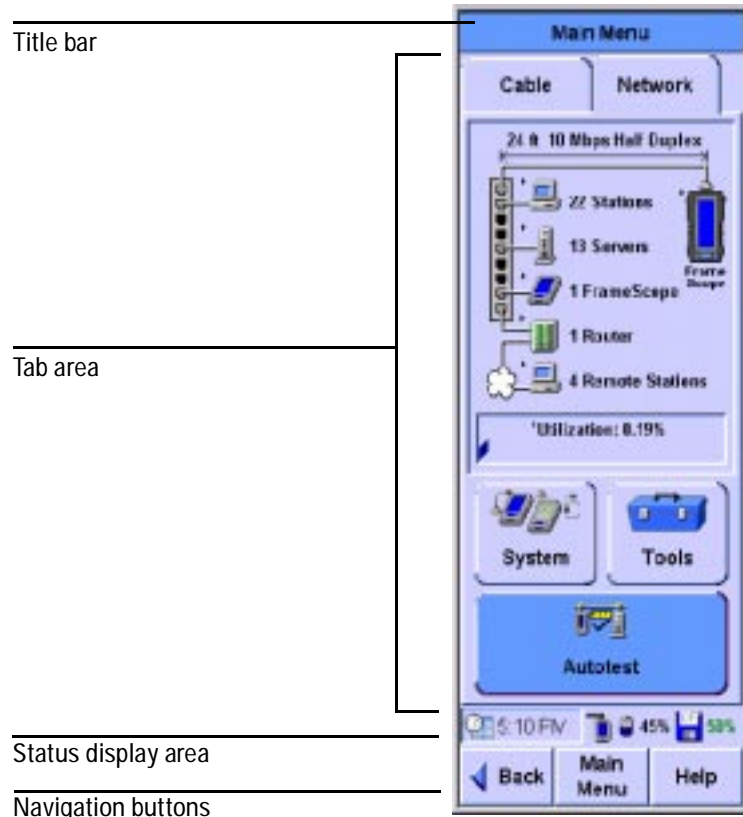


Figure 5 The Main Menu

Title Bar Displays the name of the current screen.

Tab Area Display the currently selected tab. The FrameScope 350 provides two tabs: Network and Cable. Select a tab to choose the type of testing you want to do.

Status Display Area This area displays the time of day, network connection status, battery status, storage status, and talkset activity.

Navigation Buttons These buttons move through the interface screens:

- **Back** returns to the previous screen.
- **Main Menu** returns to the Main Menu.
- **Help** launches the built-in help.

The Network Tab

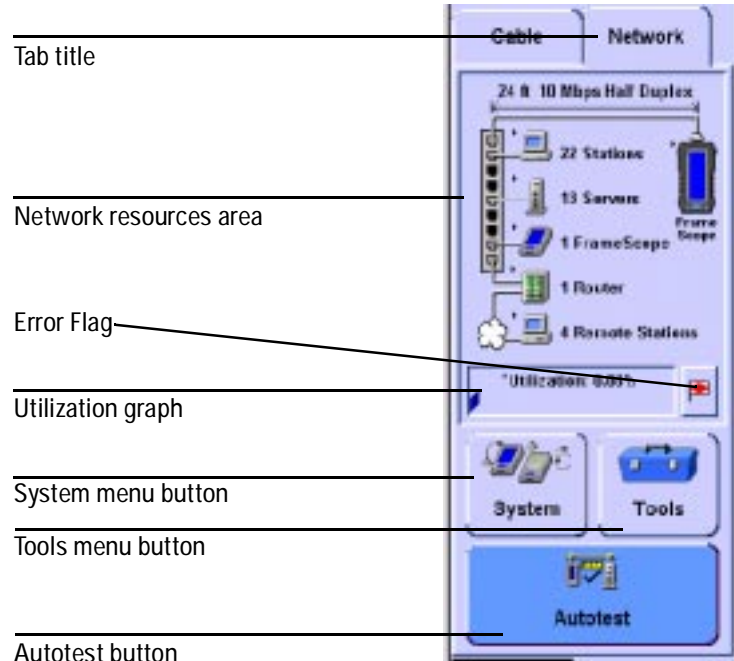


Figure 6 FrameScope Network Tab

Tab Title Displays the name of the tab.

Network Resource Area Shows all of the detected network resources. When you press the **Network** tab, the FrameScope performs auto discovery of network resources. Resource icons shown with a black triangle (see below) can be pressed to display more information.



Error Flag Displayed when an unacknowledged error is in error log

Utilization Graph Displays current network usage. Press this graph to display more statistics.

System Menu Button Calls the System menu.

Tools Menu Button Calls the Tools menu.

Autotest Button Calls the Network Autotest Setup screen.

The Cable Tab

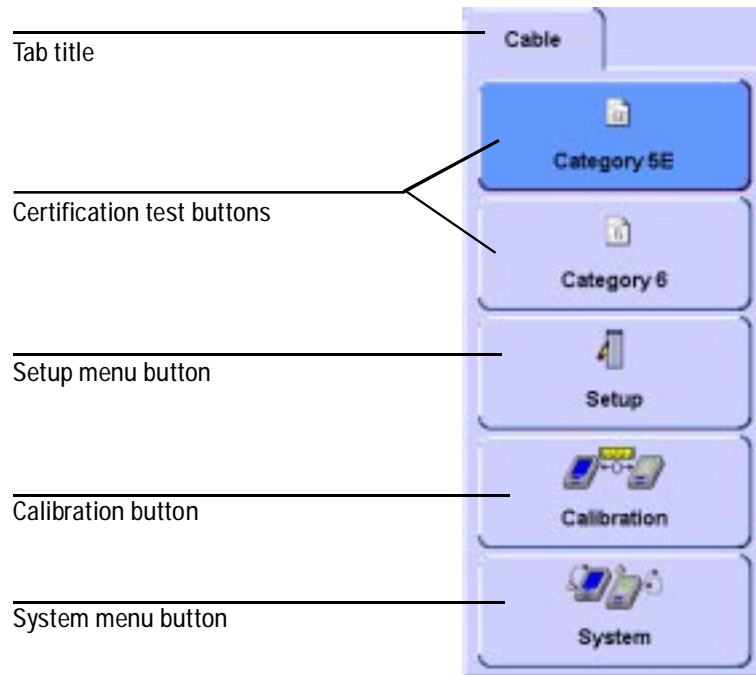


Figure 7 FrameScope Cable Tab (normal mode)

NOTE

The Cable tab will look different if Expert Mode is turned on.

Tab Title Displays the name of the tab.

Certification Test Buttons Launch a certification autotest. For example, Category 5E or Category 6 cable certification.

Setup Menu Button Opens the Setup menu.

Calibration Button Opens the Calibration screen for calibrating the FrameScope 350 with the Dual Remote 350.

System Menu Button Opens the System menu.

Getting Started

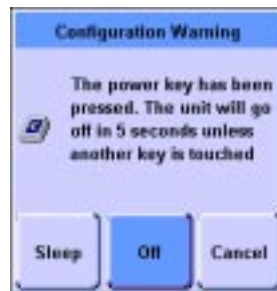
Switching the FrameScope On and Off

- 1 To switch the FrameScope on, briefly press the **Power** button on the front panel.



The screen will light and a brief tone will sound.

- 2 While the unit is on, briefly pressing the **Power** button will call the Sleep/Shutdown window.



- Press **Sleep** to put the unit in sleep mode. When the FrameScope is in sleep mode, briefly press the **Power** button or press the screen to reactivate it.
 - Press **Off** or wait five seconds to turn the unit off.
 - Press **Cancel** to go back to the Main Menu.
- 3 You can also turn the unit off by pressing the **Power** button twice.

Checking Power and Charging the Battery

The FrameScope's battery should provide enough power for a typical day of testing. The AC power adapter/charger can also be used to power the unit and to recharge the battery.

To check the battery's charge level, perform these steps:

- 1 Switch on the FrameScope, if necessary, by pressing the **Power** button on the front of the unit.
- 2 Observe the battery icon in the Status display area on the Main Menu.



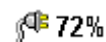
The battery icon will show how much charge remains in the battery (for example, 45%).

If the battery is severely depleted, a low-battery message will be displayed.

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



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



The AC icon will also indicate the battery's charge level (for example 72%).

Connecting to the Network

The FrameScope 350 uses test probes to connect to the network you are testing. Follow these steps to connect your unit to the network:

- 1 Select an appropriate Agilent test probe for your application:
 - Select a *Channel SmartProbe* for testing twisted pair using patch cords.
 - Select a *Link SmartProbe* for testing twisted pair at network outlets.

See also “Cable Testing Overview” on page 57.

- 2 Plug the test probe into the SmartProbe port on the top of the FrameScope.



- 3 Connect the cabling to the SmartProbe. If you are performing optical cable testing, connect both the input and output signals. If you are performing optical network testing, connect an optical-to-copper media converter to the SmartProbe.

Using the FrameScope 350

You operate the FrameScope using its front panel touchscreen and control buttons. When testing with the unit, use the following operating tips:

- Select items on the display by pressing them with your finger or with a stylus or by scrolling the highlight bar with the scroll button. The touch screen may not detect a quick press; you should press firmly.
- Many screens have lists of items that you can navigate using the Scroll button. Pressing this button up or down moves the selection highlight.
- Selected items are highlighted in dark blue to indicate that they are selected. Most screens have a default selected item.
- Execute a selected item by pressing it or by pressing the **OK** button.
- To return the Main Menu at any time, press the **Main Menu** button on the bottom of the display.
- To return to the previous screen, press the **Back** button on the bottom of the display.

Running a Test

The basic steps for performing a test with the FrameScope 350 are described below. For more information on network testing, see Chapter 2, “Network Testing with the FrameScope 350”. For more information on cable testing, see Chapter 3, “Cable Testing with the FrameScope 350”.

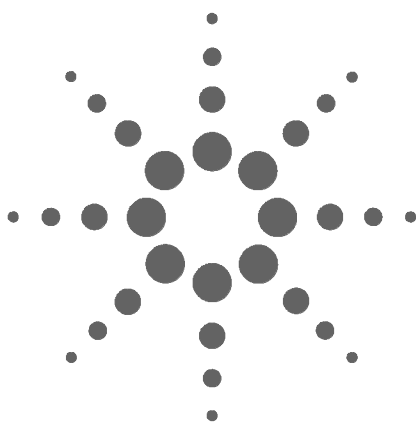
- 1 Switch the unit on. Connect power to charge the battery if necessary. See “Checking Power and Charging the Battery” on page 11.
- 2 Install the appropriate SmartProbe for your test and connect the FrameScope to the network under test. See “Connecting to the Network” on page 12.
- 3 Choose the type of test you want by pressing either the **Network** or **Cable** test tab.
- 4 Make any needed configuration changes to match your testing environment.

Most basic FrameScope operations execute automatically and require very little setup. In most cases you can skip this step.

- 5 Press the **Autotest** button or **Start Test** button to begin the test.

1 Introducing the FrameScope 350 Getting Started

See “Viewing Details and Statistics” on page 26 for information on reviewing network test results. See “Viewing Result Details” on page 82 for information on reviewing cable test results.



2 Network Testing with the FrameScope 350

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This chapter describes how to use your Agilent FrameScope 350 as a network performance analyzer.

The FrameScope 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.



Network Testing Overview

The following steps describe the general procedure for performing network analysis testing using the FrameScope 350.

- 1 Power the unit on. See “Switching the FrameScope On and Off” on page 10.
- 2 Press the **Network** tab on the Main Menu to begin.
- 3 Connect to the network under test. See “Connecting to the Network” on page 12.

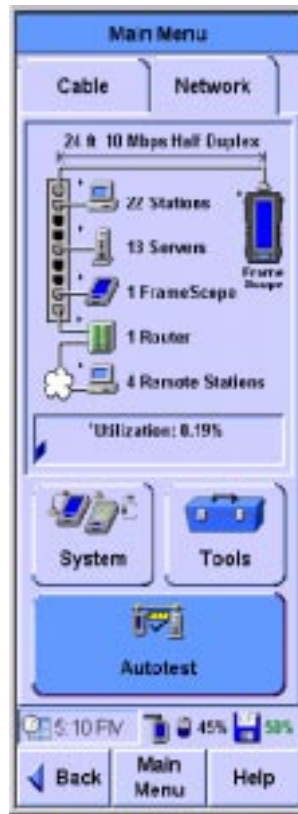
The FrameScope automatically begins to poll the network and locate devices. See “Examining the Network” on page 17.

- 4 View details about the detected network resources. See “Detailed List” on page 18.
- 5 Perform an Autotest on any or all desired resources. See “Running an Autotest” on page 19.
- 6 Select any devices on the network and perform additional testing, such as:
 - Ping test; see page 28.
 - Trace Route test; see page 31.
 - SNMP Queries; see page 34.
- 7 Save results as desired, perform other tests or functions.

Examining the Network

Network Overview

- Press the **Network** tab on the Main Menu to begin the FrameScope auto discovery on your network.



The Network resources area of the display will show a list of detected network devices.

Detailed List

- 1 To view a detailed list of network resources, press on any category in the Network Resources area. A triangle indicates that a list is available for that category.

Press icon to view details



- 2 Use the Scroll button to select items in the list. The **Collapse List** and **Expand List** button is renamed **View** when the highlight is on a particular station. Press the **View** button to see details of the selected item. A red 'X' means that the device wasn't present the last time it was checked.
- 3 Press **Back** to return to the Network tab, or press **Main Menu** to return to the beginning screen.

Running an Autotest

This section describes how to run an Autotest on the network using the FrameScope 350. The FrameScope can store Autotest *suites* that define which network elements to test.

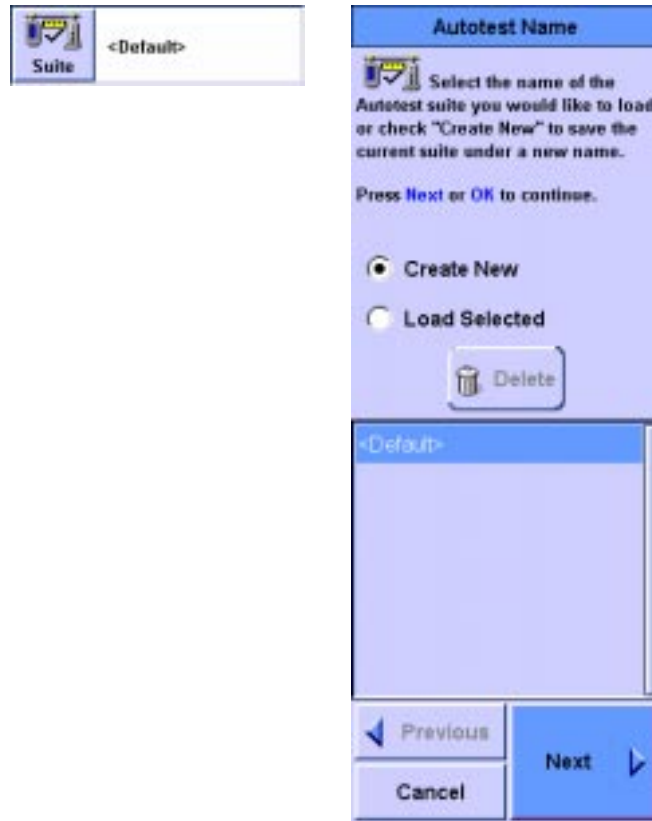
- 1 From the Network Overview screen (see page 17) press the **Autotest** button. The Network Autotest Setup screen is displayed.



2 Network Testing with the FrameScope 350

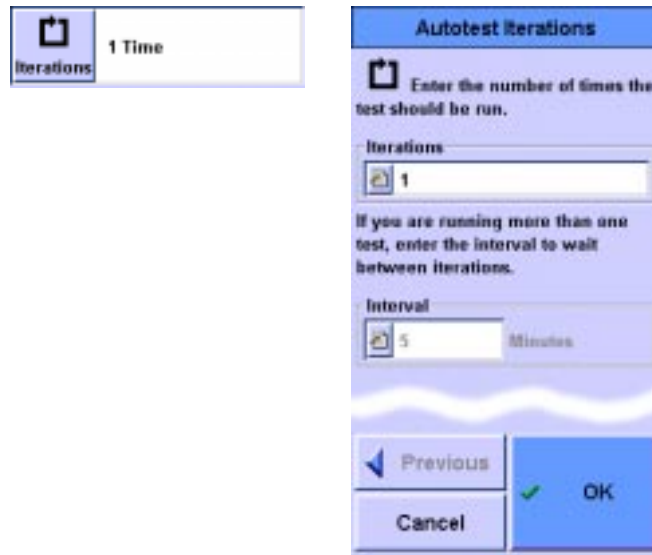
Running an Autotest

- 2 If you want to save this Autotest suite, or load a previously-stored suite, press the **Suite** button.



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

- 5 On the Network Autotest Setup window, press the **Iterations** button to select how many times the test is to be run.



- 6 Enter the number of times you want the test to run in the number entry box.
- 7 Enter the time in minutes to wait between tests in the Interval text box.
- 8 When you have finished press **OK**.
- 9 On the Network Autotest Setup screen, use the **Delete** and **Add** buttons to remove or insert elements from the resources list. You can also use the **Add** button to enter new network resources (see “Network Performance Autotest” on page 184).
- 10 To change an item on the resources list, select the item and press the **Edit** button. You will be able to enter new details for that network resource. (See “Network Performance Autotest” on page 184.)

- 11 When you have finished setting up the test, press the **Start Test** button (or press **OK**) on the Network Autotest Setup screen. The test will begin.



- 12 To stop the test at any time press the **Stop Test** button.
- 13 To view information about a network element's results, select the element from the list and press the **Details** button.
- 14 Press the **Save Results** button to store the test data on the CompactFlash™ card.

The rating numbers will range from 5 to 1, where 5 is best and 1 is worst. A red 'X' will be displayed if an error occurred during the test. See the next section for how to change the metrics used to derive the ratings.

Changing the Autotest Metrics

The FrameScope 350 provides a measure of service speed and efficiency by emulating a client device in the network. By making a request for service to a key device, and comparing the results to reasonable expectations, it provides a rating of the service. 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 350 rating can be changed. After you've run the test and received a result, such as that 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 Name Lookup, you can change the rating scale to whatever values you choose. The screen on which you do that is shown below on the right. This can be done for all rated measurements.

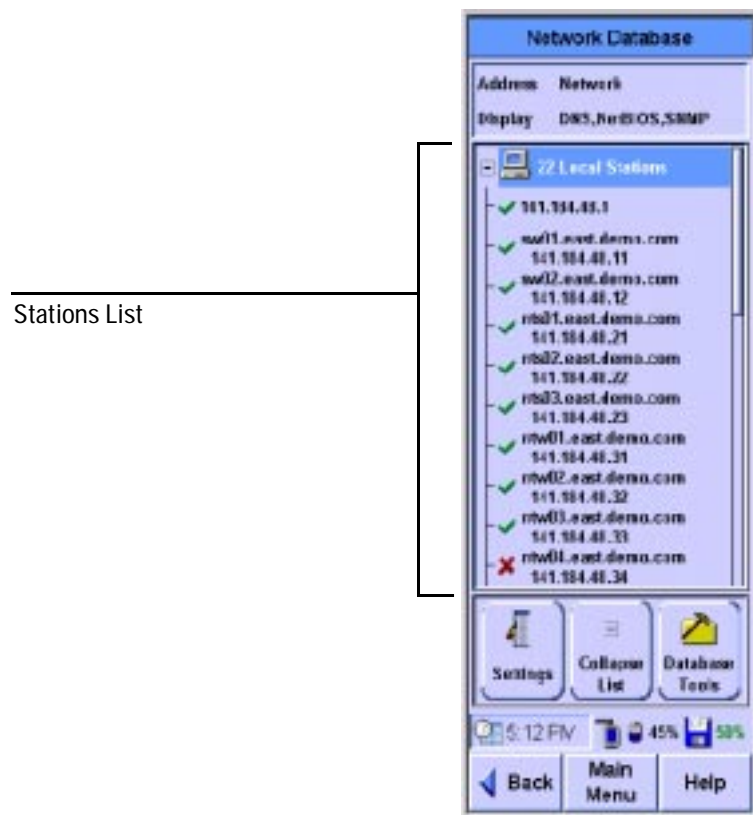
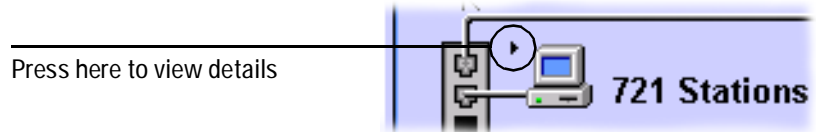


See Chapter 8, "Network Performance Analyzer Reference"

Using the Stations List

When a network resource on the Network tab is shown with a black triangle, you can press the resource to display the Network Database screen, which includes the Stations List.

- 1 On the Network tab, press the resource you wish to view.



- 2 Use the Scroll button to navigate through the items on the Station List.
- 3 Expand or collapse the Station List by selecting a category and then pressing the **Expand** (or **Collapse**) button.



NOTE

The Collapse List, Expand List, and View buttons all appear in the same place on the screen, depending on the currently selected item in the Station List. See also "Viewing Details and Statistics" on page 26.

- 4 You can use the **Settings** button to reorder the Station List and select what information is displayed.



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



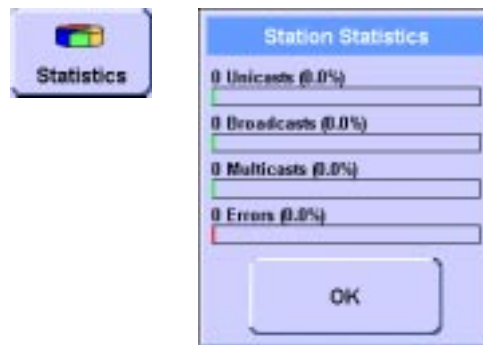
2 Network Testing with the FrameScope 350
Using the Stations List

Viewing Details and Statistics

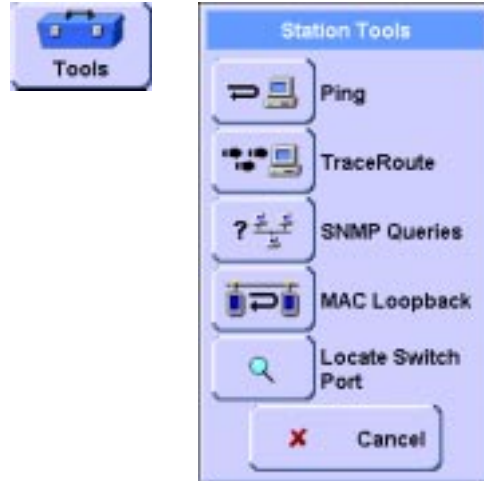
- 1 Select a station on the Station List and then press the **View** button.



- 2 Press the **Statistics** button to view statistics about the station.



- 3 On the Station Detail screen, press **Tools** to see a list of test tools that can be used on the selected station. These tools are describe in more detail in the following sections.



NOTE

The tools that are displayed on the Station Tools list will vary depending on what type of 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 “pings” a remote node by sending it a request message. If the remote device is active and reachable it will respond.

Follow these steps to run a Ping test.

- 1 From the main Network tab or from a device’s display on the Station List, press the **Tools** button to display a menu of available network testing tools.



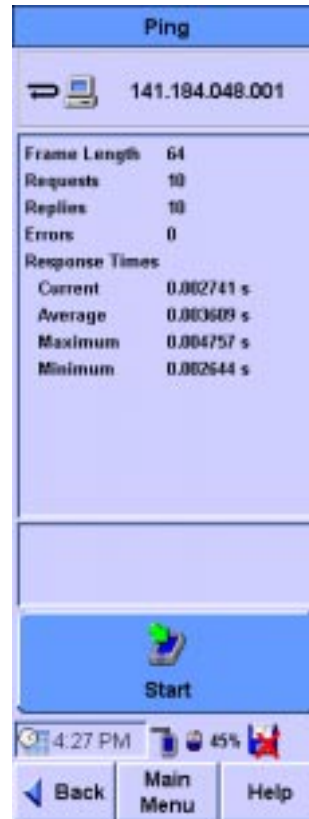
- 2 Press the **Ping** button to call the Ping screen.



- 3 Enter the device you want to ping in the Target box. You can enter the device name or address.
- 4 Select the ping options you want, selecting IP or IPX, length of the ping, and the number of iterations.
- 5 Enter the Time To Live and whether you want fragmentation in the IP Options area. Or if you selected IPX above, select the IPX request type: Diagnostic or PING.
- 6 Press the **Start** button to begin the ping test.

The Ping Results screen will be displayed.

2 Network Testing with the FrameScope 350
Performing a Ping Test



7 Observe the results of the Ping test.

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

8 To run the test again press the **Start** button.

Performing a Trace Route

The Trace Route test allows you to determine the path through the network to a particular device. The FrameScope 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 Trace Route test.

- 1 From the main Network tab or from a device's display on the Station List, press the **Tools** button to display a menu of available network testing tools.

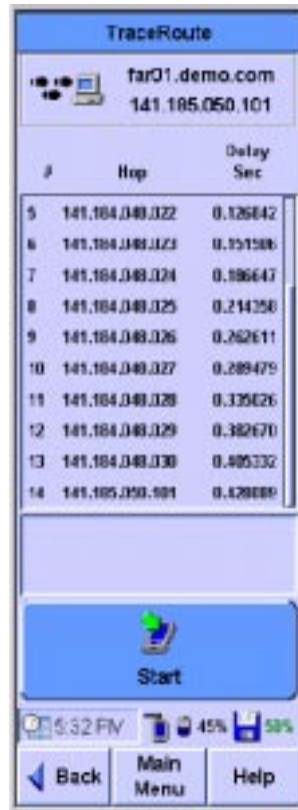


2 Network Testing with the FrameScope 350
Performing a Trace Route

- 2 Press the **TraceRoute** button to call the TraceRoute screen.



- 3 Enter the device to which you want to trace in the Target box. You can enter the device name or address.
- 4 Select the maximum number of hops to be reported.
- 5 Press the **Start** button to begin the TraceRoute test.
The TraceRoute Results screen will be displayed.



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.

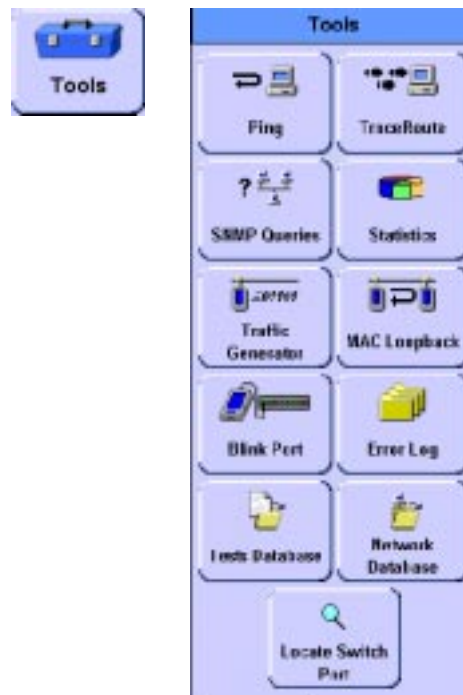
7 To run the test again press the **Start** button.

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 350.

- 1 From the main Network tab or from a device's display on the Station List, press the **Tools** button to display a menu of available network testing tools.



- 2 Press the **SNMP Queries** button to call the SNMP Query screen.



- 3 Enter the device to which you want to query in the Target box. You can enter the device name or address.
- 4 The **SNMP Settings** button allows you to add SNMP communities and ports to the default “public” community and default port 161 or to change those set up for auto discovery.
- 5 Press the **Start** button to begin the SNMP Query test.
The SNMP Queries Results screen will be displayed.

2 Network Testing with the FrameScope 350 Performing SNMP Queries



- 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.

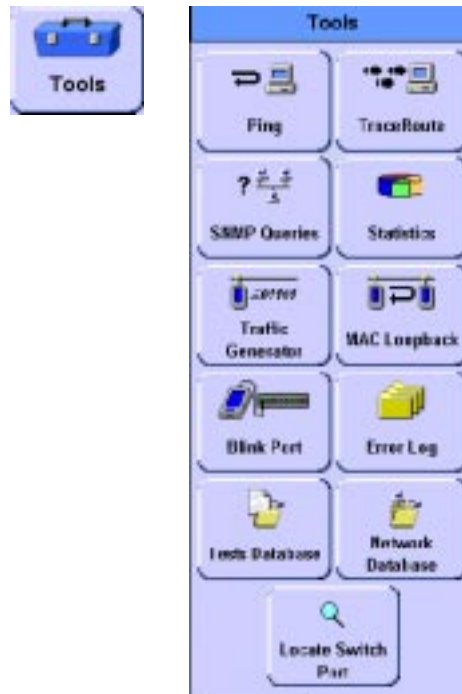
- 7 To run the test again press the **Start** button.

Viewing Statistics

You can use the FrameScope to view a variety network parameters, and see performance statistics for them.

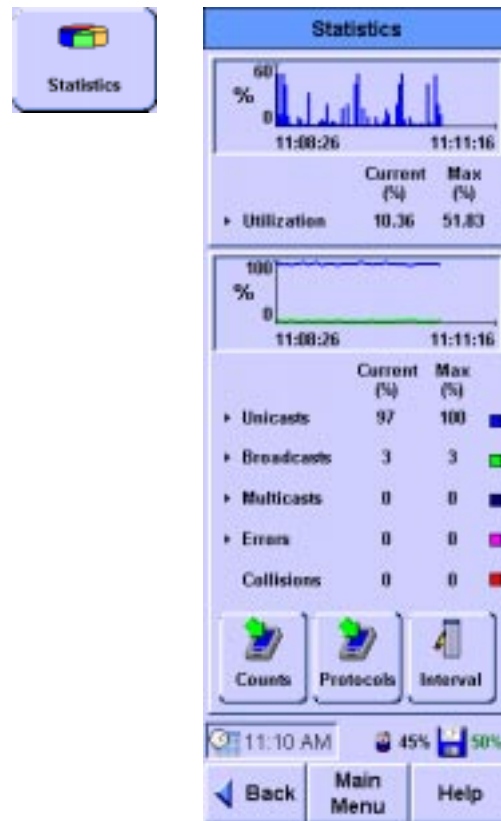
The following procedure describes how to use the FrameScope's Statistics tool.

- 1 Press the **Tools** button on the main Network tab to display the Tools menu.



2 Network Testing with the FrameScope 350 Viewing Statistics

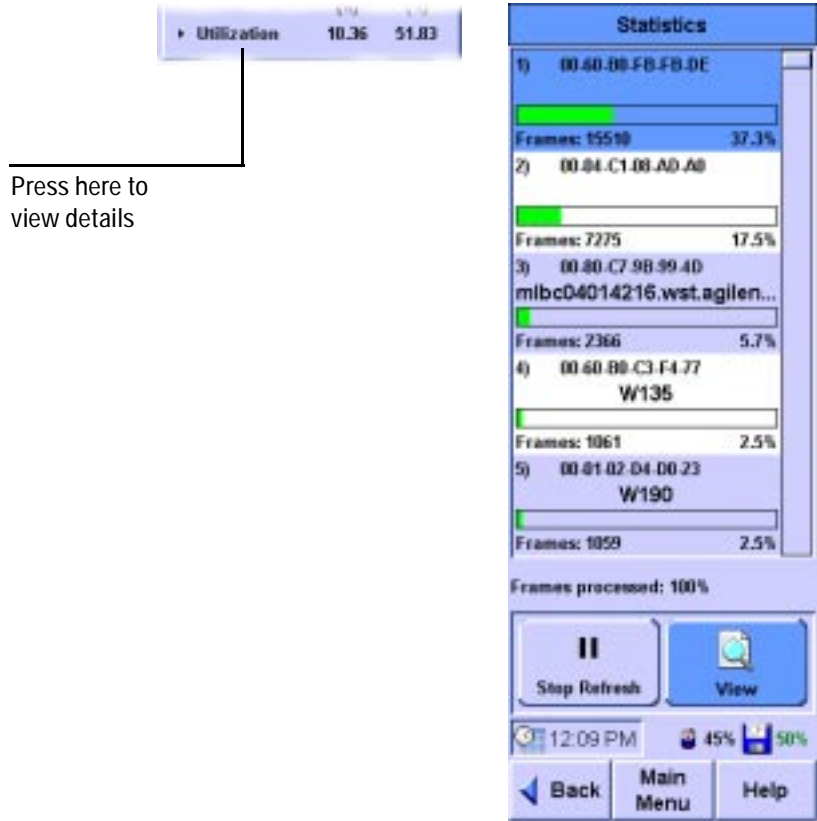
- 2 Press the **Statistics** button to call the Statistics screen.



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

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

- 4 For example, press **Utilization** on the Statistics screen to view the top talkers (most active devices) on the network.



Press here to view details

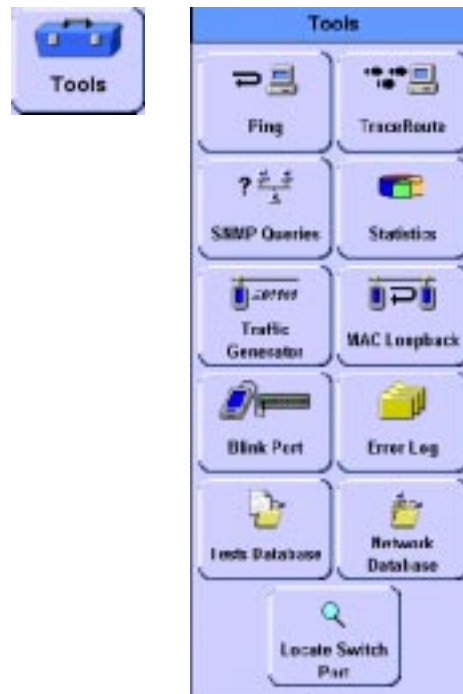
- 5 Use the other buttons on the Statistics screen to switch between counts and percentages, protocols and frames, and so on.
- Press **Unicasts**, **Broadcasts**, or **Multicasts** to view the top talkers for that frame type.
 - Press **Errors** to view a breakdown of the types of errors detected on the network.

Generating Network Traffic

You can use the FrameScope's Traffic Generator to create network traffic to stress the network and observe how it reacts under different loads.

The following procedure describes how to use the Traffic Generator.

- 1 Press the **Tools** button on the main Network tab to display the Tools menu.



- 2 Press the **Traffic Generator** button. The Traffic Generator screen will be displayed. To add security to the use of the traffic generator, since it may disrupt your network, you may configure a password to prevent someone without the password from using the traffic generator.



- 3 On the Parameters tab, configure the traffic characteristics as you desire. Press each parameter (**Frame Length**, **Frame Rate**, and so on) and enter the value you want in the on-screen keypad. See “Traffic Generation” on page 206.
- 4 To inject errors in the generated traffic, press the check box for the type of error you want (CRC, short frame, or long frame). See “Traffic Generation” on page 206.
- 5 To configure the frame characteristics of the traffic, press the **Frame** tab.

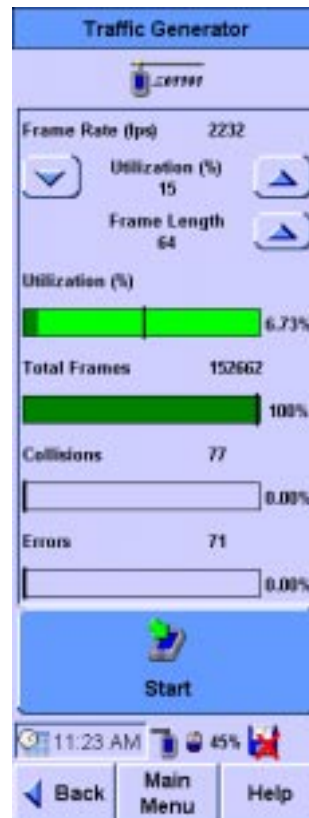


2 Network Testing with the FrameScope 350
Generating Network Traffic

- 6 Press the box buttons to enter the Frame Type, MAC source, and MAC Destination. See “Traffic Generation” on page 206. Note that if you select an IP type frame, you will get additional selections for IP Source and IP Destination.



- 7 Press the **Start** button to begin generating traffic. The Traffic Generator activity screen is displayed.



- 8 Observe the traffic statistics. For more information on the results, see “Traffic Generation” on page 206.
- 9 If you want to change traffic parameters press the **Back** key to return to the Parameters and Frame tabs. To restart the test press **Start**.

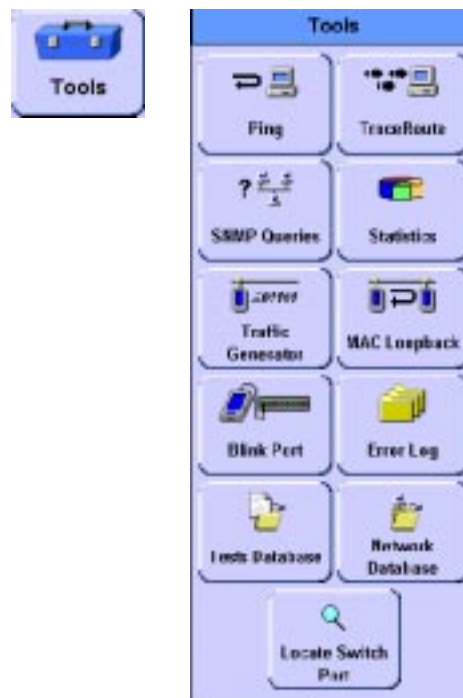
Performing a MAC Loopback

NOTE

This procedure requires two FrameScope 350s; one at each end of the network circuit to be tested.

