USER MANUAL

MTTplus-260

SHDSL Test Module for MTTplus Modular Platform

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1.0 About This User Manual

This user manual is suitable for novice, intermediate, and experienced users and is intended to help you successfully use the features and capabilities of the different modules for test platforms. It is assumed that you have basic computer experience and skills, and are familiar with IP and telecommunication concepts, terminology, and safety.

Every effort was made to ensure that the information contained in this manual is accurate. However, information is subject to change without notice. We accept no responsibility for any errors or omissions. In case of discrepancy, the web version takes precedence over any printed literature.

For more technical resources, visit the VeEX Inc. web site at www.veexinc.com. For assistance or questions related to the use of this product, call or e-mail our customer care department for customer support. Before contacting our customer care department, have the product serial number and software version ready. Please go to the Basic Operations section of the MTTplus Platform Manual for details on locating the unit serial number in the menus or locate the serial number on the back of the chassis. Please provide this number when contacting VeEX customer service.

Customer Care:

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2.0 Introduction to MTTplus 260

SHDSL is ideal for business class services, enterprise networks, and industrial communications that must rely on legacy copper based networks where fiber remains cost prohibitive. Utilizing SHDSL's multiple pair bonding application enables robust data transmission over long copper lines.

MTT Plus SHDSL Test Module provides CPE installation, CO emulation pre-qualification, and IP/ATM services testing capabilities for service installation and verification. The module is based on the industry leading Lantiq SOCRATES chipset, offering best-in-class SHDSL performance and interoperability.

Module Highlights:

- CPE Emulation for standard SHDSL and SHDSL.bis
- Standards SHDSL.bis line rates: Symmetrical 5.7 Mbps per pair
- Key DSL metrics including Data Rate, SNR Margin, and line errors
- EFM and ATM support
- SHDSL/EFM mode for Ethernet based services, offering higher data rates and superior reach for Enterprise and Industrial applications
- Legacy 4-Wire SHDSL/ATM Standard and Enhanced Modes
- EFM Bonding and ATM Bonding up to Four Pairs
- Optional CO Emulation for line prequalification using real SHDSL signals
- Based on the industry leading Lantiq SOCRATES 4e SHDSL Chipset

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3.0 Safety Information

Safety precautions should be observed during all phases of operation of this instrument. The instrument has been designed to ensure safe operation however please observe all safety markings and instructions. Do not operate the instrument in the presence of flammable gases or fumes or any other combustible environment. VeEX Inc. assumes no liability for the customer's failure to comply with safety precautions and requirements.

Optical Connectors

The test sets display a laser warning icon when the laser source is active to alert the user about a potentially dangerous situation. It is recommended to:

1. Deactivate the laser before connecting or disconnecting optical cables or patchcords.
2. Never look directly into an optical patchcord or an XFP's or SFP's connector interface while the laser is enabled. Even though XFP and SFP optical transceivers are typically fitted with Class 1 lasers, which are considered eye safe, optical radiation for an extended period can cause irreparable damage to the eyes.
3. Never use a fiber microscope to check the optical connectors when the laser source is active.

Electrical Connectors

Telephone lines may carry dangerous voltages. Always connect the electrical test ports to known test interfaces which carry low level signals.

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4.0 Basic Operations

Refer to the MTTplus Platform Manual for information about Basic Operations, Home menu, Launching Test Applications, MTTplus Host Chassis features etc.

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5.0 Utilities

Refer to the MTTplus Platform Manual for information about all Utilities and Tools available.

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6.0 SHDSL Testing

6.1 Test Mode

Select your test parameters to match your SHDSL system. When ready, press Retrain to initiate the SHDSL connection with the far end STU device.

