User Guide

AXS-200/650

IP Triple-Play Test Set

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EXFO
EXPERTISE REACHING OUT

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Units of Measurement

Units of measurement in this publication conform to SI standards and practices.

Version number: 2.0.0

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Certification Information

F.C.C. Information

Electronic test equipment is exempt from Part 15 compliance (FCC) in the United States. However, compliance verification tests are systematically performed on most EXFO equipment.

CE Information

Electronic test equipment is subject to the EMC Directive in the European Union. The EN61326 standard prescribes both emission and immunity requirements for laboratory, measurement, and control equipment. This unit has undergone extensive testing according to the European Union Directive and Standards.

CSA Information

This unit is certified by the CSA (certificate number 162451) and was evaluated according to applicable CSA and UL standards (as confirmed by "C-US" mark) as well as applicable IEC standards for use in Canada, the United States, and other countries.

DECLARATION OF CONFORMITY

Application of Council Directive(s):	73/23/EEC - The Low Voltage Directive 89/336/EEC - The EMC Directive And their amendments
Manufacturer's Name:	EXFO Electro-Optical Engineering Inc.
Manufacturer's Address:	400 Godin Avenue, Quebec, Quebec Canada, G1M 2K2 (418) 683-0211
Equipment Type/Environment:	Test & Measurement / Industrial
Trade Name/Model No.:	AXS-200/650 (Ethernet Triple-Play Test Set)

Standard(s) to which Conformity is Declared:

EN 61010-1:2001	**Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use, Part 1: General Requirements.**
EN 55022: 1998/ A2: 2003	**Limits and Methods of Measurement of Radio Disturbance Characteristics of Information Technology Equipment.**
EN 61326:1997 / A1:1998 + A2:2001 + A3:2003	**Electrical Equipment for Measurement, Control and Laboratory Use - EMC Requirements**

I, the undersigned, hereby declare that the equipment specified above conforms to the above Directive and Standards.

Manufacturer
Signature:

Full Name:	Stephen Bull, E. Eng
Position:	Vice-President Research and Development
Address:	400 Godin Avenue, Quebec (Quebec) Canada
Date:	April 18, 2007

1 Introducing the AXS-200/650 IP Triple-Play Test Set

The AXS-200/650 IP Triple-Play Test Set is a handheld unit designed to provide triple-play Quality of Experience (QoE) measurements. This test set offers a quick and thorough method for deploying triple-play services - IPTV, VoIP and data - inside the customer premises. The AXS-200/650 not only verifies service quality for every customer, but also executes downstream performance measurements such as actual IP data rates and Ethernet bit rates. In addition, it provides advanced IPTV measurements such as packet jitter and loss, PCR jitter, MDI, and IGMP zap time. The AXS-200/650 IP Triple-Play Test Set monitors residential VoIP call flow and statistics, facilitating VoIP QoS assurance.

Main Features

- Provides key IPTV qualification parameters with features such as set-top box (STB) emulation, join/leave requests, PCR jitter analysis and MDI reporting.
- Validates IPTV service quality for every subscriber through per subscriber MDI video quality measurements.
- Quantify IPTV QoE degradation due to the impact of other triple play services, such as time-sensitive voice and bursty data traffic.
- Offers superior network testing such as ping and traceroute measurements as well as HTTP and FTP speed testing.
- Facilitates troubleshooting.

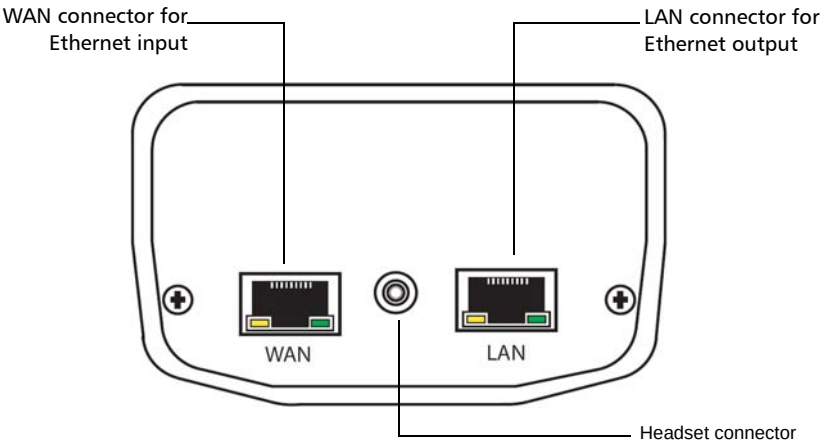
Typical Applications

The AXS-200/650 allows you to test inside the customer premises over Ethernet for applications, such as:

- Auto test
- CPE tests
- IPTV analysis
- Data analysis
- VoIP analysis

Connector Description

The top of the AXS-200/650 module supports connections to a wide area network (WAN) and a local area network (LAN).



Electrical Safety Information

For information about equipment rating for temperature, environment, and power supply, refer to the *Safety Information* chapter of the AXS-200 User Guide.

Conventions

Before using the product described in this manual, you should understand the following conventions:

WARNING

Indicates a potentially hazardous situation which, if not avoided, could result in *death or serious injury*. Do not proceed unless you understand and meet the required conditions.

CAUTION

Indicates a potentially hazardous situation which, if not avoided, may result in *minor or moderate injury*. Do not proceed unless you understand and meet the required conditions.

CAUTION

Indicates a potentially hazardous situation which, if not avoided, may result in *component damage*. Do not proceed unless you understand and meet the required conditions.

IMPORTANT

Refers to information about this product you should not overlook.

2 Getting Started with Ethernet Testing

The AXS-200/650 not only verifies service and connectivity to the DSLAM, but also executes upstream and downstream performance measurements such as actual data rates, attenuation, and noise margin. In addition, it provides advanced IPTV measurements such as packet jitter and loss, PCR jitter, MDI, PID viewer and IGMP zap time; and also supports higher layer testing such as ping, traceroute and web download speed.

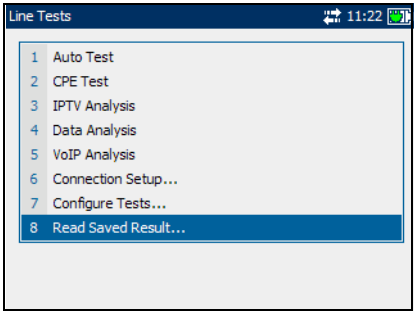
IP Tests

Ethernet tests include the Auto Test function, CPE tests and IPTV, data, and VoIP analyses.

Line Tests Menu

The **Line Tests** pane lists all the test capabilities of the unit.

To access the Ethernet-based tests:



1. From the **Home** page, use the up or down arrow key to highlight **Line Tests**, then press ✔.
2. From the **Line Tests** pane, highlight the desired item and press ✔

   OR

   press the corresponding item number.

   When selected, each of the five tests starts, using the connection setup from the current profile.

   ➤ **Connection Setup** allows you to setup a series of connection parameters for Auto Test and CPE testing, IPTV, data, and VoIP analyses beginning with the **Select Profile** tab.

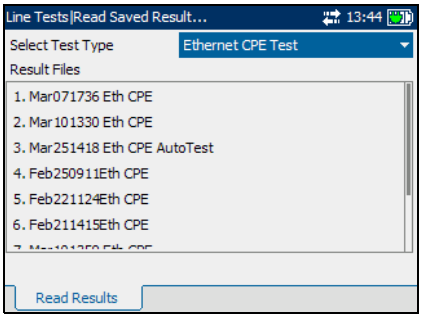
- **Configure Tests** allows you to configure a series of test parameters to verify applications, beginning with **Auto Test**.
- **Read Saved Result** allows you to view the **Read Results** page.

Read Saved Results

The **Read Results** pane tab allows you to select a test type and view the results of all the files previously saved.

Types listed include the following **Ethernet** tests:

- **CPE Test**
- **IPTV Analysis**
- **Data Analysis**
- **VoIP Analysis**



To select the test type results to read:

1. Press ✔ to open the list.
2. In the list, press the up/down arrows to select the test type.
3. Press ✔ to confirm the selection.

3 Connection Setup for IP Triple-Play Verification Tests

The purpose of the **Connection Setup** function is to configure the unit for a series of connection parameters for Auto Test and CPE testing, and IPTV, data, and VoIP analyses. These parameters are accessible through the different pane tabs.

To configure the connection parameters during Ethernet based tests:

1. From the **Line Tests** pane, use the up/down arrows to select the **Connection Setup** entry.
2. Press ✔ to confirm the selection.

To view the available tabs:

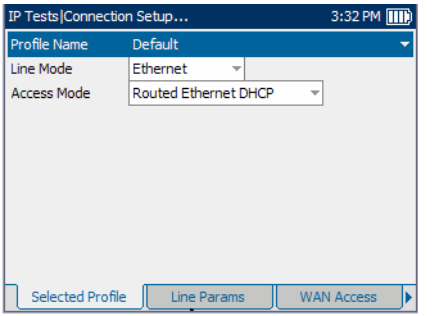
Press the left/right function arrows on each side of the F1, F2, and F3 keys.

Setup Profile

Profiles can be created and stored in the internal memory for later use. They can also be stored externally or exported to another unit via a USB memory device or HyperTerminal. You can easily load an external profile through the USB port and a HyperTerminal.

Selected Profile

The **Selected Profile** tab allows you to configure and store multiple profiles containing specific setups for the unit. The default settings for current profile are: **Profile Name** is **Default**; **LineMode** is **Ethernet**; and **AccessMode** is **Bridged**.



- **Profile Name** is a list of all available profile files in the current directory with the first entry being **Default**. Once you open the selected profile, it remains active in the unit until a different or newer profile is selected. You can store over 100 profiles.
- **Line Mode** is Ethernet.
- **AccessMode** displays a list of values for the Ethernet **Line Mode** selection.

  Bridged

  Routed Ethernet DHCP

  Routed Ethernet Static

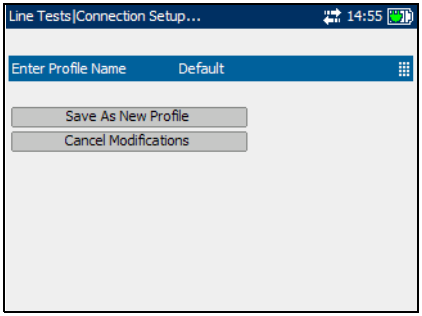
  Routed PPPoE

When you change the selections, the following actions should be performed:

1. Fill the **ProfileName** list box with the list of files from the new directory \LineMode\AccessMode.
2. Change the **ProfileName** selection to **Default** if the profile file with the current **ProfileName** does not exist in the new directory.
3. Reload the current profile from the new profile file.

At power up, all settings are read from the last current profile.

➤ **Custom Profile** is the new name of the profile.



To save modifications made to a CustomProfile:

1. Select **Save as New Profile** and create and save a new **CustomProfile** name in the current directory \LineMode\AccessMode.
2. If the file with **CustomProfile** name already exists in the current directory, you will be prompted to overwrite it.

To cancel modifications made to a CustomProfile:

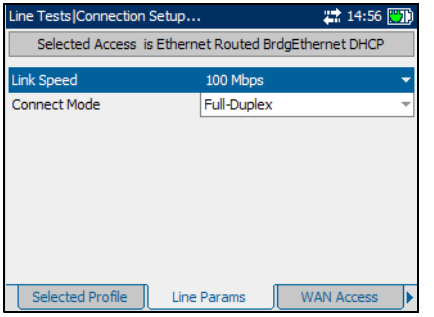
1. Select **Cancel Modifications** and reload the current profile with the default profile.
2. Proceed with the previously selected action (Back/Home/Start).