You can perform a ping-like test on the media access control (MAC) layer (Layer 2). Using two FrameScopes, you can get results on the round-trip performance.

- 1 Connect two FrameScopes to the network. Connect one at each end of the network circuit you want to test. See “Connecting to the Network” on page 12.
- 2 On the local FrameScope, press the **Tools** button on the main Network tab to display the Tools menu.



- 3 Press the **MAC Loopback** button to call the MAC Loopback screen.

2 Network Testing with the FrameScope 350
Performing a MAC Loopback



- 4 Press **Start** or press the **OK** button to begin the test.

The FrameScope will search out the other FrameScope on the network and then report back the link results.

- 5 Review the transmission information on the MAC Loopback screen.



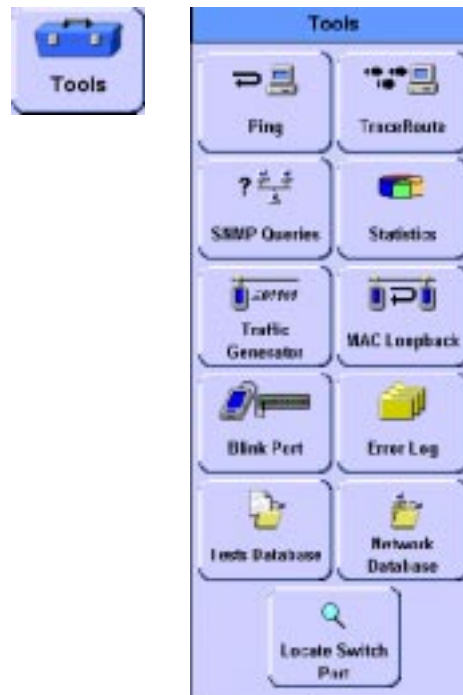
- 6 Press **Start** to repeat the test.

Locating a Hub Port with Blink Port

You can use the FrameScope to locate a network connection's port on a hub or switch. The FrameScope will toggle the port's link indicator on and off causing it to blink.

This section describes how to use the Blink Port feature of the FrameScope 350.

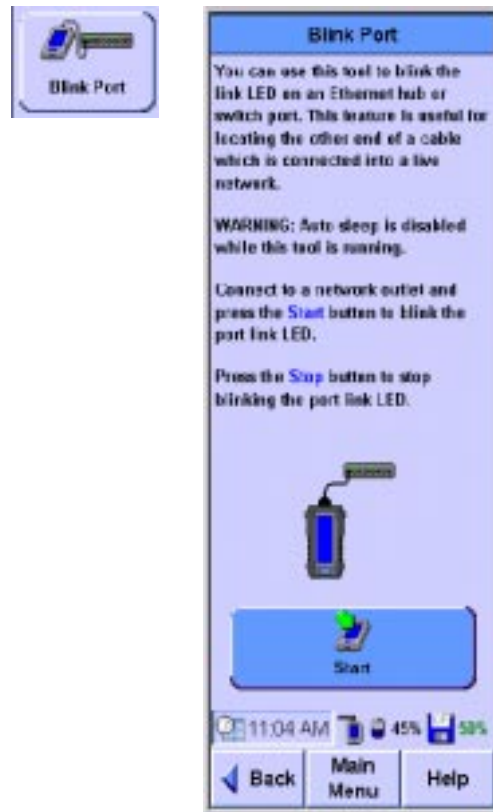
- 1 Connect the FrameScope to the remote end of the circuit whose hub you want to locate. For example, connect the unit at the network wall circuit.
- 2 Press the **Tools** button on the main Network tab to display the Tools menu.



- 3 Press the **Blink Port** on the tools menu to call the Blink Port screen.

2 Network Testing with the FrameScope 350

Locating a Hub Port with Blink Port

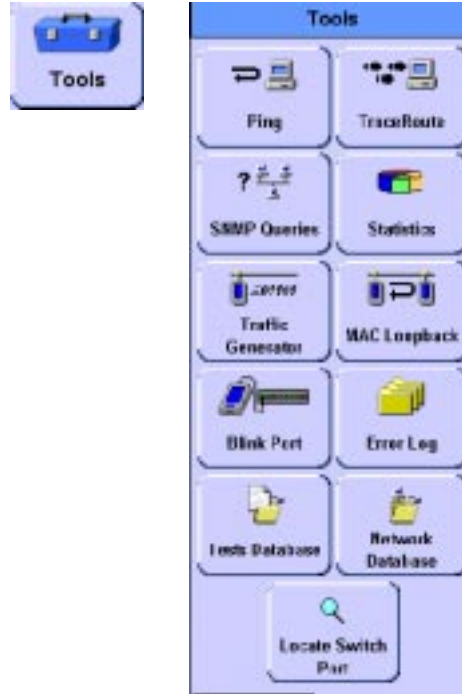


- 4 To begin blinking the port, press the **Start** button.
- 5 Observe the hub or switch and note which port's link indicator is blinking. That will be the port for the tested circuit.
- 6 To stop the blink, press the **Stop** button on the Blink Port screen.

Viewing the Error Log

This section describes how to view the FrameScope's error log. The error log tracks and displays any network problems that detected by the FrameScope 350.

- 1 From the main Network tab, press the **Tools** button to display the Tools menu.



2 Network Testing with the FrameScope 350
Viewing the Error Log

2 Press the **Error Log** button to call the Error Log screen.



- 3 Observe the errors listed in the log.
- 4 Press the **Show All** button to expand the error list and view all errors that were previously acknowledged by using the **Ack** button.
- 5 Press the **Ack** button to acknowledge the errors without clearing the log.
- 6 Press the **Reset** button to clear the log.

Using the Test Database

The FrameScope 350 allows you to store (you must have a CompactFlash™ card installed) Autotest results for later review and downloading (see “Running an Autotest” on page 19, and step 14 on page 22). You can recall previously stored test data using the Tests Database tool.

This section describes how to recall and delete stored tests.

- 1 Press the **Tools** button to call the Tools menu.
- 2 On the Tools menu, press the **Tests Database** button to call the Network Autotest Database screen.



- 3 Stored tests are displayed in a list. Use the Scroll button or a stylus to select the test you want.
- 4 When a test is selected, press the **View** button to display the detailed test results.
- 5 To delete a stored test, select the test and press the **Delete** button.

Using the Network Database

The FrameScope 350 allows you to store (only on a CompactFlash™) network topologies for later review and downloading (see “Using the Stations List” on page 24). You can recall previously stored network data using the Network Database tool. This section describes how to recall and delete stored network data.

- 1 Press the **Tools** button on the Network Main Menu to call the Tools menu.
- 2 On the Tools menu, press the **Network Database** button to call the Network Database screen.

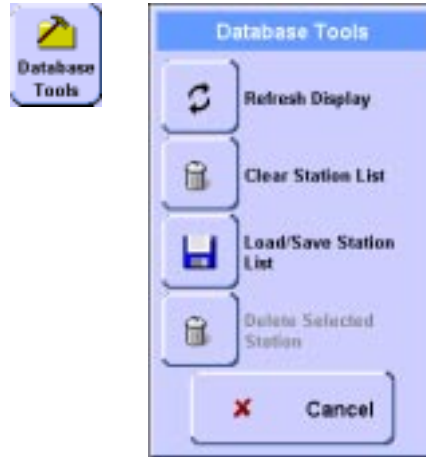


- 3 Network resources are displayed in a list. Use the Scroll button or a stylus to select the resource you want.
- 4 Use the Expand and Collapse buttons to show the items under the selected resource type.
- 5 When a network resource is selected, press the **View** button to view detailed information about it.

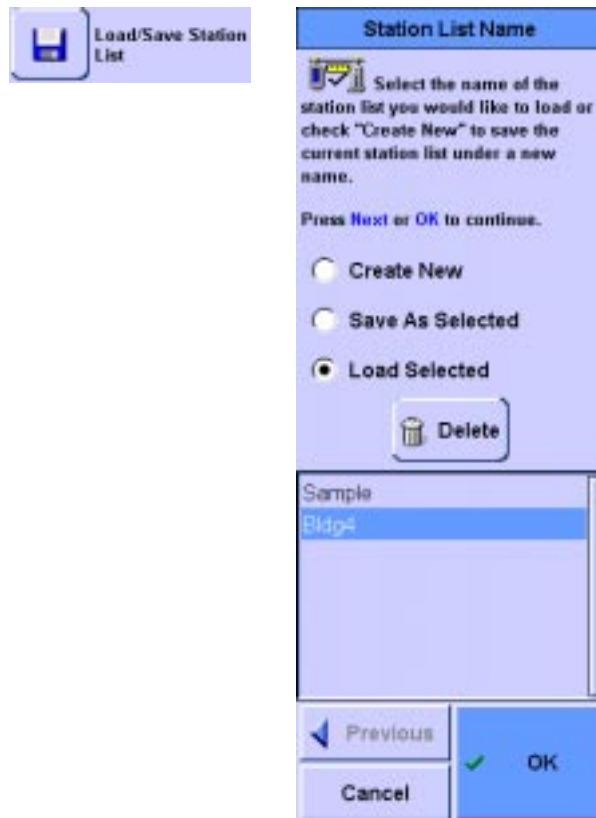
NOTE

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

- 6 To access the Database Tools menu press the **Database Tools** button.



- 7 To save the current network data, or to load previously stored network data, press the **Load/Save Station List** button.



- 8 Use the buttons on the Station List name screen to store the current network data, load stored data, or delete stored data. If you are storing data, you will be prompted to enter a name for the data file.

Locating Switch Ports

The FrameScope 350 allows you to identify the switch ports being accessed by the FrameScope or any address on the network.

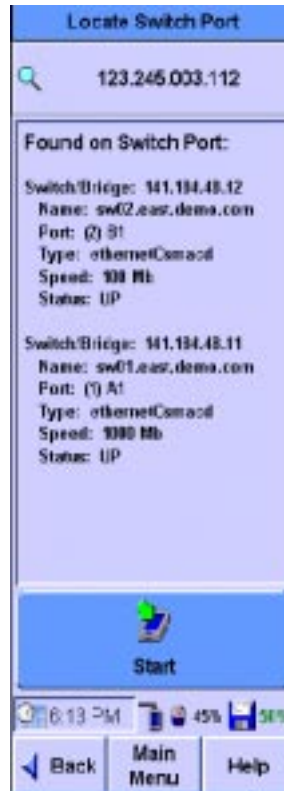
This section describes how to create a list of switch ports being used.

- 1 Press the **Tools** button to call the Tools menu.
- 2 On the Tools menu, press the **Locate Switch Port** button to call the Locate Switch Port screen.



- 3 Select the target, either this FrameScope or enter the name or address of the device you want to locate.

- 4 The SNMP Settings button allows you to add SNMP communities and ports to the default “public” community and default port 161 or to change those set up for auto discovery.
- 5 Press **Start** to see the results of the Locate Switch Port.



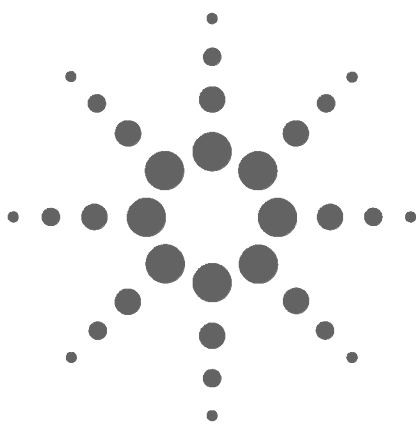
- 6 Use the Scroll button to scroll through the list if necessary.

NOTE

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

2 Network Testing with the FrameScope 350

Locating Switch Ports



3 Cable Testing with the FrameScope 350

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This chapter describes how to perform cable analysis and troubleshooting using the Agilent FrameScope 350.



The cable test features of the FrameScope 350 allow you to easily certify new network installations for compliance with industry cable standards.

NOTE

This chapter describes the standard FrameScope 350 cable test features. For information on using Expert Mode, see Chapter 5, "Cable Testing in Expert Mode".

Cable Testing Overview

Cable Testing Background

Industry standards for structured twisted-pair cabling require that both ends of each cabling run be tested to find the worst-case performance conditions. Therefore, certification testing requires a two-part test solution comprising a main unit and a remote unit with similar test capabilities. One test unit tests the cabling run from the telecommunications closet end of the cable, and the other test unit tests from the outlet end at the user location.

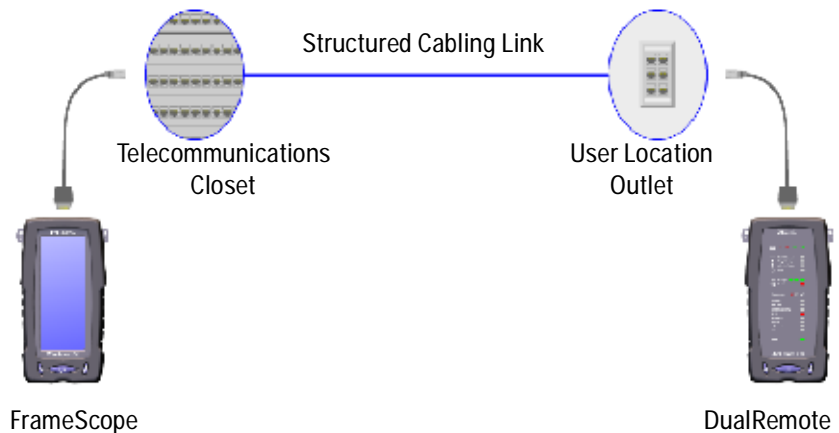


Figure 8 Typical Cable Certification Test Setup

For cable certification testing, the FrameScope 350 is one of the test units required. The other unit is the Agilent DualRemote 350.

Choosing Your Test Configuration

There are two common test configurations for cable certification testing: the *link* test configuration and the *channel* test configuration:

- The link configuration is typically used in facilities that are under construction, and does not include the user's patch cords at either end of the cabling run. Patch cords are usually installed after the facility is occupied. Performance standards are more stringent for link cable certification.

- The channel configuration provides a full end-to-end performance certification, including the cable run as well as the user's patch cords at each end. The pass/fail limits for channel performance testing are less stringent than for link configurations to accommodate the performance degradation inherent in the two additional modular connections.

The FrameScope and DualRemote use different test probes for link and channel tests. The link probes incorporate a short test cord that connects to the outlets in the telecommunications closet and user location. Channel probes feature a socket into which you connect one end of the user patch cord. The other end of the patch cord is connected to the outlet in the telecommunications closet or user location. Figure 9 and Figure 10 on page 59 show the link and channel test connections.

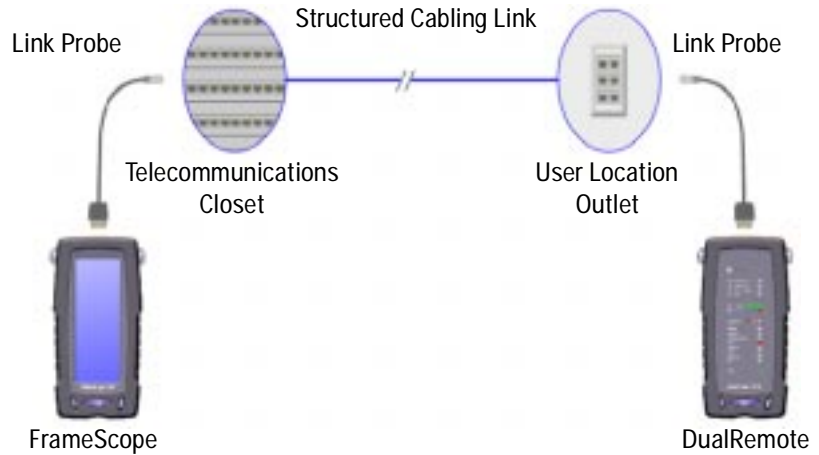


Figure 9 Link Test Configuration

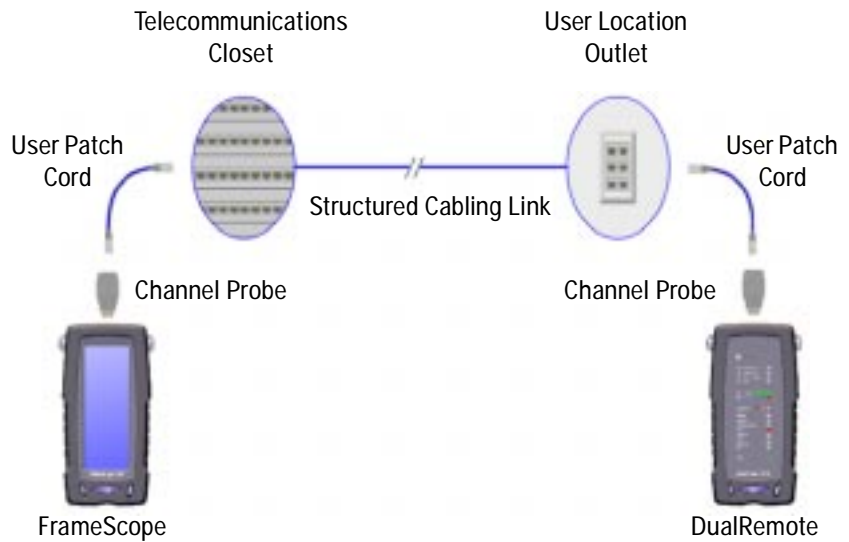


Figure 10 Channel Test Configuration

Cable Testing Procedure

The following steps describe the general procedure for performing cable certification testing using the FrameScope and DualRemote testers.

- 1 Calibrate the FrameScope and DualRemote testers that you will be using. See page 61.
- 2 Choose a *link* or *channel* test configuration to meet your application. See page 57.

3 Cable Testing with the FrameScope 350

Cable Testing Overview

- 3 Switch on the FrameScope and DualRemote testers and connect them to the cabling to be tested. See “Connecting to the Network” on page 12.
- 4 Press the **Cable** tab on the FrameScope’s Main Menu screen and then press a test button to begin the test.

You can run a preprogrammed autotest or configure your own test parameter values before running the test.

- See “Choosing the Profile” on page 62.
 - See “Opening the Setup Menu” on page 62.
- 5 View the results of the test and store test results as desired. See “Saving Test Results” on page 79.

Calibrating the Tester

Before you begin a test, the FrameScope and DualRemote pair must be calibrated. Calibration allows the FrameScope to compensate for slight anomalies in its measurement hardware or that of the companion DualRemote unit.

- 1 Connect the FrameScope 350 and DualRemote 350 in either of the configurations shown below.



- 2 On the main menu, press **Calibration**.



- 3 Follow the onscreen instructions to complete the calibration.

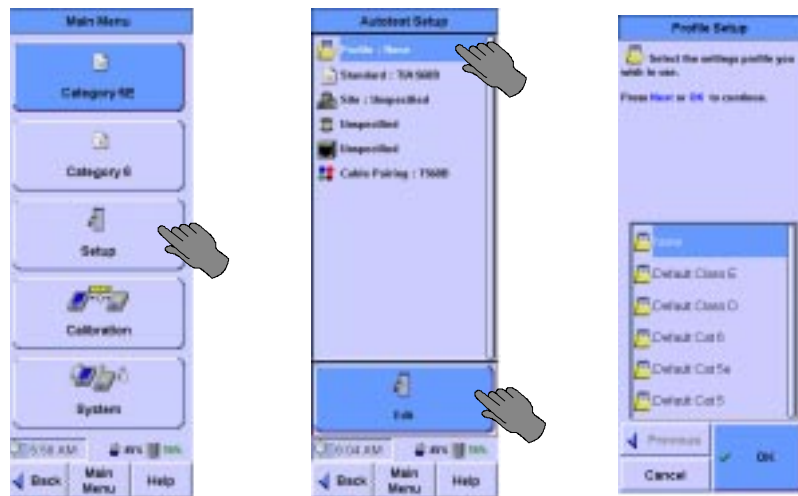
Note: To test link configurations to Category 6, Class E, or higher, Agilent recommends calibrating with the precision calibration cable.

Setting Up an Autotest

The tester must be configured for testing at each site by completing the following procedures.

Opening the Setup Menu

- 1 On the Main Menu, press **Setup**. The Autotest Setup screen displays.



Choosing the Profile

The FrameScope 350 normally displays one or two limit options on the Main Menu, based upon the profile selected. If None is selected, then the two limit options are dependent upon the Standard selected. If the Standard is TIA-568B, then the two limit options are Category 5E and Category 6. Otherwise Class D and Class E are displayed. If the profile for a specific test is selected, then only that test choice is displayed. To change the profile:

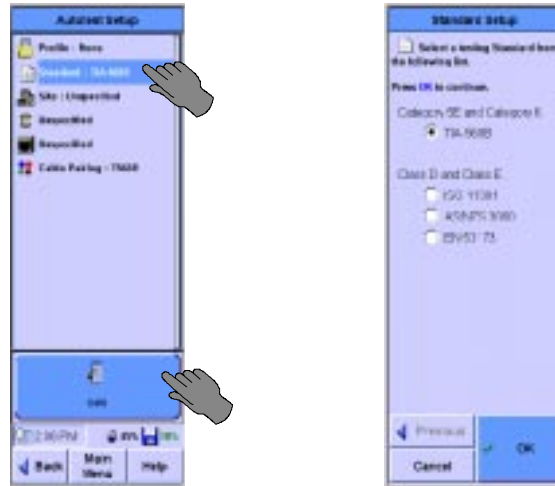
- 1 On the Autotest Setup screen, press **Profile**, then **Edit**. The Profile Setup screen displays.
- 2 Press **None**, or the profile of choice, then press **OK**. The Autotest Setup screen will then show your selected profile.

Choosing the Standard

The FrameScope 350 normally tests to the TIA-568B standard. (For detailed information about test standards, please visit the website at: <http://FrameScope.comms.agilent.com/>) To test to a different standard, follow these steps:

Note: The Profile must be set to None in order to change the Standard.

- 1 On the Autotest Setup screen, press **Standard**, then **Edit**. The Standard Setup screen displays.



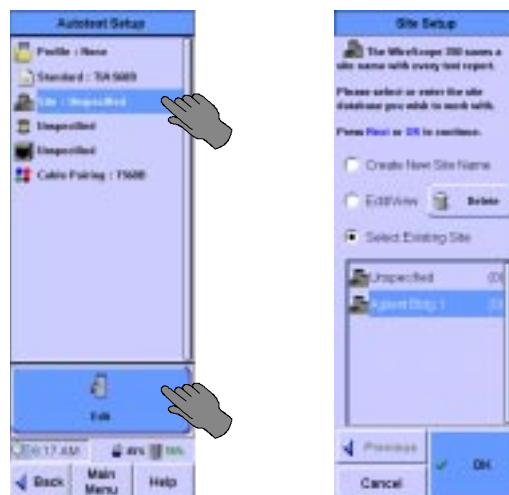
- 2 Select the desired standard, then press **OK**. The Autotest Setup screen will then show the selected standard. The selected standard is applied to all subsequent tests.

Entering the Site Name

The site name identifies the group of settings used on a job, and can be applied to test records for that site.

To enter the site name:

- 1 On the Autotest Setup screen, press **Site**, then press **Edit**. The Site Setup screen displays.

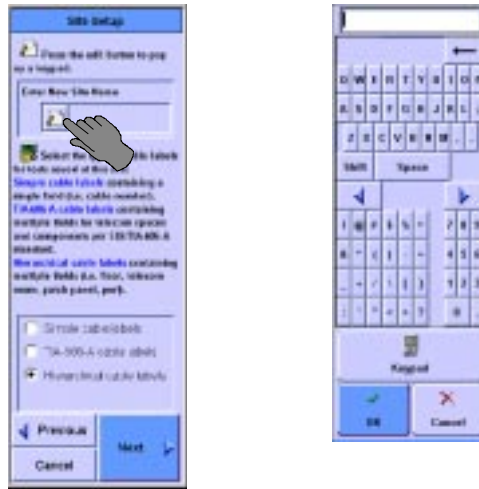


3 Cable Testing with the FrameScope 350 Setting Up an Autotest

- 2 Select **Create a New Site Name**, then press **Next**. (The **OK** button changes to a **Next** button when you select **Create a New Site Name**.) The screen changes, to allow naming the site.

Note: To change the name or labeling format for an existing site, press the site name on the list, then select **Edit/View** and press **Next**.

- 3 Press the icon under Enter New Site Name. The onscreen keyboard opens.



- 4 Press the keyboard keys to enter the site name, then press **OK**. The keyboard closes.

Choosing the Labeling Format

The labeling format specifies the scheme used to label test records for that site. This format is applied to the test report and to labels printed for the job. There are three label format options:

- **Simple** has only one field, such as 'cable number'. See page 65 for the Simple format configuration procedure.
- **TIA-606-A** complies with the TIA-606-A standard. See page 67 for the TIA-606-A format configuration procedure.
- **Hierarchical** has multiple fields, for designations such as Building, Floor, Wall Plate, and Jack Number. See page 69 for the Hierarchical format configuration procedure.

- 1 On the Site Setup screen, press the preferred labeling format, then press **Next**.



Simple Label Format

When you choose the Simple labeling format, the following screen displays:

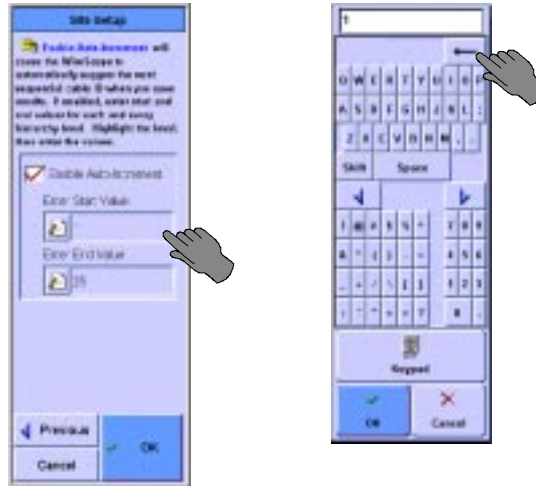


To configure the simple labeling format:

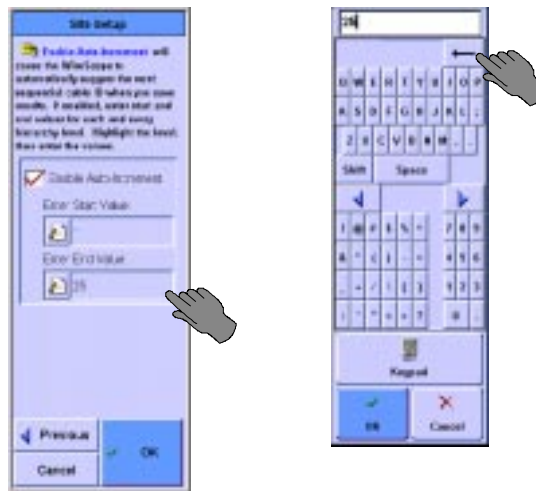
- 1 If you want the numbers on the labels to increase automatically with each new label and test, press **Enable Auto-Increment** so that a checkmark appears, as in the figure above.

3 Cable Testing with the FrameScope 350 Setting Up an Autotest

- 2 To set the beginning number to other than 1, press the **Enter Start Value** field. The onscreen keyboard opens.



- 3 Press the backspace arrow to erase the number in the display, then press the number keys to enter the new starting number. Press **OK**. The keyboard closes, and the new starting number appears in the **Enter Start Value** field.
- 4 To set the number of cable runs to label and test, press the **Enter End Value** field. The onscreen keyboard opens.



- 5 Press the backspace arrow to erase the number in the display, if any, then press the number keys to enter the new number. Press **OK**. The keyboard closes, and the new ending number appears in the **Enter End Value** field.
- 6 Press **OK**. The Autotest Setup screen displays.

TIA-606-A Label Format

When you choose the TIA-606-A labeling format and press **Next**, the following screen displays:



There are three formatting options within the TIA-606-A standard:

- Class 1 and Class 2 have fields for Floor, Telecom Room, Panel, and Position.
- Class 3 has fields for Building, Floor, Telecom Room, Panel, and Position.

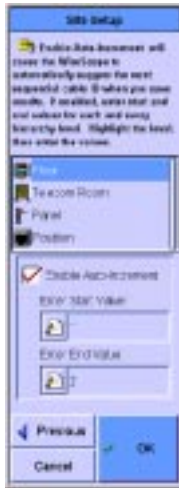
The default Auto-Increment and number settings can be used, or the settings can be changed using the following procedures.

To configure the TIA-606-A labeling format:

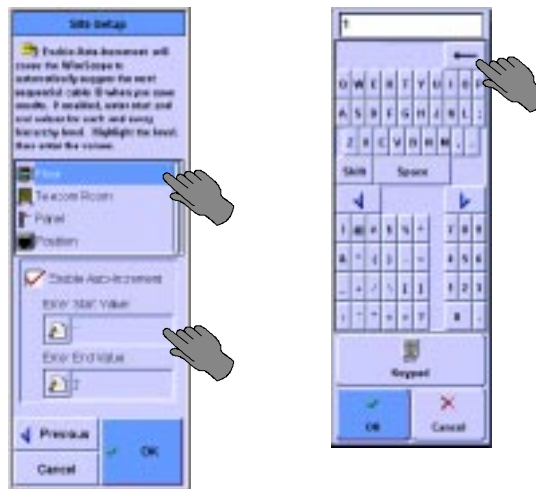
- 1 Press **Class 1** or **Class 2** if there is only one building on the site. Press **Class 3** if the site includes more than one building. Press **Next**. The Site Setup screen changes to show the fields in the label, the

3 Cable Testing with the FrameScope 350 Setting Up an Autotest

Auto-Increment settings for the field highlighted, and the start and end values for the field highlighted.

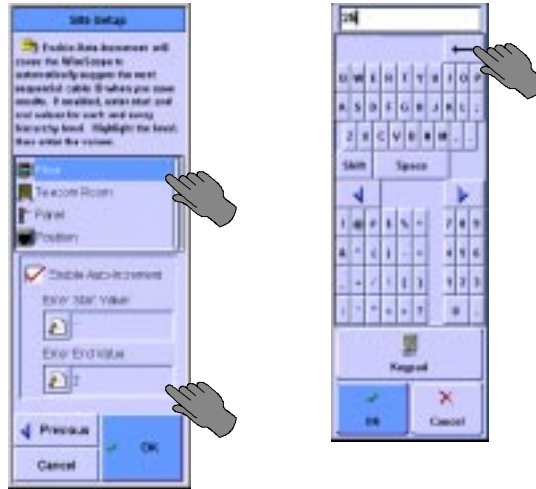


- 2 If you want the numbers for any field to increase automatically with each new label and test, highlight that field, then press **Enable Auto-Increment** so that a checkmark appears, as in the figure above.
- 3 To set the beginning number for a field to other than 1, highlight the category name, then press the **Enter Start Value** field. The onscreen keyboard opens.



- 4 Press the backspace arrow to erase the number in the display, then press the number or letter keys to enter the new starting value. Press **OK**. The keyboard closes, and the new starting value appears in the **Enter Start Value** field.

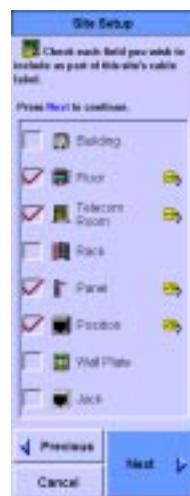
- 5 To set the number of instances of a category (for example, the number of floors), press the **Enter End Value** field. The onscreen keyboard opens.



- 6 Press the backspace arrow to erase the value in the display, then press the number or letter keys to enter the new value. Press **OK**. The keyboard closes, and the new ending value appears in the **Enter End Value** field.
- 7 Repeat steps 2 through 6 for all the selected categories.
- 8 Press **OK**. The Autotest Setup screen displays.

Hierarchical Label Format

When you choose the Hierarchical labeling format, the following screen displays:

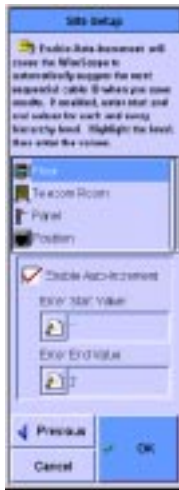


3 Cable Testing with the FrameScope 350 Setting Up an Autotest

Checkmarks indicate fields that appear in the labels. Yellow tags next to the categories indicate that automatic number incrementing is enabled for that field.

To configure the hierarchical labeling format:

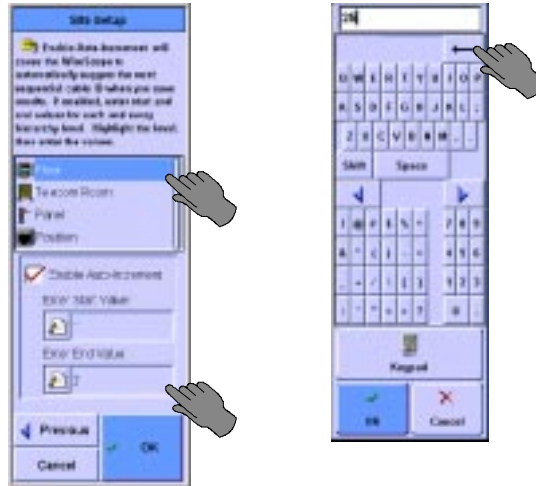
- 1 Press a category to check it for inclusion in the label, or to uncheck it so it does not appear. When all the desired categories are checked, press **Next**. The Site Setup screen changes to show the selected categories.



- 2 If you want the numbers for any field to increase automatically with each new label and test, press the category, then press **Enable Auto-Increment** so that a checkmark appears, as in the figure above.
- 3 To set the beginning number for a field to other than 1, press the category name, then press the **Enter Start Value** field. The onscreen keyboard opens.



- 4 Press the backspace arrow to erase the number in the display, then press the number or letter keys to enter the new starting value. Press **OK**. The keyboard closes, and the new starting value appears in the **Enter Start Value** field.
- 5 To set the number of instances of a category (for example, the number of floors), press the **Enter End Value** field. The onscreen keyboard opens.



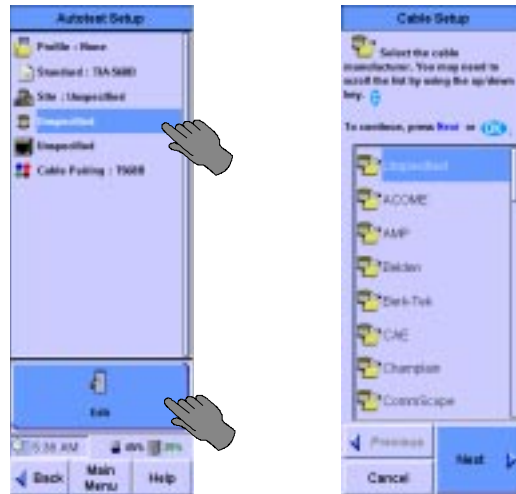
- 6 Press the backspace arrow to erase the value in the display, then press the number or letter keys to enter the new value. Press **OK**. The keyboard closes, and the new ending value appears in the **Enter End Value** field.
- 7 Repeat steps 2 through 6 for all the selected categories.
- 8 Press **OK**. The Autotest Setup screen displays.

Choosing the Cable Type

Cable from different manufacturers has different transmission characteristics. The FrameScope 350 compensates for those differences if you tell it what cable is used on the job. A solid black cable spool icon indicates a shielded cable, a grey cable spool icon indicates an unshielded cable.

3 Cable Testing with the FrameScope 350 Setting Up an Autotest

- 1 On the Autotest Setup screen, press the cable spool icon, then press **Edit**. The Cable Setup screen displays.



Note: The scroll bar on the right of the screen shows the location of the data shown and is not a functional scroll bar. To scroll use the scroll button at the lower right of the FrameScope.

- 2 Select the cable manufacturer, and press **Next**. The Cable Database screen displays.
- 3 Select a cable on the list, and press **OK**. The Autotest Setup screen displays, with the selected cable type next to the cable spool icon. If you do not see the cable on list, see the next section.

Adding a new cable type

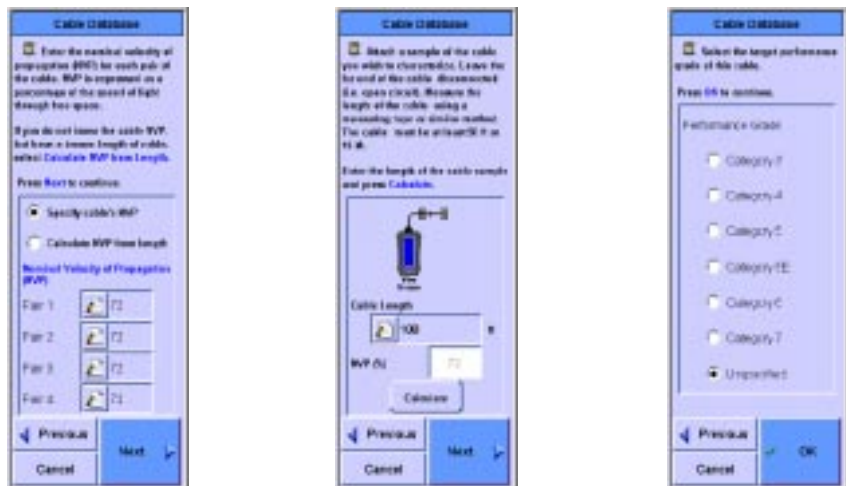
If you have a cable which is not in the cable database, you can add a new cable description to the database.