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6.2 SHDSL Test Setup

Parameter	Selections	Explanation
Modem Type	STU-R	Customer Premises (CPE) Mode
	STU-C	Central Office (CO) Mode
	STU-R Auto	Auto Mode, *for European Annex B/G systems only*
Number of Pairs	1 Pair / 2 Wires	Select the appropriate number of STU Pairs used in your SHDSL system.
	2 Pairs / 4 Wires	
	3 Pairs / 6 Wires	
	4 Pairs / 8 Wires	
ATM or EFM	ATM	Legacy SHDSL / ATM Mode
	EFM	SHDSL / Ethernet Mode
	ATM Non-STD	Only for use with non-standard 2 Pairs / 4 Wires ATM DSLAMs
	ATM-IMA	Only available for 4 Pairs / 8 Wires, for special IMA mode
Rate Mode	Adaptive	STU will negotiate with the far end to attain the max rate possible
	Fixed	Match the fixed rate set by the far end STU. It is recommended to use Fixed Rate mode whenever possible.
Annex Type	Annex B/G	European SHDSL
	Annex A/F	North American / APAC SHDSL
Test Mode	Terminate	Terminate mode
	Pass Through	Pass Through mode. Functions as a pass through bridge, routing EFM traffic to the module's RJ45 Ethernet port. An end device, such as a PC, must configure appropriate network parameters.
STU RJ45 Port Pins	N/A	For information only about the RJ45 test port pin assignments

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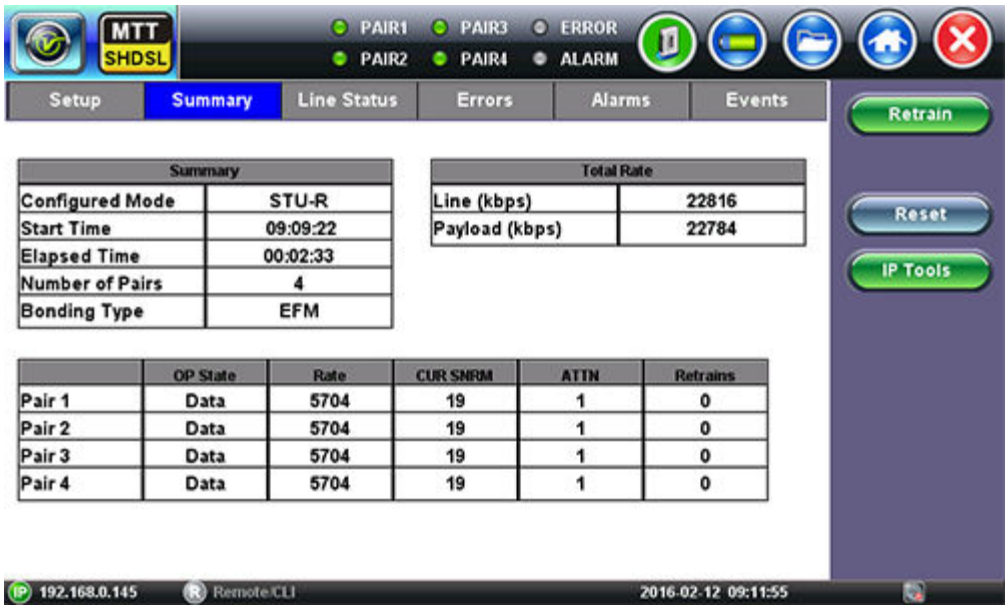
6.3 SHDSL Summary Results

View real time link parameters. Modem results windows provide general performance information on the STU-C and STU-R. For the far end data, “N/A” may be displayed if the far end STU does not transmit its data via EOC.



Summary:

Statistic	Details
Configured Mode	Selected on the Test Mode window.
Start Time	Time test began.
Elapsed Time	Elapsed Time since Retrain is pressed.
Number of Pairs	1, 2, 3, or 4, depending on the selected mode.
Bonding Type	ATM or EFM, depending on the selected mode.

Total Rate:

Statistic	Details
Payload	Data rate; reported in kbps
Line	Data rate plus 8k overhead per pair; reported in kbps

Notes for Payload and Line Rates:
• PL Rate and LN Rate are related. Line Rate is inclusive of overhead.
The difference between the two are 8K. Whenever one configuration is modified, the other one will also be modified.
• For single ended applications, i.e., STU-R emulation testing with a DSLAM, use a fixed rate that matches the expected commercial service rate.

State/Retrains: For each active pair, view the statistics.