Setup Line Connection

Line Parameters

The **Line Params** tab allows you to set the Ethernet negotiation modes for a **Selected Profile** composed of the current **AccessMode** selections.

When the **LineMode** selection is **Ethernet**, the available parameters are the following:



- **Link Speed** is a choice between **AUTO** (negotiated during the link establishment), **100** or **10 Mbps**.
- **Connect Mode** is **Full-duplex** or **Half-duplex**, when **Link Speed** is set to either **100** or **10 Mbps.**

To select the line parameters to configure:

1. From the **Connection Setup** pane, press the left/right function arrows until the **Line Params** tab is displayed.
2. Press the F1, F2, or F3 key located just below the tab to select it.
3. Press the up/down arrows to select the desired parameter.
4. Press ✔ to open the list or modify the parameter.
5. In the list, press the up/down arrows to select the function or mode.

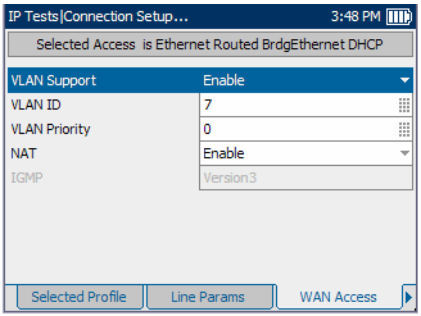
   OR

   Use the alphanumeric keypad to enter the value you want to specify.
6. Press ✔ to confirm the selection.

WAN Access

The **WAN Access** tab allows you to configure the physical line parameters required to connect to the ISP (internet service provider). The described **Selected Profile** is composed of the current **LineMode** and **AccessMode** selections.

The available parameters are the following:



- **Encapsulation Type** depends on the network configuration and sets the ATM to either **LLC** also known as LLC-SNAP (logical link control-sub network address protocol) or **VC MUX** (virtual channel multiplex).
- **VLAN Support** enables the unit to analyze and pass WAN tagged ethernet frames through the virtual local area network (VLAN).
- **VLAN ID** is a virtual local area network (VLAN) tag ranging from 0 through 4094.
- **VLAN Priority** sets the priority of the virtual local area network (VLAN) with a value ranging from 0 through 7.
- **NAT** is the network address translation (NAT), which either enables the unit to use a public router address for all outgoing packets, or exposes the private LAN IP address to the WAN, if disabled.

To select the WAN access parameters to configure:

1. From the **Connection Setup** pane, press the left/right function arrows until the **WAN Access** tab is displayed.
2. Press the F1, F2, or F3 key located just below the tab to select it.
3. Press the up/down arrows to select the desired parameter.
4. Press ✔ to open the list or modify the parameter.
5. In the list, press the up/down arrows to select the function or mode.

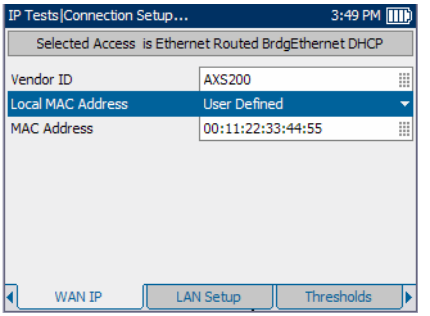
   OR

   Use the alphanumeric keypad to enter the value you want to specify.
6. Press ✔ to confirm the selection.

WAN IP

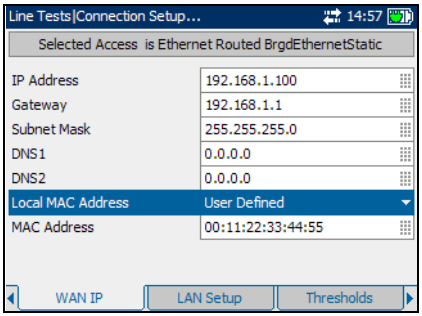
The **WAN IP** tab allows you to configure the wide area network parameters required to connect to the ISP for a **Selected Profile** composed of the current **LineMode** and **AccessMode** selections.

When the **AccessMode** selection is set to **Routed BrgdEthernet DHCP**, the available parameters are the following:



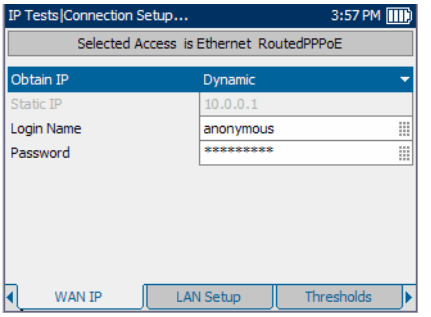
- **Vendor ID** is the name of the unit, maximum 80 characters.
- **Local MAC Address** is the *internal* **MAC address** of the unit: either **AXS200** or **User Defined**.
- **MAC Address** is a specific **MAC address**, maximum 17 characters, if you select **User Defined** for the previous parameter.

When the **AccessMode** selection is set to **Routed BrgdEthernet Static**, the available parameters are the following:



- **IP Address** is the address for the unit that is actively connected to your network or the internet at the time of login.
- **Gateway** is the IP address of the default gateway.
- **Subnet Mask** is the network address used to identify if the IP address is within the same wide area network.
- **DNS1** is the address of the *primary* domain name server to be used by the unit. If DNS is unavailable, enter 0.0.0.0.
- **DNS2** is the address of the *secondary* domain name server to be used by the unit. If DNS is unavailable, enter 0.0.0.0.
- **Local MAC Address** is the *internal* MAC address of the unit: either **AXS200** or **User Defined**.
- **MAC Address** is a specific MAC address, maximum 17 characters, if you select **User Defined** for the previous parameter.

When the **AccessMode** selection is set to **Routed PPPoE**, the available parameters are the following:



- **Obtain IP** is either **Dynamic** where the access concentrator or broadband remote access server assigns a temporary IP address to the unit, or **Static** where you enter the IP address of the unit.
- **Static IP** is the address of the current location assigned by the service provider. This entry is unavailable if **Obtain IP** is set to **Dynamic**.
- **Login Name** is your user ID.
- **Password** is your user password.

Note: *WAN IP setup is not required when Access Mode is set to Bridged. The line encapsulation setting defines the parameters required.*

To select the WAN IP parameters to configure:

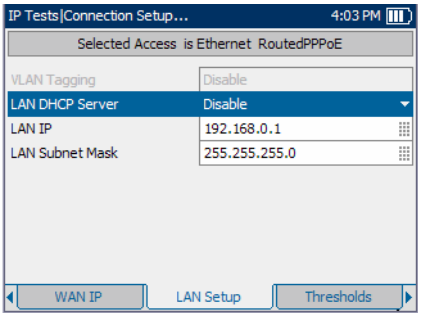
1. From the **Connection Setup** pane, press the left/right function arrows until the **WAN IP** tab is displayed.
2. Press the F1, F2, or F3 key located just below the tab to select it.
3. Press the up/down arrows to select the desired parameter.
4. Press ✔ to open the list or modify the parameter.
5. In the list, press the up/down arrows to select the function or mode.

   OR

   Use the alphanumeric keypad to enter the value you want to specify.
6. Press ✔ to confirm the selection.

LAN Setup

The **LAN Setup** tab allows you to configure the parameters required when working in *Throughmode*, and the local area network (LAN) is connected to the ethernet interface. These parameters only apply when the WAN access mode is set to **Routed.**The described **Selected Profile** is composed of the current **LineMode** and **AccessMode** selections.



The available parameters are the following:

- **VLAN Tagging** enables the unit to recognize frames with a specified PVID. This entry is disabled if **VLAN Support** is set to **Disable** on the **WAN Access** pane.
- **LAN DHCP Server** enables the dynamic host configuration protocol (DHCP) mode for the LAN side of the connection.
- **LAN IP** is the local network IP address of the unit.
- **LAN Subnet Mask** is the network address mask used to identify if the IP address is within the same local area network.

To select the LAN parameters to configure:

1. From the **Connection Setup** pane, press the left/right function arrows until the **LAN Setup** tab is displayed.
2. Press the F1, F2, or F3 key located just below the tab to select it.
3. Press the up/down arrows to select the desired parameter.
4. Press ✔ to open the list or modify the parameter.
5. In the list, press the up/down arrows to select the function or mode.

   OR

   Use the alphanumeric keypad to enter the value you want to specify.
6. Press ✔ to confirm the selection.

4 Configure Tests for IP Triple-Play Verification

The purpose of the **Configure Tests** function is to modify the unit to include and perform various tests for the applications to be verified. These tests are accessible through the different pane tabs.

To access the configure tests during a DSL/Ethernet based test:

1. From the **Line Tests** pane, use the up/down arrows to select the **Configure Tests** entry.
2. Press ✔ to confirm the selection.

To view the available tabs:

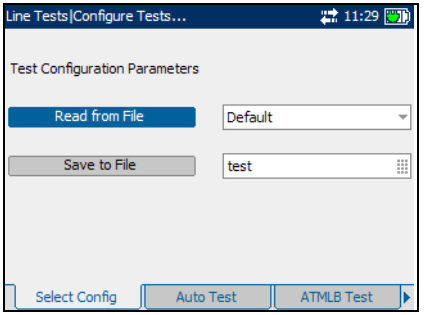
Press the left/right function arrows on each side of the F1, F2, and F3 keys.

Configure Profile

Before configuring all the line test parameters, you can refer to previously saved profiles.

Select Configuration

The **Select Config** tab allows you to setup and store multiple profiles containing specific configuration parameters for the unit. At power up, all test configuration parameters are read from the last current test configuration.



- **Read from File** allows you to view a list of previously saved profiles with the first entry being **Default**.
- **Save to File** allows you to save test parameters to a default profile or a new custom file name.

To select test configuration parameters to be used during Ethernet based tests:

1. From the **Select Config** tab pane, use the up/down arrows to highlight an old or new configuration file name.
2. Press ✔ to confirm the selection.
3. Press the left arrow to highlight the **Read from File** button.
4. Press ✔ to confirm the selection.
5. Press the up/down arrows to highlight the text edit box.
6. Use the alphanumeric keypad to enter a custom profile name.
7. Press the left arrow to highlight the **Save to File** button to save the configured profile.

Configure Line Tests

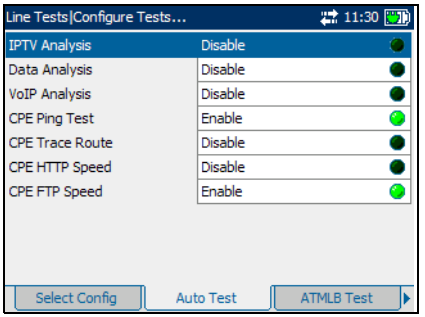
Auto Test

The purpose of the Auto Test function is to:

- Establish a connection to the DSLAM
- Log into an ISP
- Perform a Ping test

The **Auto Test** tab allows you to select a series of tests to be configured in the Auto Test procedure.

Your choice of tests to **Enable** or **Disable** are the following:



- **IPTV Analysis** runs an auto test for video. When this entry is enabled, all other test-choice entries on the **Auto Test** pane are automatically disabled.
- **Data Analysis** runs an auto test for data by enabling the unit to act as a modem, allowing you to connect from your computer to the internet via the unit's Ethernet port. When this entry is enabled, all other test-choice entries on the **Auto Test** pane are automatically disabled.
- **VoIP Analysis** runs an auto test for voice. When this entry is enabled, all other test-choice entries on the **Auto Test** pane are automatically disabled.
- **CPE Ping Test** checks the ICMP echo request during the auto test. When this entry is enabled, **IPTV**, **Data** and **VoIP** analyses are automatically disabled.