- 1 If the manufacturer is not present, leave the manufacturer as **Unspecified**. If the manufacturer is present in the list, select it, then press **Next**. The Cable Database screen is displayed. In either case you will be offered stored descriptions of cable types. If one of the stored descriptions matches the cable being tested select it, then press **OK**.
- 2 If not highlight **Add New Description** and press **Next**.
- 3 Enter the name to be added to the database and press **Next**.

- 4 Enter the pair count, cable construction, and impedance (default selections are available) and press **Next**.



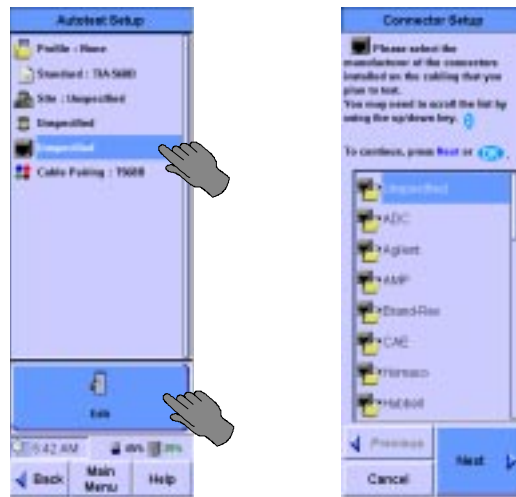
- 5 Enter the nominal velocity of propagation (NVP) for each pair, if known, or select **Calculate NVP from length**. If you need to calculate the NVP from length, attach at least 50 feet of cable to the FrameScope with the far end disconnected, enter the measured length, and press **Calculate**. The NVP as a percentage of the speed of light will be supplied in the NVP window. Press **Next**.
- 6 Select the target performance grade of the cable if known and press **OK**. The Autotest Setup screen displays, with the new cable type next to the cable spool icon.



Choosing the Connector Type

Connectors from different manufacturers have different transmission characteristics. The FrameScope 350 compensates for those differences, if you tell it what connectors are used on the job.

- 1 On the Autotest Setup screen, press the connector icon, then press **Edit**. The Connector Setup screen displays.



Note: The scroll bar on the right of the screen shows the location of the data shown and is not a functional scroll bar. To scroll use the scroll button at the lower right of the FrameScope.

- 2 Select the manufacturer of the connector, then **Next**. A list of that manufacturer's connectors displays.
- 3 Select the name of the connector, then press **OK**. The Autotest Setup screen displays, with the selected connector type next to the connector icon. If you do not see the connector on list, see the next section.

Adding a new connector type

If you have a connector which is not in the connector database, you can add a new connector description to the database.

- 1 If the manufacturer is not present, leave the manufacturer as **Unspecified**. If the manufacturer is present in the list, select it, then press **Next**. The next Connector Setup screen is displayed. In either case you will be offered stored descriptions of connector types. If one of the stored descriptions matches the connector being tested select it, then press **OK**.
- 2 If not highlight **Add New Description** and press **Next**.
- 3 Enter the name to be added to the database and press **Next**.

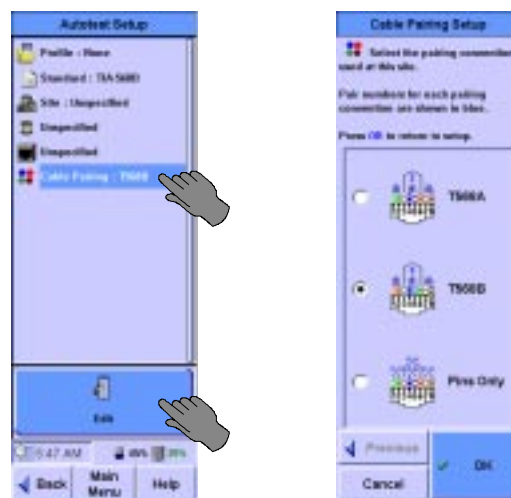
- 4 Select whether the connector is shielded or not and press **Next**.
- 5 Select the performance grade of the connector if known and press **OK**. The Autotest Setup screen displays, with the new connector type next to the connector icon.



Choosing the Cable Pairing Convention

To identify the correct pair in the test results, the FrameScope must be told what cable pairing convention is used. For example, if the 3,6 pair fails a test, it would be “Pair 2” if using T568A pairing, but it would be “Pair 3” if using T568B pairing.

- 1 On the Autotest Setup screen, press **Cable Pairing**, then press **Edit**. The Cable Pairing Setup screen displays.



- 2 Press the cable pairing convention used on the job, then press **OK**. The Autotest Setup screen displays, with the cable pairing convention named.

Entering the Operator Names

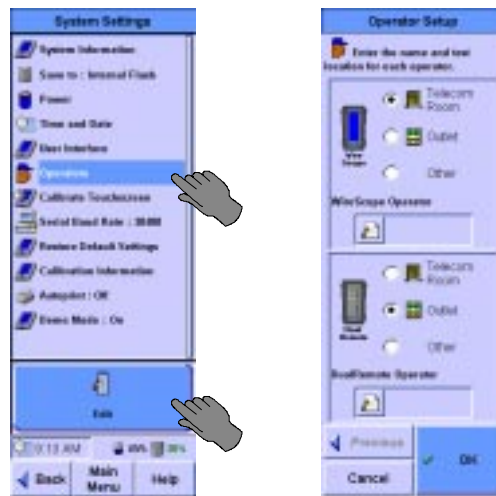
The names of the technicians performing the tests can be entered, and will appear on the test report.

To enter the test technicians' names:

- 1 On the Main Menu, press **System**. The System Settings screen displays.



- 2 Press **Operators**, then press **Edit**. The Operator Setup screen displays.



- 3 Choose the FrameScope unit's testing location, either **Telecom Room**, **Outlet**, or **Other**.
- 4 Press the **FrameScope Operator** field. The onscreen keyboard opens, with "FrameScope Operator" at the top or a list of previously

entered names will appear with the keyboard and keypad buttons available.

- 5 Pick a name from the list or press the keyboard keys to enter the name of the technician using the FrameScope, then press **OK**. The keyboard closes, and the technician's name appears in the **FrameScope Operator** field of the Operator Setup screen.
- 6 Choose the DualRemote unit's testing location, either **Telecom Room, Outlet, or Other**.
- 7 Press the **DualRemote Operator** field. The onscreen keyboard opens, with "DualRemote Operator" at the top or a list of previously entered names will appear with the keyboard and keypad buttons available.
- 8 Pick a name from the list or press the keyboard keys to enter the name of the technician using the DualRemote, then press **OK**. The keyboard closes, and the technician's name appears in the **DualRemote Operator** field of the Operator Setup screen.
- 9 Press **OK**. The System Settings screen displays.

Running an Autotest

To run an autotest:

- 1 If this is the first test of the day or after a long break, calibrate the tester. See “Calibrating the Tester” on page 61.
- 2 Connect the FrameScope 350 and Dual Remote 350 to the ends of the circuit needing certification.
- 3 On the FrameScope Main Menu, press the button identifying the selected test. The test executes.

Note: If no changes were made to the default testing standards or profiles, the Main Menu shows buttons for Category 5E and Category 6 tests. If the Profile has been changed, the Main Menu shows only one test button, indicating the new test profile.

- 4 If the autotest passes, the screen will look like this:



- 5 To save the test results, see “Saving Test Results” on page 79

Saving Test Results

Before saving test results, choose the storage site to save them to.

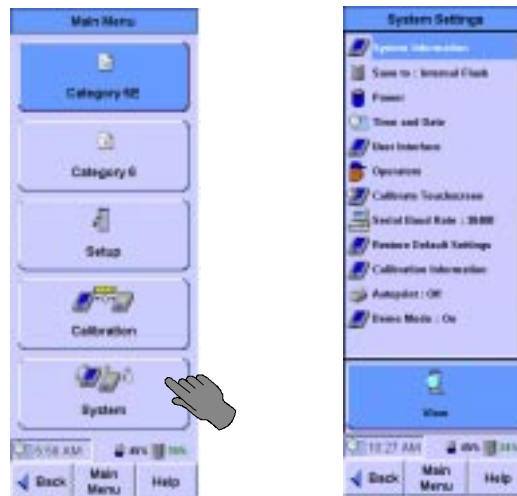
Note: The procedures below show screens from the copper testing configuration. The procedures for fiber testing are essentially the same, but the screens may differ in minor details.

Choosing the Data Storage Location

Test data can be saved to either the FrameScope's internal memory or to an installed CompactFlash™ card.

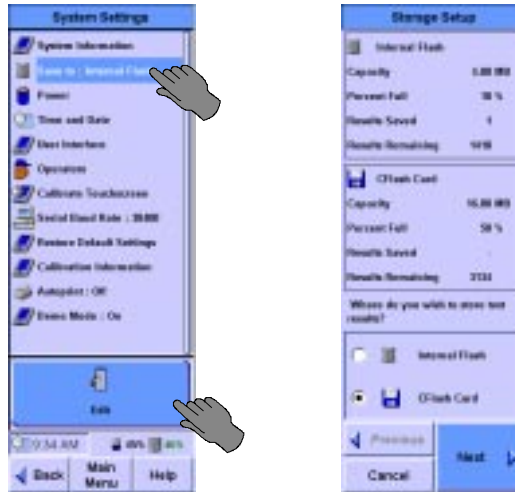
To choose the data storage location:

- 1 On the Main Menu, press **System**. The System Settings screen displays.

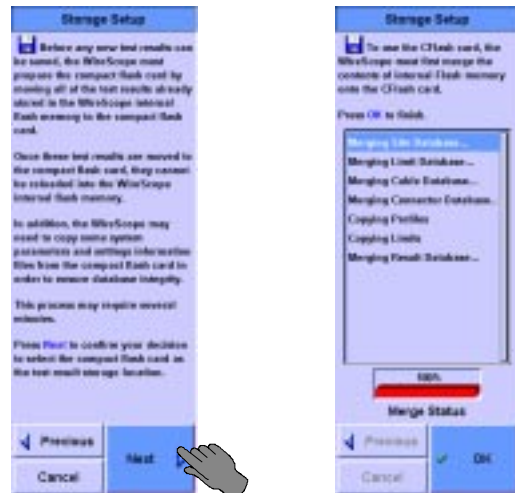


3 Cable Testing with the FrameScope 350 Saving Test Results

- 2 On the System Settings screen, press **Save To**, then press **Edit**. The Storage Setup screen displays.



- 3 Select either **Internal Flash** or **CFlash Card**.
- 4 If you chose **Internal Flash**, press **OK**. The System Settings screen displays, with “Internal Flash” next to **Save To**.
- 5 If you chose **CFlash Card**, press **Next**. The Storage Setup screen displays a message about preparing the CompactFlash™ card. The Storage Setup screen displays a list of the steps in preparing the CF card, and a progress bar.

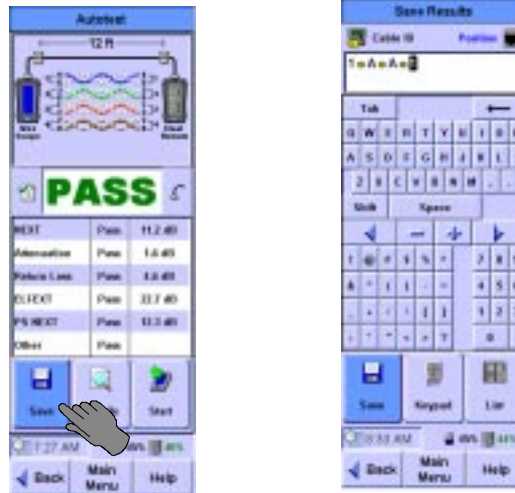


- 6 When the progress bar shows 100%, press **OK**. The System Settings screen displays, with “CFlash Card” next to **Save To**.

Saving the Results

To save the test results for inclusion in certification reports:

- 1 After completing a test, press the **Save** button. The Save Results screen displays.



- 2 If the cable ID in the display is wrong, press the backspace arrow to erase it, and press the keyboard keys to enter the correct cable ID. For a cable ID with multiple fields, press **Shift**, then **Tab** to back up to a prior field, or use your stylus or finger to get to the desired field. An unshifted **Tab** will move the cursor forward one field.
- 3 When the label is correct, press the **Save** button. The FrameScope saves the results of the test to the chosen storage site. If you have a multiple-field cable ID, there must be a value in every field, including before the first yellow dot and after the last yellow dot.

Viewing Result Details

A **Details** button on Pass and Fail screens opens the Test Data screen.



The Test Data screen lists the test parameters and indicates passing or failure for each.

To view detailed test data for one of the test parameters:

- 1 Press the name of the test parameter. The Test Data screen displays buttons appropriate for the selected parameter.

For example, when **NEXT** is selected, the screen includes **Data**, **Plots**, and **Locator** buttons, while pressing **Wiremap** shows only the **Data** button.

- 2 To view the Data screen for the selected test parameter, press **Data**. The Data screen displays.



- 3 To view the Plots screen for the selected test parameter (if the Plots button is present), press **Plots**. The Plots screen displays.



- 4 To view the Locator screen for the selected test parameter (if the Locator button is present), press **Locator**. The Locator screen displays.

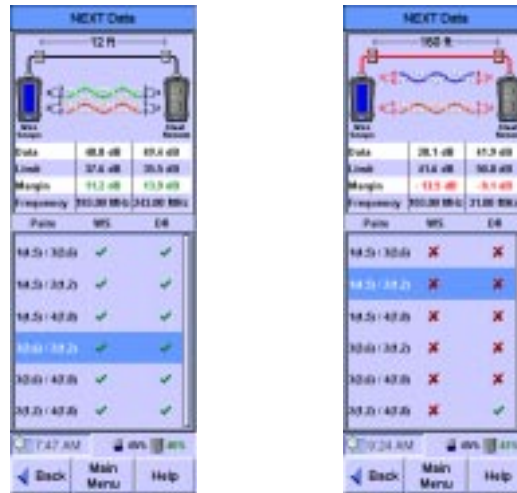


Interpreting Test Results Detail Screens

The various test detail screens present test data in different formats, as explained below.

3 Cable Testing with the FrameScope 350 Viewing Result Details

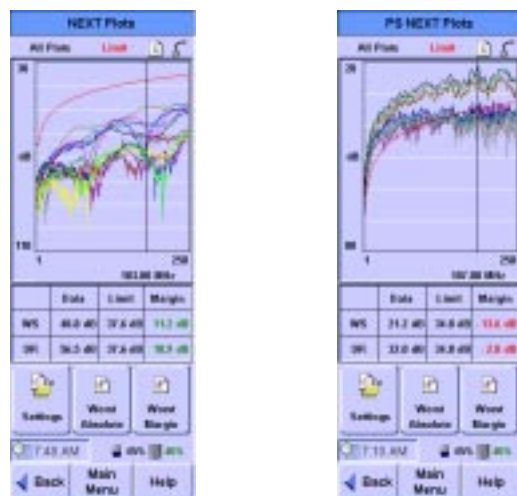
Data Screens



The Data screen shows detail of the selected test parameter results. The examples above show data of a passing test, at left, and a failing one, at right. The data included depends on which parameter is selected. (See steps 2, 3, and 4 of the “Viewing Result Details” on page 82.)

The Data screens shown above include a table that displays details of the test results for two twisted pairs of copper cable. To view the results for a different set of twisted pairs, press it on the list.

Plots Screens



Plots screens display test results as plots on a graph. The examples above show plots of a passing test, at left, and a failing one, at right. A smooth red line on the plot indicates the limit boundary between passing and failure. The **Worst Margin** button places a vertical line on the plot at the frequency where the test results come closest to the pass/fail

boundary on passing test plots. On failing test plots, the **Worst Margin** button places the line at the frequency where the results exceed the acceptable limits the most. You can move the cursor around the plot screen by pressing the area you want to see and then using the scroll rocker to fine tune the location. The frequency of the cursor is displayed and the values in the table correspond to the cursor location.

A chart below the plot shows detail results of the current location of the cursor at the FrameScope and DualRemote, and the limits for the test parameter, as follows:

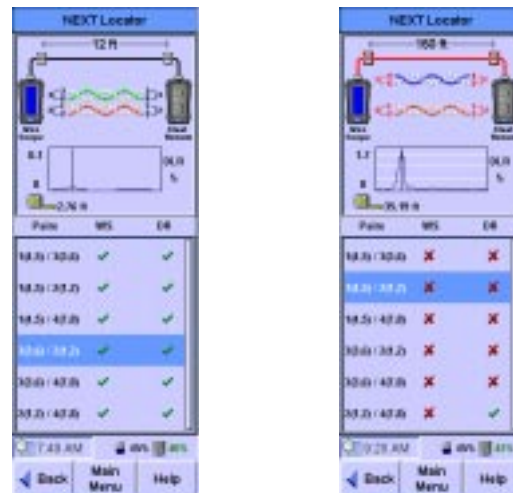
Data: This is the worst case of the test results at the cursor location.

Limit: The limit of passing results, set when the test standard is chosen at the cursor location.

Margin: The difference between the Data value and the Limit value at the cursor location.

The plots are color coded for different wire pairs. The plot lines displayed can be changed by pressing **Settings** and selecting All Plots, All Local Plots, All Remote Plots, Worst Case Plot, or Select Single Plot. You can also choose to show plots to 100 MHz, 250 MHz, or 350 MHz, as long as the test was run to the frequency selected. For example, if the test was run to 250 MHz, you could not see plots to 350 MHz. See “Setting the Maximum Frequency” on page 132.

Locator Screens



Locator screens aid in finding faults on the tested cable. The examples above show Locator screens for a passing test, at left, and a failing one, at right. Note the difference in the plots, where the failing result shows a peak where the failure occurs. The tape measure provides a reading of where the failure occurs. It will be placed on the right-hand side of the screen if showing the distance from the DualRemote. If there are more than one peak, you can press the plot area near the peak and fine tune

3 Cable Testing with the FrameScope 350

Viewing Result Details

the location using the scroll button to find the exact distance to that peak. By default, the distance shown is how far away the worst test result is from the closer of the FrameScope or DualRemote. To see the locator results for the different sets of twisted pair cables, press them on the list.

Note: Failures very near the ends of a cable run are usually because of termination errors such as a bad crimp. Failures far from the ends of a cable run are usually a fault with the cable itself.

Using Talksets

The 2-Way Talkset Kit (N2605A-137) allows operators at opposite ends of a copper cable run to coordinate their efforts.

Note: The talksets do not work with optical fiber cabling.

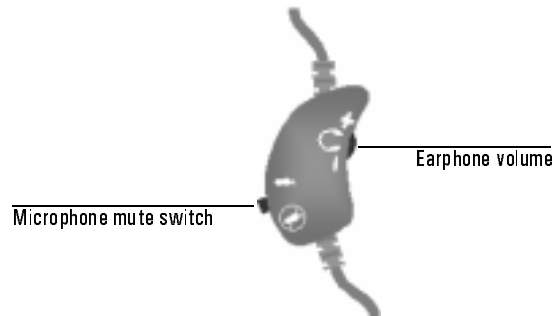
To use talksets for communicating between the ends of a cable run:

- 1 Insert a talkset's plug into the talkset jack on the FrameScope, and the plug of another talkset into the jack of the DualRemote. See "Talkset Port" on page 5, for the jack's location.
- 2 Connect the FrameScope's and DualRemote's SmartProbes to the ends of a cable run.
- 3 Speak and listen as with any telephone headset.

Note: When a test is running, talkset communication is disabled. Wait until the test finishes before speaking.

Talkset Controls

The FrameScope talksets have two controls:



- The thumbwheel in the inside curve of the control housing controls the earphone volume.
- The switch on the outside curve of the control housing switches the microphone off.

Using CompactFlash™ Cards

The FrameScope 350 can use CompactFlash™ cards for storing large amounts of test data, for transferring data to a PC, and for installing new software.

Installing CompactFlash™ Cards

To install a CompactFlash™ card:

- 1 Find the CompactFlash™ card slot in the bottom of the FrameScope 350. See “CompactFlash™ Slot” on page 4, for the location of the slot.
- 2 Insert the CompactFlash™ card into the slot. If the card does not go in easily, make sure it is oriented correctly with the lip on the bottom.
- 3 The FrameScope detects the card, and asks if you want to configure the card.

Configuring CompactFlash™ Cards

When a CompactFlash™ card is inserted in the FrameScope 350, the tester detects it and displays a window asking if you want to configure the card.

To configure an installed CompactFlash™ card:

- 1 Insert the card in the slot at the bottom of the FrameScope. The Storage window opens.
- 2 On the Storage dialog box, press **Yes**. The Storage Setup screen displays.



- 3 A screen describing the configuration procedure displays. The configuration executes in steps.
- 4 When the progress bar shows 100%, press **OK**. The FrameScope 350 will automatically change the Save to: setting on the System Settings to CFlash Card.

Printing Labels

Printing Labels On Site

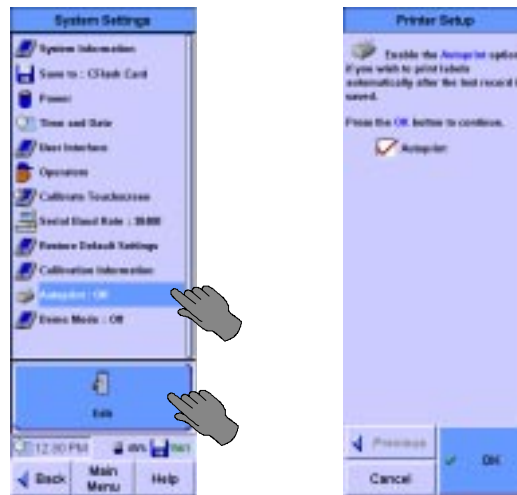
The FrameScope 350 can print labels directly to a Brady TLS2200 label printer. The labeling parameters are set using the procedure “Choosing the Labeling Format” on page 64. When the FrameScope is configured as described in the following procedure, a label for the tested cable will be printed after saving a test result.

To configure the FrameScope 350 to print to the Brady label printer:

- 1 On the Cable Main Menu, press **System**. The System Settings screen displays.



- 2 On the System Settings screen, press **Autoprint**, then **Edit**. The Printer Setup screen displays.

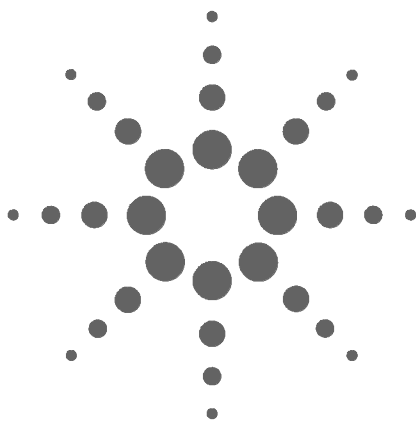


- 3 Press **Autoprint** to enable the Autoprint function. A checkmark shows that the function is enabled. Press **OK**
- 4 Connect the N2605A-050 interface cable to the serial ports of the FrameScope 350 and Brady TLS2200.
- 5 Turn the Brady printer on.
- 6 Press the **Func** and **Exit** keys on the printer simultaneously. This sets the printer to Peripheral mode.

Printing Labels from a PC

Refer to the *ScopeData Pro User's Guide* for instructions on printing labels using a PC.

**3 Cable Testing with the FrameScope 350
Printing Labels**



4 Fiber Testing

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Fiber Testing Overview

This chapter describes how to certify optical fiber cabling. The procedures in the chapter are sufficient for most fiber certification jobs. If the requirements of the job are not addressed here, refer to Chapter 6, “Expert Fiber Testing”.

Three connection configurations are available for optical fiber certification testing.

Double-Ended, Single Fiber



Double-ended single fiber configuration tests one fiber, using two Fiber SmartProbes. For single fiber testing the fiber must go from the transmitter/laser source on the DualRemote to the detector on the FrameScope. When the 850nm multimode probe is in the DualRemote, the units can be as much as 4 km apart. When the 1300nm multimode probe is in the DualRemote, the units can be as much as 10 km apart. When singlemode probes are used, the FrameScope and DualRemote can be as much as 50 km apart. All maximum lengths are barring excessive loss.

Double-Ended, Fiber Pair



Double-ended fiber pair configuration tests two fibers, using two Fiber SmartProbes. When multimode probes are used, the FrameScope and DualRemote can be as much as 4 km apart. When singlemode probes are used, the FrameScope and DualRemote can be as much as 50 km apart. All maximum lengths are barring excessive loss.

Single-Ended, Fiber Pair (Loopback)



Single-ended loopback configuration tests two fibers, using one Fiber SmartProbe and a fiber test jumper. When an 850nm multimode probe is used, the FrameScope and the fiber test jumper can be as much as 2 km apart or 4 km overall fiber length. When an 1300nm multimode probe is used, the FrameScope and the fiber test jumper can be as much as 5 km apart or 10 km overall fiber length. When singlemode probes are used, the FrameScope and fiber test jumper can be as much as 25 km apart or 50 km overall. All maximum lengths are barring excessive loss.

Note: Singlemode Fiber SmartProbes use a laser light source that requires warming up before use. Before calibrating or testing with singlemode fiber probes, always connect the probes, turn on the FrameScope (and DualRemote, if used), and wait five minutes for most accurate readings.

Calibrating the Tester

Before you begin a test, the FrameScope and DualRemote pair must be calibrated. Calibration allows the FrameScope to compensate for slight anomalies in its measurement hardware or that of the companion DualRemote unit.

Calibrating for Double-Ended Testing

Method A

This method is commonly called method A or the 2-jumper method and is usually recommended for singlemode fiber.

Note: Use the same calibration method whether you are testing two fibers or just one fiber.

- 1 Insert a Fiber SmartProbe⁺ in the FrameScope, and a Fiber SmartProbe⁺ in the DualRemote. They should both be either multimode or singlemode.

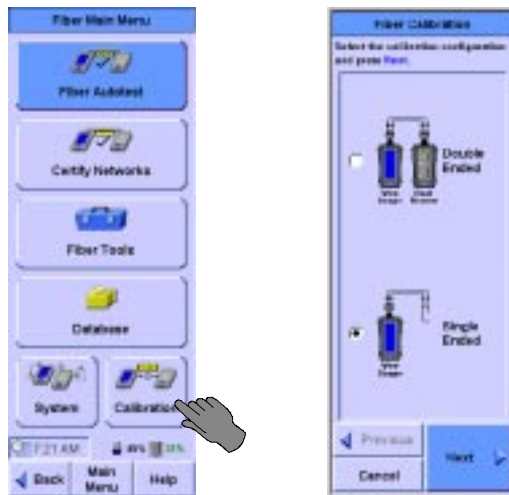
Note: Singlemode Fiber SmartProbes use a laser light source that requires warming up before use. Before calibrating or testing with singlemode fiber probes, always connect the probes, turn on the FrameScope (and DualRemote, if used), and wait five minutes for most accurate readings.

- 2 Connect test jumpers to the two Fiber SmartProbes.
- 3 Connect the test jumpers to each other, using two couplers. Connect the FrameScope transmitter to the DualRemote detector, and vice versa.
- 4 Turn on the FrameScope and DualRemote.

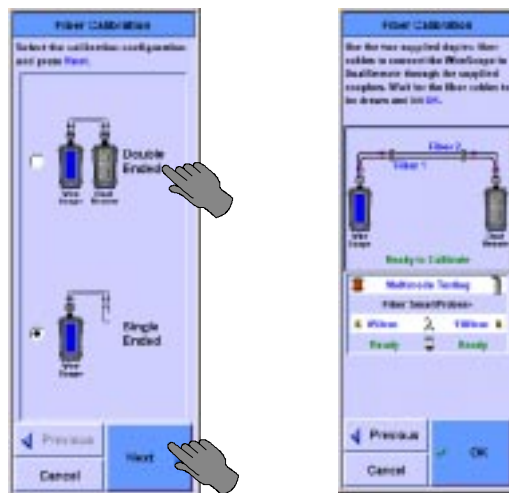
The FrameScope detects a Fiber SmartProbe⁺, and displays the following window:



- On the Fiber Main Menu, press **Calibration**. The Fiber Calibration screen displays.



- Choose **Double Ended**, and press **Next**. The Fiber Detection screen displays.



- When the message below the diagram reads, “Ready to Calibrate,” press **OK**. The Calibration window opens.
- When the window reads, “Calibration Successful,” press **OK** in the window. The Fiber Main Menu displays. Remove the couplers and use the coupler ends of the jumpers when changing connections. Leave the cable connections to the FiberProbes intact

Method B

Method B or the 1-jumper method is usually recommended for multimode fiber.

- 1 Insert a Fiber SmartProbe⁺ in the FrameScope, and a Fiber SmartProbe⁺ in the DualRemote. They should both be multimode.
- 2 Connect a single fiber of each of two duplex test jumpers to the two Fiber SmartProbes with the transmitter of each connected to the detector of the other with no coupler.
- 3 Turn on the FrameScope and DualRemote, if necessary.
- 4 On the Fiber Main Menu, press **Calibration**. The Fiber Calibration screen displays as above.
- 5 Choose **Double Ended**, and press **Next**. The Fiber Detection screen displays as above.
- 6 When the message below the diagram reads, “Ready to Calibrate,” press **OK**. The Calibration window opens.
- 7 When the window reads, “Calibration Successful,” press **OK** in the window. The Fiber Main Menu displays. Leave the transmitter connection to the fiber probe intact. Remove both detector connections and replace with the previously unused fiber of the duplex test jumper on each probe.

Method C

Method C is recommended for multi-fiber and small form factor (SFF) connectors. Because the multi-fiber/SFF connectors are polarized connectors, ensure that you have selected the proper connector type in the Autotest Setup screen, see “Choosing the Connector Type” on page 110.

- 1 Insert a Fiber SmartProbe⁺ in the FrameScope, and a Fiber SmartProbe⁺ in the DualRemote. They should both be either multimode or singlemode.

Note: Singlemode Fiber SmartProbes use a laser light source that requires warming up before use. Before calibrating or testing with singlemode fiber probes, always connect the probes, turn on the FrameScope (and DualRemote, if used), and wait five minutes for most accurate readings.

- 2 Connect special ST or SC to multi-fiber/SFF test jumpers to the two Fiber SmartProbes. These special transition jumpers are available from the connector manufacturers.
- 3 Connect the test jumpers to each other, using a special reference jumper which mates with the multi-fiber/SFF connector. Special reference jumpers are manufacturer specific. Contact the connector manufacturer for details. Connect the FrameScope transmitter to the DualRemote detector, and vice versa.
- 4 Turn on the FrameScope and DualRemote, if necessary.
- 5 On the Fiber Main Menu, press **Calibration**. The Fiber Calibration screen displays as above.
- 6 Choose **Double Ended**, and press **Next**. The Fiber Detection screen displays as above.

- 7 When the message below the diagram reads, “Ready to Calibrate,” press **OK**. The Calibration window opens.
- 8 When the window reads, “Calibration Successful,” press **OK** in the window. The Fiber Main Menu displays. Remove the reference jumper to start testing.

Calibrating for Single-Ended Testing

- 1 Insert a Fiber SmartProbe⁺ in the FrameScope.

Note: Singlemode Fiber SmartProbes use a laser light source that requires warming up before use. Before calibrating or testing with singlemode fiber probes, always connect the probes, turn on the FrameScope (and DualRemote, if used), and wait five minutes.

- 2 Connect a test jumper to the Fiber SmartProbe⁺.
- 3 Connect the two ends of the test jumper to each other, using a coupler.
- 4 Turn on the FrameScope.

The FrameScope detects a Fiber SmartProbe⁺, and displays the following window:

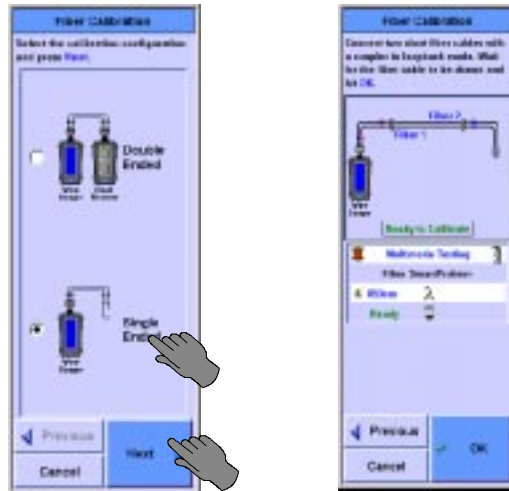


- 5 On the Fiber Main Menu, press **Calibration**. The Fiber Calibration screen displays.



4 Fiber Testing
Calibrating the Tester

- 6 Choose **Single Ended**, and press **Next**. The Fiber Detection screen displays.



- 7 When the message below the diagram reads, “Ready to Calibrate,” press **OK**. The Calibration window opens.
- 8 When the window reads, “Calibration Successful,” press **OK** in the window. The Fiber Main Menu displays.

Setting Up an Autotest

The tester must be configured for testing at each site by completing the following procedures.

Opening the Settings Menu

- 1 On the Main Menu, press **Fiber Autotest**. The Fiber Autotest Setup screen displays.



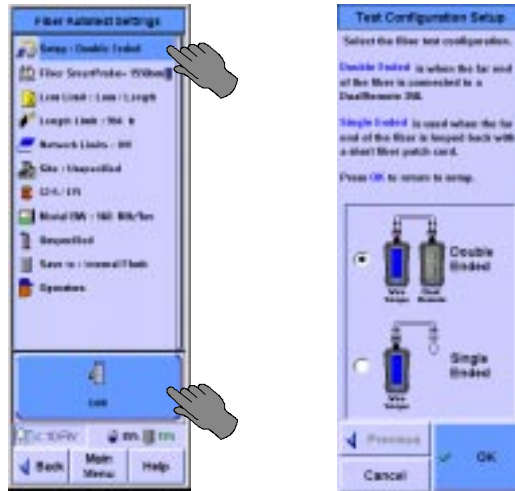
- 2 Press **Edit Settings**. The Fiber Autotest Settings screen displays.



Choosing the Test Configuration

To choose either single-ended or double-ended testing:

- 1 On the Fiber Autotest Settings screen, press **Setup**, then press **Edit**. The test Configuration Setup screen displays.

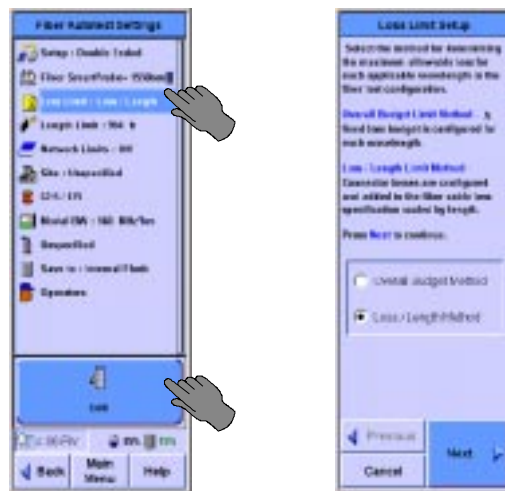


- 2 Press either **Double Ended** or **Single Ended**, then press **OK**. The Fiber Autotest Settings screen displays, with the selected configuration next to Setup.

Setting the Loss Limit

To set the loss limit for fiber testing:

- 1 On the Fiber Autotest Settings screen, press **Loss Limit**, then **Edit**. The Loss Limit Setup screen displays.



- 2 Select either **Overall Budget Method** or **Loss/Length Method**, then press **Next**. Continue by completing the steps in the matching section that follows.

Overall Budget Method

Overall Budget Method configures a fixed loss limit value for each applicable wavelength. If a multimode SmartProbe is installed, you are asked to specify overall loss budgets for 850 nm and 1300 nm wavelengths. If a singlemode SmartProbe is installed, you are asked to specify overall loss budgets for 1310 nm and 1550 nm wavelengths.

When you select **Overall Budget Method** and press **Next** on the Loss Limit Setup screen, the screen changes to the following:



- 1 To set the loss limit for a listed wavelength, press the wavelength field. The numeric keypad opens.



- 2 Press the backspace arrow to erase the displayed value, then enter the new limit value. Press **OK**. The keypad closes.

3 Press **OK**. The Fiber Autotest Settings screen displays.

Loss/Length Method

When **Loss/Length Method** is selected, the FrameScope 350 calculates the limit based on the length of the cable tested. You can set values for connectors, loss per connector, splices, and loss per splice. The connector and splice losses are added to the loss that is calculated by multiplying the length of the fiber by the loss/Km specification of the selected cable, which is shown at the bottom of the Setup screen.

When you select **Loss/Length Method** and press **Next** on the Loss Limit Setup screen, the screen changes to the following:



1 To set any of the variable values, press the variable. The numeric keypad opens.



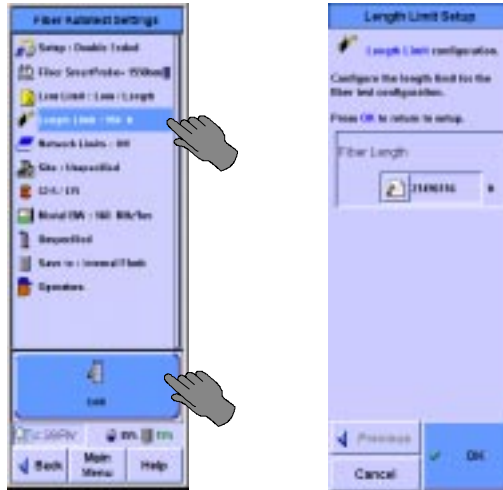
2 Press the backspace arrow to erase the displayed value, then enter the new variable value. Press **OK**. The keypad closes.