Statistic	Details
OP State	Handshake, Line Probing, Training, Data
Retrains	How many times synch has been lost and reacquired

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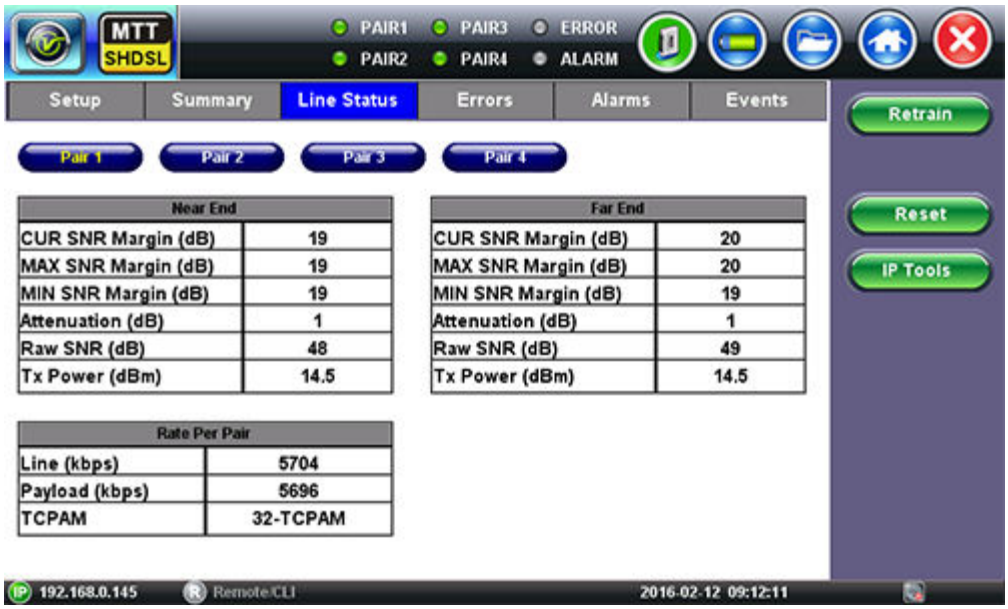
6.4 SHDSL Line Status

Results are available for each active pair. Touch the Pair buttons to see all of the results.



Near End/Far End: For the far end data, “N/A” may be displayed if the measurement is not available from the far end STU device.

Statistic	Details
CUR SNR Margin (dB)	Maximum dB increase in equalized noise or maximum dB decrease in equalized signal that a system can tolerate and maintain a BER of 1E-7.
MAX SNR Margin (dB)	Maximum signal-to-noise margin measured during ET. Reset when either RETRAIN or Esc is pressed.
MIN SNR Margin (dB)	Minimum signal-to-noise margin that is measured during ET. Reset when either RETRAIN or Esc is pressed.
Attenuation (dB)	Loop attenuation
RAW SNR (dB)	Basic signal to noise ratio.
TX Power (dBm)	Transmit power output

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Rate per Pair (kbps)

Statistic	Details
Payload	Data rate; reported in kbps.
Line	Data rate plus 8k overheadper pair; reported in kbps.
TCPAM	TC-PAM modulation mode being used. Typically 16-TCPAM for legacy SHDSL and 32-TCPAM for SHDSL.bis.

Notes for Payload and Line Rates:
• Payload Rate and Line Rate are related. Line Rate is inclusive of overhead. The difference between the two are 8K. Whenever one configuration is modified, the other one will also be modified.
• For single ended applications, i.e., STU-R emulation testing with a DSLAM, use a fixed rate that matches the expected commercial service rate.

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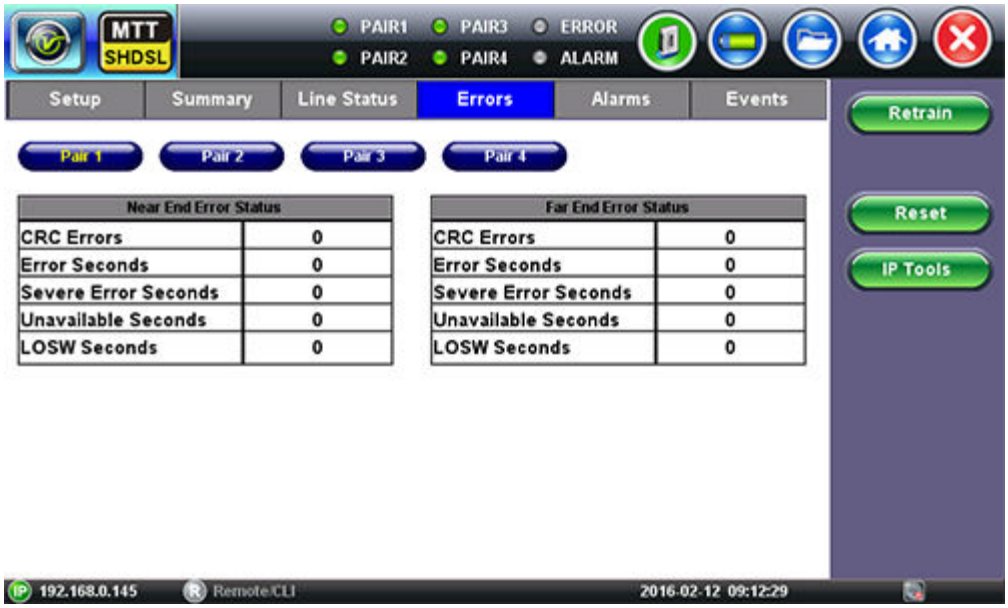
6.5 SHDSL Error Status