- **CPE Trace Route** reports the status of IP packets being sent to a specified IP destination, and the path and time taken to do so, in auto test. When this entry is enabled, **IPTV**, **Data** and **VoIP** analyses are automatically disabled.
- **CPE HTTP Speed** measures the speed of downloading web pages, in auto test.When this entry is enabled, **IPTV**, **Data** and **VoIP** analyses are automatically disabled.
- **CPE FTP Speed** measures the speed of the file transfer protocol download, in auto test.When this entry is enabled, **IPTV**, **Data** and **VoIP** analyses are automatically disabled.

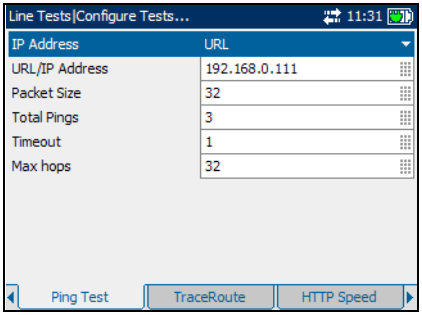
To select the tests to include:

1. Press the up/down arrows to highlight a desired test.
2. Press ✔ to toggle between **Enable** or **Disable**.
3. Select other tests as required.

Ping Test

The **Ping Test** tab allows you to configure the parameters to perform a ping test, also known as an ICMP echo request, during the CPE test.

The available parameters are the following:



- **IP Address** lists either the **URL** or **IP Address** where the unit pings.
- **URL/IP Address** is the destination IP address of the device actively connected to the network.
- **Packet Size** is a value from 32 through 1200 of the number of bytes sent in one packet. The default value is 32.
- **Total Pings** is the total number of ping packets to send out from 1 through 99. The default value is 3.
- **Timeout** is the time in seconds from 1 through 15, that the unit will wait for a response back from the destination device. The default value is 1.
- **Max hops** is the number of hops from 1 through 99, that the unit will attempt to reach a destination IP address. The default value is 32.

To select the ping parameters to configure:

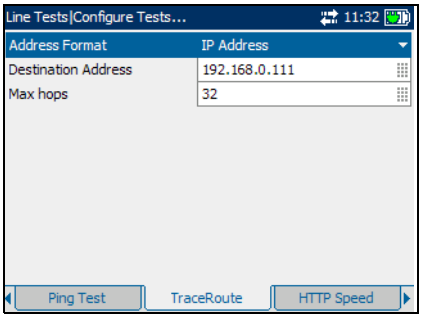
1. Press the up/down arrows to select the desired parameter.
2. Press ✔ to open the list or modify the parameter.
3. In the list, press the up/down arrows to select the function or mode.

   OR

   Use the alphanumeric keypad to enter the value you want to specify.
4. Press ✔ to confirm the selection.

TraceRoute

The **TraceRoute** tab allows you to trace an IP packet from the unit (or a computer) to a specified IP destination and define how many hops the packet requires to reach the destination. This test is useful in determining where the longest delays are occurring along the network path.



The available parameters are the following:

- **Address Format** lists the address either as a **URL** or **IP Address**.
- **Destination Address** is the destination IP address.
- **Max hops** is a value from 1 through 99 specifying the maximum number of hops to be used in attempting to reach the destination IP address. The default value is 32.

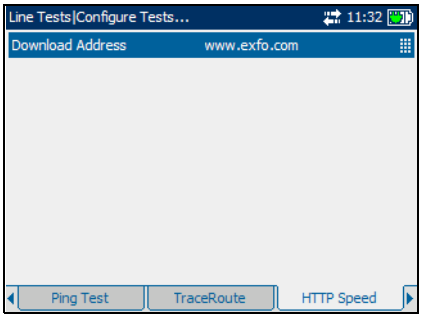
To select the traceroute parameters to configure:

1. Press the up/down arrows to select the desired parameter.
2. Press ✔ to open the list or modify the parameter.
3. In the list, press the up/down arrows to select the function or mode.

   OR

   Use the alphanumeric keypad to enter the value you want to specify.
4. Press ✔ to confirm the selection.

HTTP Speed



The **HTTP Speed** tab allows you to enter the **Download Address** which is the destination IP address or web site URL to be downloaded (depending on the test selected) from the http server.

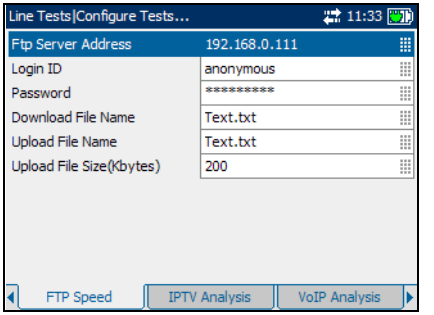
To select the download parameter to configure:

1. Press the up/down arrows to select the desired parameter.
2. Press ✔ to modify the parameter.
3. Use the alphanumeric keypad to enter the value you want to specify.
4. Press ✔ to confirm the selection.

FTP Speed

The **FTP Speed** tab allows you to configure the file transfer protocol parameters for downloading and uploading files to the server.

The available parameters are the following:



- **Ftp Server Address** is the address of the file transfer protocol (FTP), maximum 72 characters.
- **Login ID** is your user name, maximum 72 characters. The default value is **anonymous**.
- **Password** is your user password, maximum 36 characters.
- **Download File Name** is the filename requested for downloading, maximum 128 characters; left blank if no download test is required.
- **Upload File Name** is the filename used for uploading, maximum 128 characters.
- **Upload File Size(Kbytes)** is the number of bytes or size of the file to be uploaded to the server.Valid values range from 1 through 65536.

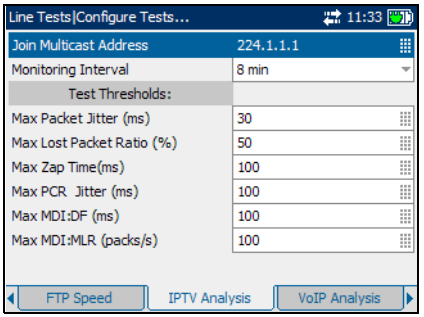
To select the FTP speed parameters to configure:

1. Press the up/down arrows to select the desired parameter.
2. Press ✔ to modify the parameter.
3. Use the alphanumeric keypad to enter the value you want to specify.
4. Press ✔ to confirm the selection.

IPTV Analysis

The **IPTV Analysis** tab allows you to configure the unit for video testing.

The parameters are the following:



- **Join Multicast Address** is the multicast address of the channel that is automatically requested to join when running the video analysis during the auto test.
- **Monitoring Interval** is a list of time interval values - **8**, **16**, **32**, or **64 min** - to set the length of time for which data is plotted on a graph.
- **Test Thresholds** allow you to set critical quality of service (QoS) values for delivering IPTV over Ethernet.
  - **Max Packet Jitter (ms)** is a value in accordance with the network characteristics, ranging from 0 through 99 milliseconds, to be used as the pass or fail criteria for QoS.
  - **Max Lost Packet Ratio (%)** is a percentage of the total packet rate, ranging from 0 through 10.00, to use as pass/fail criteria for QoS.
  - **Max ZAP Time(ms)** is the time in milliseconds, ranging from 0 through 999, required for a channel change and to be considered when evaluating IPTV QoS.
  - **MAX PCR Jitter (ms)** is the short-term variation in milliseconds, ranging from 0 through 999, of the arrival of the PCR (program clock reference) information at the video decoder.
  - **Max MDI:DF (ms)** is the media delivery index (MDI) to delay factor (DF) in milliseconds, ranging from 0 through 999.
  - **Max MDI:MLR (packs/s)** is the media delivery index (MDI) to media loss rate (MLR) in packets lost per second, ranging from 0 through 999.

To select the IPTV analysis parameters to configure:

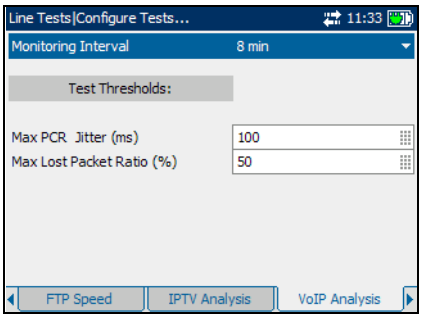
1. Press the up/down arrows to select the desired parameter.
2. Press ✔ to open the list or modify the parameter.
3. In the list, press the up/down arrows to select the function or mode.

   OR

   Use the alphanumeric keypad to enter the value you want to specify.
4. Press ✔ to confirm the selection.

VoIP Analysis

The **VoIP Analysis** tab allows you to configure the unit for voice over IP testing.



The parameters are the following:

- **Monitoring Interval** is a list of time interval values - **8**, **16**, **32**, or **64 min** - to set the length of time for which data is plotted on a graph.
- **Test Thresholds** allow you to specify the thresholds against which the actual measured unit/DSLAM negotiated results will be evaluated.
  - **Max PCR Jitter (ms)** is a value in accordance with the characteristics of the network, ranging from 0 through 200 to be used as the pass or fail criteria for the quality of service (QoS).
  - **Max Lost Packet Ratio (%)** is a percentage of the total packet rate, to be used as the pass or fail criteria for the quality of service (QoS).

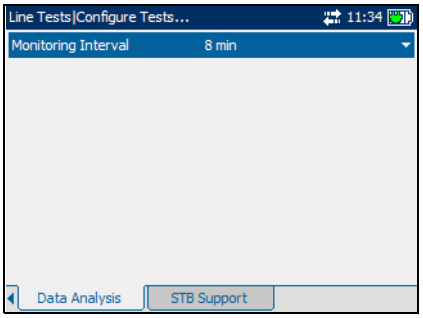
To select the VoIP analysis parameters to configure:

1. Press the up/down arrows to select the desired parameter.
2. Press ✔ to open the list or modify the parameter.
3. In the list, press the up/down arrows to select the function or mode.

   OR

   Use the alphanumeric keypad to enter the value you want to specify.
4. Press ✔ to confirm the selection.

Data Analysis



The **Data Analysis** tab allows you to select the **Monitoring Interval** which is a list of time interval values - **8**, **16**, **32**, or **64 min** - to set the length of time for which data is plotted on a graph.

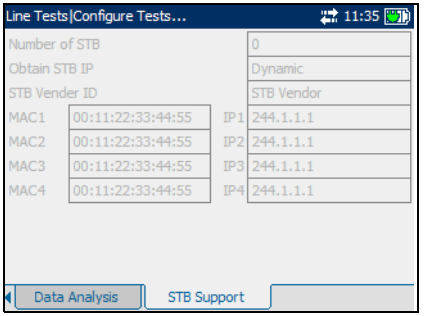
To select the monitoring interval:

1. Press the up/down arrows to select the parameter.
2. Press ✔ to open the list.
3. In the list, press the up/down arrows to select the value.
4. Press ✔ to confirm the selection.

STB Support

The **STB Support** tab allows you to specify the network addresses for up to four set-top boxes to be emulated. This pane is active only for bridged access mode.

The available parameters are the following:



- **Number of STB** is the quantity of set top boxes (maximum 4) to be emulated by the unit at the testing location.
- **Obtain STB IP** is either **Dynamic** where the access concentrator or broadband remote access server assigns a temporary IP address to the set top box, or **Static** where you enter the IP address of the set top box.
- **STB Vendor ID** is the name of the set top box, maximum 80 characters. This entry is unavailable if **Obtain STB IP** is set to **Static**.
- **MAC1-4** is the MAC address for each specified set top box.
- **IP1-4** is the IP address for each set top box that has been specified.

To select the STB support parameters to configure:

1. Press the up/down, left/right arrows to select the desired parameter.
2. Press ✔ to open the list or modify the parameter.
3. In the list, press the up/down arrows to select the function or mode.