- 3 Press **OK**. The Fiber Autotest Settings screen displays.

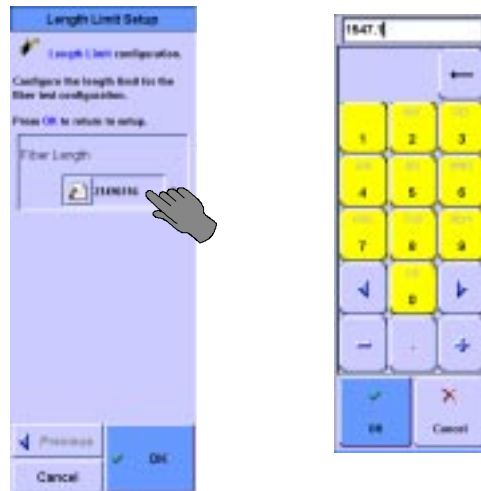
Setting the Length Limit

To set the length limit for fiber testing:

- 1 On the Fiber Autotest Settings screen, press **Length Limit**, then press **Edit**. The Length Limit Setup screen displays.



- 2 Press the Fiber Length field. The numeric keypad opens.



- 3 Press the backspace arrow to erase the displayed value, then enter the new limit value. Press **OK**. The keypad closes.
- 4 Press **OK**. The Fiber Autotest Settings screen displays.

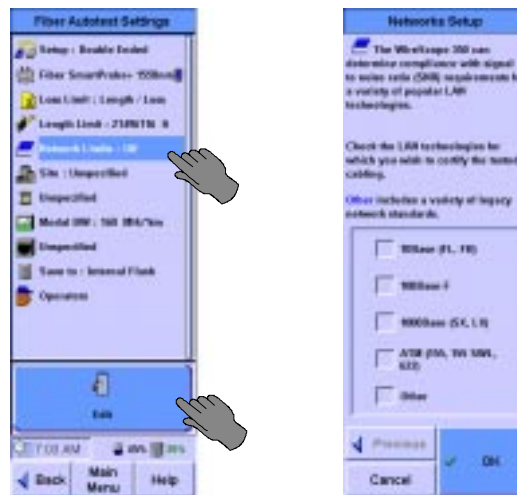
Choosing the Network Limit

The FrameScope 350 can certify cabling for compliance with the physical medium dependent (PMD) requirements of popular network interface technologies such as Ethernet or ATM. Network certification can be performed in addition to certifying to cabling limits.

A pass result for a particular networking technology indicates that the tested cable run meets the loss and length requirements necessary to successfully support communications between devices of that type.

To choose the network limit:

- 1 On the Fiber Autotest Settings screen, press **Network Limits**, then press **Edit**. The Networks Setup screen displays.

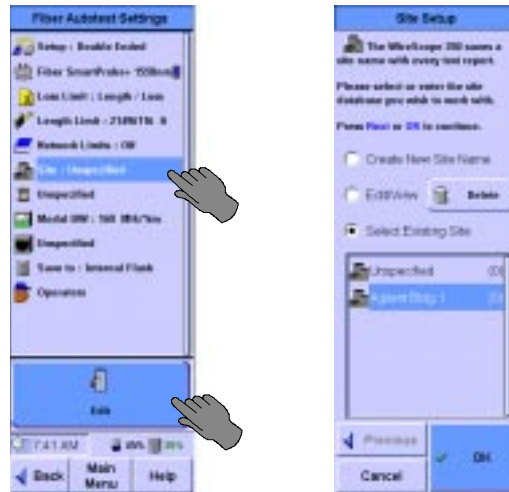


- 2 Press a limit to choose it. When you have placed check marks next to all types of networks you wish to certify, press **OK**. The Fiber Autotest Settings screen displays.

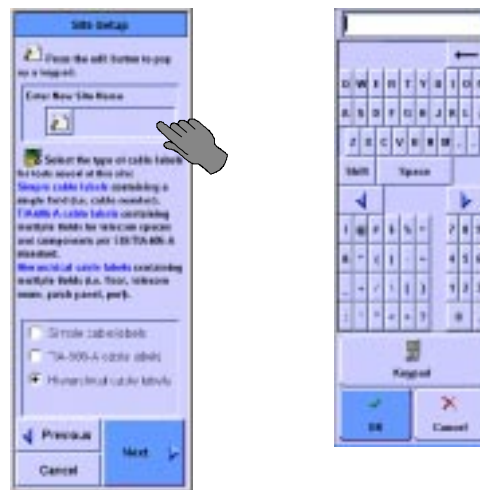
Entering the Site Name

The site name identifies the group of settings used on a job.

- 1 On the Fiber Autotest Settings screen, press **Site**, then press **Edit**. The Site Setup screen displays.



- 2 Select **Create a New Site Name**, then press **Next**. (The **OK** button changes to a **Next** button when you select **Create a New Site Name**.) The screen changes, to allow naming the site.
- 3 Press the Enter New Site Name field. The onscreen keyboard opens.



- 4 Press the keyboard keys to enter the site name, then press **OK**. The keyboard closes.

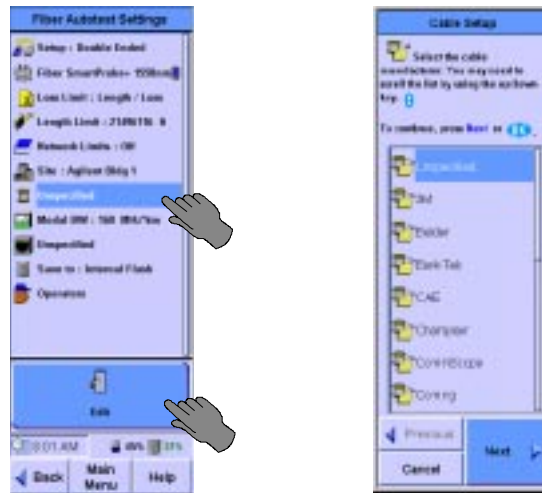
Choosing the Labeling Format

The labeling format for fiber is the same as that for copper. See “Choosing the Labeling Format” on page 64 for more information.

Choosing the Cable Type

Cable from different manufacturers has different transmission characteristics. The FrameScope 350 compensates for those differences if you tell it what cable is used on the job. The color of the cable spool icon indicates multimode (orange) or singlemode (yellow) fiber.

- 1 On the Fiber Autotest Settings screen, press the spool icon, then press **Edit**. The Cable Setup screen displays.



- 2 Select the cable manufacturer, and press **Next**. The Cable Database screen displays.
- 3 Select a cable on the list, and press **OK**. The Fiber Autotest Setup screen displays, with the selected cable type next to the spool icon. If you do not see the cable on list, see the next section.

Adding a new cable type

If you have a cable which is not in the cable database, you can add a new cable description to the database.

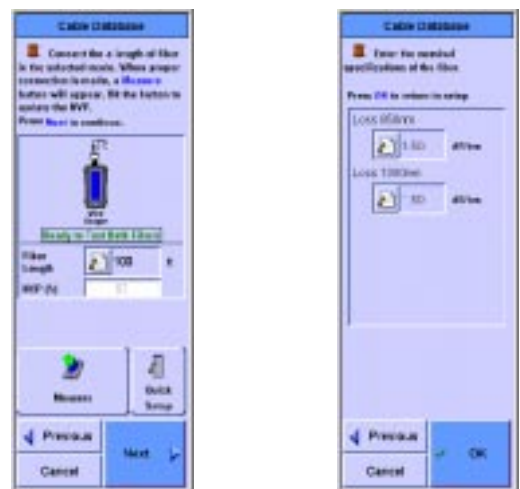
- 1 If the manufacturer is not present, leave the manufacturer as **Unspecified**. If the manufacturer is present in the list, select it, then press **Next**. The Cable Database screen is displayed. In either case you will be offered stored descriptions of cable types. If one of the stored descriptions matches the cable being tested select it, then press **OK**.
- 2 If not highlight **Add New Description** and press **Next**.
- 3 Enter the name to be added to the database and press **Next**.

4 Select the fiber construction that is appropriate and press **Next**.



5 Enter either the nominal velocity of propagation (NVP) of the fiber cable, **OR** the fiber cable's refractive index (default values are presented) and press **Next**. If you do not know either value, but have a known length of cable, select **Calculate NVP from length** and select the Test Configuration and press **Next**.

6 If you are calculating NVP from length, enter the fiber length. You may have to calibrate the tester in the test configuration you have specified, using appropriate test jumpers. There is a **Quick Setup** button for specifying the test configuration and fiber construction for the NVP measurement. When the proper connection has been made, a **Measure** button will appear. Press **Measure** and the NVP as a percentage of the speed of light will be entered in to NVP window. When completed, press **Next**.



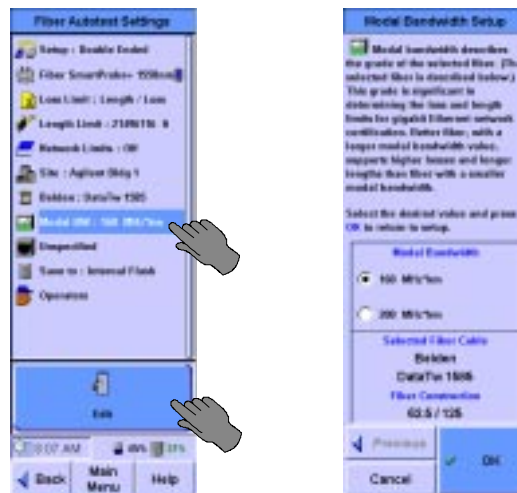
- 7 Enter the nominal specifications of the fiber. Default values are presented. Press **OK** and the Fiber Autotest Settings screen will display with the new cable description entered beside the cable pool icon.

Setting the Modal Bandwidth

Note: Modal bandwidth is a selection only available with multimode fiber. If a single mode fiber cable is selected above, this selection field is not present.

With multimode fiber, the signal can be transmitted in different “modes.” The modal bandwidth is a measurement of the ability of the fiber cable to pass the signal without adding additional attenuation. Modal bandwidth is a rating given to the fiber. The fiber manufacturer should be able to tell what the modal bandwidth of their fiber is. You should then select the proper Modal Bandwidth in the FrameScope 350 before running the test. To set the modal bandwidth for optical fiber certification:

- 1 On the Fiber Autotest Settings screen, press **Modal BW**, then **Edit**. The Modal BW Setup screen displays.

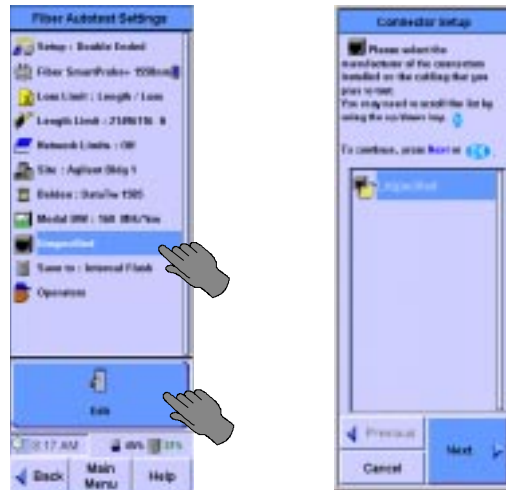


- 2 Choose the modal bandwidth and press **OK**. The Fiber Autotest Setup screen displays, with the chosen bandwidth next to **Modal BW**.

Choosing the Connector Type

Connectors of different types have different transmission characteristics. The FrameScope 350 compensates for those differences, if you tell it what connectors are used on the job.

- 1 On the Fiber Autotest Settings screen, press the connector icon, then **Edit**. The Connector Setup screen displays.



- 2 Press **Next**. A list of that connector types displays.



- 3 Press the type of the connector, then press **OK**. The Fiber Autotest Setup screen displays, with the selected connector type next to the connector icon. If you do not see the connector on the list, see the next section.

Adding a new connector type

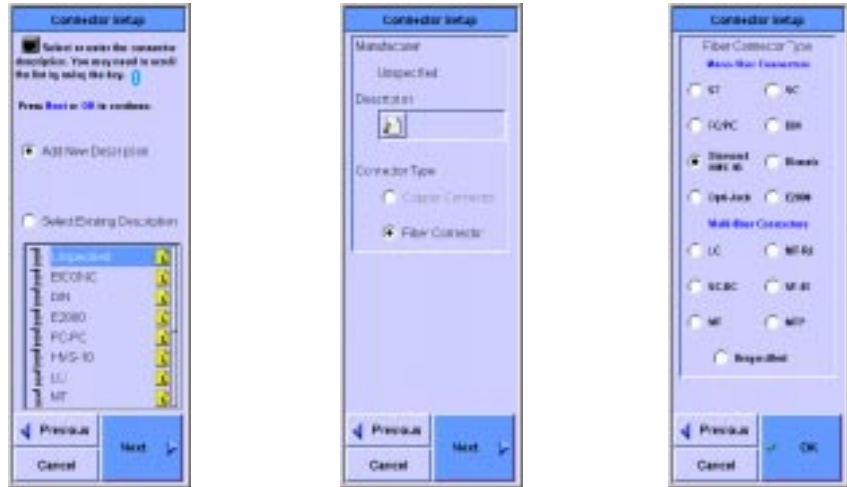
If you have a connector which is not in the connector database, you can add a new connector description to the database.

- 1 If the manufacturer is not present, leave the manufacturer as **Unspecified**. If the manufacturer is present in the list, select it, then press **Next**. The next Connector Setup screen is displayed. In either case you will be offered stored

4 Fiber Testing Setting Up an Autotest

descriptions of connector types. If one of the stored descriptions matches the connector being tested select it, then press **OK**.

2 If not highlight **Add New Description** and press **Next**.



3 Enter the name to be added to the database and press **Next**.

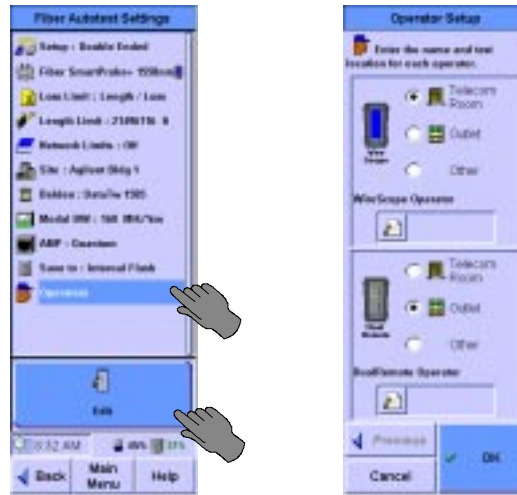
4 Select the fiber connector type from the list of mono-fiber connectors and multi-fiber connectors shown or select **Unspecified**. Press **OK** and the Fiber Autotest Settings screen displays with the new connector description beside the connector icon.

Entering the Operator Names

The names of the technicians performing the tests can be entered, and will appear on the test report.

To enter the test technicians' names:

- 1 On the Fiber Autotest Setup screen, press **Operators**, then **Edit**. The Operator Setup screen displays.

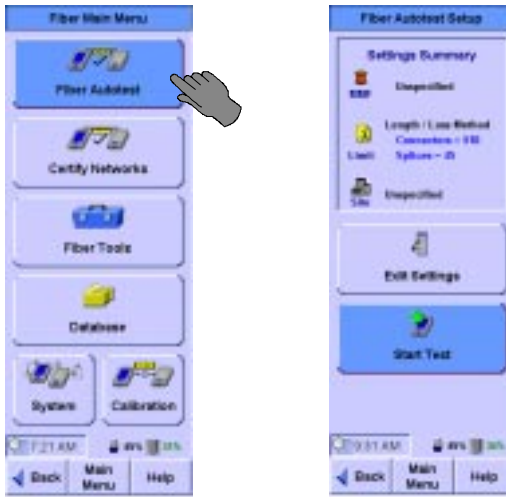


- 2 Choose the FrameScope unit's testing location, either **Telecom Room**, **Outlet**, or **Other**.
- 3 Press the **FrameScope Operator** field. The onscreen keyboard opens, with "FrameScope Operator" at the top or a list of previously entered names will appear with the keyboard and keypad buttons available.
- 4 Press the keyboard keys to enter the name of the technician using the FrameScope, then press **OK**. The keyboard closes, and the technician's name appears in the **FrameScope Operator** field of the Operator Setup screen.
- 5 Choose the DualRemote unit's testing location, either **Telecom Room**, **Outlet**, or **Other**.
- 6 Press the **DualRemote Operator** field. The onscreen keyboard opens, with "DualRemote Operator" at the top or a list of previously entered names will appear with the keyboard and keypad buttons available.
- 7 Press the keyboard keys to enter the name of the technician using the DualRemote, then press **OK**. The keyboard closes, and the technician's name appears in the **DualRemote Operator** field of the Operator Setup screen.
- 8 Press **OK** and press **Main Menu**. The Fiber Main Menu displays.

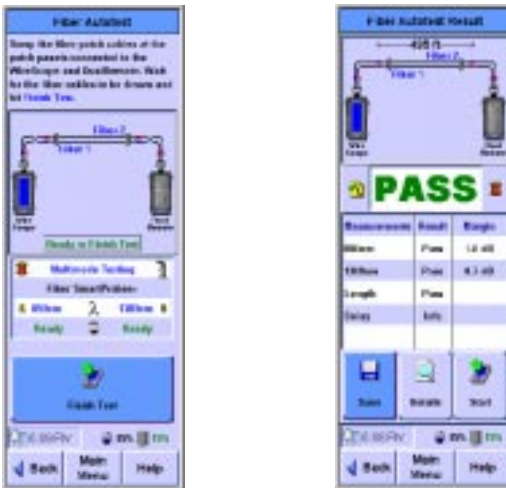
Running an Autotest

To run an autotest:

- 1 Connect the FrameScope 350 and Dual Remote 350 to the ends of the circuit needing certification.
- 2 On the FrameScope Fiber Main Menu, press **Fiber Autotest**. The Fiber Autotest Setup screen displays.

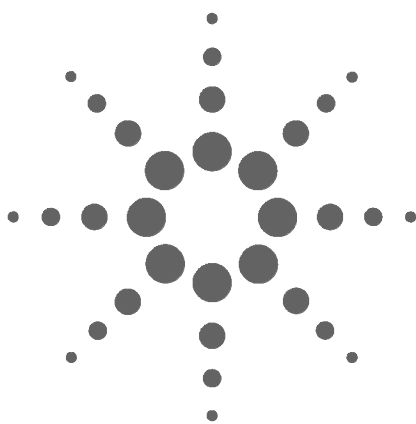


- 3 Press **Start Test**. The autotest executes.
- 4 Follow the on screen directions, which may include swapping fiber connections.



Note: When disconnecting fibers for swapping, disconnect at the end of the test jumpers, not at the Fiber SmartProbe⁺.

- 5 To save the test results, see “Saving Test Results” on page 79



5 Cable Testing in Expert Mode

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This chapter describes how to perform cable testing in Expert Mode using the Agilent FrameScope 350.



Expert Mode allows you a great deal of flexibility and customization when using the cable test features of the FrameScope 350. Expert Mode allows you to certify new network installations for compliance with industry cable standards, while providing detailed control of test setup and management.

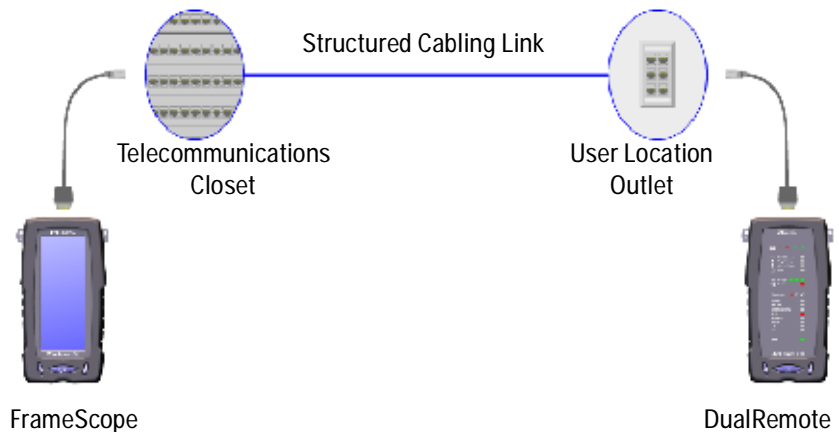
NOTE

This chapter describes the Expert Mode FrameScope 350 cable test features. For information on using standard cable testing, see Chapter 3, "Cable Testing with the FrameScope 350".

Testing Overview

This section provides an overview of cable testing in Expert Mode. For additional information on cable testing, see “Cable Testing Background” on page 57.

Expert Mode uses the same two-tester method as regular cable testing, employing a FrameScope 350 at one end and a DualRemote 350 at the other.



The following steps describe the general procedure for performing Expert Mode cable certification testing.

- 1 Calibrate the FrameScope and DualRemote testers that you will be using. See “Calibrating the Tester” on page 61.
- 2 Choose a *link* or *channel* test configuration to meet your application. See “Choosing Your Test Configuration” on page 57.
- 3 Switch on the FrameScope and DualRemote testers and connect them to the cabling to be tested. See “Connecting to the Network” on page 12.
- 4 Put the FrameScope 350 into Expert Mode. See “Changing to Expert Mode” on page 118.
- 5 Run an AutoTest on the network. See page 119.
- 6 Create a new settings profile (see page 121) or open an existing settings profile (see page 119).

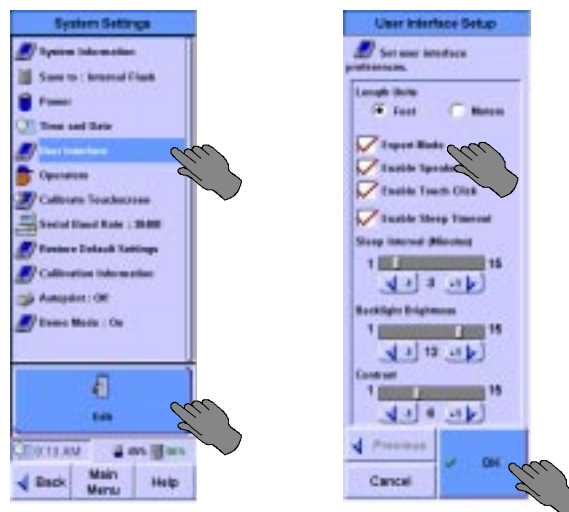
Changing to Expert Mode

To change the FrameScope from standard configuration to Expert mode:

- 1 On the Main menu, press **System**. The System Settings screen displays.



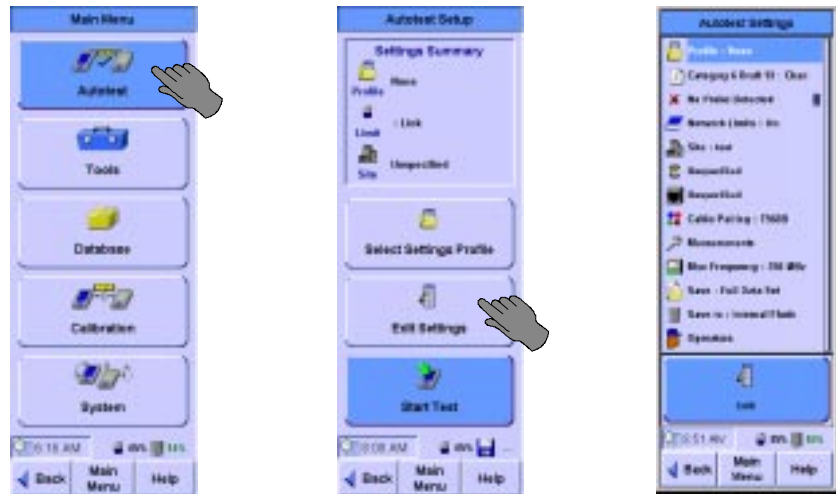
- 2 On the System Settings screen, press **User Interface**, then press **Edit**. The User Interface Setup screen displays.



- 3 On the User Interface Setup screen, press **Expert Mode** to turn it on (a check mark will appear in the box,) then press **OK**. The System Settings screen displays.

The Expert Autotest Setup

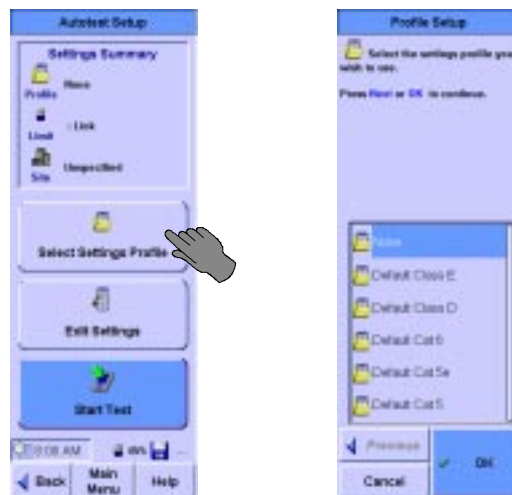
When in the Expert Mode, additional Autotest setup choices are available.



Choosing an Existing Settings Profile

A profile is a predefined locked set of Autotest settings, locked to prevent the user from changing them. Default settings profiles exist for Cat 5, Cat 5E, Cat 6, Class D, and Class E. Previously defined settings profiles are added to the list of default profiles. To select an existing settings profile:

- 1 In Expert Mode, press Autotest on the Main Menu.
- 2 In the Autotest Setup screen, press **Select Settings Profile**.



5 Cable Testing in Expert Mode The Expert Autotest Setup

- 3 In the Profile Setup screen, press the desired profile. If the scroll bar is not full length, use the scroll rocker to scroll down to see more stored profiles
- 4 Press **OK** when done.
- 5 Press **Start Test** to run the Autotest.

Note: Locked settings are displayed with a padlock icon along the right edge of the Autotest Settings screen, reached by pressing **Autotest**, then pressing **Edit Settings**. If a locked setting needs to be changed, edit the profile as described below. Realize that you are violating the existing profile settings selection when doing this.

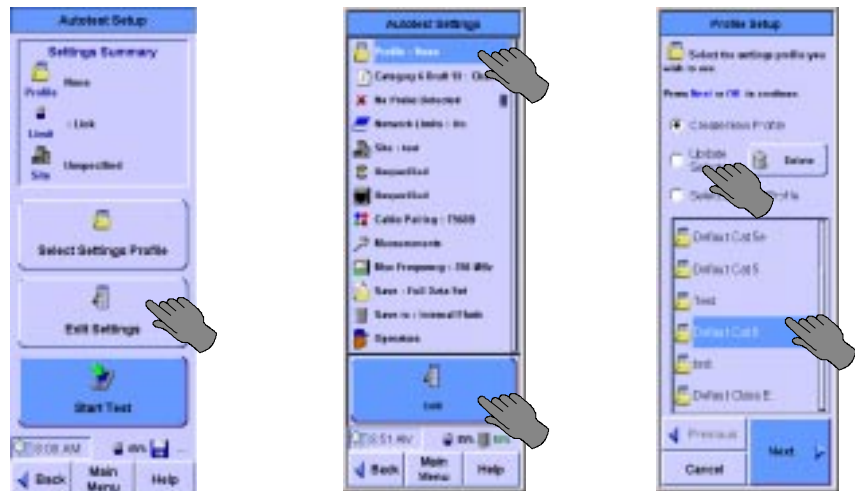
Note: When selecting a setting profile, only the locked settings are set by the selection. Unlocked settings need to be verified as appropriate for the environment being tested.

Editing an Existing Settings Profile to Remove a Lock

You may also edit or delete existing profiles, including the Default profiles. It is recommended that you do not edit nor delete the Default profiles, as you must reload the software to get them back in their original form to meet the standards. To create a profile similar to a default profile, first select the desired default profile to set the locked settings. Then create a new profile as described in the next section.

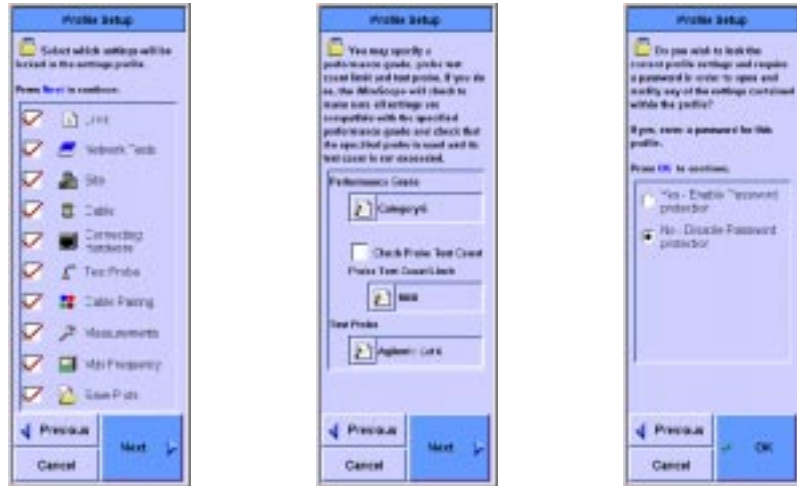
To edit an existing settings profile:

- 1 In Expert Mode, press **Autotest**. On the Autotest Settings screen, press **Edit Settings**, then press **Profile**, then press **Edit**.



- 1 On the Profile Setup Screen, press the selected profile, then press Update Selected, then press **Next**.
- 2 Change the lock settings by pressing the appropriate boxes. The check marks toggle with subsequent presses. Then press **Next**. If the Test Probe setting is locked, you will see the center screen below, which will prompt you to select the Performance Grade of the probe as well as the Probe Test Count Limit, if desired. Then press **Next**. If

the Test Probe setting is not locked you will go directly to the Password Screen, where you can choose to password protect your profile.



- 3 If you choose to password protect your profile, you will be prompted to enter the password. Once you are satisfied with your password selection, press **OK** to return to the Autotest Settings screen, where the locks will be shown. If it is password protected, you will now be prompted to enter the password in order to modify this profile.



Creating a New Settings Profile

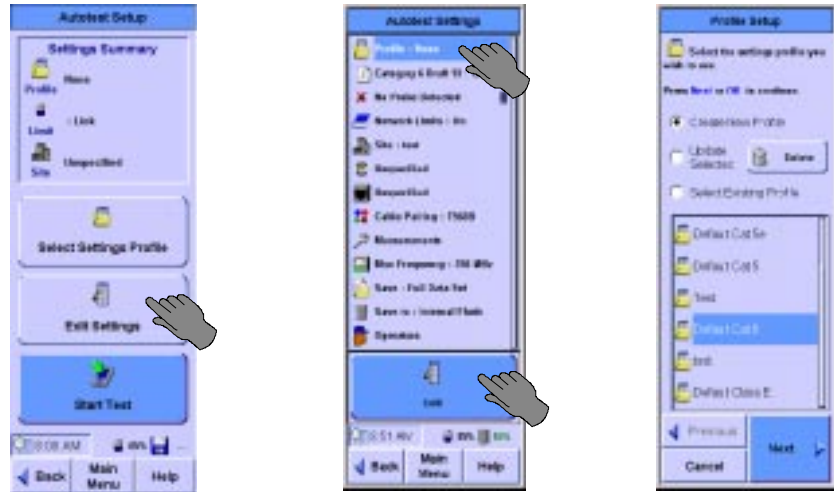
A new profile may be created either directly on the FrameScope 350 or on a PC using ScopeData Pro and subsequently downloaded into the FrameScope 350. To create a settings profile directly on the FrameScope 350:

- 1 You must configure all the Autotest Settings to the desired settings prior to creating a new profile. Profiles created on the FrameScope

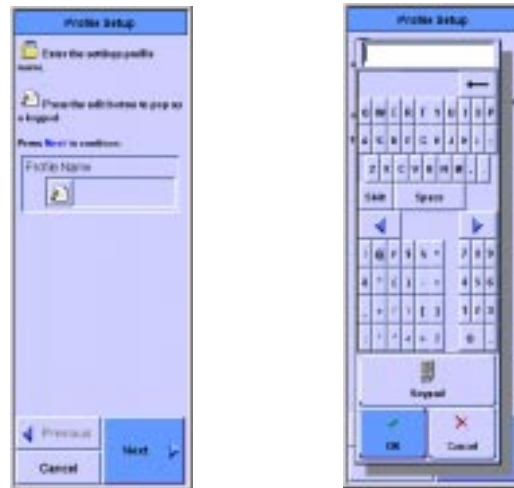
5 Cable Testing in Expert Mode
The Expert Autotest Setup

350 use the existing settings for all the parameters. See the remainder of this section to configure the other settings.

- 2 In Expert Mode, press **Autotest**. On the Autotest Settings screen, press **Edit Settings**, then press **Profile**, then press **Edit**.

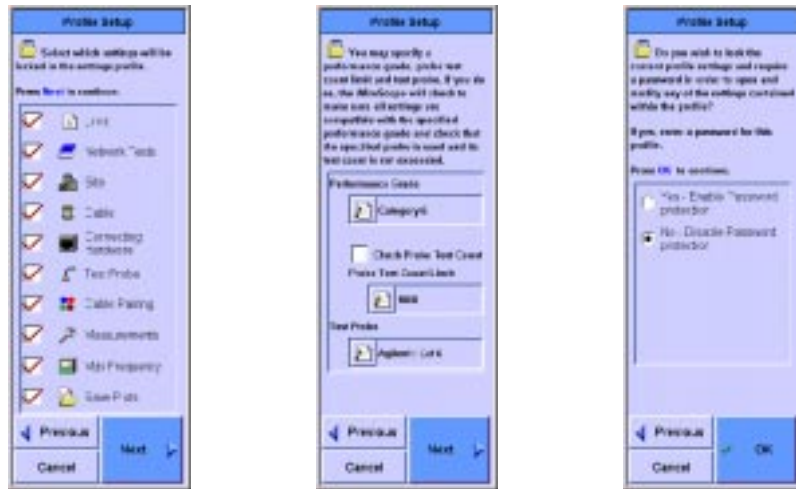


- 3 On the Profile Setup Screen, press **Create New Profile**, then press **Next**. Press anywhere in the Profile Name area to open a keyboard to allow you to enter the new profile name. After entering the new name, press **OK**, then press **Next**.

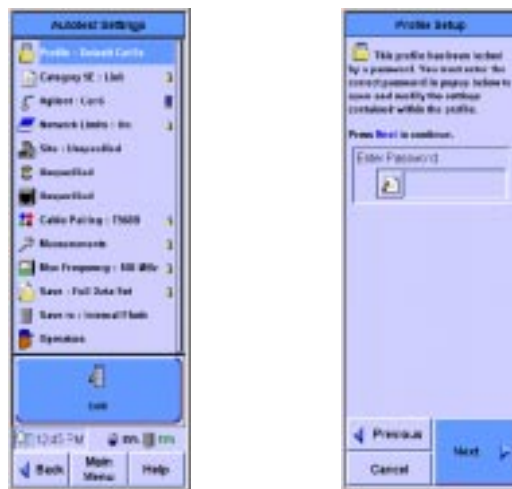


- 4 Change the lock settings by pressing the appropriate boxes. The check marks toggle with subsequent presses. Then press **Next**. If the Test Probe setting is locked, you will see the center screen below, which will prompt you to select the Performance Grade of the probe as well as the Probe Test Count Limit, if desired. Then press **Next**. If the Test Probe setting is not locked you will go directly to the

Password Screen, where you can choose to password protect your profile.



- 5 If you choose to password protect your profile, you will be prompted to enter the password. Once you are satisfied with your password selection, press **OK** to return to the Autotest Settings screen, where the locks will be shown. If it is password protected, you will now be prompted to enter the password in order to modify this profile.



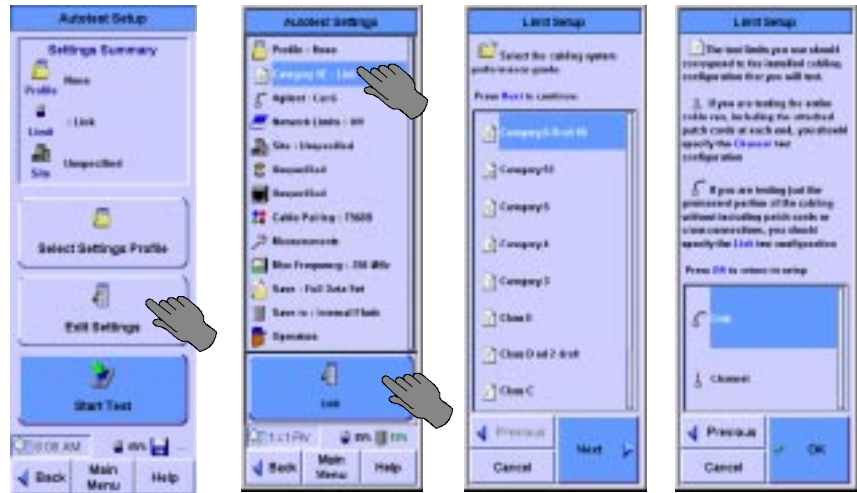
Setting the Test Limit

The Expert Mode allows you to set the test limit according to several standards. To set the test limit to a certain standard:

- 1 In Expert Mode, press **Autotest** on the Main menu.
- 2 On the Autotest Setup screen press **Edit Settings**. On the Autotest Settings screen press the icon second from the top of the list that looks like a page with a number or letter superimposed on it.