Results are available for each active pair. Touch the Pair buttons to see all of the results.



Near End/Far End: For the far end data, “N/A” may be displayed if the measurement is not available from the far end STU device. Counts are reset when RESET is pushed.

Statistic	Details
CRC Errors	Count of CRC errors.
Error SEC	Count of 1 second intervals during which one or more CRC errors are declared and/or one or more LOSW defects are declared.
Unavailable Seconds	Count of 1 second intervals for which the SHDSL line is unavailable, which begins at the onset of 10 contiguous SES seconds.
Severe ERR Seconds	Count of 1 second intervals during which there is a 30% error frame rate for a normal frame length.
LOSW Seconds	Loss of synchronization word second is a count of 1 second intervals during which one or more SHDSL LOSW defects are declared.

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6.6 SHDSL Alarm Status

View general alarm status (current and history for local and remote). Results are available for each active pair. Touch the Pair buttons to see all of the results.

Near End/Far End

These alarm conditions are displayed as current and history. These are defined as:

- Current YES: The alarm condition is currently detected.
- Current NO: The alarm condition is not currently detected.
- History YES: The alarm condition has been detected, but it is no longer present.
- History NO: The alarm condition has never been detected since the start of the test or since pressing LED RESET.

For the far end data, “N/A” is displayed.

Statistic	Details
SNR	Triggered when the local current SNR margin value is below the user threshold setting. For future implementation.
LOSW	Loss of Sync Word defect alarm. A loss of synchronization word defect is declared when at least 3 consecutive received frames contain 1 or more errors. An LOSW defect is cleared when at least 2 consecutive received frames contain no errors.
ATTN	Triggered when the local attenuation value is greater than the user threshold value. For future implementation.

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6.7 Events

Events mode not only logs and displays a time stamped sequence of the SHDSL connection process, but also records modem retrains due to link failures, micro-interruptions and other aberrations. At a mere glance, the technician can quickly identify whether the modem is training successfully and whether or not Data Mode was achieved in a timely manner.

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6.8 ATM Functions

Optional feature. Applies for ATM mode only.

For legacy SHDSL/ATM networks: OAM loopback cells can be used to verify end-to-end connectivity while a segmented OAM ping test can quickly isolate problem locations.

OAM Tx: OAM Cell Generation

- **Type:** Select the type of OAM Cell to transmit.
  - F5EE: F5 End-to-End
  - F5SG: F5 Segment

  - F4EE: F4 End-to-End
  - F4SG: F4 Segment
- **VPI:** Enter the Virtual Path Identifier used in your system.
- **VCI:** Enter the Virtual Channel Identifier used in your system.

When ready, press Start Tx to begin OAM Cell Transmission.

OAM Rx: OAM Received Cells

- **F4:** Count of received F4 OAM cells.
- **F5:** Count of received F5 OAM cells.

OAM Statistics

- **Rate (bps):** Current OAM Cell Rate
- **Count:** Total OAM Cell count
- **Dropped:** Dropped OAM Cell count