   OR

   Use the alphanumeric keypad to enter the value you want to specify.
4. Press ✔ to confirm the selection.

5 Running CPE Tests

The purpose of the CPE Test function is to establish a connection to the DSLAM and confirm the status of the Ethernet line. You can then log on to an ISP to perform advanced tests, including Ping, TraceRoute, and download speed tests.

To view the available tabs:

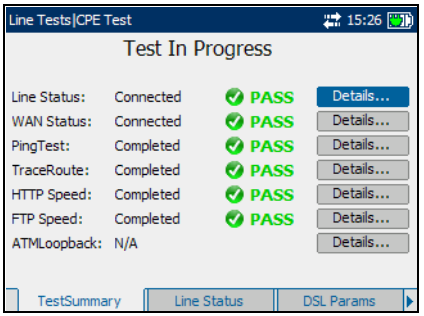
Press the left/right function arrows on each side of the F1, F2, and F3 keys.

Reading Results

Test Summary

The **TestSummary** tab allows you to view the **PASS/FAIL** status and **Details** of a series of CPE test results.

The available test results are the following:



- **Line Status** displays either **Connected** or **Disconnected** for the particular line connection under test.
- **WAN Status** displays whether the unit is Connected to the wide area network, or in idle mode.
- **PingTest** is also known as ICMP echo request and determines network connectivity and accessibility.
- **TraceRoute** reports the path and the time of an IP packet to reach the destination IP address.
- **HTTP Speed** allows you to evaluate the speed at which a particular web page or URL or web object can be downloaded by the unit.
- **FTP Speed** displays the status of whether the file transfer protocol was completed or not.

➤ **Details** button shortcuts to the applicable tab which provides more information about a particular test result.

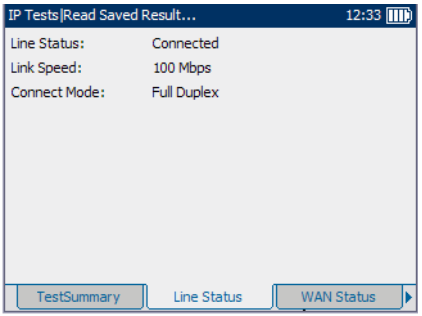
To view more information about each available test result:

1. Press the up/down arrows to highlight the **Details** button alongside the desired test result.
2. Press ✔ to select the desired **Details** button.

Line Status

The **Line Status** tab allows you to view the conditions of the line under test which was configured in the connection setup.

The available test results are the following:



➤ **Line Status** displays either **Connected** or **Disconnected** for the particular line connection under test.

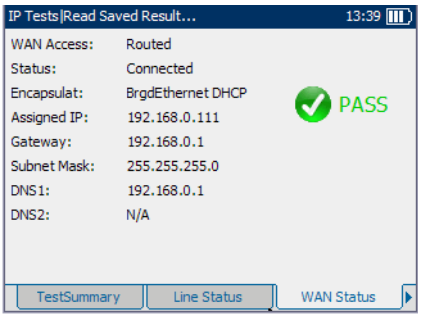
➤ **LinkSpeed** is a choice between **AUTO** (negotiated during the link establishment), **100** or **10 Mbps**.

➤ **ConnectMode** is **FULL_DUP** or **HALF_DUP**, when **Link Speed** is set to either **100** or **10 Mbps**.

WAN Status

The **WAN Status** tab allows you to view the status of the connection between the wide area network and the ISP.

The available test results are the following:

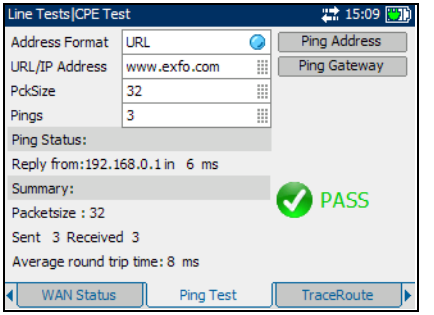


- **WAN Access** specifies the type of wide area network access, either **Bridged** or **Routed** mode.
- **Status** displays either **Connected** or **Disconnected** for the particular line connection under test.
- **Encapsulat** is the encapsulation method used by the network and consists of the following types:
  - **PPPoE** is point-to-point protocol over Ethernet.
  - **Bridged Ether DHCP** is also known as multi-protocol encapsulation over ATM (MPoA).
- **Assigned IP** is the IP address information assigned to the unit that is actively connected to your network or the internet at the time of login.
- **Gateway** is the IP address of the default gateway.
- **Subnet Mask** is the network address used to identify if the IP address is within the same wide area network.
- **DNS1** is the address of the *primary* domain name server to be used by the unit.
- **DNS2** is the address of the *secondary* domain name server to be used by the unit.

Ping Test

The **Ping Test** tab allows you to view the **PASS/FAIL** summary status of either a **Ping Address** or **Ping Gateway**.

The available test results are the following:

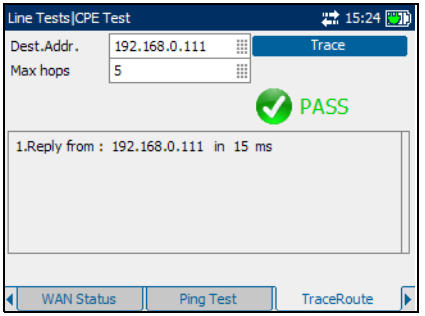


- **Address Format** lists either the **URL** or **IP Address** where the unit pings.
- **URL/IP Address** is the IP address (a.b.c.d) or domain name (www.abcd.com) of the destination being pinged.
- **PckSize** is the number of bytes sent in one packet ranging from 32 through 1200 (default is 32 bytes).
- **Pings** display the total number of ping requests to be sent.
- **Ping Status** is the duration in milliseconds (ms) it took the data to come back from the destination device.
- **Summary:**
  - **Packetsize** displays the size of the Ping packet as selected.
  - **Sent/Received**: shows the number of packets sent versus the number of packets received.
  - **Average round trip time** is the duration in milliseconds (ms) it took the data to reach the destination device and come back.

TraceRoute

The **TraceRoute** tab allows you to view the **PASS/FAIL** status of an IP packet being sent to a specified IP destination, and the path and time taken to do so.

The available test results are the following:

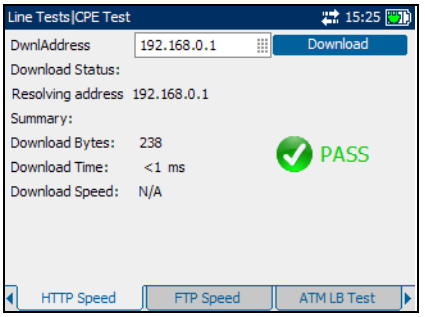


- **Dest.Addr.** is the destination IP or URL address.
- **Max hops** specifies the maximum number of hops used in attempting to reach the destination address.
- **Trace** button starts TraceRoute, displaying the test progress in the area below.

HTTP Speed

The **HTTP Speed** tab allows you to view the **PASS/FAIL** summary status of the download test configured in the CPE test setup.

The available test results are the following:



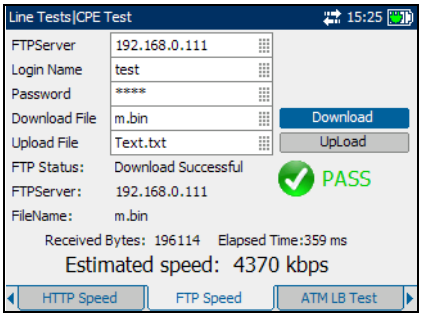
- **DwnlAddress** is the destination IP address or website that was downloaded.
- **Download** button starts the HTTP speed test, displaying the progress below.
- **Resolving Address** is the address of the **DwnlAddress**.
- **Download Bytes** displays the count of bytes received.

- **Download Time** is the amount of time it took to receive the download bytes.
- **Download Speed** is the speed at which the unit is capable of downloading a web page or content.

FTP Speed

The **FTP Speed** tab allows you to view the **PASS/FAIL** summary status of whether or not the file transfer protocol (FTP) which was configured in the CPE test setup was completed successfully or not.

The available test results are the following:



- **FTPServer** is the IP address of the connected FTP server.
- **Login Name** is your user ID.
- **Password** is your user password.
- **Download File** is the name of the file downloaded to the FTP server.

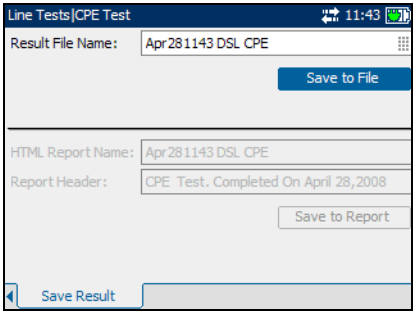
  The **Download** button starts downloading the file entered here.
- **Upload File** is the name of the file uploaded to the FTP server. The file size is limited to a maximum of 64 Mb.

  The **UpLoad** button starts uploading the file entered here.
- **File Name** is the name of the uploaded or downloaded file being summarized on the pane.
- **Received Bytes** displays the number of bytes that was downloaded from the FTP server.
- **Elapsed Time** is the duration in ms of downloading/uploading the file.
- **Estimated speed** is the calculated rate - number of received bytes divided by elapsed time - of downloading/uploading the file.

Saving Results

Save Result

The **Save Result** tab allows you to save your test results to a file or to an HTML report.



Each entry on the pane is described below:

- **Result File Name** is the current date and time stamp plus you can enter any filename.

  Save to File button saves the file in memory.

- **HTML Report Name** is the current date and time stamp plus you can enter any name for the HTML file.

- **Report Header** is where you can enter any comment. The initial value is the current test followed by the date and time stamp.

  Save to Report button saves the results to the HTML report.

6 IPTV Analysis

The IPTV Analysis test functionality provides all the required information for the installation, maintenance, and/or troubleshooting of video services, including IPTV, delivered over Ethernet.

To view the available tabs:

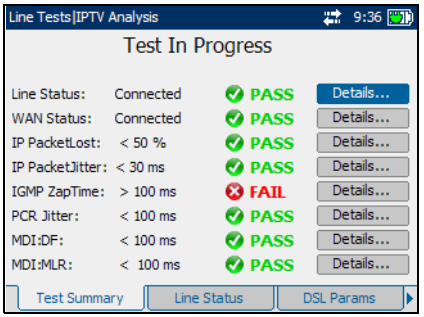
Press the left/right function arrows on each side of the F1, F2, and F3 keys.

Reading Results

Test Summary

The **Test Summary** tab allows you to view the **PASS/FAIL** status and **Details** of all the tests configured. If a measured value is out of the threshold range configured for the IPTV analysis setup, the **Test Summary** screen displays a **FAIL** message.

The available test results are the following:



- **Line Status** displays either **Connected** or **Disconnected** for the particular line connection under test.
- **WAN Status** displays whether the unit is **Connected** to the wide area network, or in idle mode.
- **IP PacketLoss** is the total number of lost video packets within the threshold range.
- **IP PacketJitter** is the variance of the real-time transport protocol (RTP) data packet inter-arrival time.

- **IGMP ZAPTime** is the time required for a channel change when traffic is being transferred between the central network and STB.
- **PCR Jitter** is the short-term variation in the arrival of program clock reference (PCR) information at the video decoder.
- **MDI:DF** is the media delivery index (MDI) delay factor (DF) which monitors the amount of time the video must be delayed in the virtual buffer due to cumulative IP packet jitter and IP packetization.
- **MDI:MLR** is the media delivery index (MDI) media loss rate (MLR), which monitors the amount of media packet loss experienced per second.
- **Details** button shortcuts to the applicable tab which provides more information about a particular test result.