5 Cable Testing in Expert Mode The Expert Autotest Setup

- 3 Then on the Limit Setup screen, select the desired cabling system performance grade.



Note: The scroll bar on the right of the screen shows the location of the data shown and is not a functional scroll bar. To scroll use the scroll rocker at the lower right of the FrameScope.

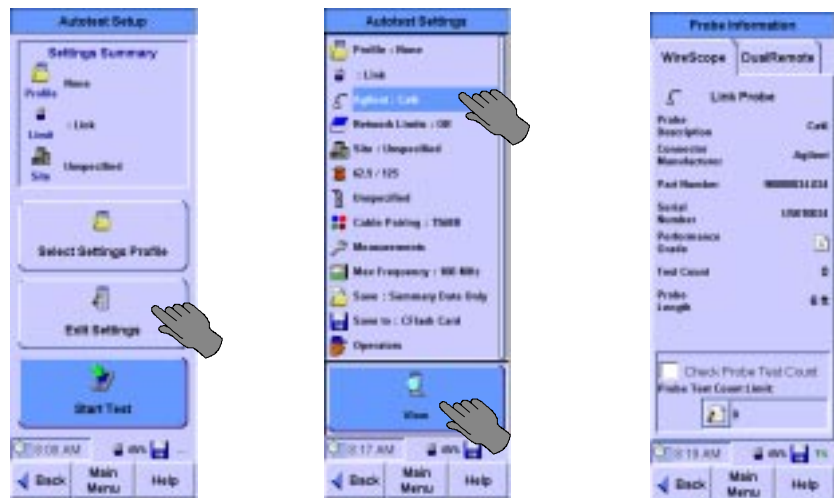
- 4 Then press **Next**. The next Limit Setup screen allows you to select **Link** or **Channel** test configuration.

Viewing Probe Information

The FrameScope can display details about the probes inserted in the tester. If the probes are SmartProbes, the information includes the number of tests the probes have performed.

To view detailed information on the probe currently inserted:

- 1 In Expert mode, press **Autotest** on the Main Menu. The Autotest Setup screen displays.

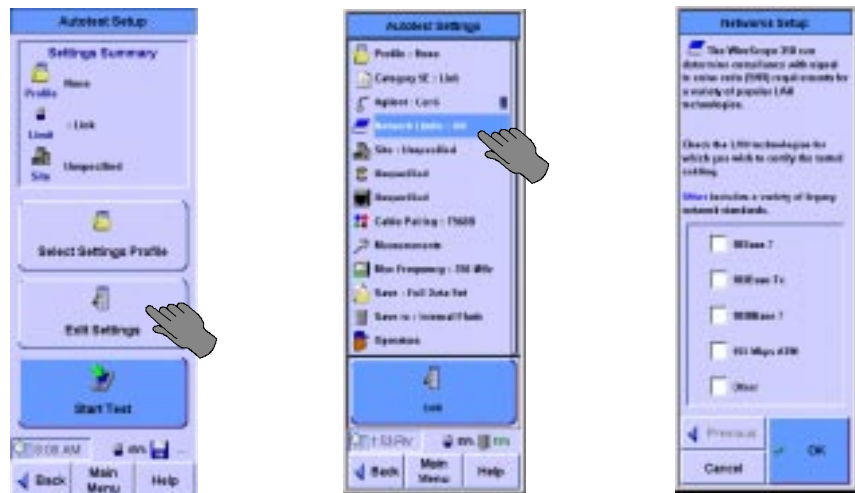


- 2 On the Autotest Setup screen, press **Edit Settings**. The Autotest Settings screen shows a menu of parameters and functions.
- 3 Press the name of the probe, then press **View**. The Probe Information screen displays, with information on the probe inserted in the FrameScope.
- 4 If you desire to check the probe test count before each test, press **Check Probe Test Count** and enter the limit to be tested against.
- 5 To view information on the probe installed in the DualRemote, press the DualRemote tab. The Probe Information screen displays information about the probe in the DualRemote after running an Autotest.
- 6 If you desire to check the DualRemote probe test count before each test, press **Check Probe Test Count** and enter the limit to be tested against.

Setting Network Limits

The FrameScope 350 can determine compliance with signal to noise ratio (SNR) requirements for a variety of popular LAN technologies. To do this:

- 1 In Expert Mode, press **Autotest** on the Main Menu. The Autotest Settings screen displays.
- 2 On the Autotest Setup screen press **Edit Settings**.
- 3 On the Autotest Settings screen press **Network Limits**. Then press **Edit**.



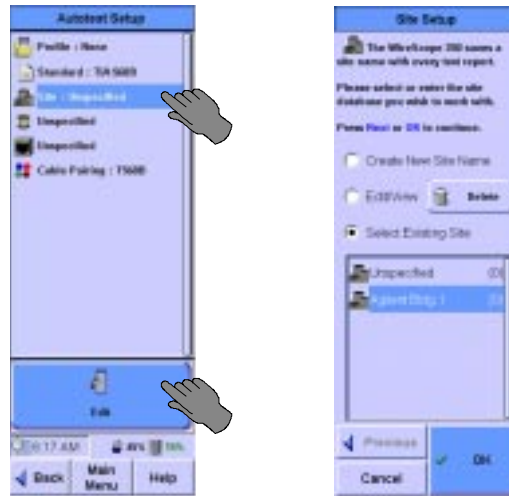
- 4 On the Networks Setup screen press on the appropriate technology for which you want to certify the tested cabling. A red check will appear in each technology selected. **Other** includes a variety of legacy network standards.

Entering the Site Name

The site name identifies the group of settings used on a job, and can be applied to test records for that site.

To enter the site name:

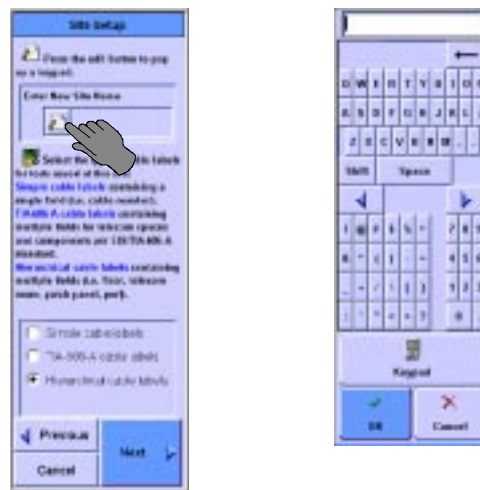
- 1 On the Autotest Setup screen, press **Site**, then press **Edit**. The Site Setup screen displays.



- 2 Press **Create a New Site Name**, then press **Next**. (The **OK** button changes to a **Next** button when you select **Create a New Site Name**.) The screen changes, to allow naming the site.

Note: To change the name or labeling format for an existing site, press the site name on the list, then press **Edit/View** and **Next**.

- 3 Press the icon under Enter New Site Name. The onscreen keyboard opens.



- 4 Press the keyboard keys to enter the site name, then press **OK**. The keyboard closes.

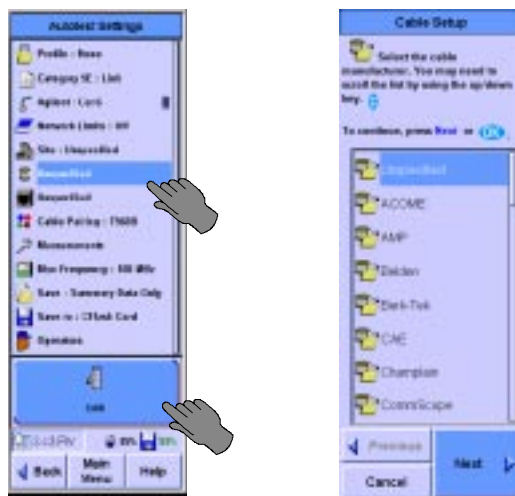
Choosing the Labeling Format

The labeling format for Expert Mode is the same as that previously described in Chapter 3, “Cable Testing with the FrameScope 350”. See “Choosing the Labeling Format” on page 64 for more information.

Choosing the Cable Type

Cable from different manufacturers has different transmission characteristics. The FrameScope 350 compensates for those differences if you tell it what cable is used on the job. A grey cable spool icon indicates UTP cabling, a black cable spool icon indicates shielded cabling.

- 1 On the Autotest Setup screen, press the cable spool icon, then press **Edit**. The Cable Setup screen displays.



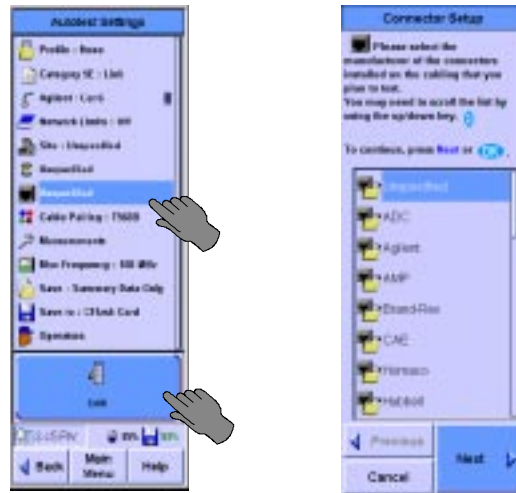
Note: The scroll bar on the right of the screen shows the location of the data shown and is not a functional scroll bar. To scroll use the scroll button at the lower right of the FrameScope.

- 2 Select the cable manufacturer, and press **Next**. The Cable Database screen displays.
- 3 Select a cable on the list, and press **OK**. The Autotest Setup screen displays, with the selected cable type next to the cable spool icon. If the cable is not in the cable database, see “Adding a new cable type” on page 72.

Choosing the Connector Type

Connectors from different manufacturers have different transmission characteristics. The FrameScope 350 compensates for those differences, if you tell it what connectors are used on the job.

- 1 On the Autotest Setup screen, press the connector icon, then press **Edit**. The Connector Setup screen displays.



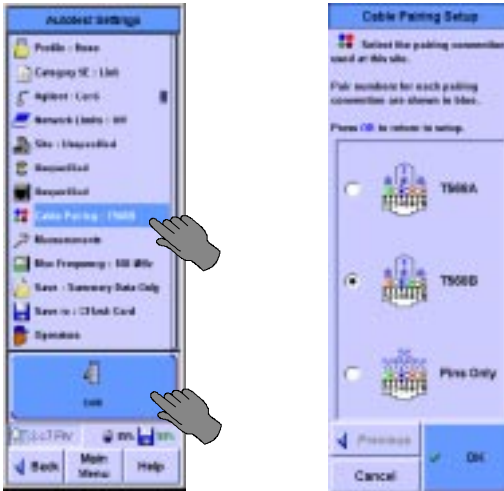
Note: The scroll bar on the right of the screen shows the location of the data shown and is not a functional scroll bar. To scroll use the scroll button at the lower right of the FrameScope.

- 2 Press the manufacturer of the connector, then **Next**. A list of that manufacturer's connectors displays.
- 3 Press the name of the connector, then press **OK**. The Autotest Setup screen displays, with the selected connector type next to the connector icon. If the connector type is not in the connector database, see "Adding a new connector type" on page 74.

Choosing the Cable Pairing Convention

To identify the correct pair in the test results, the FrameScope must be told what cable pairing convention is used. For example, if the 3,6 pair fails a test, it would be "Pair 2" if using T568A pairing, but it would be "Pair 3" if using T568B pairing.

- 1 On the Autotest Setup screen, press **Cable Pairing**, then press **Edit**. The Cable Pairing Setup screen displays.



Press the cable pairing convention used on the job, then press **OK**. The Autotest Setup screen displays, with the cable pairing convention named.

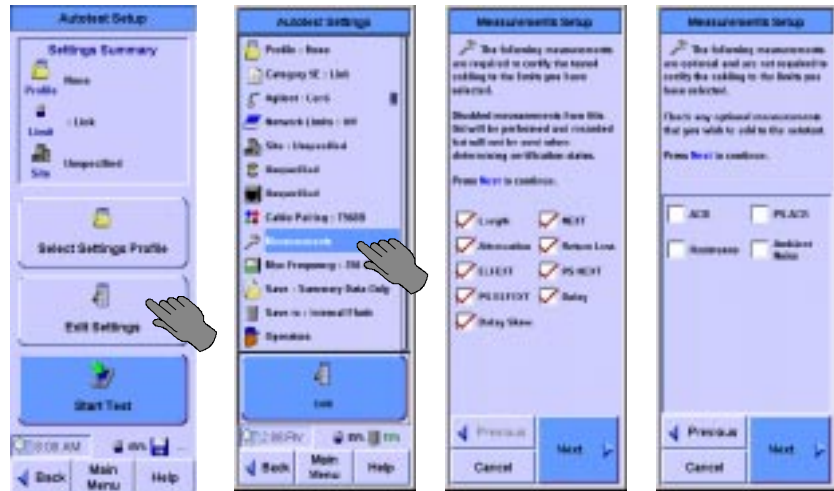
Setting the Measurements

In Expert Mode, you have the ability to specify in detail what measurements are used to determine the certification status of your test. In addition, there are choices for optional features.

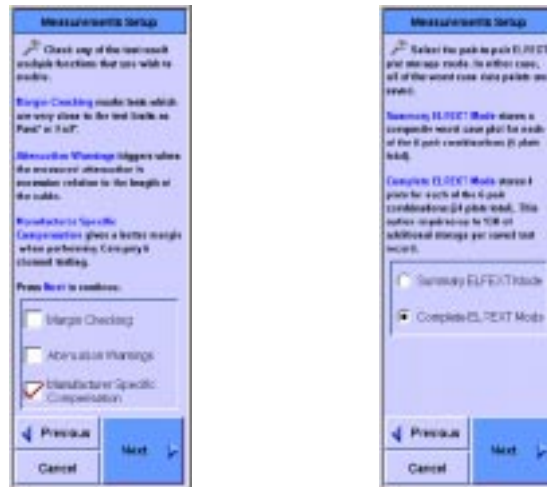
- 1 In Expert Mode, press **Autotest** on the Main menu.
- 2 On the Autotest Setup screen press **Edit Settings**. On the Autotest Settings screen press **Measurements**. The first Measurements Setup screen identifies the required measurements for the limits you have selected. It is possible to disable the measurements, but it is not

5 Cable Testing in Expert Mode The Expert Autotest Setup

recommended. Press **Next** to view the optional measurements you may want to add to your test. Add them by pressing the name or box.

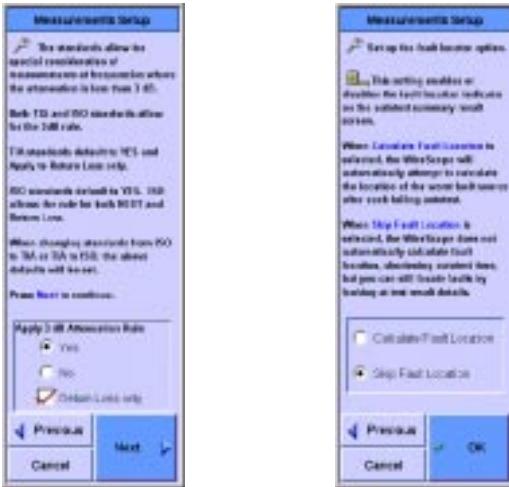


- 3 After you have made your optional choices, press **Next** to allow you to enable test result analysis functions. It is recommended that you should choose Manufacturer Specific Compensation when you are performing Category 6 channel testing. Press **Next** when done.



- 4 The next Measurements Setup screen allows you to choose between Summary ELFEXT data and Complete ELFEXT data storage modes. If you have storage space and/or you will wish to recertify in the future using the stored data, the **Complete ELFEXT Mode** is recommended. When complete, press **Next**.
- 5 The next Measurement Setup Screen allows the user to apply the 3 dB attenuation rule, which provides for special consideration of measurements where the attenuation is less than 3 dB or in certain ISO cases, 4 dB. This rule applies to both NEXT and Return Loss in the ISO case, but only to Return Loss in the TIA case. The FrameScope 350 automatically sets this choice based upon the standard chosen previously. It also implements the 4 dB

appropriately even though it is called the 3 dB rule. When you are satisfied with the choice, press **Next**.

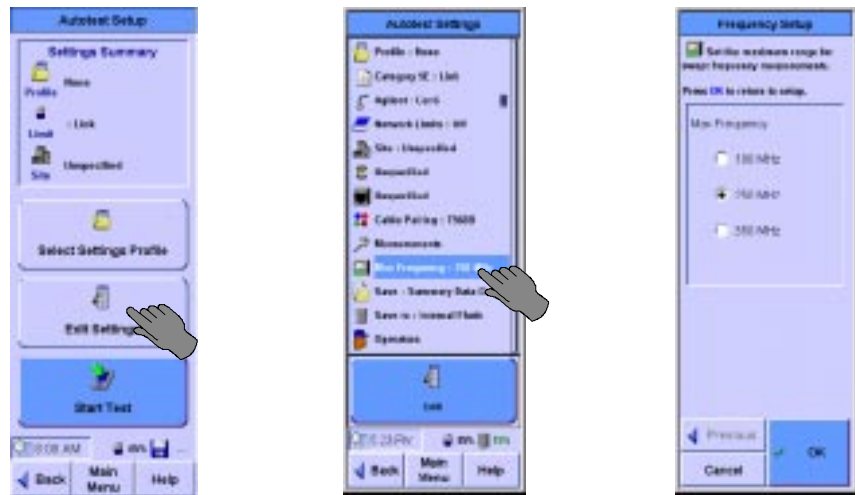


- 6 The last Measurements Setup screen allows you to skip the automatic fault location calculation. This does not prevent you from using the locator in the Results Details function, but prevents the calculation on each test, including the passing tests. When this selection has been made, press **Next** to return to the Autotest Settings screen.

Setting the Maximum Frequency

The FrameScope 350 allows you to select the maximum range for swept frequency measurements. The choices depend somewhat on the standard selected previously, for example for Category 6, the 100 MHz choice is not available. To set the maximum frequency:

- 1 In Expert Mode, press **Autotest** on the Main menu.
- 2 On the Autotest Setup screen press **Edit Settings**. On the Autotest Settings screen press **Max Frequency**. On the Frequency Setup screen select the maximum frequency of the data being stored.



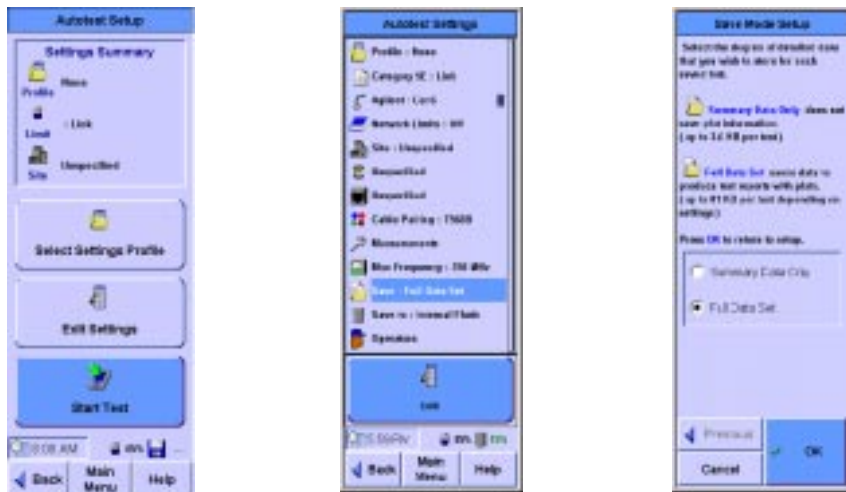
Note: The reason to select the lowest frequency is to decrease test time and decrease memory storage. The additional optional data is for information only, unless you wish to preserve the data for possible later recertification at a higher frequency standard with ScopeData Pro software on a PC. If you have not saved the higher frequency data, the recertification may not be available. For example, if you test to the Category 5E (Class D) standard, but have limited your maximum frequency to 100 MHz, then you will not be able to recertify later with the stored data to Category 6 (Class E) which requires data to 250 MHz.

Setting the Plot Storage Requirements

Another storage choice is available, whether to save plots or not. Saving plots stores the entire swept frequency measurement. Summary data is the worst case value for each test and is the minimum required for standards compliance. To set the data being stored:

- 1 In Expert Mode, press **Autotest** on the Main menu.

- 2 On the Autotest Setup screen press **Edit Settings**. On the Autotest Settings screen press **Save**, then **Edit** to bring up the Save Mode Setup screen. Press **Summary Data Only** or **Full Data Set**.



Note: If you save summary data only, you will not be able to recertify later with the saved data, since the plots will not be part of the stored data used for recertification by ScopeData Pro.

Setting the Storage Location

This is the same function as that shown in the System Settings screen. Also when a CompactFlash™ card is inserted, this function will automatically set the storage location to the CompactFlash™ card See *Configuring CompactFlash™ Cards*, on page 2-6.

Setting the Operator Names

The names of the technicians performing the tests can be entered, and will appear on the test report. This is the same function as that shown in the System Settings section See *Entering the Operator Names*, on page 3-18. If it has been done already there, it is reflected here.

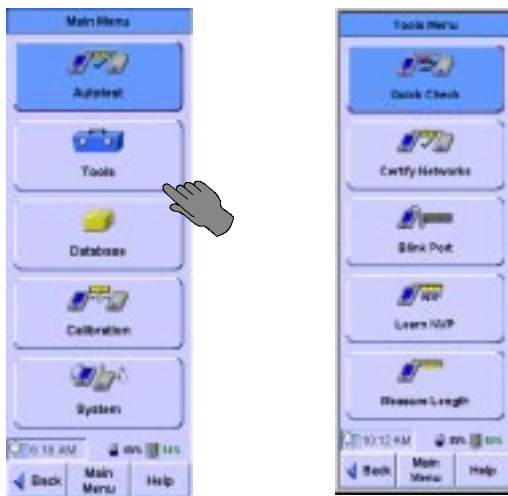
The Expert Tools Menu

The Expert mode Tools menu includes the following:

- **Quick Check** tests the continuity and length of a cable run. See *Running a Quick Check*, on page -134.
- **Certify Networks** lets you choose standards for certification of the network. See *Certifying a Network*, on page -136.
- **Blink Port** blinks the LED on a circuit at an Ethernet hub or switch port. This helps locate the far end of a circuit. See *Blinking the Port*, on page -137.
- **Learn NVP** allows the user to determine the NVP (Nominal Velocity of Propagation) of a sample of cable. See *Learning the NVP of a Cable*, on page -138.
- **Measure Length** measures the length of each pair of a cable whose type is in the Cable Database. See *Measuring the Cable Length*, on page -139.

To open the Tools menu:

- 1 Change to Expert mode (see page -118).
- 2 On the Main Menu, press **Tools**. The Tools Menu displays.

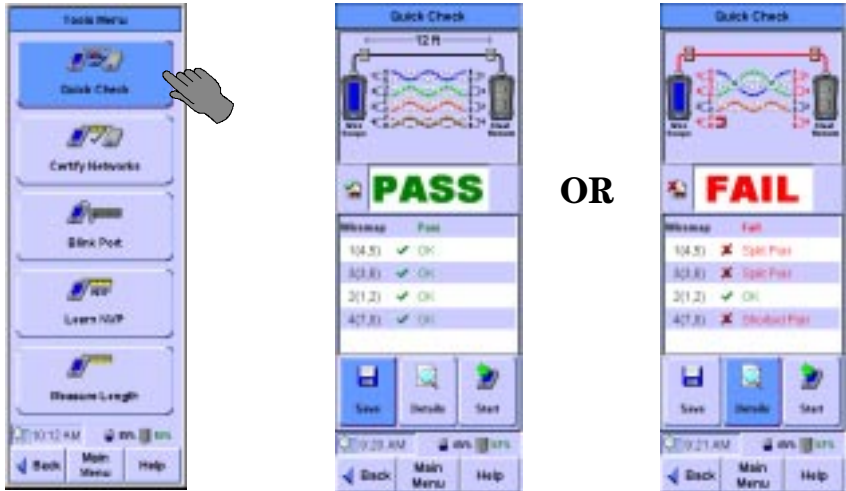


Running a Quick Check

The Quick Check function tests a cable run for shorts, opens, shield integrity, correct termination, and length.

To run a Quick Check:

- 1 On the Tools menu (see page -134), press **Quick Check**. The test runs, and a Pass or Fail screen displays.

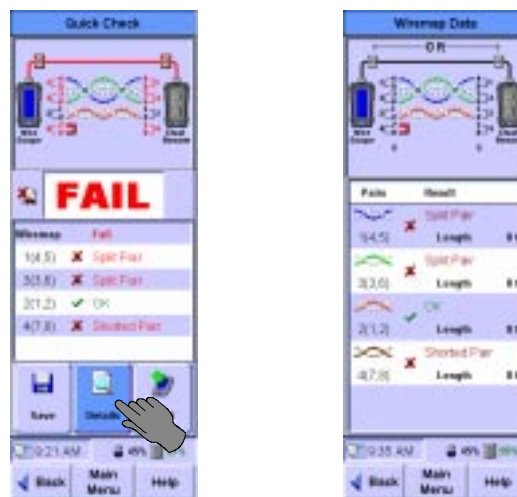


Viewing Details of Quick Check Results

The FrameScope can display detailed information about both passing and failing results of a Quick Check.

To view results details:

- 1 On the Quick Check PASS or FAIL screen, press **Details**. The Wiremap Data screen displays.



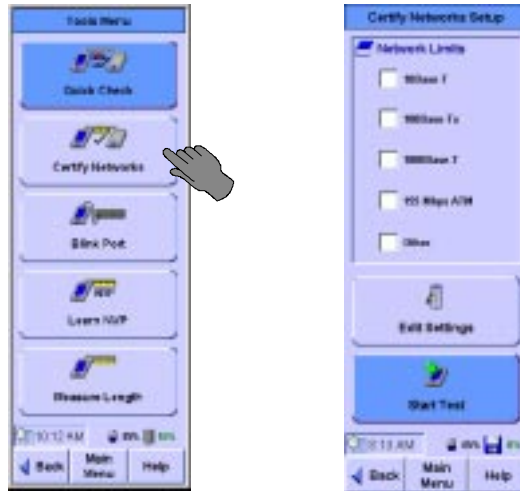
- 2 The results may be saved, if desired.

Certifying a Network

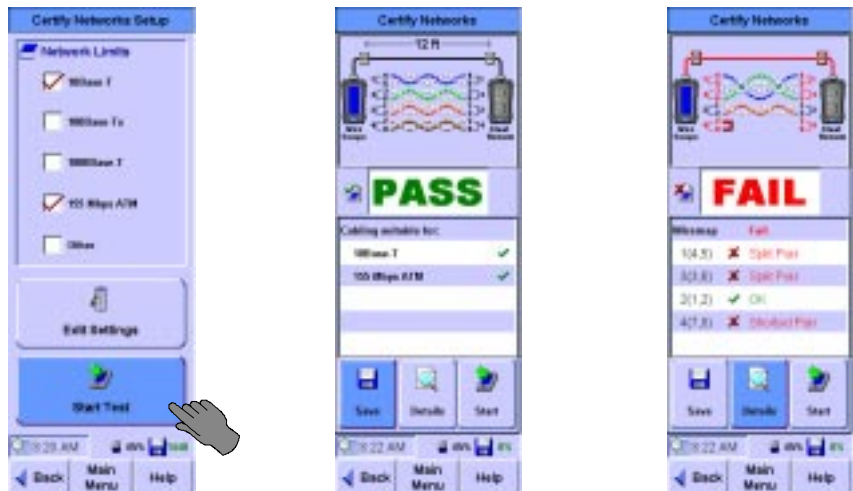
The Expert mode Tools menu includes **Certify Network**, which lets you test a cable for conformance to different network standards.

To certify a network:

- 1 Connect the FrameScope and DualRemote to the cable.
- 2 On the Expert mode Tools Menu (see page -134), press **Certify Network**. The Certify Networks Setup screen displays.



- 3 Press a standard in the list to select it. A checkmark appears next to each selected standard.
- 4 To test the network to the selected standards, press **Start Test**. The test executes, and FrameScope displays a Pass or Fail screen.



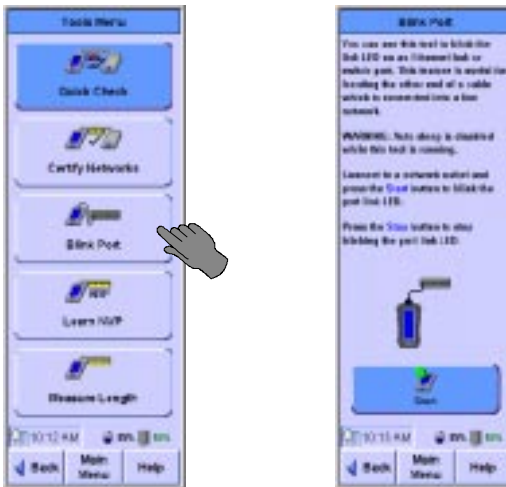
You can save and view details of the test results as with any test by pressing **Details**. See *Saving Test Results*, on page 5-3, and “Viewing Result Details” on page 5.

Blinking the Port

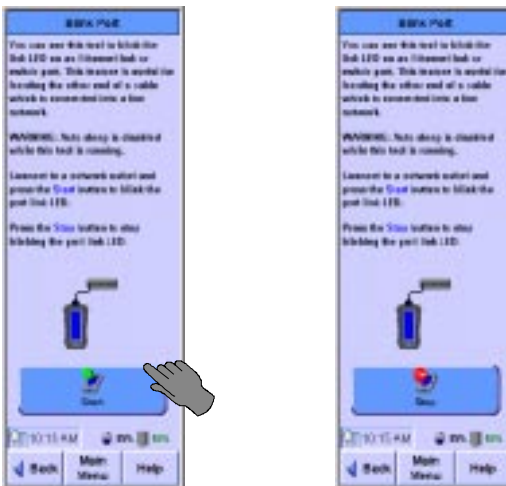
To locate the switch or hub a cable is connected to, the FrameScope 350 can blink the switch or hub port. The technician using the FrameScope at the wall plate end of the circuit blinks the indicator on the panel at the hub or switch end.

To blink the port:

- 1 On the Tools menu (see page -134), press **Blink Port**. The Blink Port screen displays.



- 2 Press **Start**. The port begins blinking, and the **Start** button changes to a **Stop** button.



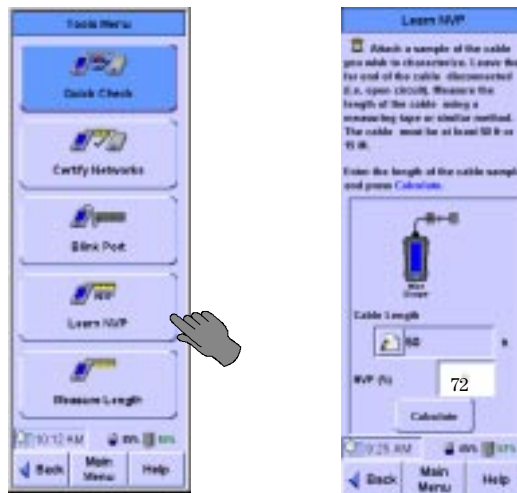
- 3 To stop the blinking, press **Stop**. The blinking stops.

Learning the NVP of a Cable

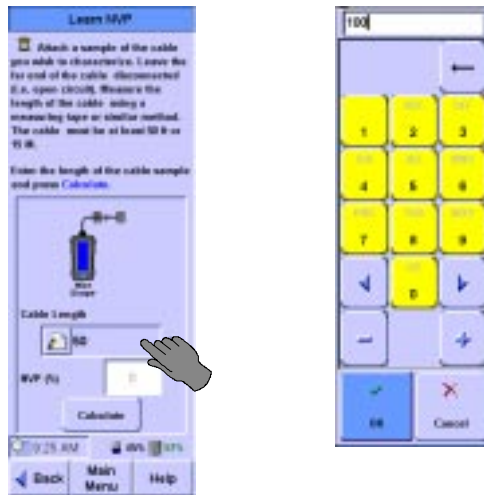
The FrameScope can determine the NVP (Nominal Velocity of Propagation) of a cable, for use in certification testing. NVP is expressed as a percentage of the speed of light. you must use a sample of the cable at least 50 feet (15 meters) long. Longer cable samples produce more accurate results.

To learn the NVP:

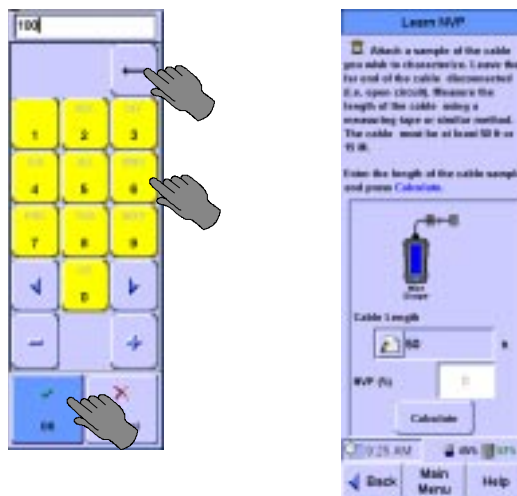
- 1 Measure the length of a sample of the cable.
- 2 Connect the cable sample to the FrameScope. Do not connect the DualRemote.
- 3 On the Expert mode Tools menu (see page -134), press **Learn NVP**. The Learn NVP screen displays.



- 4 Press the Cable Length field. The numeric keyboard opens.



- 5 Press the backspace arrow to erase any value in the number field, then enter the length of the cable sample, in or meters. Press **OK**. The keyboard closes, and the Learn NVP screen displays new number in the Cable Length field.



- 6 Press **Calculate**. The FrameScope calculates the NVP of the sample cable, and displays it in the NVP field.

Measuring the Cable Length

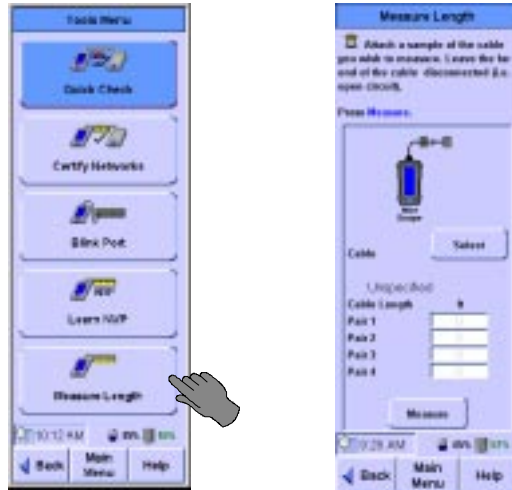
The FrameScope 350 can measure the length of an attached cable if the cable type is in its database.

To measure the length of a cable:

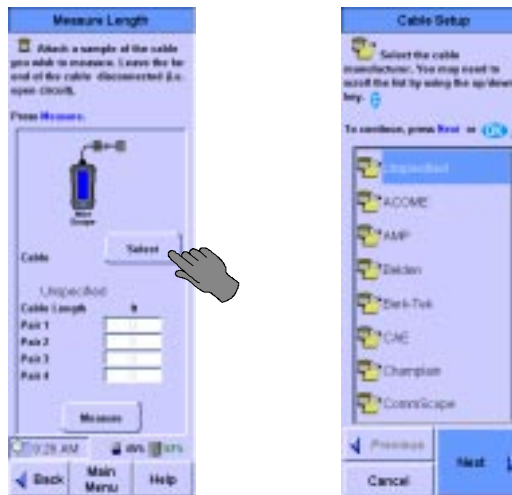
- 1 Connect the FrameScope to the cable. Do not attach the DualRemote.

5 Cable Testing in Expert Mode
The Expert Tools Menu

- 2 On the Tools menu, press **Measure Length**. The Measure Length screen displays.



- 3 Press **Select**. The Cable Setup screen displays.

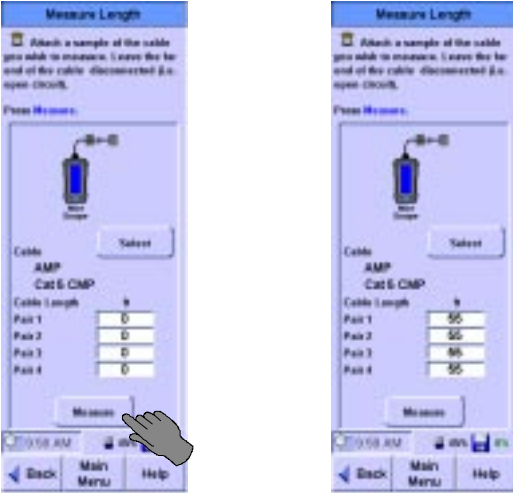


- 4 Select the cable manufacturer, and press **Next**. The Cable Database screen displays.

Note: The reason to select the cable type is that in order for the FrameScope 350 to accurately measure length, it needs the proper NVP value stored with the cable specifications.

- 5 Select a cable on the list, and press **OK**. The Measure Length screen displays, with the selected cable type shown.

- 6 Press **Measure**. The FrameScope calculates the length of the cable, and displays the length of each twisted pair on the Measure Length screen.



Running COAX and TWINAX Autotests

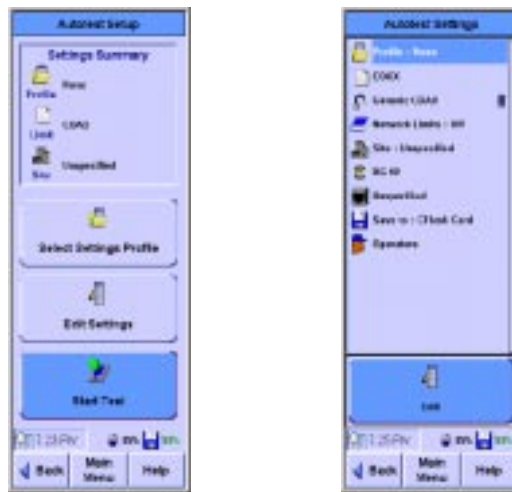
The FrameScope 350 and the DualRemote 350 support both Coaxial and Twinaxial standards. This section will instruct you how to test to these standards.

COAX Testing

Coaxial cable (also called Coax) consists of an insulated central conducting wire wrapped in another cylindrical conducting wire. Both of these wires are encased in an insulating layer and an outer protective layer. Coax is typically used in carrying high-speed data and in CATV.

Testing of coaxial cable checks only for length and cable integrity. Because of this, there is no need to calibrate before the Autotest. Only a subset of the tester settings applies to Coax testing. These settings are shown on the screens below.

- 1 Insert the Coax probe in the FrameScope 350's SmartProbe port and connect it to the coaxial cable to be tested. The FrameScope 350 will automatically detect it and change several settings. There is no need to use the DualRemote 350 in certifying Coax cables. Press the **Autotest** button on the Main Menu to bring up the Autotest Setup screen. Press the **Edit Settings** button to change any settings.



Note: It may be necessary for you to add a new description to the cable database (add name, specify 1 pair for cable pair count, then select Coax; then, either specify the cable's NVP or select Calculate NVP from length; finally, add or select the target performance grade for the cable, if applicable (otherwise, Unspecified)).

- 2 When the Coax probe is inserted a default Coax cable is automatically selected. You can change to a different Coax cable in the Autotest Settings screen.

- 3 The FrameScope 350 is capable of certifying 10Base-2 and 10Base-5 network operation over Coax. By selecting **Other** in the Network Limits of the Autotest Settings screen, or in the Summary screen of the Certify Networks screen, you can enable the certification of these networks.
- 4 Press the **Start Test** button from the Autotest Setup screen to perform the Coax Autotest (or Certify Network test).

Results

The Coax Autotest evaluates length and cable integrity. These results are shown in both the diagram at the top of the screen and the table at the bottom. Delay and NVP information are also shown. The results of coax network certification are also shown in the bottom section of the result screen. Press the **Details** button to display the Wiremap Data screen containing additional information about the test.



Twinax Testing

Twinaxial (also called Twinax) cables are able to carry high frequencies and are most often used for data transmissions and video applications. Twinax consists of one twisted pair and a metallic shield.

Testing of Twinaxial cable checks only for length and cable integrity. Because of this, there is no need to calibrate before the Autotest. Only a subset of the tester settings applies to Twinax testing. These settings are shown on the screens below.

- 1 Insert the Twinax probe in the FrameScope 350's SmartProbe port and connect it to the Twinax cable to be tested. Press the **Autotest** button on the Main Menu to bring up the Autotest Setup screen shown above. When the Twinax probe is inserted a default Twinax

5 Cable Testing in Expert Mode Running COAX and TWINAX Autotests

cable is automatically selected. Press the **Edit Settings** button to change any settings.

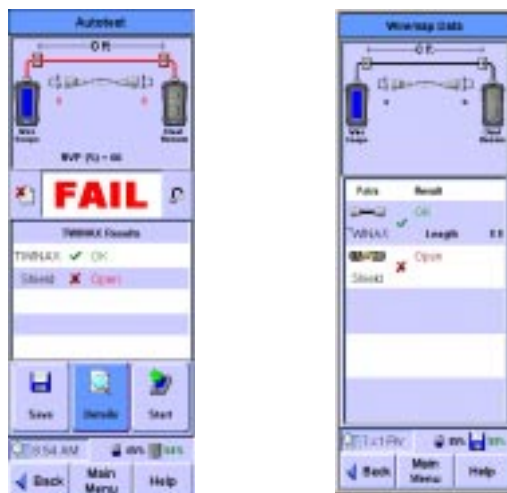


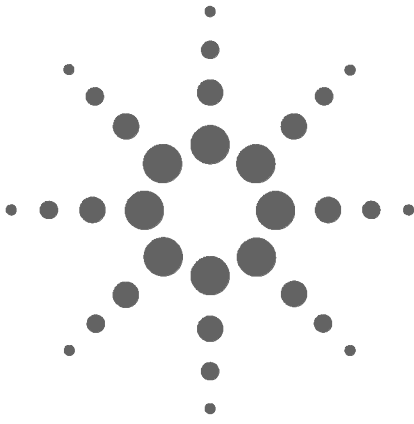
Note: The FrameScope 350 does not specify any networking standards that run on Twinax cable. Any attempt to run a Certify Networks test on a Twinax cable will trigger an error message stating that none of the networks selected are configured to run on this type of cable

- 2 Press the **Start Test** button from the Autotest Setup screen to perform the Twinax Autotest

Results

The Twinax Autotest evaluates length and cable integrity. Twinax cable integrity includes the detection of a properly connected shield. These results are shown in both the diagram at the top of the screen and the table at the bottom. Delay and NVP information are also shown. Pressing the **Details** button shows more information about the test.





6 Expert Fiber Testing

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Measuring Length and Delay	151
Using the Power Meter	151
Using Trace Mode	152
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About Fiber Expert Mode

FrameScope's Expert Mode includes many configuration and testing options not included in the standard test configurations.

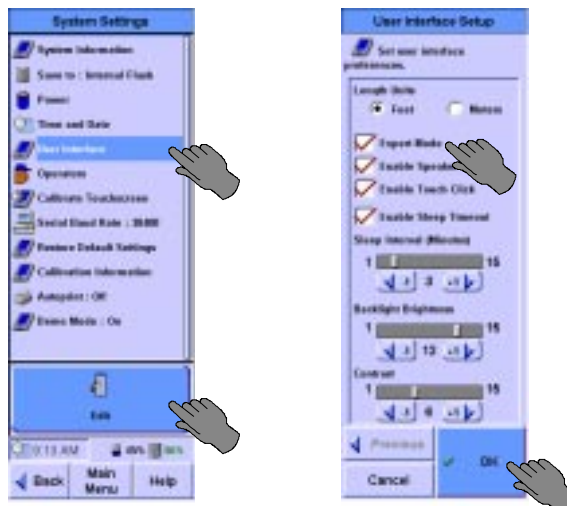
Changing to Expert Mode

To change the FrameScope tester from standard configuration to Expert Mode:

- 1 On the Fiber Main menu, press **System**. The System Settings screen displays.



- 2 On the System Settings screen, press **User Interface**, then press **Edit**. The User Interface Setup screen displays.



On the User Interface Setup screen, press **Expert Mode** to turn it on, then press **OK**. The System Settings screen displays.

Viewing Probe Information

The FrameScope can display details about the probes installed in the tester.

To view detailed information on the installed probes:

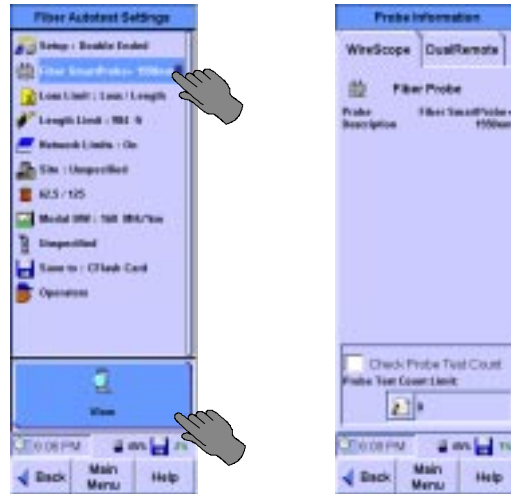
- 1 In Expert mode, press **Fiber Autotest** on the Main Menu. The Fiber Autotest Setup screen displays.



- 2 On the Fiber Autotest Setup screen, press **Edit Settings**. The Fiber Autotest Settings screen displays.



- 3 Press the name of the probe, then **View**. The Probe Information screen displays, with information on the probe installed in the FrameScope.



- 4 To view information on the probe installed in the DualRemote, press the DualRemote tab. The Probe Information screen displays information about the probe in the DualRemote.



The Fiber Tools Menu

The Expert mode Fiber Tools menu contains the following:

- **Loss Meter** This tool continuously measures and reports the loss on connected fiber cables.
- **Length & Delay** This tool measures the length and propagation delay of connected fiber cables.
- **Power Meter** This tool measures the power level reaching the Fiber SmartProbe from a light source connected to the fiber cable.
- **Trace Mode** This activates the transmitter on the Fiber SmartProbe, to verify that light reaches the other end of a connected cable.
- **Learn Fiber NVP** This tool teaches the FrameScope the NVP of a cable sample.

To open the Fiber Tools menu:

- 1 Change to Expert mode. (See *Changing to Expert Mode*, on page -147.)
- 2 On the Expert Mode Main Menu, press **Fiber Tools**. The Fiber Tools screen displays.

Using the Loss Meter

To use the Loss Meter:

- 1 On the Fiber Tools menu, press **Loss Meter**. The Fiber Loss Meter screen displays.



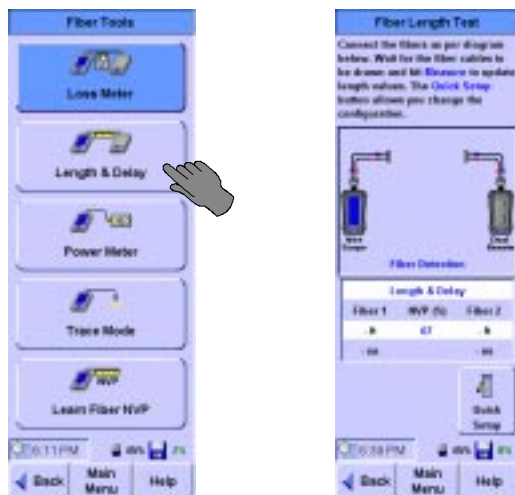
- 2 To clear the values in the data table at the center of the screen, press **Clear Peak**.
- 3 To write the current data table to the results database, press **Save**.

- 4 To select the test configuration or to specify the fiber type, press **Quick Setup**.

Measuring Length and Delay

To use the Length & Delay tool:

- 1 On the Fiber Tools menu, press **Length & Delay**. The Fiber Length Test screen displays. If a valid fiber connection is present, a **Measure** button appears.



- 2 To begin the test, press **Measure**.
- 3 To select the test configuration, fiber type, or NVP, press **Quick Setup**.

Using the Power Meter

To use the Power Meter:

- 1 On the Fiber Tools menu, press **Power Meter**. You may be prompted to calibrate upon entering this tool. This is *not* the same calibration as

the one used for testing. This calibration is just for the Fiber Power Meter. After calibration the Fiber Power Meter displays.

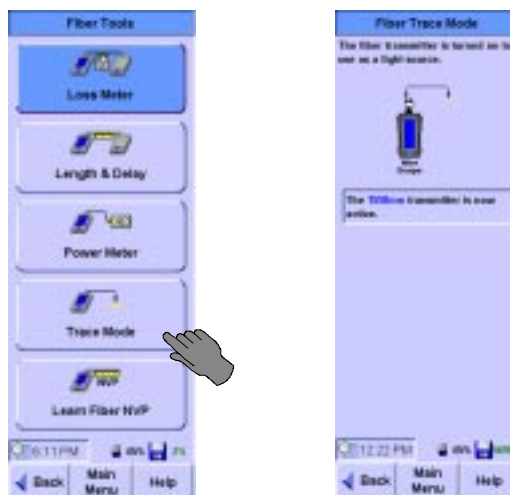


- 2 To set the current power value as a reference, press **Set Reference**. The difference is shown in the Delta field. The actual measurement is shown in the Optical Power field.
- 3 To write the current data table to the results database, press **Save**.
- 4 To calibrate the Power Meter, press **Calibrate**.

Using Trace Mode

To turn on the Fiber SmartProbe's transmitter:

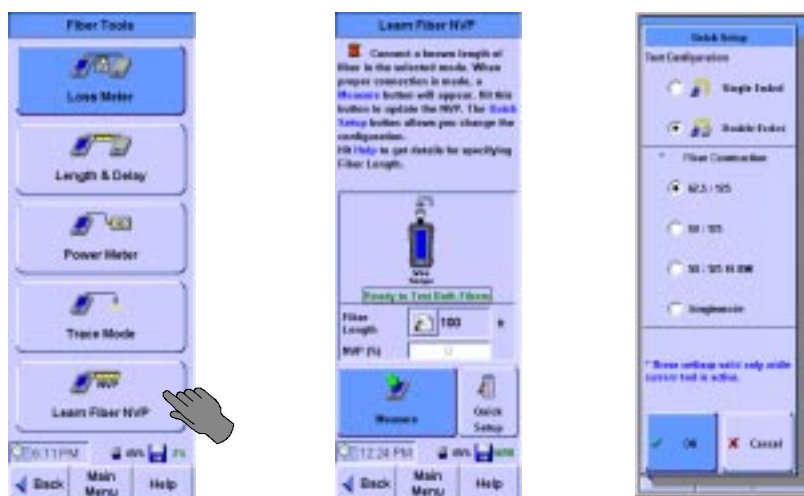
- On the Fiber Tools menu, press **Trace Mode**. The Fiber Trace Mode screen displays and indicates that the transmitter is active.



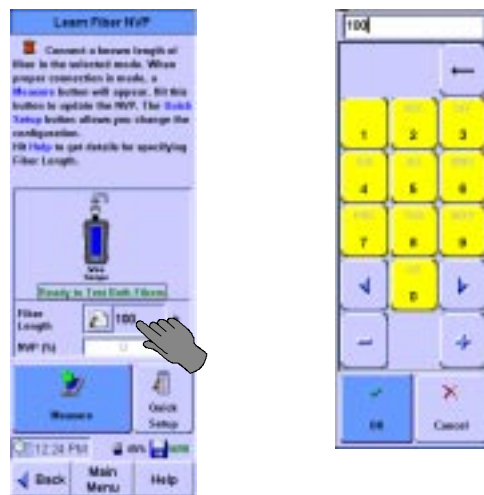
Learning the NVP of a Fiber

To learn the NVP of a fiber cable sample:

- 1 Connect a known length sample of the fiber to the Fiber SmartProbe. The sample must be at least 50 feet (15 meters) long.
- 2 On the Fiber Tools menu, press **Learn Fiber NVP**. The Learn Fiber NVP screen displays. Use the Quick Setup to help configure the cable for single ended or double ended test configuration and to provide fiber construction details prior to the test. You may need to calibrate using the test jumper depending on which test configuration you choose. If you need to calibrate, use the Calibration tool on the Main Menu.



- 3 Press the Fiber Length field. The numeric keyboard opens.

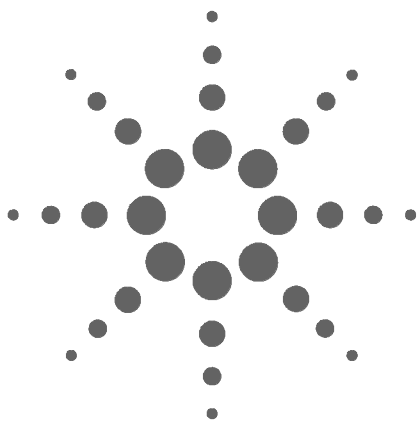


- 4 Enter the length of the sample fiber, and press **OK** to close the keyboard. Make sure to use the correct length units (feet or meters.)
 - When measuring two fibers, enter the average length of the two.

6 Expert Fiber Testing

The Fiber Tools Menu

- When measuring one length of fiber looped back to the FrameScope, enter the entire length of the fiber.
- 5 Press **Measure** to learn the NVP of the fiber sample. The NVP displays in the NVP (%) field of the Learn Fiber NVP screen.



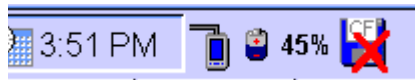
7 System Operations

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This chapter describes the various system operations of the FrameScope 350.



The Status Display Area



The status display shows the current time set on the FrameScope 350, talkset status, battery status, and storage status.

Clock Display

The clock shows the time of day. It can be set in the Time and Date section of the System settings menu.

Network Connection Status



FrameScope icon: When in the Network tab, the FrameScope icon appears. If a red X is shown on the connection, it means the FrameScope is not connected to the network.

Talk Set



Talkset icon: The talkset icon appears when a talkset is plugged in.

Battery/Power Display



Ac Power icon: This icon appears when the ac power adapter is connected to the FrameScope and an ac power source. The number next to the icon is the percent of full battery charge.



Battery Charge icon: When the FrameScope operates using battery power, this icon shows the current battery state. The percentage figure is the amount of charge remaining in the battery.

Storage Status

Storage icon: The storage icon indicates where test results are saved and how full the CF card or internal memory is.



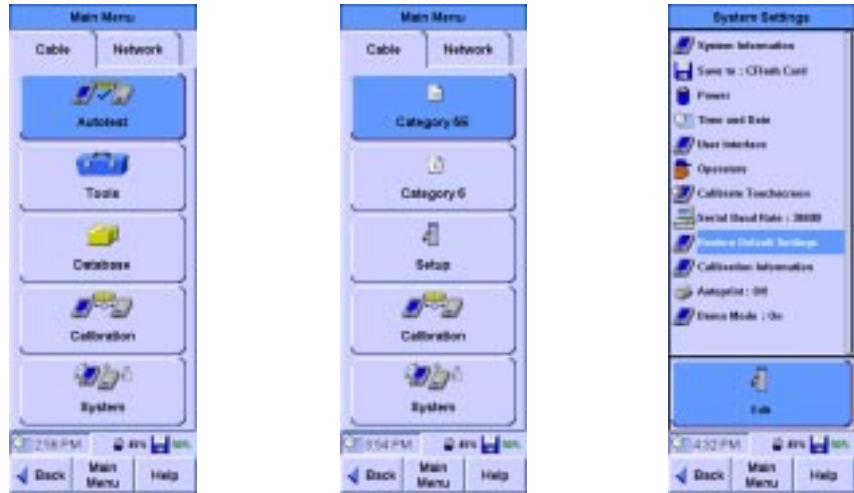
= Results are saved to a compact flash card. In the example, the card is half full. A red X on the icon means that the compact flash card is not installed.



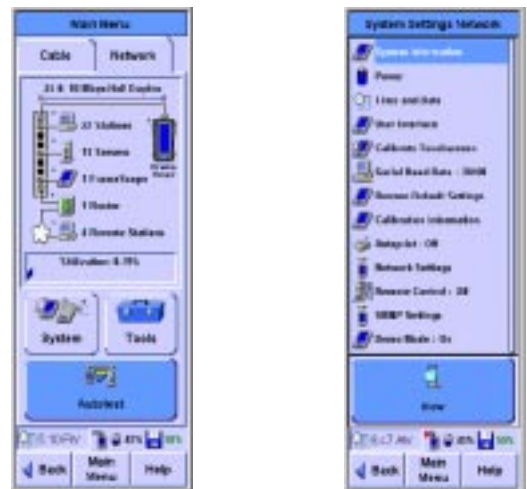
= Results are saved to internal memory. In the example, the internal memory is 65% full.

The System Menu

The FrameScope 350 System Menu is displayed by pressing **System** in either the Cable or Network Main Menu, whether in Expert Mode or not. The Cable tab System Menu:



However, the System Menu has different entries if entered via the Network tab. The Save to: and Operators settings are deleted and Network Settings, Remote Control, and SNMP Settings are added. The Network tab System Menu:



System Information

Pressing **System Information** then pressing **View** on either System Settings menu displays the FrameScope serial number, software and hardware revision numbers. If the DualRemote has been attached and calibrated, it displays the same information for the DualRemote.



Storage Setup

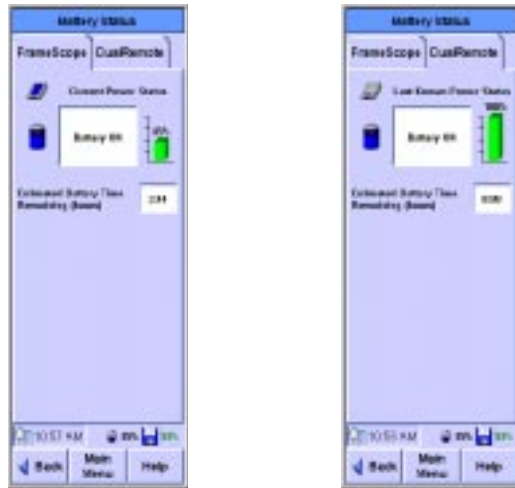
The Network tab requires a CompactFlash card so there are no choices in the Network System Settings.

The Cable tab allows you to select where the test results are stored. Press **Save to:** and then press **Edit**. Choose either the Internal Flash or the CFlash Card.



Battery Status

To view the current battery status press **Power** then press **View**. If the DualRemote is connected and calibrated, both the FrameScope Battery Status and the DualRemote Battery Status are available. The display also shows an estimated remaining battery time.



The DualRemote battery status is updated every time a calibration or test is run. It is not updated in real time.

Time and Date Setup

To set the time and date on the FrameScope, press **Time and Date**, then press **Edit**. The Time and Date Setup screen allows you to set the Month, Day, Year, and Time as well as the display method for each.



User Interface Setup

The User Interface Setup screen is where the following choices are made:

Length Units - Feet or Meters

Expert Mode - ON/OFF (only when accessed from the Cable tab)

Enable Speaker ON/OFF

Enable Touch Click ON/OFF

Enable Sleep Timeout ON/OFF - A screen touch will wake the screen. When enabled the Sleep Interval setting bar is displayed.

Sleep Interval (Minutes) how many minutes (1-15) without a screen touch or button press until the unit goes to sleep.

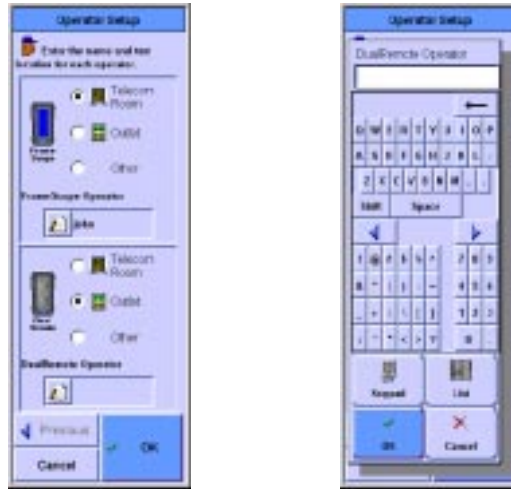
Backlight Brightness Scale of 1 to 15

Contrast Scale of 1 to 15



Operator Setup

In the Cable test mode, you can set the Operators by pressing **Operators** then pressing **Edit**. You can indicate where the operator is for each of the FrameScope and DualRemote and what their name is.



Touchscreen Calibration

If it seems that the FrameScope 350 is not responding correctly to taps on the touch screen, you may need to calibrate the touch screen to bring it into alignment with the underlying display.

To calibrate the touch screen:

- 1 Ensure that you have the stylus available.
- 2 On the Main Menu, press **System**. The System Settings screen displays.
- 3 On the System Settings screen, press **Calibrate Touch Screen**, then press **Edit**. A Calibration screen displays.
- 4 Using the stylus, press the screen where the onscreen instructions direct.



When the calibration is complete, the System Settings screen displays.

An alternate way into the screen calibration menu is:

- 1 Turn the unit on.
- 2 When it has finished booting up, hit the **Scroll** key with the sequence UP-DOWN-DOWN-UP.

This will go directly to the touchscreen calibration window. This method should be used when it appears that normal screen presses are misinterpreted to the point that you can't enter the calibration screen.

Serial Baud Rate Setup

You can specify what serial baud rate the serial port of the FrameScope uses for uploading test records. Press **Serial Baud Rate**; then press **Edit**. On the Serial Baud Rate Setup screen select one of 115.2K, 38.4K, or 19.2K and press **OK**.



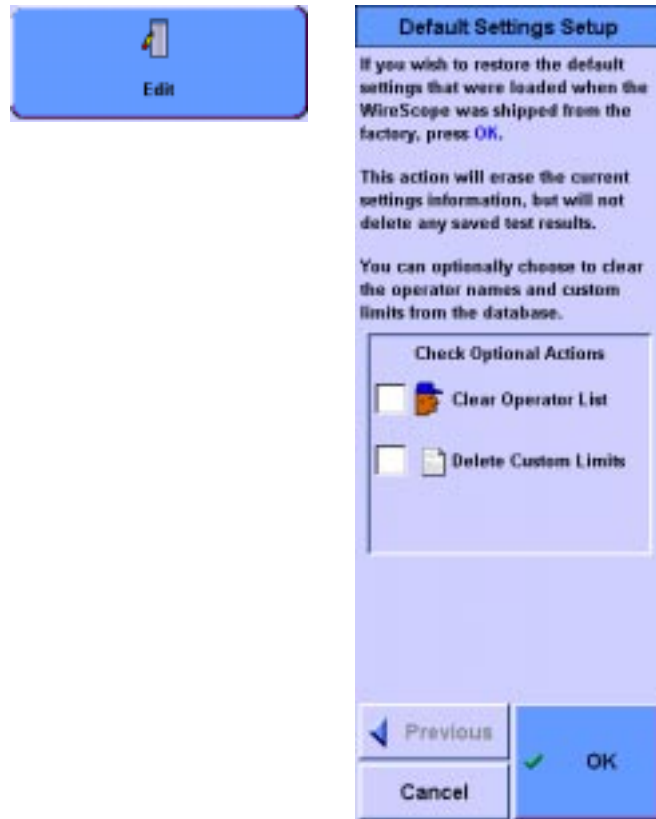
Restore Default Settings

The following procedure describes how to restore the FrameScope 350 to the configuration values that were set when your unit was shipped from the factory.

- 1 From the Main Menu on either the Cable or Network tab, press the **System** button. The System Settings screen is displayed.



- 2 Use the Scroll button to select **Restore Default Settings**.
- 3 Press the **Edit** button or press the **OK** button to call the Restore Defaults screen.



- 4 If you want to clear the Operator List, press the **Clear Operator List** checkbox.
- 5 If you want to clear custom test limits, press the **Delete Custom Limits** checkbox.
- 6 Press **OK** to restore the factory-programmed settings and clear the items you selected in step 4 and step 5.
- 7 Because this will erase any current settings, you are asked to confirm. In the subsequent confirmation dialog boxes press **Yes** to accept the resets. Press **No** to cancel the resets and return to the System Settings screen.

Calibration Information

You may display the calibration information by pressing **Calibration Information** and **View**. The Calibration Information screen displays the factory calibration date for both the FrameScope and DualRemote as well as the last Field Calibration date.

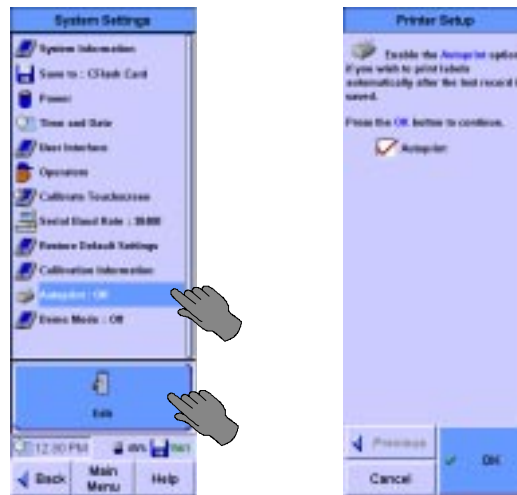


Printer Setup

The FrameScope 350 can print labels directly to a Brady TLS2200 label printer. The labeling parameters are set using the procedure “Choosing the Labeling Format” on page 64. When the FrameScope is configured as described in the following procedure, a label for the tested cable will be printed after saving a test result.

To configure the FrameScope 350 to print to the Brady label printer:

- 1 On the Main Menu, press **System**. The System Settings screen displays.
- 2 On the System Settings screen, press **Autoprint**, then **Edit**. The Printer Setup screen displays.

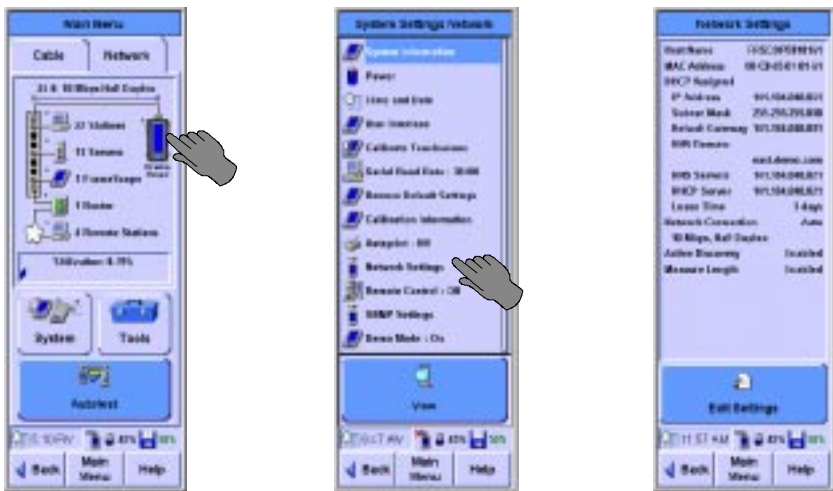


- 3 Press **Autoprint** to enable the Autoprint function. A checkmark shows that the function is enabled.
- 4 Connect the N2605A-050 interface cable to the serial ports of the FrameScope 350 and Brady TLS2200.
- 5 Turn the Brady printer on.
- 6 Press the **Func** and **Exit** keys on the printer simultaneously. This sets the printer to Peripheral mode.

Network Settings

The Network Settings screen shows a summary of the network configuration. This screen may also be accessed by pressing on the FrameScope icon on the right of the Main Menu. This includes the following:

The Network Settings screen can be reached by pressing on the FrameScope Icon on the Network tab Main Menu or by pressing **System** from the Network tab Main Menu and then pressing **Network Settings** and then **Edit**.



The information displayed includes Host Name (FrameScope 350 name, which by default is FRSCOPE plus the last three hex bytes of the MAC address, but it can be changed,) MAC address of the FrameScope 350 (This is a factory setting that identifies FrameScope uniquely among all Ethernet devices.), information assigned by DHCP or manually, Network Connection (Auto or Manual,) and whether Active Discovery and Measure Length are enabled or disabled. To change any of the settings, press **Edit Settings**.

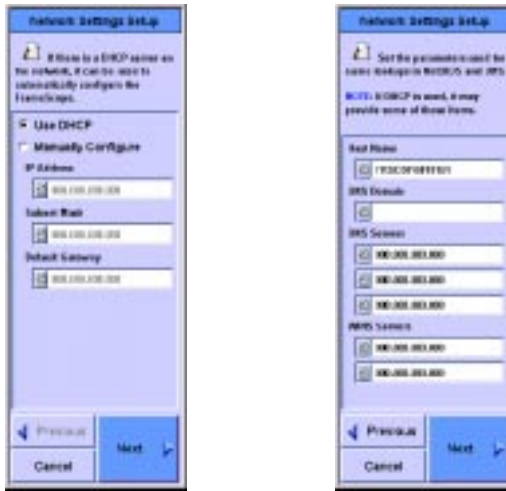
IP Settings The first Network Settings Setup screen allows you to select using DHCP to automatically configure the FrameScope when connected to the network, or to manually configure. If you manually configure, you are required to at least enter a valid IP address and a valid subnet mask.

- IP Address – This value uniquely identifies the FrameScope in the TCP/IP network.
- Subnet Mask – This value is combined with the IP Address to define the subnet to which the FrameScope belongs.

- **Default Gateway** – This is the default gateway (router) the FrameScope will use to communicate with devices on other subnets.

Press **Next** when satisfied with your choices.

The second Network Settings Setup screen allows you to change the Host Name from the default, enter a DNS Domain, and to provide DNS and WINS server addresses.



Host Name This name will be used to identify the FrameScope in NetBIOS and FrameScope protocols. The name defaults to 'FRSCOPE' plus the last 6 hexadecimal digits of the MAC Address. It may be changed to any name desired.

DNS and NetBIOS Settings Devices on the network may be referred to by name. In the Domain Name System (DNS), the FrameScope asks DNS servers to convert the name to an IP address. When NetBIOS names are used, the FrameScope asks WINS servers to convert the name to an IP address. The DNS Domain and the DNS and WINS servers can be learned through DHCP and may be entered manually by the user. If the user enters a DNS Domain, it will be used in place of the DHCP supplied value. If the user enters DNS or WINS servers, they will be used in preference to the DHCP supplied values. When satisfied with all the settings, press **Next** to get the third Network Settings Setup screen.

Network Connection Since network hardware may function at a variety of speeds and modes, the FrameScope has the ability to auto-negotiate its speed and mode when it is connected to the network. The auto-negotiation attempts to configure the devices for the fastest network connection supported. If necessary, the

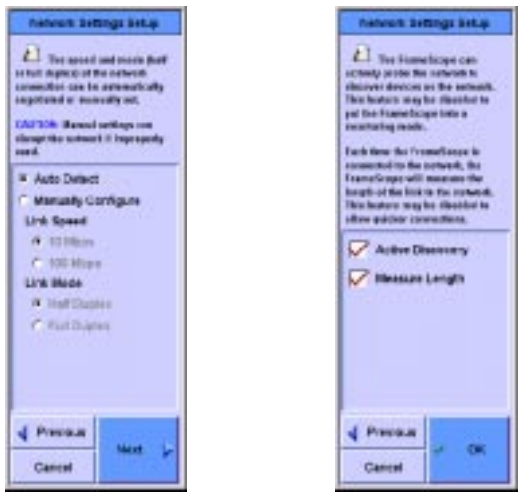
user can manually set the FrameScope for 10 or 100 Mbps and full or half duplex mode. This may be used for instance to prove that a 10/100 switch can properly support the 10 Mbps speed. When satisfied with the settings, press **Next** get the last Network Settings Setup screen.

Active Discovery (Enable / Disable) When the FrameScope is attached to a switch port it only sees broadcast traffic and traffic targeted for the FrameScope. When 'Active Discovery' is enabled the FrameScope requests information from devices on the network to increase the amount of information the FrameScope can learn from the network.

NOTE

Active Discovery will affect the network and, in some cases, will trigger some alarms. Use at your own risk.

Measure Length (Enable / Disable) If 'Measure Length' is enabled, each time the FrameScope is attached to the network, it measures the length of the cable. This step takes approximately 3 seconds. This step can be skipped by disabling 'Measure Length' in the 'Network Settings Setup' wizard. When satisfied, press **OK**.



Remote Control

The FrameScope can be controlled through its web interface. Before this interface can be used, it must be enabled through the Remote Control Setup wizard. This wizard also lets the user choose the level of security which will be used on the web interface. A User Name and a Password may be entered and a Port other than the default (80) may be used. If the Port is changed, then it must be specified when accessing the FrameScope. For instance, if the FrameScope's address is 209.6.108.252, it would normally be accessed with the following URL:

`http://209.6.108.252/`

If the port is changed to 8080, the following URL would be used:

`http://209.6.108.252:8080/`

When the Remote Control settings have changed, the FrameScope must be rebooted to use the new settings.



SNMP Settings

The FrameScope 350 uses the default community “public” and the default port 161 for SNMP access. You may expand the SNMP communities and port numbers to use during active discovery, SNMP queries, and the Locate Switch Tool. Press **SNMP Settings** on the Network System Settings screen then press **Edit**. Enter the additional information and press **OK**.



The image shows a screenshot of the 'SNMP Settings' dialog box. At the top, it has a title bar 'SNMP Settings'. Below the title bar, there is a small icon and a paragraph of text: 'Enter the SNMP communities and port numbers to use during active discovery, SNMP queries and the Locate Switch Tool test. The default community "public" and default port 161 will be used but not from the communities and ports listed here will be tried.' Below this text, there are two sections: 'Community' and 'Port'. Each section has three input fields labeled 1, 2, and 3. At the bottom of the dialog, there are three buttons: 'Previous' (with a left arrow), 'Cancel', and 'OK' (with a right arrow).

Demo Mode

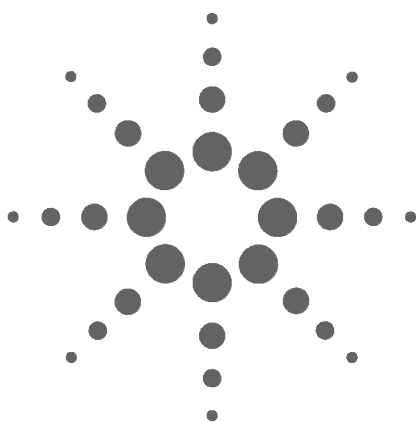
The FrameScope 350 may be put in a Demo mode for training or demonstration purposes. In the Network tab, the Demo mode provides for a network consisting of several stations, servers, a router, two switch/bridges, and 5 SNMP agents. All functions are demoable without connecting to a live network. Autotests of all functions are simulated.

In the Cable tab, the Demo mode provides for a wiremap failure, a cable test failure, and a cable test pass on consecutive Autotests.

The Demo mode may be enabled and disabled by pressing **Demo Mode**: on the System Settings menu from either Network or Cable tab, then pressing **Edit**. When satisfied, press **OK**.