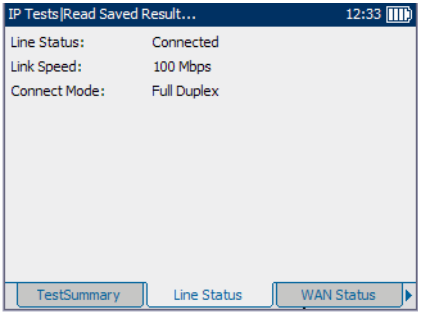
To view more information about each available test result:

1. Press the up/down arrows to highlight the **Details** button alongside the desired test result.
2. Press ✔ to select the desired **Details** button.

Line Status

The **Line Status** tab allows you to view the conditions of the line under test which was configured in the connection setup.

The available test results are the following:

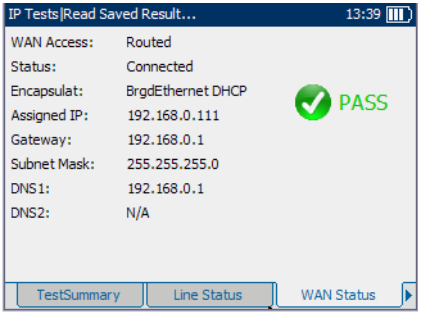


- **Line Status** displays either **Connected** or **Disconnected** for the particular line connection under test.
- **LinkSpeed** is a choice between **AUTO** (negotiated during the link establishment), **100** or **10 Mbps**.
- **ConnectMode** is **FULL_DUP** or **HALF_DUP**, when **Link Speed** is set to either **100** or **10 Mbps**.

WAN Status

The **WAN Status** tab allows you to view the status of the connection between the wide area network and the ISP.

The available test results are the following:

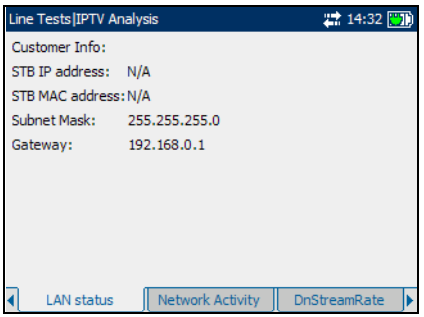


- **WAN Access** specifies the type of wide area network access, either **Bridged** or **Routed** mode.
- **Status** displays either **Connected** or **Disconnected** for the particular line connection under test.
- **Encapsulat** is the encapsulation method used by the network and consists of the following types.
  - **PPPoE** is point-to-point protocol over Ethernet.
  - **Bridged Ether DHCP** is also known as multi-protocol encapsulation over ATM (MPoA).
- **Assigned IP** is the IP address information assigned to the unit that is actively connected to your network or the internet at the time of login.
- **Gateway** is the IP address of the default gateway.
- **Subnet Mask** is the network address used to identify if the IP address is within the same wide area network.
- **DNS1** is the address of the *primary* domain name server to be used by the unit.
- **DNS2** is the address of the *secondary* domain name server to be used by the unit.

LAN Status

The **LAN Status** tab allows you to view the **Customer Info** configured for the local area network (LAN).

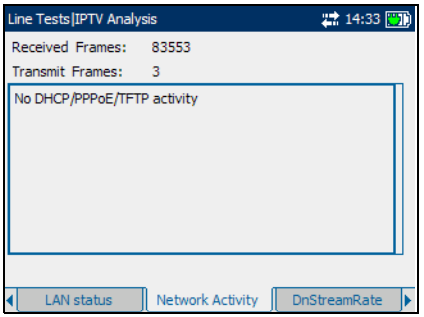
The available information is as follows:



- **STB IP address** is the IP address of the set-top box (STB) connected to the LAN port.
- **STB MAC address** is the MAC address of the STB connected to the LAN port.
- **Subnet Mask** is the network address used to identify if the IP address is within the same local area network.
- **Gateway** is the IP address of the default gateway.

Network Activity

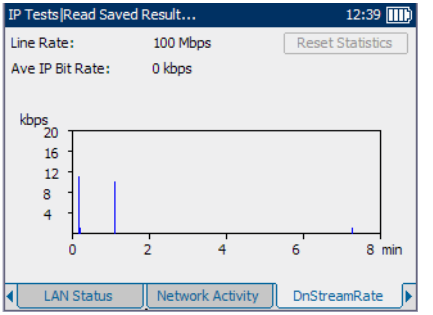
The **Network Activity** tab allows you to view the **PPPoE** (point-to-point protocol over Ethernet), **DHCP** (dynamic host configuration protocol) and **TFTP** (trivial file transfer protocol) mode sessions resulting from the video tests.



Down Stream Rate

The **DnStreamRate** tab allows you to view the bit rates of different layers related to the IPTV service.

The available test results are the following:

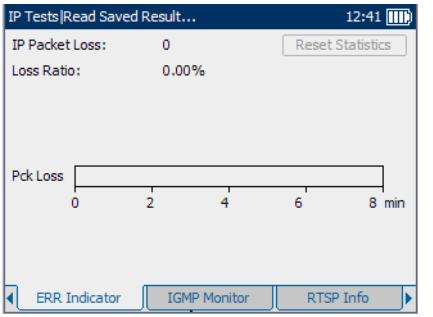


- **Line Rate** is the actual rate achieved by the circuit, in kbps.
- **Ave IP Bit Rate** is the average IP data rate for the IPTV service, including all channels detected.
- **Reset Statistics** button sets all monitoring values to 0.

ERR Indicator

The **ERR Indicator** tab allows you to view the errors encountered at the different layers related to the IPTV service.

The available test results are the following:

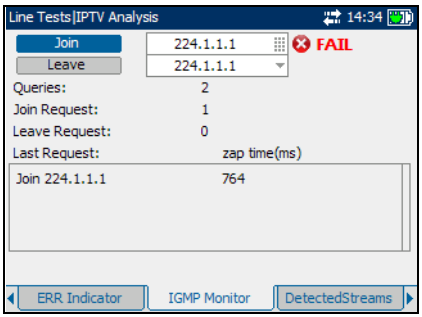


- **IP Packet/Pck Loss** is the number of packets lost, with errors, or out of sequence, during the test period.
- **Loss Ratio** is the percentage of IP packet loss during a one second period.
- **Reset Statistics** button sets all monitoring values to 0.

IGMP Monitor

The **IGMP Monitor** tab allows you to confirm that IGMP traffic is being transferred between the central network and STB, and view the statistics.

The available statistics are the following:



- **Queries** counts the number of IGMP queries issued by the network.
- **Join Request** is the number of unsolicited IGMP "joins" issued by the STB or the user.
- **Leave Request** is the number of IGMP "leaves" issued by the STB or the user.
- **Last Request** displays the multicast addresses for **Join**/**Leave** channels.
- **zap time(ms)** is the time required for a channel change or join, and is one of the key factors to be considered when evaluating the IPTV quality of service (QoS).

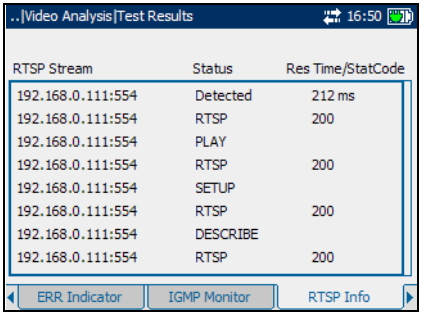
To start/stop reporting:

1. To have the STB send an IGMP report with the multicast IP address, press **Join**.
2. To inform the network to stop sending the current stream, press **Leave**.

RTSP Info

The **RTSP Info** tab allows you to view the media stream sessions established by the real time streaming protocol (RTSP).

The available test results are the following:



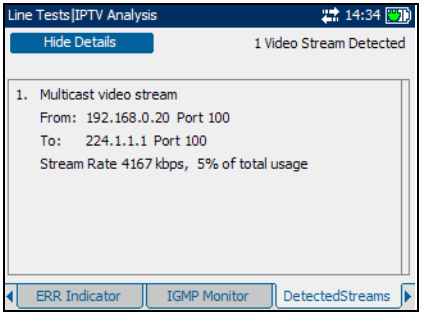
- **RTSP Stream** is the IP address of the last RTSP server port.
- **Status** displays a message for the condition of the last RTSP.
- **Res Time** is the response time in ms from video request to incoming video data.
- **StatCode** displays the RTSP status codes defined as follows:
  - 100 - Continue
  - 200 - OK
  - 201 - Created
  - 250 - Low on Storage Space
  - 300 - Multiple Choices
  - 301 - Moved Permanently
  - 302 - Moved Temporarily
  - 303 - See Other
  - 304 - Not Modified
  - 305 - Use Proxy
  - 400 - Bad Request
  - 401 - Unauthorized
  - 402 - Payment Required
  - 403 - Forbidden
  - 404 - Not Found
  - 405 - Method Not Allowed

- 406 - Not Acceptable
- 407 - Proxy Authentication Required
- 408 - Request Time-out
- 410 - Gone
- 411 - Length Required
- 412 - Precondition Failed
- 413 - Request Entity Too Large
- 414 - Request-URI Too Large
- 415 - Unsupported Media Type
- 451 - Parameter Not Understood
- 452 - Conference Not Found
- 453 - Not Enough Bandwidth
- 454 - Session Not Found
- 455 - Method Not Valid in This State
- 456 - Header Field Not Valid for Resource
- 457 - Invalid Range
- 458 - Parameter Is Read-Only
- 459 - Aggregate operation not allowed
- 460 - Only aggregate operation allowed
- 461 - Unsupported transport
- 462 - Destination unreachable
- 463 - Key management Failure
- 500 - Internal Server Error
- 501 - Not Implemented
- 502 - Bad Gateway
- 503 - Service Unavailable
- 504 - Gateway Time-out
- 505 - RTSP Version not supported
- 551 - Option not supported

Detected Streams

The **DetectedStreams** tab allows you to view the details of detected video streams.

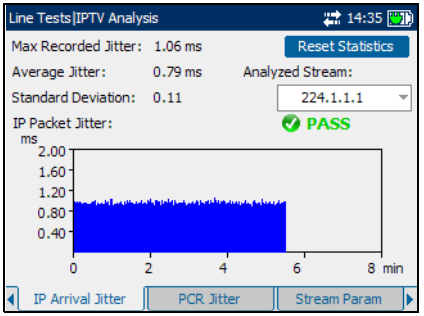
The available test results are the following:



- **Show Details** button, when pressed, displays a detailed description of the stream including from and to IP addresses and port numbers.
- **Stream IP** is the multicast IP address assigned to a specific channel.
- **Type** describes the video stream as:
  - **RTSP**: video on demand (VOD) or live TV streaming over connection based on RTP/RTSP/TCP or RTSP/TCP.
  - **Unicast**: unicast streaming over connection based on UDP or RTP/UDP.
  - **Multicast**: multicast streaming based on UDP or RTP/UDP.
- **Rates** is the IP packet rate in Kbps for this video stream.
- **Usage** is the percentage of total bandwidth being used by this particular video stream.

IP Arrival Jitter

The **IP Arrival Jitter** tab allows you to view the **PASS/FAIL** status of the registered **IP Packet Jitter** for the video stream with a selected multicast IP address assigned to the specific video channel or **Analyzed Stream**.



The available test results are the following:

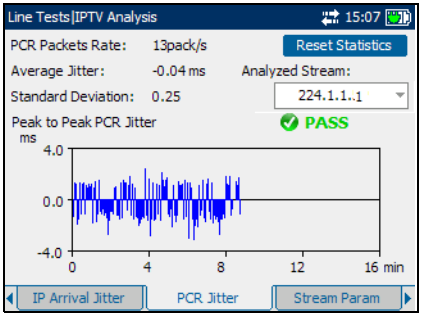
- **Max Recorded Jitter** is the maximum jitter detected, in **ms**.
- **Average Jitter** is the continuous running average of the jitter detected, in **ms**.
- **Standard Deviation** is based on the continuous sample size.
- **Reset Statistics** button clears all monitoring values.