7 System Operations
Demo Mode



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Network Connection

Before the FrameScope 350 is attached to a network, it is constantly checking for a connection. When the FrameScope 350 detects that it has been plugged into a network device it does the following:

- Measures the length of the cable (optional). This feature can be disabled through the Network Settings wizard. After the connection is made, the length of the cable is displayed on the network map on the Main Menu.
- Listens for a link pulse or traffic to determine which cable pairs are being used for transmit and receive. If this operation fails, a dialog pops up informing the user of the error, and the FrameScope 350 continues to listen for a link. This condition usually means that the network device is not turned on, or the connection from the FrameScope 350 to the device is faulty.
- Auto-negotiates wire speed and mode (optional). The user can manually set the speed and mode (half or full duplex) through the Network Settings wizard. The wire speed and mode are displayed on the network map on the Main Menu and on the Network Settings Window.
- Uses DHCP to obtain the following (optional):
 - IP address
 - IP subnet mask
 - Default gateway
 - DNS server
 - NetBIOS node type
 - NetBIOS Name Server (WINS)

The user can manually set these parameters through the Network Settings wizard. These parameters are displayed on the Network Settings Window. If DHCP fails, a dialog pops up informing the user and asking if DHCP should be retried or if the FrameScope 350 should give up. DHCP may fail if the DHCP server is not accessible from the FrameScope 350's connection point or if the DHCP server's security is configured to deny access by unknown devices.

- Test the Default Gateway and the DNS and WINS servers. If any of these devices is not working, an error is recorded in the Error Log. The Default Gateway is tested by ARPing for its MAC address. The DNS and WINS servers are tested by looking up the FrameScope 350's host name.

When all of this has finished, the FrameScope 350 is ready to monitor the network and perform network testing.

NOTE

If the operator directly connects the FrameScope 350 to the DualRemote 350 using just a cable (no hubs or other network devices), the FrameScope 350 detects this condition and switches to cable test mode.

Network Database

The FrameScope 350 listens to the network traffic and actively interrogates network devices 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 CompactFlash™ or may be uploaded to a PC through the web interface.

Station List

The Network Database is organized into the following groups where each station is listed by name, if known, and address:

Local Stations lists stations with any of the following:

- IP addresses on the same subnet as the FrameScope.
- IPX addresses in the same broadcast domain.
- MAC address, but no IP or IPX address.

Remote Stations lists stations with any of the following:

- IP addresses not on the same subnet as the FrameScope.
- IPX addresses on the other side of a router

Servers Lists stations that supply services, grouped by service

Routers Lists stations that advertise routing capabilities or transmit traffic from remote stations.

FrameScopes - Lists other FrameScopes found.

Switches/Bridges Lists stations who support bridge MIBs through SNMP.

SNMP Agents Lists stations who are running SNMP agents.

The operator can get more detailed information about any device by selecting it from one of these lists.

Device Details

The Network Database includes details learned about each device. The detailed information includes the following, where appropriate:

DNS, NetBIOS and SNMP System name

MAC address

Network addresses: IP and IPX

Services provided by the device (DHCP, DNS, etc.)

Protocols used by the device (IP, IPX, etc.)

While the device details are displayed, the following statistics pertaining to the device are also available by pressing the **Statistics** button:

Unicasts, where the % is the percentage of all unicasts

Broadcasts, where the % is the percentage of all broadcasts

Multicasts, where the % is the percentage of all multicasts

Errors, where the % is the percentage of all errors

The FrameScope 350 also provides a set of tools for accessing a device from the detailed view. These tools include:

Ping

Locate Switch Port

Trace Route (IP Only)

SNMP query (IP Only)

MAC Loopback (FrameScope 350 Only)

Active Discovery Process

Active Discovery Query order for FrameScope 350

- 1 Every 60 seconds:
 - Get SNMP name and bridge info
- 2 Done once:
 - Broadcast PING
- 3 Every 600 seconds:
 - Broadcast a DHCP discover message.
- 4 Every 60 seconds:
 - Broadcast a FrameScope announcement (UDP to/from port 52341)

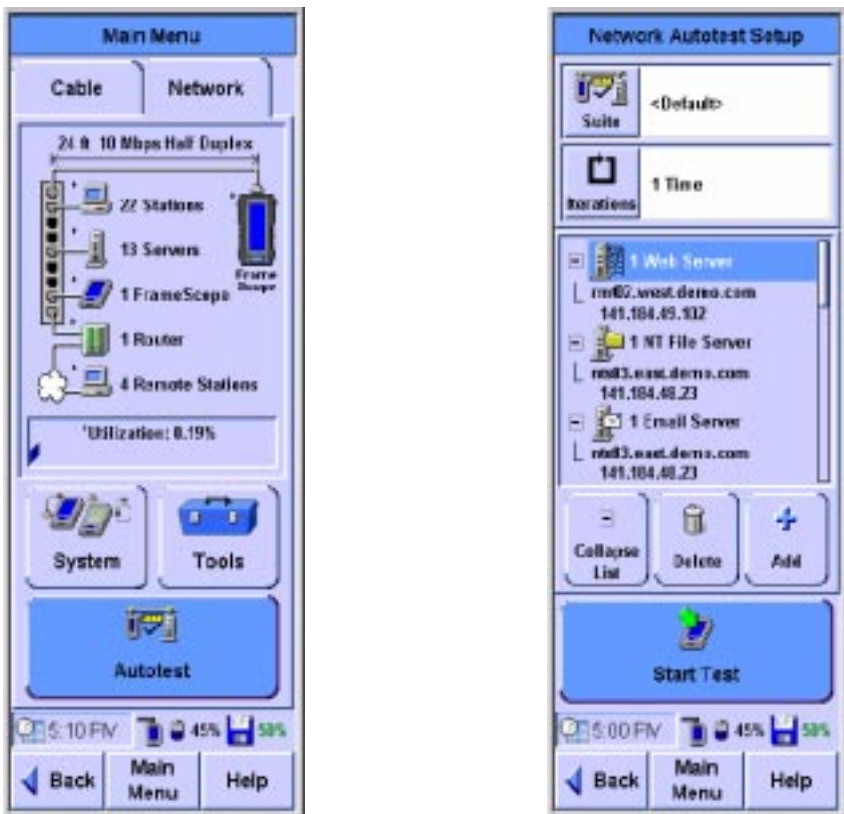
- Broadcast RIP v1 and v2 routing table requests
- 5 Every 300 seconds:
- Send an ARP for each IP address in the subnet range
 - For every ARP response received, send an ICMP echo request
- 6 Every 300 seconds:
- Reset IP services
- 7 Every 30 seconds (and whenever a new IP address is learned)
- Discover IP Services
 - a. Discover Domain Controller
 - b. Discover Domain Browsers
 - c. For each IP station in the station list which has not been probed yet:
 - 1) Query the DNS servers to get the hostname for the IP address.
 - 2) ARP the IP address
 - 3) Start a TCP connect to the LPD port to check for an IP printer server.
 - 4) Use SNMP to request the system name
 - 5) Use SNMP to request the subnet mask
 - 6) Start a TCP connect to the HTTP port to check for a web server
 - d. For each MAC in the station list
 - 1) Mark as router any MAC that has more than one IP address associated, one of which is marked as remote
- 8 Every 60 Seconds:
- Broadcast an IPX SAP Request

Network Performance Autotest

The Autotest is used to measure connectivity and response time of important network resources. Each network resource is tested using target-specific access methods to communicate with these resources.

Autotest Setup

The Autotest Setup screen can be reached by pressing on the **Autotest** button on the Network tab Main Menu.



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, one 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 boots up with the <Default> suite selected. When the <Default> suite is selected, the FrameScope automatically creates an Autotest suite from the servers listed in the Network Database.

Editing Tests

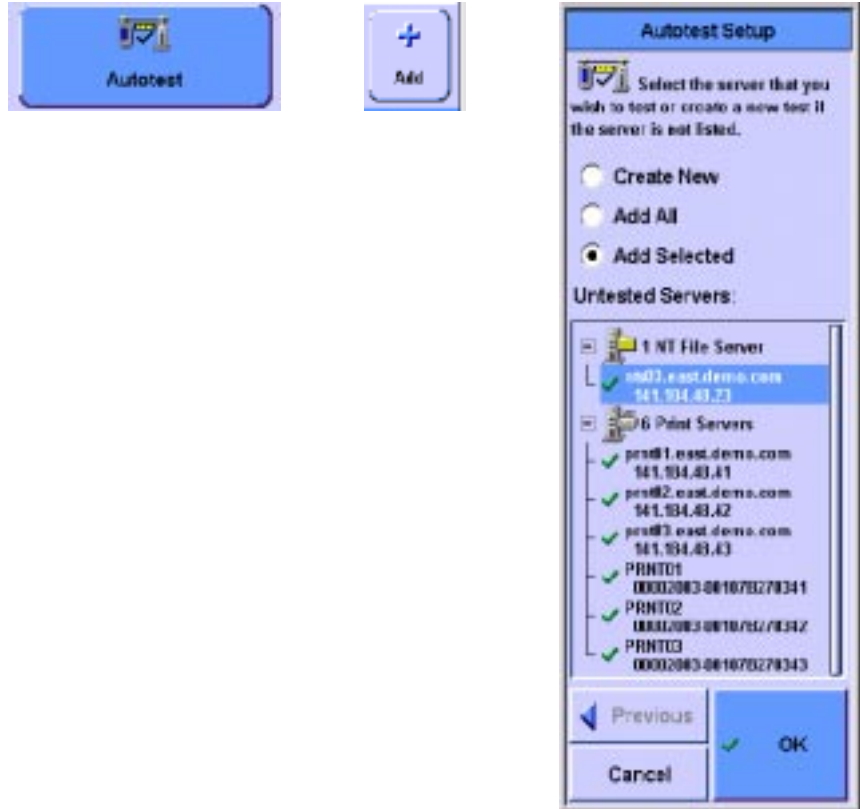
Each test has parameters that specify the test's behavior and coverage. For instance, there is a well-known port for web servers to listen on, but a web server may have been configured to listen at a different port. So, the port number is provided as a parameter with the well-known port number as the default. User names and passwords are also included as parameters for tests that can provide extra coverage by logging in to a server. The extra coverage may include reading a file or retrieving E-mail. Each server has a default test that can be performed without the user providing any set up information so that a new test can be configured with minimal effort. After selecting a specific name or address, the **Edit** button starts up a wizard which allows the test's parameters to be modified. See 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 when the **Delete** button is pressed, the test is removed from the Autotest suite. If a heading such as **6 Print Server** is selected, all of the print server tests will be removed from the suite.

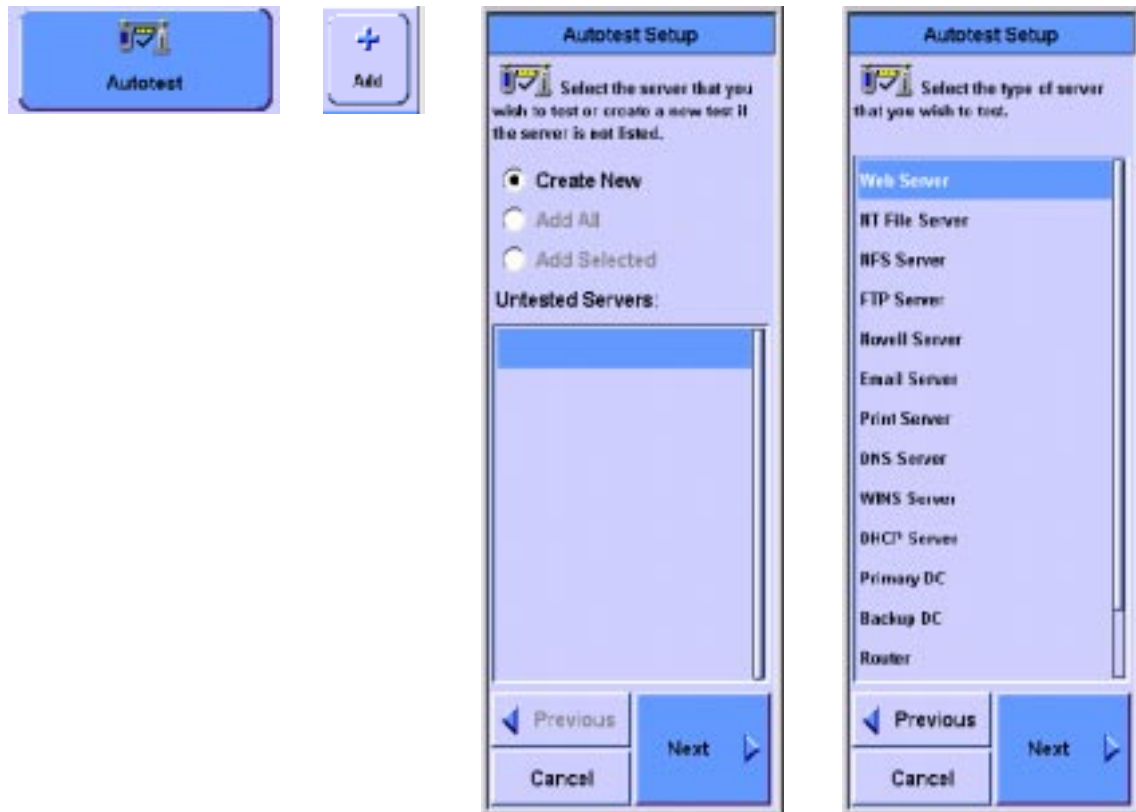
Adding Tests

The Add button will start up a wizard which is used 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**. One of these tests may be added to the Autotest suite by selecting the test and pressing **OK**. All of these tests may be added to the suite by pressing the **Add All** radio button and pressing **OK**.

Another way to add a test to the suite is to press the **Create New** radio button and press **Next**.



- 1 A list of test types is presented on the next screen.
- 2 Select the type of test and press Next.
- 3 Test specific parameters may be edited on the next screens as discussed below under each test heading.

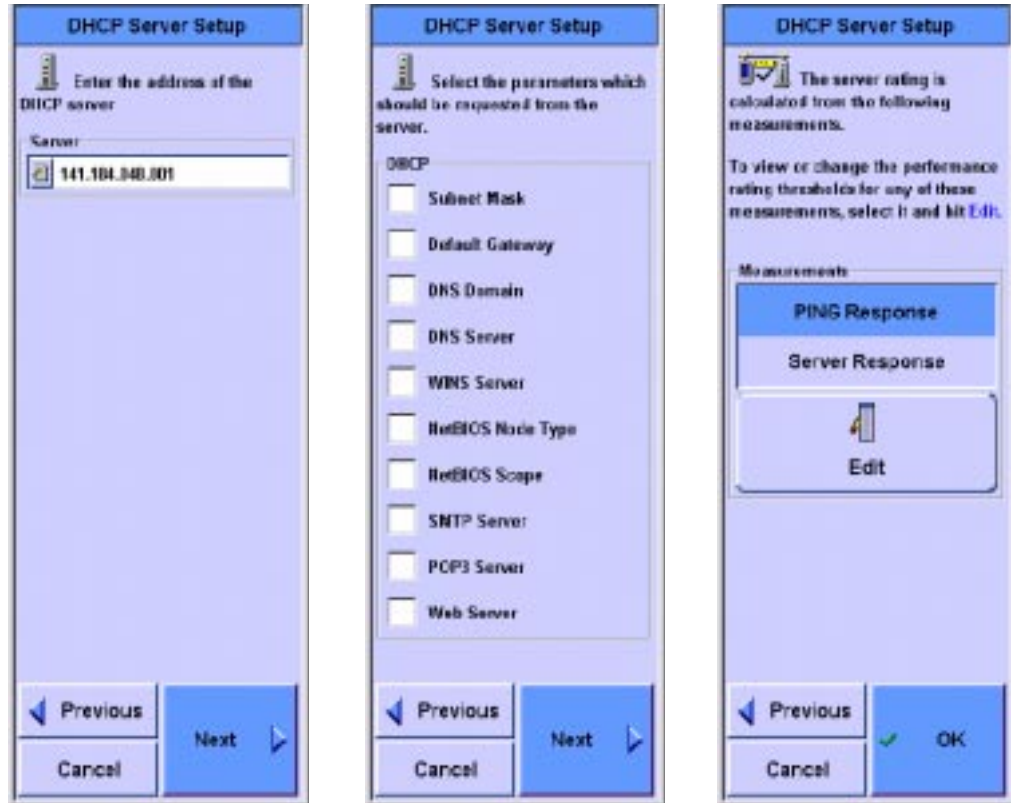
DHCP Server

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 would be checked for all of the requested information.

Setup

The IP address of the DHCP Server to test is entered on the first DHCP Server test setup screen. All DHCP responses received during this test are compared against this address to verify that responses are being received from this server. The next setup screen is used to specify which optional items should be

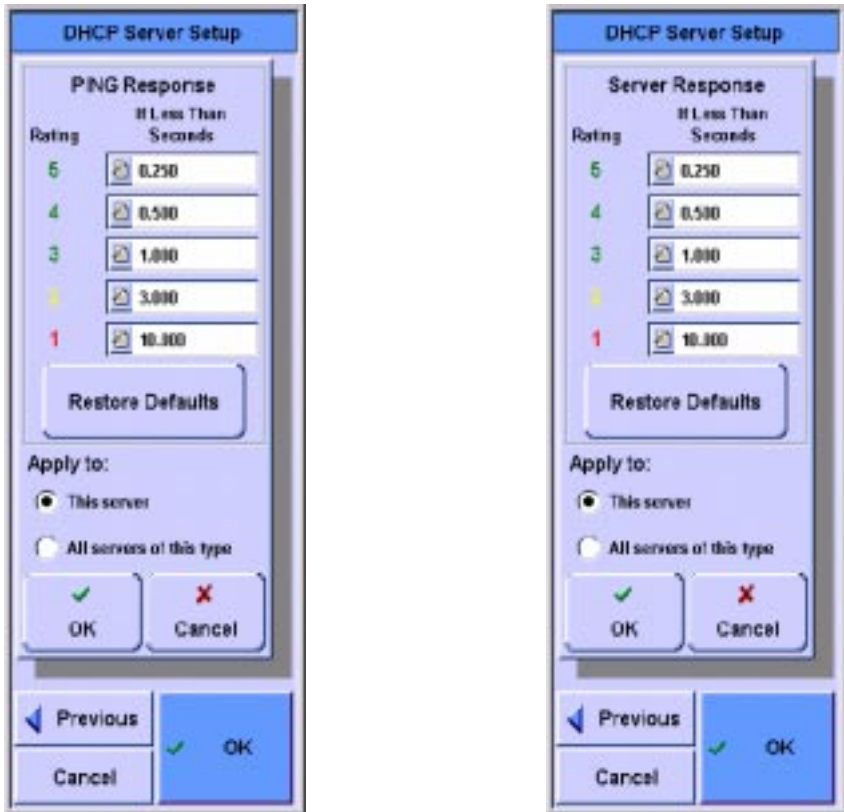
requested from the DHCP Server. The last setup screen provides a list of the measurements performed during this test.



Any of the thresholds used to rate the performance of each of these measurements may be viewed and modified by selecting it from this list and selecting Edit. The measurements taken during this test are:

PING Response The time it takes to perform an ICMP Echo test on the server.

Server Response The total time for negotiating for an IP address from the DHCP Server



DNS Server

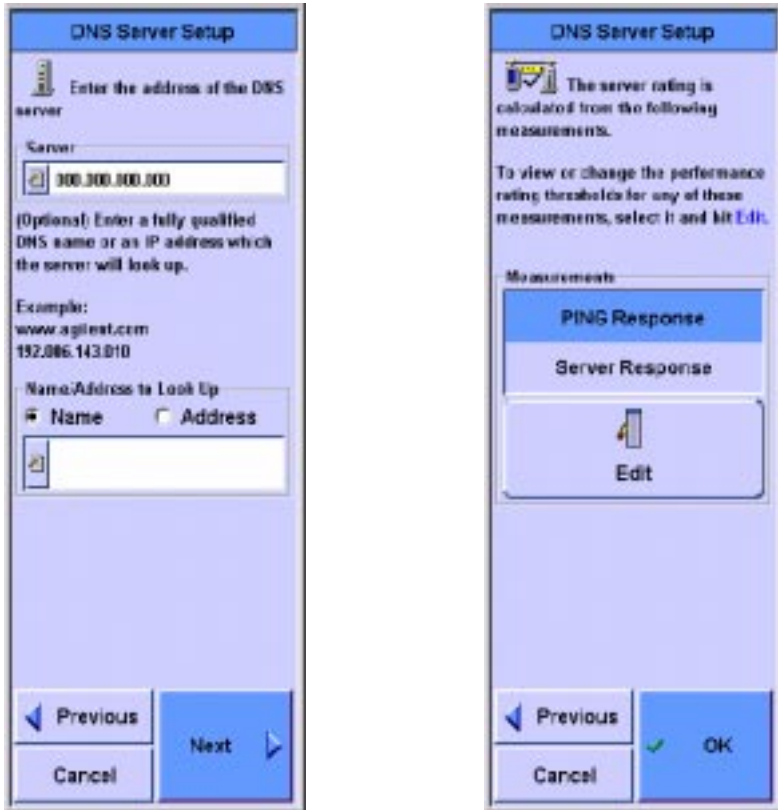
The DNS Server test verifies that the server can look up a name or an IP address.

Test Setup

The first setup screen is used to enter the IP address of the DNS server to test and to enter 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 the measurements performed during the test. Any of the thresholds used to rate the performance of each of these measurements may be viewed and

modified by selecting it from this list and selecting Edit as shown in the DHCP server.



The measurements taken during this test are:

PING Response The time it takes to perform an ICMP Echo test on the server.

Server Response The request/response time for converting a name or address into an address or name.

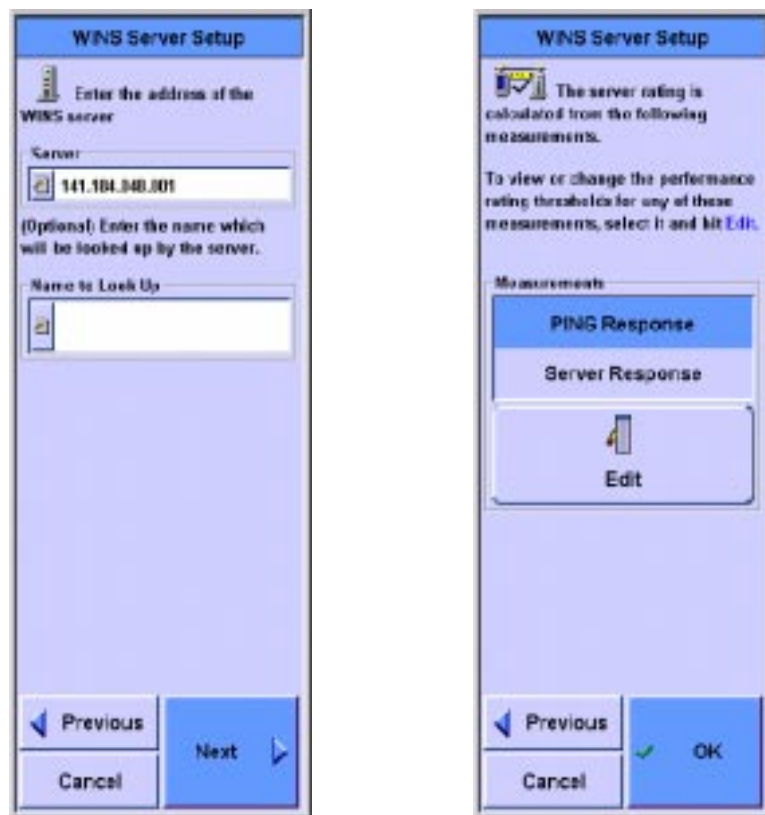
WINS Server (NetBIOS Name Server)

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 enter the IP address of the WINS server to test and to enter the name that will be sent to the WINS server in the request.

The last setup screen provides a list of the measurements performed during the test. Any of the thresholds used to rate the performance of each of these measurements may be viewed and modified by selecting it from this list and selecting Edit as shown in the DHCP server.



The measurements taken during this test are:

PING Response The time it takes to perform an ICMP Echo test on the server.

Server Response The request/response time for converting a name into an address.

NT File Server

NFS File Server

The file server tests provide the following basic operations:

- Check server availability by logging-in to the server or with a partial log-in if a username and password are required for log-in but have not been provided by the user.
- The following operations are optional. If any of these operations is requested, the user must enter the full path name to the file (or directory) on the server:
 - Log in to the server.
 - Read from an existing file.
 - Write to, read from, and delete a file.

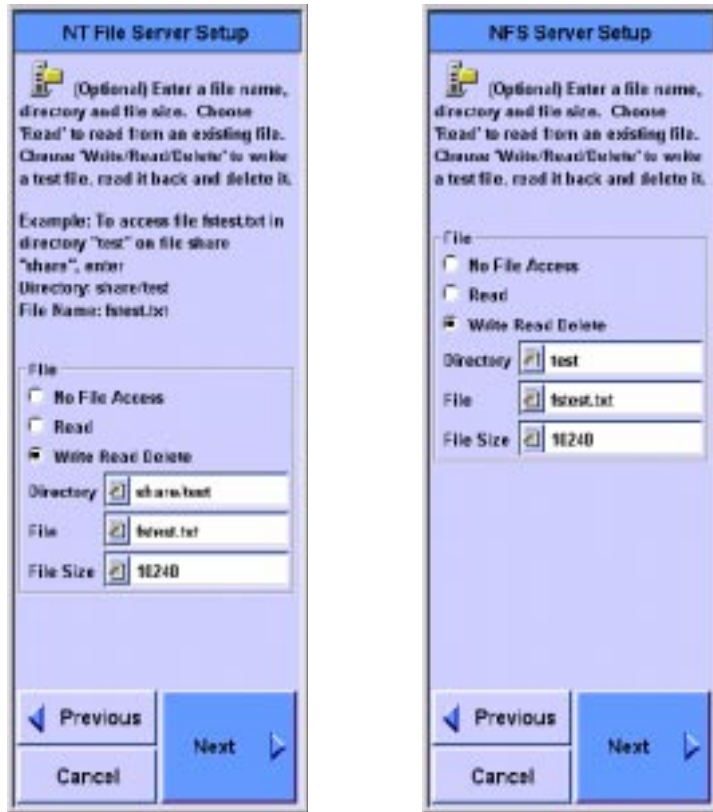
Test Setup

The first file server setup screen requests a name or address as well as login information needed to access the server.

The screenshot shows the 'NT File Server Setup' dialog box. It has a blue title bar and a light blue background. At the top, it says 'Enter the address of the NT file server:'. Below this is a 'Server:' label and a text input field containing '300.300.300.300'. There are two radio buttons: 'Name' (unselected) and 'Address' (selected). Below this is the text '(Optional) Enter a user name and password to allow file accesses.' followed by a 'User:' label. There are two text input fields: 'User Name' and 'Password'. At the bottom, there are four buttons: 'Previous' (with a left arrow), 'Next' (with a right arrow), 'Cancel', and 'Next' (with a right arrow).

The screenshot shows the 'NFS Server Setup' dialog box. It has a blue title bar and a light blue background. At the top, it says 'Enter the address of the NFS server:'. Below this is a 'Server:' label and a text input field containing '300.300.300.300'. There are two radio buttons: 'Name' (unselected) and 'Address' (selected). Below this is the text '(Optional) Enter a user ID or group ID and password to allow file accesses.' followed by a 'User:' label. There are three text input fields: 'UID' (containing '0'), 'GID' (containing '0'), and 'Machine'. At the bottom, there are four buttons: 'Previous' (with a left arrow), 'Next' (with a right arrow), 'Cancel', and 'Next' (with a right arrow).

The next setup screen allows selection of the file actions to be tested.



The last setup screen provides a list of the measurements performed during the test. Any of the thresholds used to rate the performance of each of these measurements may be viewed and modified by selecting it from this list and selecting Edit. Note that the scroll bar on the right of the screen only shows the

location of the screen shown. Use the Scroll rocker to scroll through the list. The time responses are modified as shown in the DHCP server.



The measurements taken during this test are:

Name Lookup The request/response time for converting a name into an address.

PING Response The time it takes to perform an ICMP Echo test on the server.

Connect Time/Mount Time The time it takes to connect to the NT file server, or mount the NFS server.

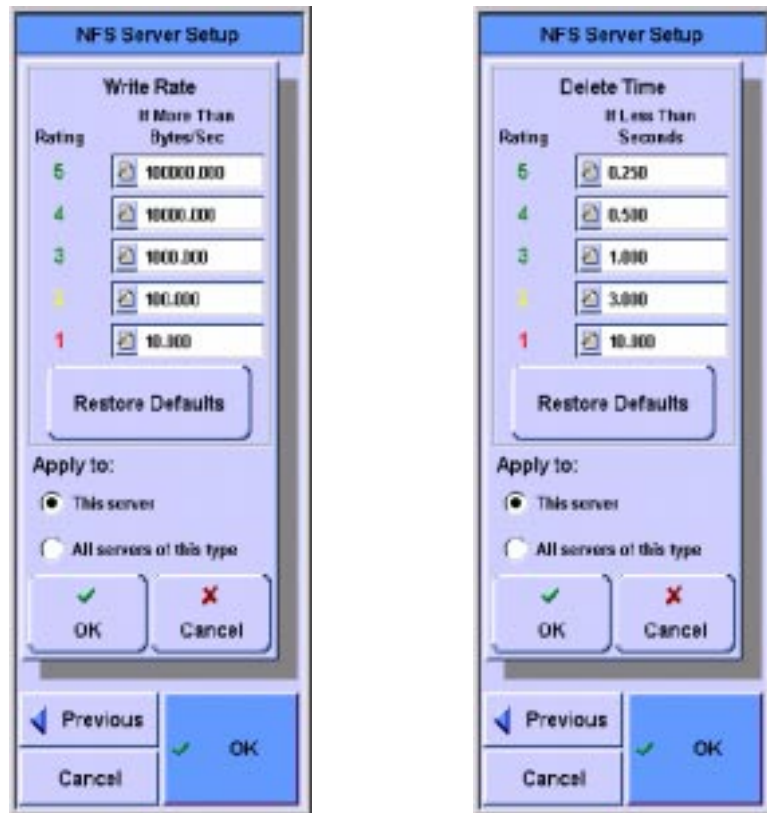
Write Rate The bytes per second rating of the write operation.

Read Rate The bytes per second rating of the read operation.

Delete Time The time it takes to delete the file.

Disconnect Time The time it takes to disconnect from the file server.

Examples of modifying rates and time are shown below:



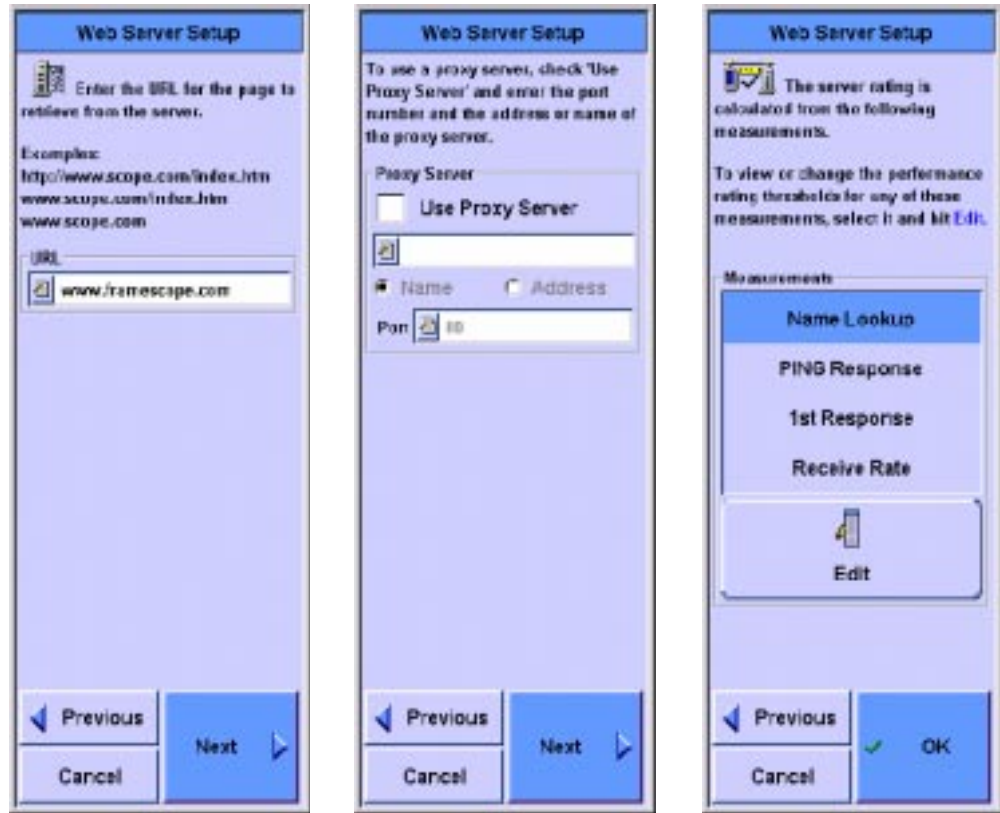
Web Server

The Web Server test verifies that server is accessible and measures the download time of the first get operation.

Test Setup

The first setup screen is used to enter the URL of the web server to test. The second setup screen provides an opportunity to request a proxy server and to name it. The last setup screen provides a list of the measurements performed during the test. Any of the thresholds used to rate the performance of each of these

measurements may be viewed and modified by selecting it from this list and selecting Edit.



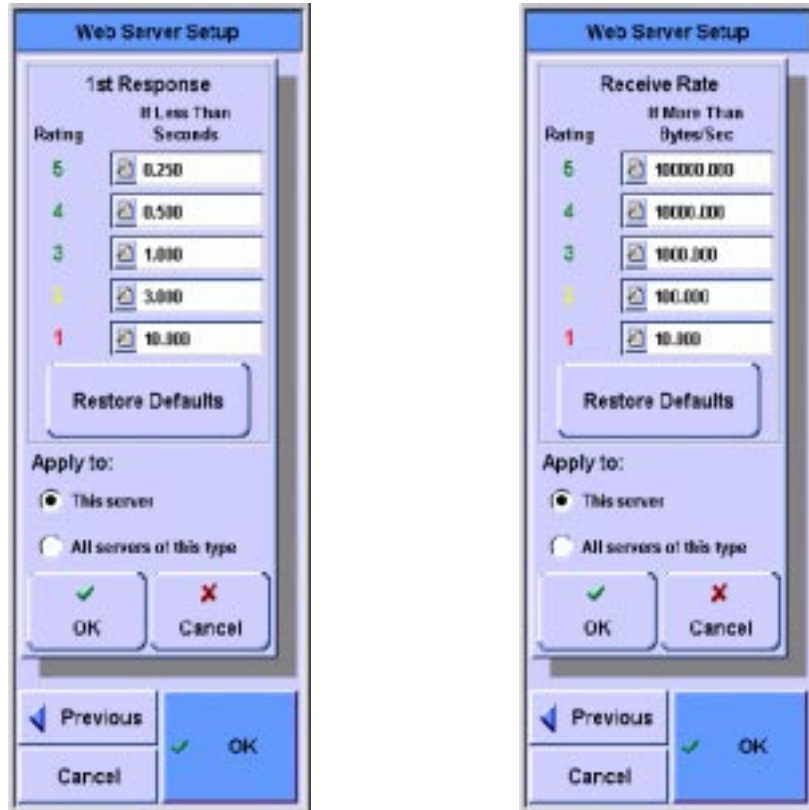
The measurements taken during this test are:

Name Lookup The request/response time for converting a name into an address.

PING Response The time it takes to perform an ICMP Echo test on the server.

1st Response The time it takes to acknowledge the GET command.

Receive Rate The rate in bytes per second for the download of the first data in response to the get command.