The default monitoring interval is 8 minutes.

PCR Jitter

The **PCR Jitter** tab allows you to view the **PASS/FAIL** status of the **Peak to Peak PCR Jitter** for the short-term variation in the arrival of the program clock reference (PCR) information at the video decoder.

The available test results are the following:



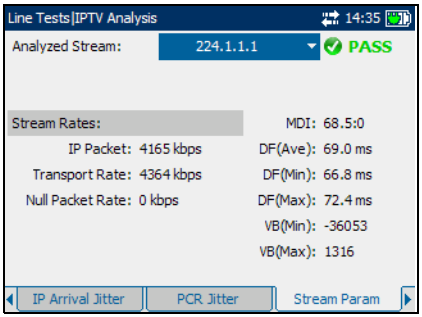
- **PCR Packets Rate** is the number of received packets monitored over a one-second period.
- **Average Jitter** is the continuous running average of the jitter detected, measured in ms.
- **Analyzed Stream** is the multicast IP address assigned to the specific video channel.
- **Standard Deviation** is based on the continuous sample size.
- **Reset Statistics** button clears all monitoring values.

The default monitoring interval is 8 minutes.

Stream Parameters

The **Stream Param** tab allows you to view the detected video **Stream Rates** and the **PASS/FAIL** status of the multicast IP address assigned to the specific video channel or **Analyzed Stream**.

The available test results are the following:



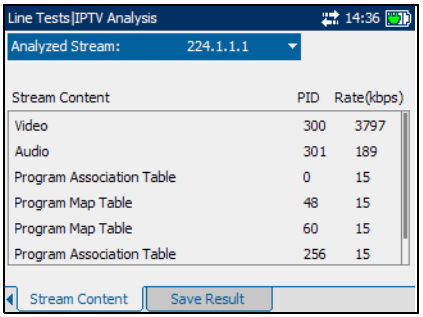
- **IP Packet** is the IP data rate for the IPTV service, for the selected channel.
- **Transport Rate** is the bit rate calculated based on the program clock reference (PCR).
- **Null Packet Rate** is the rate calculated for MPEG2-TS null packets. Null packets are defined as having no data.
- **MDI** is the media delivery index (MDI) or IP cumulative jitter and packet loss rate for the video stream.
- **DF(Ave)** is the average delay factor (DF) or the average amount of time the video must be delayed in the virtual buffer due to cumulative IP packet jitter and IP packetization.
- **DF(Min)** is the minimum delay factor (DF) or the minimum amount of time the video must be delayed in the virtual buffer due to cumulative IP packet jitter and IP packetization.
- **DF(Max)** is the maximum delay factor (DF) or the maximum amount of time the video must be delayed in the virtual buffer due to cumulative IP packet jitter and IP packetization.
- **VB(Min)** is the minimum virtual buffer (VB).
- **VB(Max)** is the maximum virtual buffer (VB).

Stream Content

The **Stream Content** tab allows you to view statistical information about the **Video**, **Audio** and **Program Association/Map Table**(s) content for each MPEG video **Analyzed Stream**.

The available statistical results are the following:

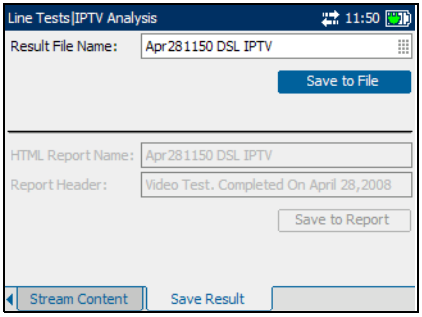
- **PID** is a unique integer value or packet identifier (PID) that indicates the type of data that is stored in the packet payload of the video stream.
- **Rate(kbps)** is the rate calculated for a given stream.



Saving Results

Save Result

The **Save Result** tab allows you to save your test results to a file or to an HTML report.



Each entry on the pane is described as follows:

- **Result File Name** is the current date and time stamp plus you can enter any filename.

  Save to File button saves the file in memory.

- **HTML Report Name** is the current date and time stamp plus you can enter any name for the HTML file.

- **Report Header** is where you can enter any comment. The initial value is the current test followed by the date and time stamp.

  Save to Report button saves the results to the HTML report.

7 Data Analysis

The purpose of the Data Analysis test function is to have the unit act as a DSL modem allowing you to connect from your computer to the internet via the unit's Ethernet port. The unit will display the connected DSLAM parameters as well as bandwidth utilization, statistics for the IP traffic, and the different protocols detected as you send and receive information.

To view the available tabs:

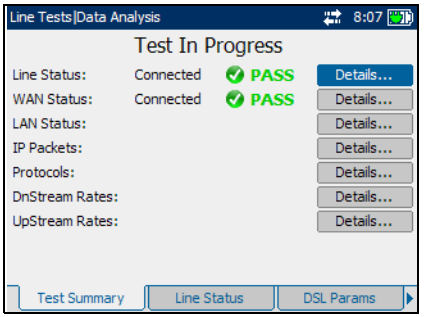
Press the left/right function arrows on each side of the F1, F2, and F3 keys.

Reading Results

Test Summary

The **Test Summary** tab allows you to view the **PASS/FAIL** status and **Details** of the different tests. If a measured value is out the thresholds configured in the data analysis setup, or if the WAN/LAN connection was not completed successfully, the **Test Summary** pane will display a **FAIL** message.

The available test results are the following:



- **Line Status** displays either **Connected** or **Disconnected** for the particular line connection under test.
- **WAN Status** displays whether the unit is **Connected** to the wide area network, or in idle mode.
- **LAN Status** displays if the unit is **Connected** to the local area network.
- **IP Packets** provides a summary of the total amount of data received (being addressed to) and sent by a specific device on the local network.

- **Protocols** presents a summary of the different protocols used by the local network devices.
- **DnStream Rates** displays whether the maximum attainable downstream bit rate that the circuit can handle is within the threshold range.
- **UpStream Rates** displays whether the maximum attainable upstream bit rate that the circuit can handle is within the threshold range.
- **Details** button shortcuts to the applicable tab which provides more information about a particular test result.

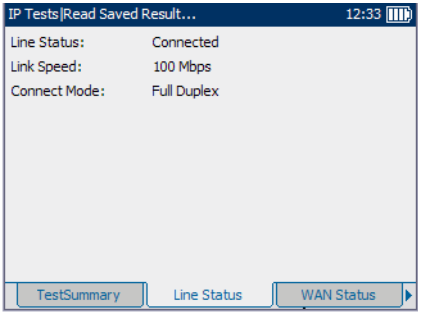
To view more information about each available test result:

1. Press the up/down arrows to highlight the **Details** button alongside the desired test result.
2. Press ✔ to select the desired **Details** button.

Line Status

The **Line Status** tab allows you to view the conditions of the line under test which was configured in the connection setup.

The available test results are the following:

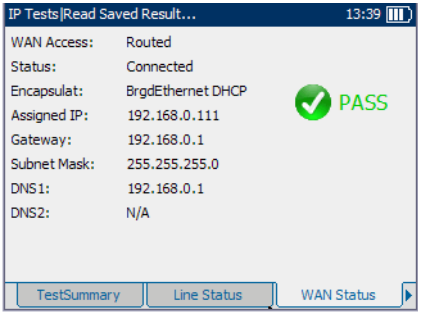


- **Line Status** displays either **Connected** or **Disconnected** for the particular line connection under test.
- **LinkSpeed** is a choice between **AUTO** (negotiated during the link establishment), **100** or **10 Mbps**.
- **ConnectMode** is **FULL_DUP** or **HALF_DUP**, when **Link Speed** is set to either **100** or **10 Mbps**.

WAN Status

The **WAN Status** tab allows you to view the status of the connection between the wide area network and the ISP.

The available test results are the following:

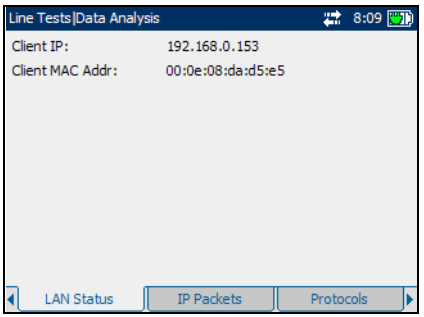


- **WAN Access** specifies the type of wide area network access, either **Bridged** or **Routed** mode.
- **Status** displays either **Connected** or **Disconnected** for the particular line connection under test.
- **Encapsulat** is the encapsulation method used by the network and consists of the following types.
  - **PPPoE** is point-to-point protocol over Ethernet.
  - **Bridged Ether DHCP** is also known as multi-protocol encapsulation over ATM (MPoA).
- **Assigned IP** is the IP address information assigned to the unit that is actively connected to your network or the internet at the time of login.
- **Gateway** is the IP address of the default gateway.
- **Subnet Mask** is the network address used to identify if the IP address is within the same wide area network.
- **DNS1** is the address of the *primary* domain name server to be used by the unit.
- **DNS2** is the address of the *secondary* domain name server to be used by the unit.

LAN Status

The **LAN Status** tab allows you to view the customer information configured for the local area network (LAN).

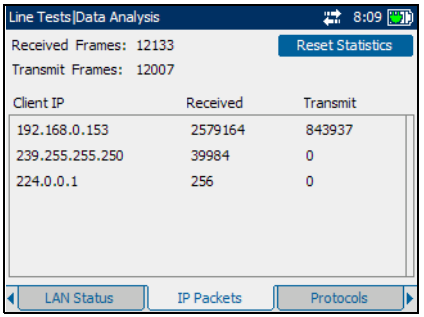
The available information is as follows:



- **Client IP** is the IP address of the network device connected to the LAN port.
- **Client MAC Addr** is the MAC address of the network device connected to the LAN port.
- **LAN IP** is the local network IP address of the unit.
- **LAN SubMask** is the network address mask used to identify if the IP address is within the same local area network.

IP Packets

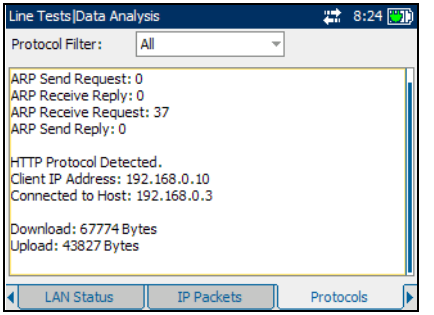
The **IP Packets** tab allows you to view the IP traffic statistics summary of the total amount of data **Received** (being addressed to) and sent (**Transmit**) for each **Client IP** address.



- **Client IP** the source IP address of the different requests.
- **Reset Statistics** button clears all monitoring information.

Protocols

The **Protocols** tab allows you to view a summary of the different protocols detected by the local network devices.



The screen identifies the source IP address (**Client IP Address**) of the different requests, as well as the amount of transmitted (**Download**) and received (**Upload**) information.

Protocols are displayed in reverse order with the most recent activity first.

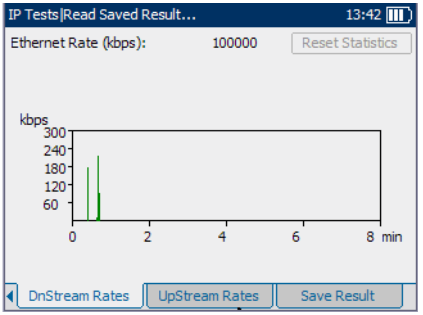
Protocol Filter lists the different types of protocols that can be monitored such as: **RTP, SIP, MGCP, SCCP**, and **HTTP**.

Down Stream Rates

The **DnStream Rates** tab allows you to view the maximum achieved downstream data rates for the data stream layers of the connection.

The available test results are the following:

- **Ethernet Rate (kbps)** is the actual downstream rate.
- **Reset Statistics** button sets all monitoring values to 0.

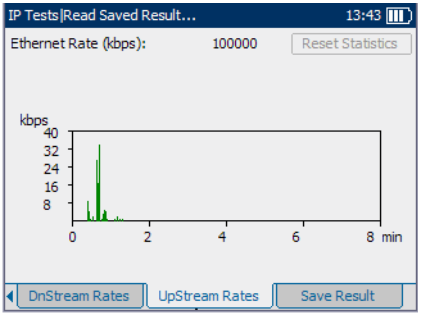


Up Stream Rates

The **UpStream Rates** tab allows you to view the maximum achieved upstream data rates for the data stream layers of the connection.

The available test results are the following:

- **Ethernet Rate (kbps)** is the actual upstream rate.
- **Reset Statistics** button sets all monitoring values to 0.

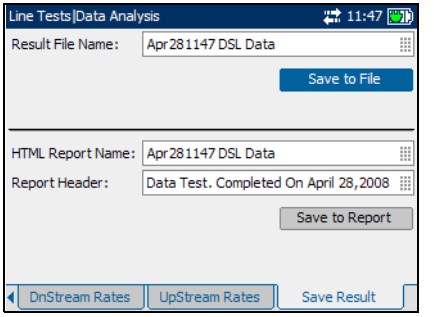


Saving Results

Save Result

The **Save Result** tab allows you to save your test results to a file or to an HTML report.

The available entries are the following:



- **Result File Name** is the current date and time stamp plus you can enter any filename.

  Save to File button saves the file in memory.

- **HTML Report Name** is the current date and time stamp plus you can enter any name for the HTML file.

- **Report Header** is where you can enter any comment. The initial value is the current test followed by the date and time stamp.

  Save to Report button saves the results to the HTML report.

8 Running a VoIP Test

The purpose of the VoIP analysis test function is to allow you to configure the unit for VoIP testing. During the analysis, the unit determines the IP packet rate and calculates jitter, packet loss, and packet delay. Results are displayed on the following tabs.

To view the available tabs:

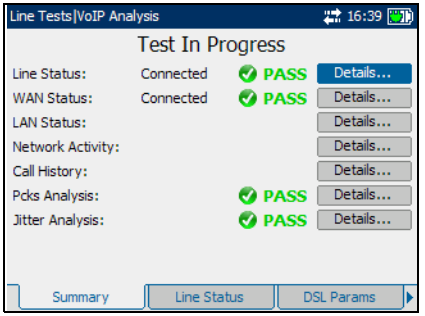
Press the left/right function arrows on each side of the F1, F2, and F3 keys.

Reading Results

Summary

The **Summary** tab allows you to view the **PASS/FAIL** status and **Details** of the different tests. If a measured value is out the thresholds configured in the VoIP analysis setup, or if the WAN/LAN connection was not completed successfully, the **Summary** pane will display a **FAIL** message.

The available test results are the following:



- **Line Status** displays either **Connected** or **Disconnected** for the particular line connection under test.
- **WAN Status** displays whether the unit is **Connected** to the wide area network, or in idle mode.
- **LAN Status** displays if the unit is **Connected** to the local area network.
- **Network Activity** displays whether or not voice protocol registration activity is detected.
- **Call History** specifies the signaling protocol being used and determines the state of the call along with the call flow.
- **Pcks Analysis** displays the status of the percentage of packets of varying inter-arrival rates that are within 10 milliseconds of each other.

- **Jitter Analysis** is the status of the quality of the call by displaying an estimate of the variance of the real-time transport protocol (RTP) data packet inter-arrival time.
- **Details** button shortcuts to the applicable tab which provides more information about a particular test result.

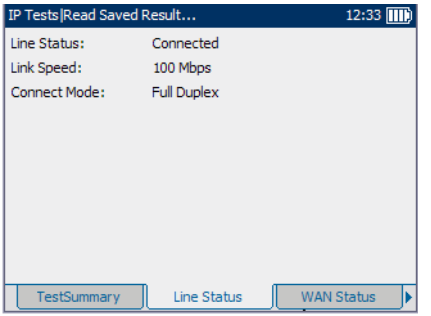
To view more information about each available test result:

1. Press the up/down arrows to highlight the **Details** button alongside the desired test result.
2. Press ✔ to select the desired **Details** button.

Line Status

The **Line Status** tab allows you to view the conditions of the line under test which was configured in the connection setup.

The available test results are the following:

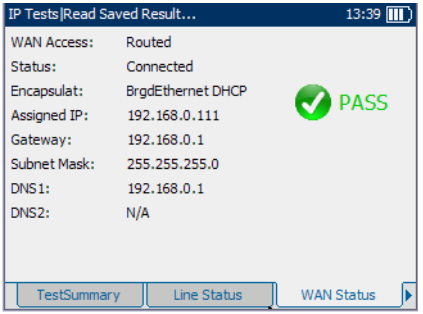


- **Line Status** displays either **Connected** or **Disconnected** for the particular line connection under test.
- **LinkSpeed** is a choice between **AUTO** (negotiated during the link establishment), **100** or **10 Mbps**.
- **ConnectMode** is **FULL_DUP** or **HALF_DUP**, when **Link Speed** is set to either **100** or **10 Mbps**.

WAN Status

The **WAN Status** tab allows you to view the status of the connection between the wide area network and the ISP.

The available test results are the following:

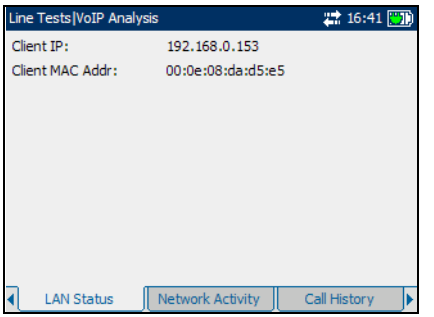


- **WAN Access** specifies the type of WAN access, either **Bridged** or **Routed** mode.
- **Status** displays either **Connected** or **Disconnected** for the particular line connection under test.
- **Encapsulat** is the encapsulation method used by the network and consists of four types.
  - **PPPoE** is point-to-point protocol over Ethernet.
  - **Bridged Ether DHCP** is also known as multi-protocol encapsulation over ATM (MPoA).
- **Assigned IP** is the IP address information assigned to the unit that is actively connected to your network or the internet at the time of login.
- **Gateway** is the IP address of the default gateway.
- **Subnet Mask** is the network address used to identify if the IP address is within the same wide area network.
- **DNS1** is the address of the *primary* domain name server to be used by the unit.
- **DNS2** is the address of the *secondary* domain name server to be used by the unit.

LAN Status

The **LAN Status** tab allows you to view the customer information configured for the local area network (LAN).

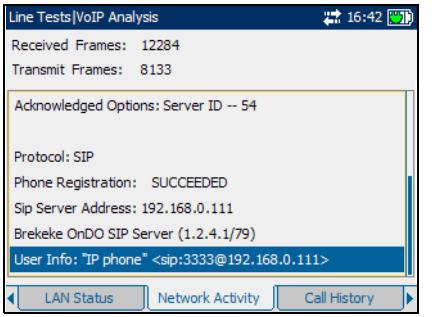
The available information is as follows:



- **Client IP** is the IP address of the network device connected to the LAN port.
- **Client MAC Addr** is the MAC address of the network device connected to the LAN port.
- **LAN IP** is the local network IP address of the unit.
- **LAN SubMask** is the network address mask used to identify if the IP address is within the same local area network.

Network Activity

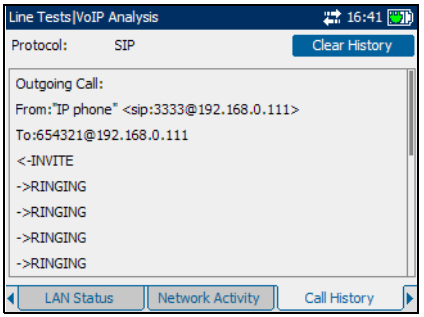
The **Network Activity** tab allows you to view the **PPoE** (Point-to-Point Protocol over Ethernet), **DHCP** (Dynamic Host Configuration Protocol) and **TFTP** (Trivial File Transfer Protocol) mode sessions resulting from the voice tests. It displays whether or not registration activity for the voice protocol is detected.



SIP (Session Initiation Protocol) is a signalling protocol used for establishing sessions in an IP network.

Call History

The **Call History** tab allows you to view the detailed call flow of the detected voice protocol. **SIP** (Session Initiation Protocol) is a signalling protocol used for establishing sessions in an IP network.

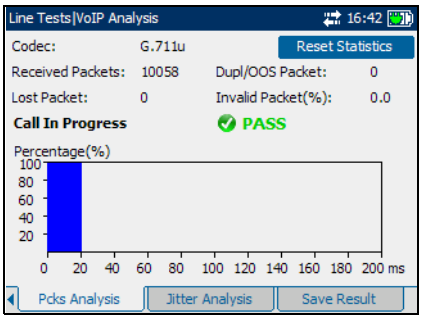


The **Clear History** button clears all information displayed.

Packets Analysis

The **Pcks Analysis** tab allows you to view the **PASS/FAIL** status of the percentage of packets of varying inter-arrival rates that are within 10 milliseconds of each other.

The available test results are the following:

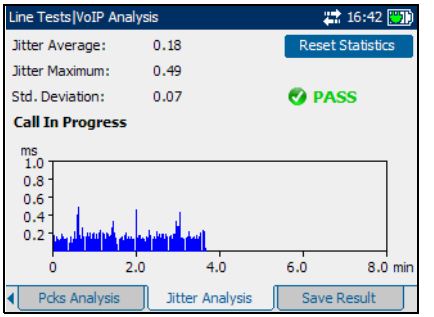


- **Codec** is the VoIP coder/decoder in use as detected by the unit.
- **Received Packets** display the total number of received VoIP packets.
- **Lost Packet** is the total number of lost VoIP packets that were never received during the conversation.
- **Dupl/OOS Packet** is the total number of duplicated (Dupl) or out of sequence (OOS) packets.
- **Invalid Packet(%)** represents a QoS reference factor of lost packets detected during the VoIP conversation.
- **Reset Statistics** button sets all monitoring values to 0.

Jitter Analysis

The **Jitter Analysis** tab allows you to view the **PASS/FAIL** status of the quality of the call by displaying an estimate of the variance of the real-time transport protocol (RTP) data packet inter-arrival time.

The available test results are:



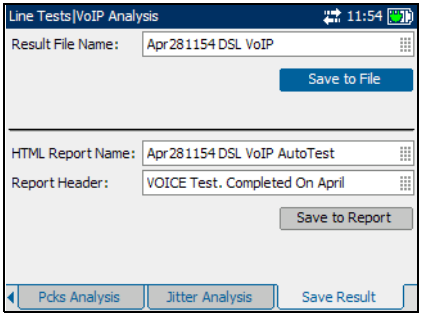
- **Jitter Average** is the continuous running average jitter.
- **Jitter Maximum** is the maximum jitter detected.
- **Std. Deviation** is the standard deviation based on the continuous sample size.
- **Reset Statistics** button sets all monitoring values to 0.

Saving Results

Save Result

The **Save Result** tab allows you to save your test results to a file or to an HTML report.

The available entries are the following:



- **Result File Name** is the current date and time stamp plus you can enter any filename.