E-mail Server

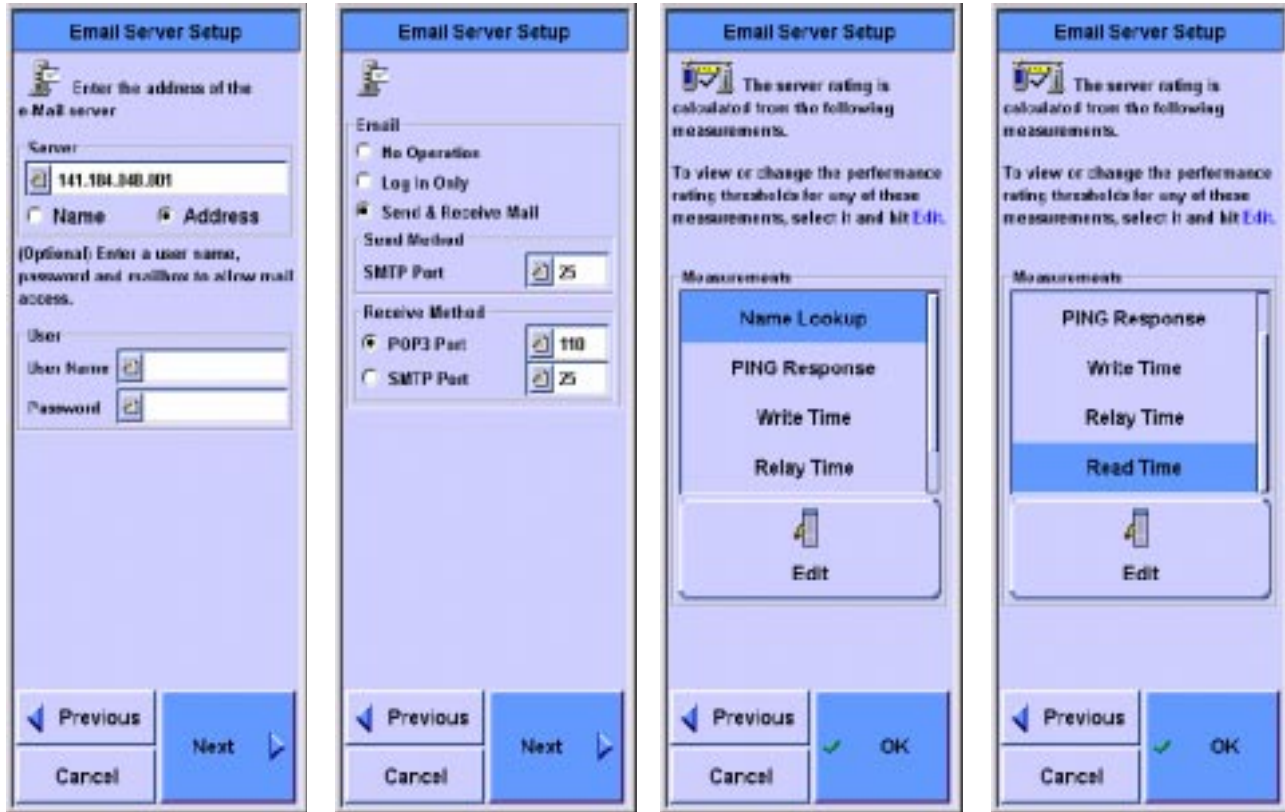
The E-mail Server test verifies that the E-mail server is accessible and measures the access time and download rate of E-mail.

Test Setup

The first setup screen is used to enter the name or address of the E-mail server and enter the user name and password, if desired. The second setup screen is used to enter the operations to be tested and the send and receive methods as well as the ports used. Default port addresses are provided

The last setup screen provides a list of the measurements performed during the test. Any of the thresholds used to rate the

performance of each of these measurements may be viewed and modified by selecting it from this list and selecting Edit.



The measurements taken during this test are:

Name Lookup The request/response time for converting a name into an address.

PING Response The time it takes to perform an ICMP Echo test on the server.

Write Time The time it takes to write to the server.

Relay Time The time it takes to relay through the server and be available to read.

Read Time The time it takes to read the E-mail using either POP3 or SMTP.

These times may all be modified by selecting the measurement and pressing **Edit**.

Novell Server

Print Server

FTP Server

SNMP Agent

Primary Domain Controller

Backup Domain Controller

Router

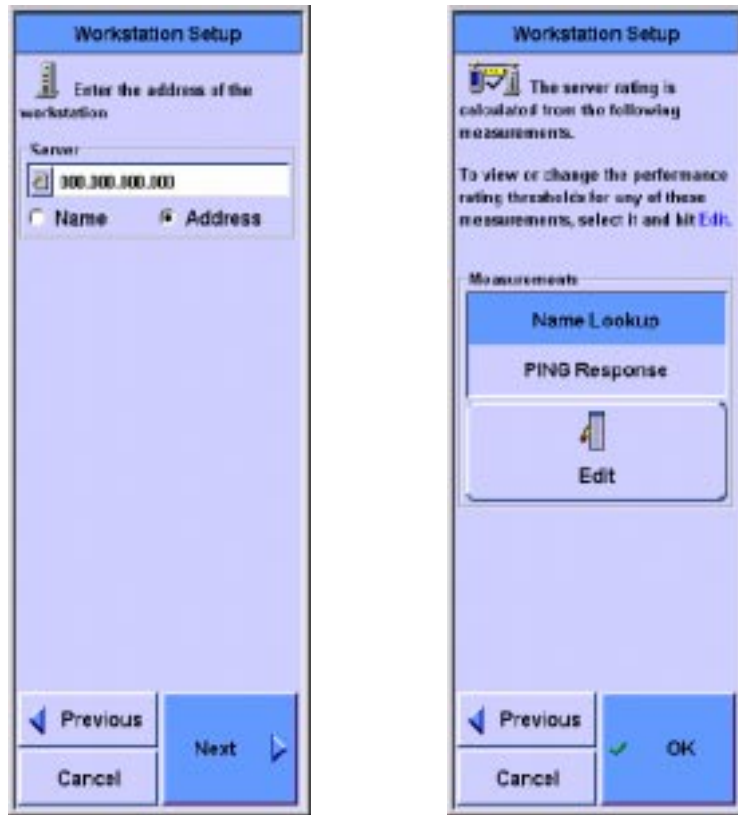
Workstation

These tests verify that the named device is accessible and measures the name lookup time and the ping response time.

Test Setup

The first setup screen is used to enter the name or address of the device to be tested.

The last setup screen provides a list of the measurements performed during the test. Any of the thresholds used to rate the performance of each of these measurements may be viewed and modified by selecting it from this list and selecting Edit.



The measurements taken during all these tests are:

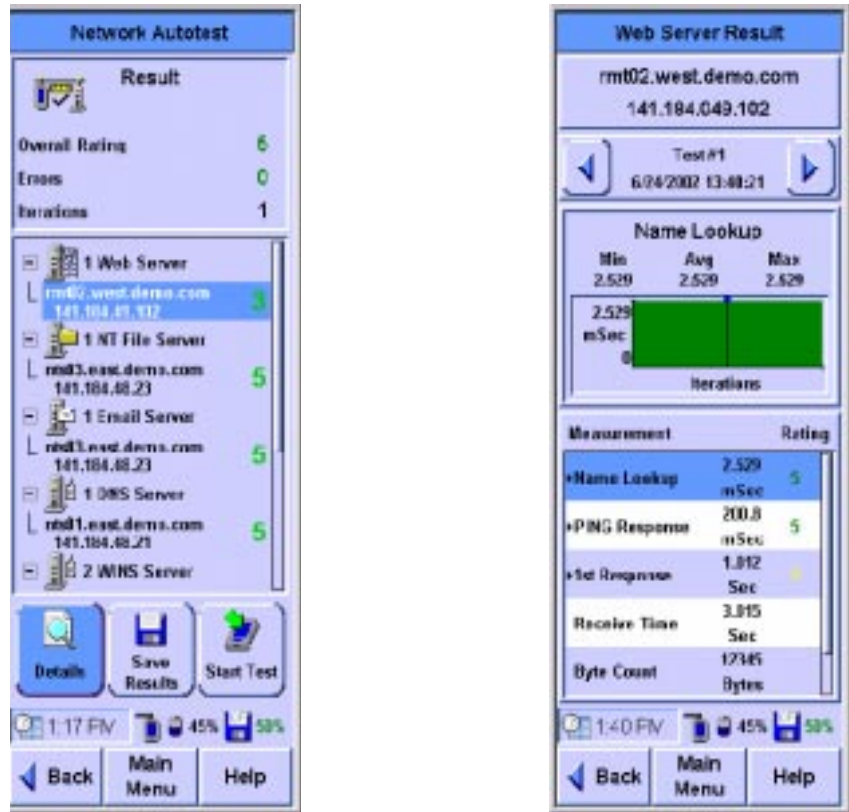
Name Lookup The request/response time for converting a name into an address.

PING Response The time it takes to perform an ICMP Echo test on the device.

Autotest Results

While the test is running, the overall status of each server test is displayed. As each test completes, it is given a performance metric. When all of the tests are completed, the overall performance metric is calculated and presented to the user. Details about each test result may be viewed. As an example of the details available, a web server test may require a DNS

lookup, a PING response, a first response, and a page read operation. The status and time for each of these operations is presented in the detailed view.



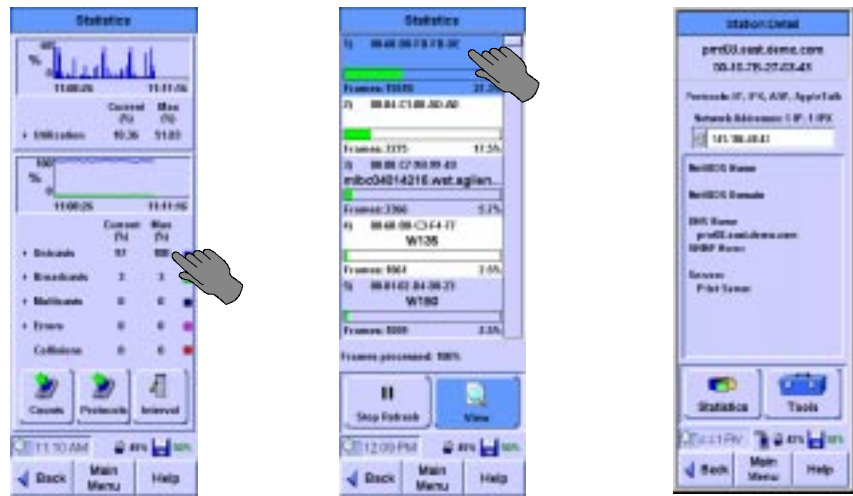
The Autotest may be left running in a loop with a programmable delay between each iteration of the autotest. This feature may be used to find problems that may only occur at certain times of the day. In this case, the response times for each test are recorded and the current, average, minimum and maximum response times for each test are displayed after each test. When the autotest is finished, the response times for any test may be plotted.

Statistics

The first view into statistics provides the overall network health. The operator can drill down into the statistics to get more and more detailed information. Some of the more detailed information is gathered by software that may not have enough bandwidth to process 100% of the frames. So a value is presented for the percent of frames processed in these cases.

Overall Statistics

The current and maximum values of each statistic are displayed. Graphs of the 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 last 5 minutes in detail up to the last 24 hours with less detail. The operator can get more information about any of these statistics by selecting it.



Utilization Utilization values are displayed as percent of total network bandwidth. Pressing this statistic switches to a list of Top Transmitters.

Unicasts The number of unicast frames or the percent of the utilization used up by unicast frames. Pressing this statistic switches to a list of Top Unicast Transmitters.

Multicasts The number of multicast frames or the percent of the utilization used up by broadcast frames. Pressing this statistic switches to a list of Top Multicast Transmitters. Pressing any of the Top Transmitters brings up the Station Detail screen for that station.

Broadcasts The number of broadcast frames or the percent of the utilization used up by broadcast frames. Pressing this statistic switches to a list of Top Broadcast Transmitters. Pressing any of the Top Transmitters brings up the Station Detail screen for that station.

Errors The number of frames with errors or the percent of the utilization used up by frames with errors. Pressing this statistic switches to the Error Mix. Pressing on one of the Error Mix, will switch to a list of the Top Transmitter of that error type. Pressing any of the Top Transmitters brings up the Station Detail screen for that station.

Collisions The number of collisions or the percent of the utilization used up by collisions.

Top Transmitters

A list of stations, sorted by a specific statistic is displayed. The statistic used for sorting is set when the list is created. For instance, if the user enters the Top Transmitters by pressing the Jabbers statistic in the Statistics screen the Top Jabber Transmitters is displayed. Pressing any of the Top Transmitters brings up the Station Detail screen for that station.

Error Mix

Long Frames Any frame over 1518 bytes with a valid CRC and alignment. Pressing this statistic gets you to the Top Long Frame Transmitters.

Short Frames Any frame under 64 bytes long with a valid CRC and alignment. Pressing this statistic gets you to the Top Short Frame Transmitters.

Jabbers Any frame over 1518 bytes with a CRC or alignment error. Pressing this statistic gets you to the Top Jabber Transmitters.

CRC/Alignment Errors Any valid sized frame with a CRC or alignment error. Pressing this statistic gets you to the Top Transmitters with an invalid CRC or alignment.

Protocol Mix

Pressing the protocol gets you to the Top Transmitters of that protocol. Pressing any of the Top Transmitters brings up the Station Detail screen for that station.

- IP
- IPX
- ARP
- RARP
- Banyan
- DECnet
- SNA
- AppleTalk
- NetBIOS
- Spanning Tree
- Other

Network Tools

Ping

The Ping tool is used to verify 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 there was no response.

This tool may be run in IP or IPX mode. The IP Ping sends ICMP Echo frames to the target device. The IPX Ping can use either 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 entered as a name or address. If an IP device is specified by a name, DNS and WINS are used to translate the name into an IP address. Names in 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 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 tells routers along the path that this frame should not be divided into smaller fragments.

Trace Route

The Trace Route tool is used to determine the route taken to a remote device. A list of routers found along the path to the remote 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:

Remote device IP address The remote device may be selected from a list or entered as a name or IP address. If the device is specified by a 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 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. SNMP is used to look for switches in the network. Each of these switches are probed to see if the device shows up in the switch's tables. All of the switch ports which are mapped to the devices MAC address are displayed. There is no order to the list for multiple results, so you cannot interpret the results as a direct path.

MAC Loop-back

The MAC Loop-back tool measures frame loss, delay and delay variations across an Ethernet network. The test requires the use of a remote FrameScope connected through hubs or switches. This test 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 the user specified 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 64-1518 unless long or short frames are specified. If the Short Frames box is checked, the frame size ranges from 40-63. If the Long Frames box is checked, the frame size ranges from 1519-5000.

Frame Rate The rate at which frames are transmitted by the FrameScope. Changing the Frame Rate causes the Utilization to be recalculated.

Utilization The percent of the Ethernet bandwidth which the FrameScope should fill up. This value ranges from 0 which causes no frames to be transmitted to 100 which causes the FrameScope to completely load the network connection. Changing the Utilization causes the Frame Rate to be recalculated.

Frames or Continuous Specifies the number of frames the FrameScope should generate when the **Start** button is pressed. If **Continuous** is selected, the FrameScope begins generating frames when the **Start** button is pressed and does not stop until the **Stop** button 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's MAC or simulate multiple (10, 100 or 200) stations. The simulated MACs use the values 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, enter 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's MAC address should be used.

Source IP or IPX Source network address, if required. If Source MAC is set to simulate multiple stations, then the Source IP is incremented along with the MAC. For instance, if the FrameScope is set up to generate Ethernet/IP frames from multiple simulated stations with 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 350 to provide a means to control and monitor the FrameScope 350 via a web browser. The FrameScope's home page provides links to the following FrameScope functions:

Station List Links to the current list of stations. This is the same list that is accessible on the FrameScope through the Tools -> Network Database buttons.

Autotest Results Links to the current autotest results.

Test Database Links to a list of stored autotest results. These results may be viewed directly as web pages or the result file may be uploaded to the PC. The result file contains all of the results for the test in Comma Separated Value (CSV) format for use in spreadsheet programs. If the FrameScope is in any of the Network Autotest screens, the results in the Test Database may not be displayed.

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 Comma Separated Value (CSV) format for use in spreadsheet or database programs.

Remote Control Links to a page which shows an image of the FrameScope's display. Clicking on this image has the effect of pressing the FrameScope's display. The display is updated when the user of the web interface clicks on the screen or every 10 seconds if no screen operations are performed.

Memory Requirements

The FrameScope 350 requires a CompactFlash™ card to store test results and network station lists. The amount of memory that each Autotest result takes up depends on the number of test and the 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 a limit of 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.

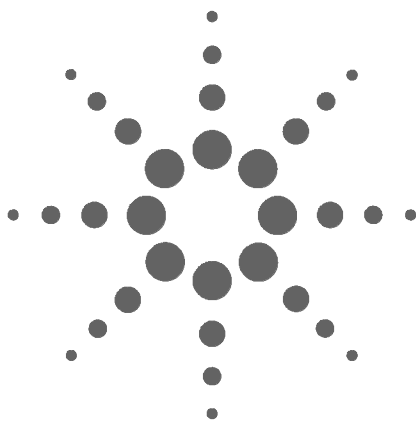
The station list storage requirement is 250 bytes per station with a maximum of about 1500 stations, so the maximum size is 375 KB

The FrameScope 350 does not use any of the 4MB of internal Flash memory for network test result storage. The cable test results can be stored in the internal Flash memory.

The following table lists approximate record storage capacities when configured for a 32 MB removable CompactFlash™ card and for comparison, a 192 MB card. All sizes of CompactFlash™ will work as FrameScope 350 Network Autotest results storage.

Saved Test Results Capacities, assuming a 1 MB used for test suites and station lists

Autotest #	Iterations	Size of record	Capacity (# of Records)	
			32 MB CFlash Card	192 MB CFlash 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 Cable Tester Reference

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This chapter describes the cable tester features of the Agilent FrameScope 350.



Measurements

The FrameScope 350 makes the following test measurements. See “Setting the Measurements” on page 129 for more details.

Wiremap

Wiremap testing checks for proper continuity and termination of cables. The test identifies the following faults:

- Short circuit
- Open circuit
- Reversed pairs
- Transposed pairs
- Split pairs
- Shield continuity faults

Length

Length measurements determine the electrical length of cable runs up to 1100 feet (335 meters). Accurate length measurements require accurate NVP settings. Choosing a cable type from the FrameScope’s database automatically loads NVP settings, or the NVP for a cable can be measured on a sample (“Learning the NVP of a Cable” on page 138).

Length Measurement Specifications

Accuracy	$\pm 4\%$ or ± 2 feet (0.6 M), whichever is greater
Resolution	± 1 foot (0.3 M) < 100M
Minimum Distance	0 feet (0 M)
Maximum Distance	1,100 feet (335 M)

Propagation Delay and Skew

The Propagation Delay test measures the one-way propagation delay over each pair of the tested cable run. Skew is the difference in propagation delay between the pairs with the longest and shortest delay in a cable.

Propagation Delay and Skew Measurement Specifications

Accuracy	$\pm 4\%$ or ± 1 nanoseconds, whichever is greater
Resolution	± 1 nanoseconds
Minimum Delay	0 nanoseconds
Maximum Delay	2,000 nanoseconds

Delay Skew	The difference in nanoseconds between the longest and shortest measured propagation delay among the four pairs of a single cable run
-------------------	--

Near End Crosstalk (NEXT)

NEXT measures near end coupling between pairs in the tested cable run, at both ends of a cable, over 6 pair combinations.

NEXT Measurement Specifications

Frequency Range	1 – 350 MHz
Frequency Step Sizes	125 kHz, 250 kHz, 500 kHz, 1 MHz, set automatically based on selected standards
Resolution	0.1 dB
Dynamic Range	90 dB or 25 dB beyond Category6 basic link limit, whichever is higher
Baseline Accuracy	40% better than TIA Level III requirement *

* TIA level III measurement parameter and tester accuracy requirements per TIA Category 6 Draft – Addendum to TIA-568-B and ISO/IEC 61935-1 draft amendment 1, 10/99

Attenuation

Attenuation measures the decrease in signal strength over the length of all pairs in a cable.

Attenuation Measurement Specifications

Frequency Range	1 – 350 MHz
Frequency Step Size	125 kHz, 250 kHz, 500 kHz, 1 MHz, set automatically based on selected standards
Resolution	0.1 dB
Dynamic Range	90 dB
Baseline Accuracy	40% better than TIA Level III requirement *

* TIA level III measurement parameter and tester accuracy requirements per TIA Category 6 Draft – Addendum to TIA-568-B and ISO/IEC 61935-1 draft amendment 1, 10/99

Return Loss

Return Loss measures the degradation of signal over all four pairs from each end of the tested cable run.

Return Loss Measurement Specifications

Frequency Range	1 – 350 MHz
Frequency Step Size	125 kHz, 250 kHz, 500 kHz, 1 MHz, set automatically based on selected standards
Resolution	0.1 dB
Dynamic Range	35 dB
Baseline Accuracy	40% better than TIA Level III requirement *

* TIA level III measurement parameter and tester accuracy requirements per TIA Category 6 Draft – Addendum to TIA-568-B and ISO/IEC 61935-1 draft amendment 1, 10/99

Equal Level Far End Crosstalk (ELFEXT)

ELFEXT measures far end coupling between pairs in the tested cable, for all pair combinations.

ELFEXT Measurement Specifications

Frequency Range	1 – 350 MHz
Frequency Step Size	125 kHz, 250 kHz, 500 kHz, 1 MHz, set automatically based on selected standards
Resolution	0.1 dB
Dynamic Range	90 dB or 40 dB beyond Category 6 link limit whichever is higher
Baseline Accuracy	40% better than TIA Level III requirement *

* TIA level III measurement parameter and tester accuracy requirements per TIA Category 6 Draft – Addendum to TIA-568-B and ISO/IEC 61935-1 draft amendment 1, 10/99

Attenuation to Crosstalk Ratio (ACR)

The ratio of the measured attenuation and the near end crosstalk (NEXT) at each frequency point.

Power Sum NEXT (PSNEXT)

Computed for each pair by calculating a power sum total of the pair-to-pair NEXT from the three other pairs.

Power Sum ELFEXT (PSELEXT)

Computed for each pair by calculating a power sum total of the pair-to-pair ELFEXT from the three other pairs.

Power Sum ACR (PSACR)

The ratio of the measured attenuation and the computed power sum near end crosstalk (PSNEXT) at each frequency point.

Resistance

The dc loop resistance for each pair in the tested cable run.

Resistance Measurement Specifications

Range	5 – 1,000 Ω
Accuracy	$\pm 5\%$

Ambient Noise

The ambient noise spectrum of each pair immediately after the autotest.

Ambient Noise Measurement Specifications

Frequency Range	1 – 350 MHz
Sensitivity	0.1 mV RMS
Accuracy	$\pm 5\%$

Calibration

Measurement Calibration

Remote Calibration

Remote calibration establishes a common zero reference for the FrameScope 350 and its associated DualRemote 350, before any end-to-end measurements are taken.

You must perform a remote calibration if you use your FrameScope 350 with a different DualRemote 350, or if you upgrade the software in either the FrameScope or DualRemote. The FrameScope stores the serial number information of the DualRemote that it has been calibrated with. Before each measurement, the FrameScope checks the serial numbers of the DualRemote to which it is connected. If the FrameScope does not have remote calibration data stored for the detected DualRemote, a warning appears, asking you to calibrate the DualRemote.

Agilent Technologies recommends running the remote calibration once a day, at the beginning of a testing session.

Environmental Calibration (Internal)

Environmental calibration compensates for the effects of ambient temperature and voltage variations. The FrameScope 350 and DualRemote 350 use internal calibration paths to connect the signal source and measurement circuits, establishing a local calibration reference before each measurement. No operator involvement is required.

Field Verification of Baseline Accuracy

The Self-Test probe (part # N2594A-015) can be used in the field to verify the baseline accuracy of a FrameScope 350 or DualRemote 350. The Self-Test probe uses the SmartProbe port interface to automate the required setups for this function.

To run a Self Test on the FrameScope 350:

- 1 Make sure that the FrameScope 350 display displays the main menu.
- 2 Insert the Self-Test probe in the SmartProbe port
- 3 Press the **OK** key. A PASS or FAIL screen displays.

The PASS screen indicates that the FrameScope's baseline calibration data is valid.

If a FAIL screen displays, contact Agilent Technical Support.

To run a self test on the DualRemote 350:

- 1 Insert the Self-Test probe in the SmartProbe port of the DualRemote 350.
- 2 Press the **OK** key. The Pass/Fail LED on the front panel of the DualRemote 350 indicates the outcome of the self test.

If the self test fails, the DualRemote 350 requires a new baseline calibration or repair. Contact Agilent Technical Support.

Memory Requirements

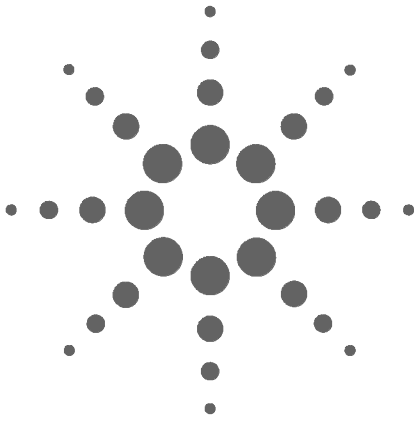
The amount of memory that each test result takes up depends on the options that you set before starting the test. Generally, if you save plots with each test, test result files are larger than if you omit plots. When you save plots, the size of the result file depends on the maximum frequency selected, and on how many additional measurements each autotest includes.

The FrameScope 350 allocates approximately 4MB of internal Flash memory for test result storage. The exact amount of memory available depends on the size of the FrameScope 350 software.

The following table lists approximate record storage capacities for the internal Flash memory when configured for 4MB and for a 32 MB removable CompactFlash™ card and for comparison, a 192 MB card. All sizes of CompactFlash™ will work as extra storage.

Saved Test Capacities

Autotest Type	Configuration	Stored NEXT Frequency Points	Capacity (# of Records)		
			Internal 4 MB Flash	32 MB CFlash Card	192 MB CFlash Card
Category 5E or 6 without plots	None	12	1,200	9,900	59,550
Category 5E or 6 without plots	Ambient noise sweep on and network tests	12	1,150	9,250	55,700
Category 5E with plots saved	Plots to 100 MHz	6288	94	750	4,500
Category 6 with plots saved	Plots to 250 MHz	9816	60	480	2,880
Category 6 with plots saved	Plots to 350 MHz; Ambient noise spectrum, Networks (All Options ON)	12,204	45	360	2,150



10 DualRemote 350 Reference

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This chapter describes the features of the Agilent DualRemote 350.



The DualRemote 350

The DualRemote 350 performs the same tests as the FrameScope 350, and is controlled by the FrameScope. The DualRemote displays information using LED indicators.



Control Buttons

The DualRemote 350 has the same control buttons on its face as the FrameScope 350.

Power: The **Power** button turns the unit on and off.

OK: Pressing the **OK** button does nothing.

Scroll: The Scroll button scrolls through the diagnostic indications.

Indicators

Pair Status Indicators

The pair status indicators turn green or red at the end of a test to show the status of each pair. A red indicator means the associated pair failed the current test.

Warning Indicators

The warning indicators denote conditions that might prevent or impair testing.

Hub/NIC Detected: The Hub/NIC Detected indicator means the DualRemote 350 is connected to a hub/Switch port or NIC port, instead of to a port connected to the FrameScope 350. [This function is not yet supported.]

Voltage Warning: The voltage warning indicator means the DualRemote 350 is connected to a line which has a potentially damaging voltage present. This condition usually occurs when attempting to test a line that is connected to a telephone switch.

Caution: If you see this indicator, *immediately disconnect the DualRemote from the line.* Failure to disconnect the line can permanently damage the DualRemote 350.

Calibration Required: The Calibration Required indicator means the DualRemote 350 is not calibrated to the FrameScope 350. The autotest will not execute until the calibration is done.

Battery: The battery indicator shows the current state of the DualRemote 350 battery charge.

When an external charger is supplying power to the DualRemote:

- The Battery indicator is steady green when the battery is charging.
- The Battery indicator flashes green when the battery is fully charged.

When no external charger is connected to the DualRemote:

- The Battery indicator is dark when the battery is operating normally.
- The Battery indicator is red when the battery charge is low.

Caution: Use only the 12V charger/adaptor supplied with your FrameScope and DualRemote. Using any other charger/adaptor can damage your FrameScope equipment and void your warranty.

Test Progress and Result Indicators

Progress: The Progress indicators show approximately how much of the current test is complete 1/3, 2/3, and complete.

Pass/Fail: The Pass/Fail indicator turns green when the test passes, or red when the test fails.

Diagnostics

The Diagnostics section of the DualRemote 350 front panel provides more detailed information about failing test results.

WS and DR: Indicate at which end of the tested cable the measurement failed.

- WS lights when a failure occurs at the FrameScope end of the circuit.
- DR lights when a failure occurs at the DualRemote end of the circuit.
- WS and DR both light when failures occur at both ends of the circuit. To determine which failures occurred at which end of the circuit, use the Scroll button.

A column of diagnostic indicators shows details about the cause(s) of a test failure. The failures indicated on the DualRemote 350 are:

Wiremap: Turns red when a fault with the cable connections is detected.

Split Pairs: Turns red when a split pair is detected.

Length/Delay/Skew: Turns red when cable length, signal delay, or skew are outside the passing limits.

NEXT : Turns red when near end pair-to-pair or power sum crosstalk faults are detected.

Attenuation: Turns red when attenuation is outside passing limits.

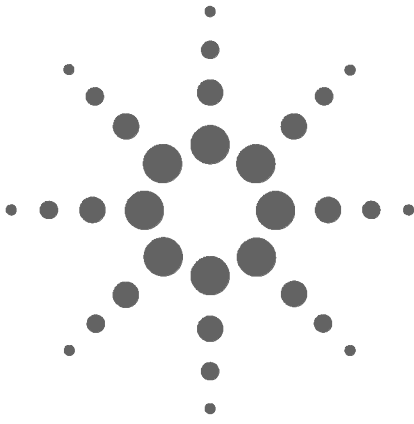
ELFEXT : Turns red when far-end pair-to-pair or power sum crosstalk faults are detected.

Return Loss: Turns red when the return signal loss exceeds passing limits.

Other: turns red when any other failing test results occur. If the cable run has multiple test failure causes, the **Scroll** button scrolls between diagnostic indications. The current selection blinks. The pair indicators and WS or DR indicators associated with the selected failure also blink.

Power

The Power indicator turns green when the DualRemote 350 is powered on.



11 Specifications

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Physical

The FrameScope 350 and DualRemote 350 are the same size, and weigh the same.

Size	9.125" x 4.625" x 2.625" HWD (23.17 x 11.75 x 6.66 cm)
Weight	2.86 lbs. (1.3 kg)

Environmental

Indoor / Outdoor	Intended for indoor use; not weatherized
Operating temperature range	0 to 40° C (32 to 104° F)
Storage temperature range	-10 to 55° C (14 to 131° F)
Maximum humidity	80% for temperatures to 31° C (88° F)
Altitude	To 3000 meters
Pollution degree	2

Electrical

Battery	A removable rechargeable Nickel Metal Hydride (NiMH) battery pack typically provides 5-6 hours of operation between charges, depending on use and power management settings. An internal fast charger recharges the NiMH battery pack in less than 5 hours. Extra battery packs are available. Battery pack specification: (Part Number N2605A-135) 7.2 Vdc 3800 mAh
External power	Power converter: External ac to dc power converter (Part Number N2595A-110 for 110 VAC models, Part Number N2595A-210 for 220 VAC models) supplies 12 Vdc, 1.2 A to the FrameScope 350 or DualRemote 350 power connector. Power connector polarity: Positive (+) on the outer sleeve; Negative (-) on the tip.
Mains supply voltage	Must be within 10% of nominal voltage
Installation overvoltage	Category II

WARNING

Use only the ac adapter supplied in the FrameScope Kit. Using other power adapters may damage the tester, and will void its warranty.

NOTE

This device complies with part 15 of the FCC rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

NOTE

If this equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired and successful operation cannot be guaranteed.

Ports

SmartProbe test port

Attachment point for test probes. Interface contains high performance signal channels for measurement functions and two-way control interface for reading and controlling active test probes.

Serial port

Allows the FrameScope 350 or DualRemote 350 to connect to PCs or printers. Connector is an 8-pin micro-DIN. Pinout:

Din 8 pin #	Signal	DB9 pin #	DB25 pin #
1	DTR	4	20
2	RXD	2	3
3	GND	5	7
4	NOT USED		
5	TXD	3	2
6-8	NOT USED		

USB-A port

FrameScope 350 only. The USB-A port allows the FrameScope 350 to connect to USB peripherals. Provides up to 100 mA @ 5 Vdc for attached USB peripherals.

USB-B port

FrameScope 350 and DualRemote 350. The USB-B port allows the FrameScope 350 or DualRemote 350 to connect to a PC equipped with a USB port.

Talkset connector (3.6 mm phone jack)

FrameScope 350 and DualRemote 350. Supports two-way voice communication between FrameScope and DualRemote operators over cable run under test. Accepts Agilent talkset (Part Number N2605A-137).

CompactFlash™ card slot

Provides removable non-volatile storage for test result files. Supports any standard CompactFlash™ storage card. Densities as high as 512MB are presently available. Data stored in standard format compatible with PCMCIA-ATA specification.

Display

6.625" (16.83 cm) diagonal backlit color LCD. Resolution: 240 (H) x 640 (V). The display is capable of displaying text and graphics in up to 256 colors.

9 Specifications

Fiber SmartProbe+

Fiber SmartProbe⁺

General	FiberSmartProbe+850nm, Fiber SmartProbe+ 1300nm	Fiber SmartProbe+ 1310nm, Fiber SmartProbe+ 1550nm
<i>Size</i>	2.4" x 1.6" x 0.8" (6.0 cm x 4.0 cm x 2.5 cm)	2.4" x 1.6" x 0.8" (6.0 cm x 4.0 cm x 2.5 cm)
<i>Optical Connectors</i>	ST@ x 2	SC x 2
<i>Power Source</i>	Draws power from WireScope 155 or DualRemote 155 via intelligent test port interface	Draws power from WireScope 155 or DualRemote 155 via intelligent test port interface
<i>Operating Temperature</i>	0° to 40° C	0° to 40° C
<i>Storage Temperature</i>	- 10° to 55° C	- 10° to 55° C
<i>Operating Humidity</i>	10 to 90% non-condensing	10 to 90% non-condensing
<i>Maximum Relative Humidity</i>	80% for temperatures up to 31 C, decreasing linearly to 50% relative humidity at 40 C	80% for temperatures up to 31 C, decreasing linearly to 50% relative humidity at 40 C
<i>Altitude</i>	Up to 2000 meters	Up to 2000 meters
Detector	FiberSmartProbe+850nm, Fiber SmartProbe+ 1300nm	Fiber SmartProbe+ 1310nm, Fiber SmartProbe+ 1550nm
<i>Receive Wavelengths</i>	850 and 1300nm	1310nm and 1550nm
<i>Measurement Accuracy</i>	+/-0.2dB @ -20dBm	+/-0.2dB @ -20dBm
<i>Dynamic Range</i>	0 to -40 dBm	0 to -40 dBm
<i>Detector Type</i>	Germanium	Germanium
Transmitter	FiberSmartProbe+850nm, Fiber SmartProbe+ 1300nm	Fiber SmartProbe+ 1310nm, Fiber SmartProbe+ 1550nm
<i>Power Output</i>	(into 62.5/125 multimode fiber) -10dBm (850nm), -15dBm (1300nm)	(into 9/125 singlemode fiber) -3 dBm (1310nm and 1550nm)
<i>Source Type</i>	LED	Stabilized Class 1 LASER ² product in accordance with EN 60825.1 and FDA 21 CFR 1040.10.
<i>Center Wavelength</i>		1310nm +/- 30nm, 1550nm +/- 30nm
<i>Spectral Bandwidth (RMS)</i>		< 5nm
<i>Stability</i>	N/A	+/- 0.1dB, 1Hr. @ 25 C
<i>Stabilization Time</i>	N/A	< 5 min.
Cable Length	FiberSmartProbe+850nm, Fiber SmartProbe+ 1300nm	Fiber SmartProbe+ 1310nm, Fiber SmartProbe+ 1550nm
<i>Accuracy (whichever is greater)</i>	+/- 4% or +/- 1.5 meters	+/- 4% or +/- 1.5 meters
<i>Resolution</i>	+/- 1.5 meters	+/- 1.5 meters
<i>Distance¹ Range</i>	0 – 4 km for 3.75 dB/km @ 850nm 0 – 10 km for 1.50 dB/km @ 1300nm	0 – 50 km for 0.5dB/km @ 1310nm and 1550nm
Propagation Delay	FiberSmartProbe+850nm, Fiber SmartProbe+ 1300nm	Fiber SmartProbe+ 1310nm, Fiber SmartProbe+ 1550nm
<i>Accuracy (whichever is greater)</i>	+/- 4% or +/- 6 nanoseconds	+/- 4% or +/- 6 nanoseconds
<i>Resolution</i>	+/- 6 nanoseconds	+/- 6 nanoseconds
<i>Range</i>	0 – 300 microseconds	0 – 300 microseconds

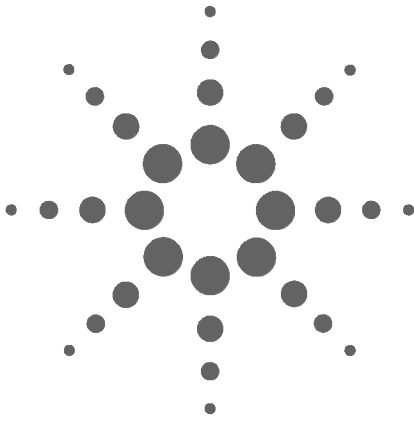
¹ Assumes double-ended configuration with -15dB maximum multimode link loss and 25dB maximum singlemode link loss. Divide by two for single-ended configuration.

² For safety the transmitter should never be viewed directly with the naked eye, a lens, or magnifying device.



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ARP Address Resolution Protocol - A broadcast protocol used to discover the low level (MAC) address that corresponds to the higher level (IP, IPX, etc.) 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 Mbit Ethernet at half or full duplex.

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 A 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.

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 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.

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, etc., 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 which 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 <enter> 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 time stamp 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.

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, using the Type of Service bits, higher grades of service can be requested. If the network equipment supports better service i.e. 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 percent of the maximum line speed in the network. For example, if the network's current usage is at 2 Mb/sec and the bandwidth available (line speed) is 100 Mb/sec., 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.

WireScope Agilent Technologies' category 6 / class E cable tester.

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