  Save to File button saves the file in memory.

- **HTML Report Name** is the current date and time stamp plus you can enter any name for the HTML file.

- **Report Header** is where you can enter any comment. The initial value is the current test followed by the date and time stamp.

  Save to Report button saves the results to the HTML report.

9 Troubleshooting

Solving Common Problems

The table below presents common problems and their solution.

Problem	Possible Cause	Solution
Impossible to turn on unit.	➤ You did not press ⏻ long enough. ➤ Main batteries discharged. ➤ Battery compartment door is open. ➤ One of the two batteries is missing. ➤ Weather too cold.	➤ Press ⏻ for 2 seconds. ➤ Charge batteries by connecting the AC adapter/charger. ➤ Close battery compartment door. ➤ Insert 2 batteries and replace battery compartment door.
The display is almost blank when you turn on the unit.	Brightness may need some adjustment.	Press ☼ to adjust brightness properly.
Batteries do not charge as expected.	➤ Temperature is too high. ➤ Battery is incorrectly connected.	➤ Ensure temperature is within specifications. ➤ Ensure battery is connected properly.
A battery status LED is yellow.	Battery is defective.	Contact EXFO or replace the battery.
The unit is not responding.		Shut down the unit by pressing ⏻ and holding it down. You will hear a first beep; release the key after you hear a second beep. Turn the unit on again to reset it.

Contacting the Technical Support Group

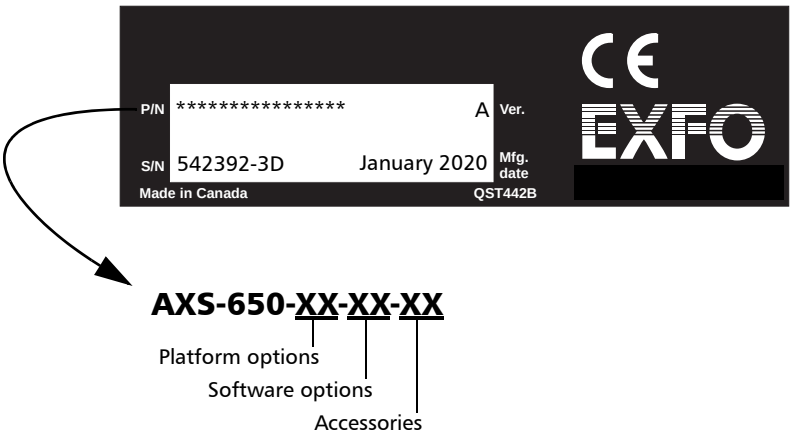
To obtain after-sales service or technical support for this product, contact EXFO at one of the following numbers. The Technical Support Group is available to take your calls from Monday to Friday, 8:00 a.m. to 7:00 p.m. (Eastern Time in North America).

For detailed information about technical support, visit the EXFO Web site at www.exfo.com.

Technical Support Group
400 Godin Avenue
Quebec (Quebec) G1M 2K2
CANADA

1 866 683-0155 (USA and Canada)
Tel.: 1 418 683-5498
Fax: 1 418 683-9224
support@exfo.com

To accelerate the process, please have information such as the name and the serial number (see the product identification label—an example is shown below), as well as a description of your problem, close at hand.



Transportation

Maintain a temperature range within specifications when transporting the unit. Transportation damage can occur from improper handling. The following steps are recommended to minimize the possibility of damage:

- Pack the unit in its original packing material when shipping.
- Avoid high humidity or large temperature fluctuations.
- Keep the unit out of direct sunlight.
- Avoid unnecessary shocks and vibrations.

10 Maintenance

General Maintenance

To help ensure long, trouble-free operation:

- Keep the unit free of dust.
- Clean the unit casing and front panel with a cloth slightly dampened with water.
- Store unit at room temperature in a clean and dry area. Keep the unit out of direct sunlight.
- Avoid high humidity or significant temperature fluctuations.
- Avoid unnecessary shocks and vibrations.
- If any liquids are spilled on or into the unit, turn off the power immediately and let the unit dry completely.

WARNING

Use of controls, adjustments, and procedures for operation and maintenance other than those specified herein may result in hazardous radiation exposure.

Battery Charging and Replacing

Charging the AXS-620 battery can take up to 1.5 hours. This battery was custom made for your unit; replacement batteries must be ordered from EXFO.

For more information about the battery, refer to the *Maintenance* chapter of the AXS-200 User Guide.

Recycling and Disposal (Applies to European Union Only)

Recycle or dispose of your product (including electric and electronic accessories) properly, in accordance with local regulations. Do not dispose of it in ordinary garbage receptacles.

This equipment was sold after August 13, 2005 (as identified by the black rectangle).

- Unless otherwise noted in a separate agreement between EXFO and a customer, distributor or commercial partner, EXFO will cover costs related to the collection, treatment, recovery, and disposal of end-of-lifecycle waste generated by electronic equipment introduced after August 13, 2005 to an European Union member state with legislation regarding Directive 2002/96/EC.
- Except for reasons of safety or environmental benefit, equipment manufactured by EXFO, under its brand name, is generally designed to facilitate dismantling and reclamation.

For complete recycling/disposal procedures and contact information, visit the EXFO Web site at www.exfo.com/recycle.

11 Warranty

General Information

EXFO Electro-Optical Engineering Inc. (EXFO) warrants this equipment against defects in material and workmanship for a period of one year from the date of original shipment. EXFO also warrants that this equipment will meet applicable specifications under normal use.

During the warranty period, EXFO will, at its discretion, repair, replace, or issue credit for any defective product, as well as verify and adjust the product free of charge should the equipment need to be repaired or if the original calibration is erroneous. If the equipment is sent back for verification of calibration during the warranty period and found to meet all published specifications, EXFO will charge standard calibration fees.

IMPORTANT

The warranty can become null and void if:

- **unit has been tampered with, repaired, or worked upon by unauthorized individuals or non-EXFO personnel.**
- **warranty sticker has been removed.**
- **case screws, other than those specified in this guide, have been removed.**
- **case has been opened, other than as explained in this guide.**
- **unit serial number has been altered, erased, or removed.**
- **unit has been misused, neglected, or damaged by accident.**

THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES EXPRESSED, IMPLIED, OR STATUTORY, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. IN NO EVENT SHALL EXFO BE LIABLE FOR SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES.

Liability

EXFO shall not be liable for damages resulting from the use of the product, nor shall be responsible for any failure in the performance of other items to which the product is connected or the operation of any system of which the product may be a part.

EXFO shall not be liable for damages resulting from improper usage or unauthorized modification of the product, its accompanying accessories and software.

Exclusions

EXFO reserves the right to make changes in the design or construction of any of its products at any time without incurring obligation to make any changes whatsoever on units purchased. Accessories, including but not limited to fuses, pilot lamps, batteries and universal interfaces (EUI) used with EXFO products are not covered by this warranty.

This warranty excludes failure resulting from: improper use or installation, normal wear and tear, accident, abuse, neglect, fire, water, lightning or other acts of nature, causes external to the product or other factors beyond EXFO's control.

Certification

EXFO certifies that this equipment met its published specifications at the time of shipment from the factory.

Service and Repairs

EXFO commits to providing product service and repair for five years following the date of purchase.

To send any equipment for service or repair:

1. Call one of EXFO's authorized service centers (see *EXFO Service Centers Worldwide* on page 80). Support personnel will determine if the equipment requires service, repair, or calibration.
2. If equipment must be returned to EXFO or an authorized service center, support personnel will issue a Return Merchandise Authorization (RMA) number and provide an address for return.
3. If possible, back up your data before sending the unit for repair.
4. Pack the equipment in its original shipping material. Be sure to include a statement or report fully detailing the defect and the conditions under which it was observed.
5. Return the equipment, prepaid, to the address given to you by support personnel. Be sure to write the RMA number on the shipping slip. *EXFO will refuse and return any package that does not bear an RMA number.*

Note: *A test setup fee will apply to any returned unit that, after test, is found to meet the applicable specifications.*

After repair, the equipment will be returned with a repair report. If the equipment is not under warranty, you will be invoiced for the cost appearing on this report. EXFO will pay return-to-customer shipping costs for equipment under warranty. Shipping insurance is at your expense.

Routine recalibration is not included in any of the warranty plans. Since calibrations/verifications are not covered by the basic or extended warranties, you may elect to purchase FlexCare Calibration/Verification Packages for a definite period of time. Contact an authorized service center (see *EXFO Service Centers Worldwide* on page 80).

EXFO Service Centers Worldwide

If your product requires servicing, contact your nearest authorized service center.

EXFO Headquarters Service Center
400 Godin Avenue
Quebec (Quebec) G1M 2K2
CANADA

1 866 683-0155 (USA and Canada)
Tel.: 1 418 683-5498
Fax: 1 418 683-9224
quebec.service@exfo.com

EXFO Europe Service Center
Omega Enterprise Park, Electron Way
Chandlers Ford, Hampshire S053 4SE
ENGLAND

Tel.: +44 2380 246810
Fax: +44 2380 246801
europe.service@exfo.com

EXFO China Service Center/
Beijing OSIC
Beijing New Century Hotel
Office Tower, Room 1754-1755
No. 6 Southern Capital Gym Road
Beijing 100044
P. R. CHINA

Tel.: +86 (10) 6849 2738
Fax: +86 (10) 6849 2662
beijing.service@exfo.com

A Technical Specifications

IMPORTANT

The following technical specifications can change without notice. The information presented in this section is provided as a reference only. To obtain this product's most recent technical specifications, visit the EXFO Web site at *www.exfo.com*.

IPTV TESTING SUITE

Supported video compression/standards	MPEG2, MPEG4 part 2 and 10 (H.264/AVC), WM9
Video streaming control	Video streaming (channels) detection IGMP joins/leaves
Operation	Through mode or stand-alone with STB IGMP emulation
Analysis and statistics	IP layer analysis Bandwidth usage per channel IGMP packets Set-top box (STB) traffic Key IP video QoS parameters: packet loss, packet jitter, zap time PCR jitter, PID statistics Media delivery index (MDI) (option) QoS pass/fail indicators Multicast/unicast RTP/UDP TCP/RTSP VOD
Graphic results	Bandwidth usage IP packet and PCR jitter histograms

VoIP ANALYSIS SUITE (VoIP TESTING)

Recognized signaling protocol	Session initiation protocol (SIP) v2 (RFC)
Operation	Through mode
Call monitoring/analysis	IP layer call statistics Call flow Codec indicator (G.711, G.729, G.726, G.723) Key VoIP QoS parameters: packet loss, packet jitter QoS pass/fail indicators
Graphic results	Delay distribution, jitter histogram

DATA ANALYSIS MODE

Login format	Username and password using PAP or CHAP
IP options	Routing functionality, NAT, DNS support
Ping	Pings another device on the network Device: gateway, destination IP address or URL Configurable number of pings (1 to 99) Packet size: 32 to 1500 bytes (32 is default) Results: indicate packet size, packets sent/received, minimum/average/maximum round-trip times in milliseconds (ms)
Traceroute	Determines the path used to reach device on the network Timeout in seconds Time to live (TTL) (default is 100 ms, maximum is 5 s) Packet size: 32 bytes Number of hops: 1 to 30 (default is 30) Results indicate IP address of hop and round-trip time in milliseconds (ms)
HTTP speed test	Downloads a Web page and indicates speed of download Address: IP or URL Protocol: HTTP
FTP speed test	FTP upload, FTP download or both Displays speed to upload and/or download a file

IP CONNECTIVITY SUPPORT

Supported functions	DNS, DHCP, client/server, NAT, VLAN (802.1g)

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Printed in Canada (2008-09)

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