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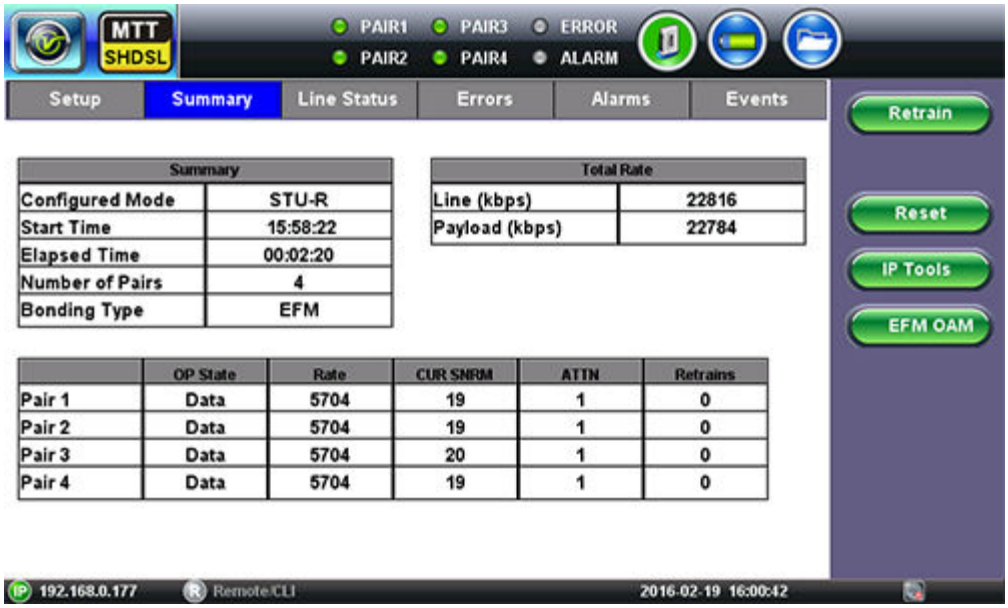
6.9 EFM OAM

This is a basic EFM OAM feature pertaining to Continuity Check Message (CCM) Transmission, for EFM mode.



Setup parameters:

- **CCM Transmit:** Disable or Enable. Enable will configure the unit to transmit CCM frames when EFM Data Mode is established, per the selections made.
- **Transmit Interval:** select from 10 seconds, 1 second, or 100 ms time intervals.
- **MD Level:** Maintenance Domain level, ranging from 0 to 7. Match the settings of your system.
- **VLAN ID:** Match the settings of your system.
- **VLAN Priority:** Match the settings of your system.

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6.10 IP Tools

Currently applies for EFM mode only.

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6.10.1 Setup

By detault the IP configuration is set to DHCP and the unit will automatically attempt to connect.

For IP configuration, the following fields are required. Additional fields vary depending on Static or DHCP connection.

- **Profile:** Default, Delete, Save, Save as..., Default, or Last configuration
- **IP Address:** Select from Static or DHCP
  - **Static:** If Static is selected, the user will manually enter the IP address parameters (local IP, Gateway IP and DNS server IP)
  - **DHCP:** If DHCP is selected, the unit will obtain IP address parameters from the DHCP server
- **Gateway and DNS:** Enable or Disable
  - **Enabled:** If enabled, enter the IPv4 address of the Gateway and DNS server in Static mode, or use the IP address provided by the DHCP server in DHCP mode
  - **Disabled:** If disabled, no Gateway or DNS server will be used for the tests

Enter all parameters then press **Connect** to start the test.

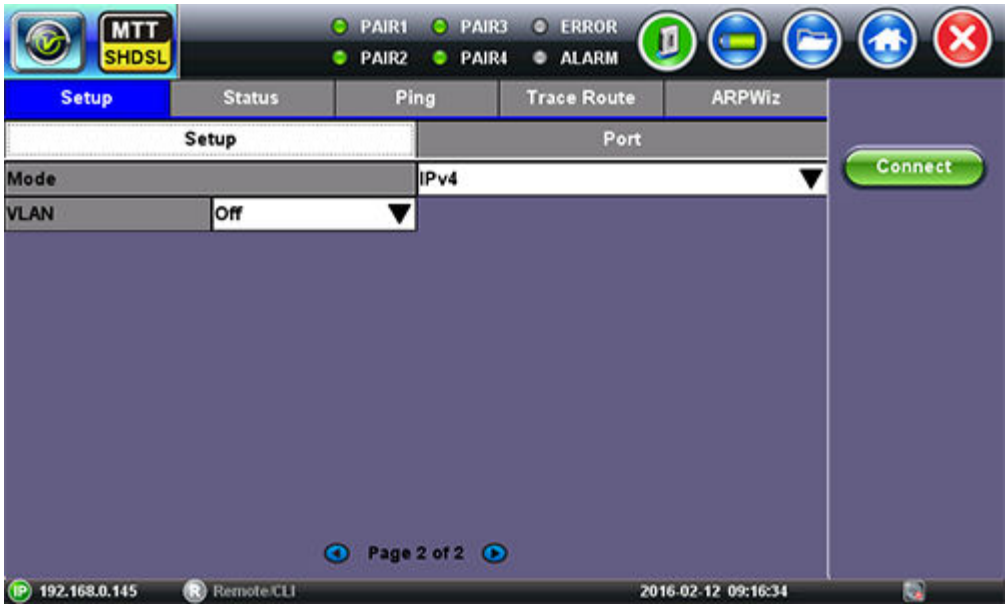
For **Static** type connection, these additional fields are required:

Static: The user is required to enter a Local IP, Gateway address (if Gateway and DNS are set to Enable), and Subnet. All Static fields can be filled by tapping on the section to access an alphanumeric keypad.

- **Local IP:** IPv4 address of the test set.
- **Subnet:** Enter the subnet mask.
- **Gateway and DNS:** Enable or Disable. If set to enable, Gateway and DNS fields become available.
  - **Gateway:** Off or On. IPv4 address of the network gateway.

- **DNS:** Off, Primary, or Primary & Secondary. If set to Primary or Primary & Secondary, a DNS IP is required in order to use the URL as a destination.

Enter all parameters then press **Connect** to start the test.



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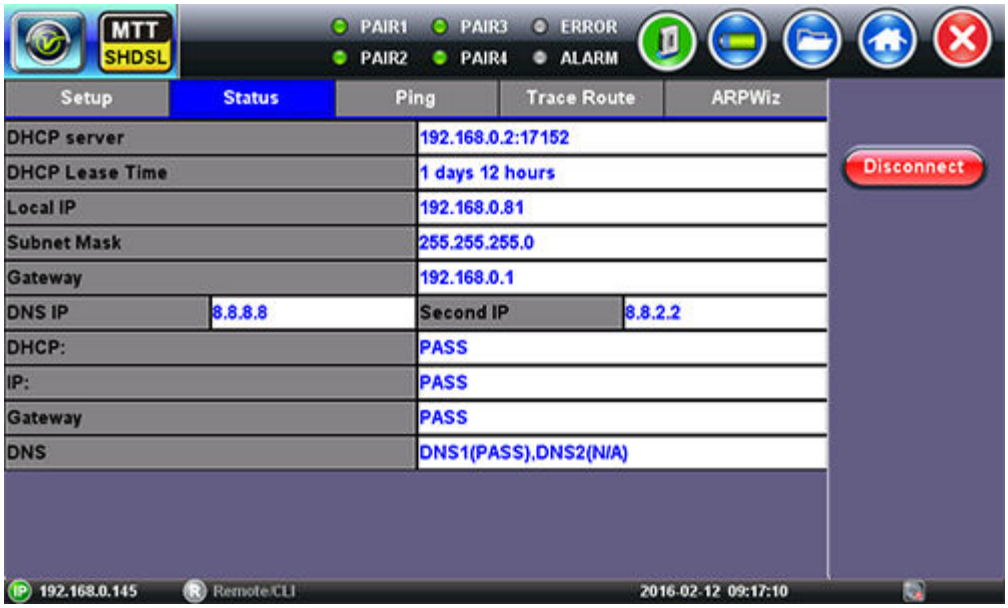
6.10.2 IP Connection Status

- Ensure the Status is PASS before continuing with any IP tests.
- If the connection fails, go back to the setup screen to verify that the parameters are entered correctly. Verify that the Ethernet cable is properly connected on the management port.
- **DHCP:** PASS indicates that an IP address has successfully been assigned.
- **IP:** PASS indicates that the IP address assigned has been verified to be unique in the network.
- **Gateway:** PASS indicates that the gateway IP address is valid.
- **DNS:** PASS indicates that the DNS IP address is valid.



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6.10.3 Ping

The Ping Result provides the number of Sent, Received, Unreach, Missing, and the Round Trip delay.

Ping Testing

Ping is a popular computer network tool used to test whether a particular host is reachable across an IP network. A ping is performed by sending an echo request or ICMP (Internet Control Message Protocol) to the echo response replies.

Ping Setup

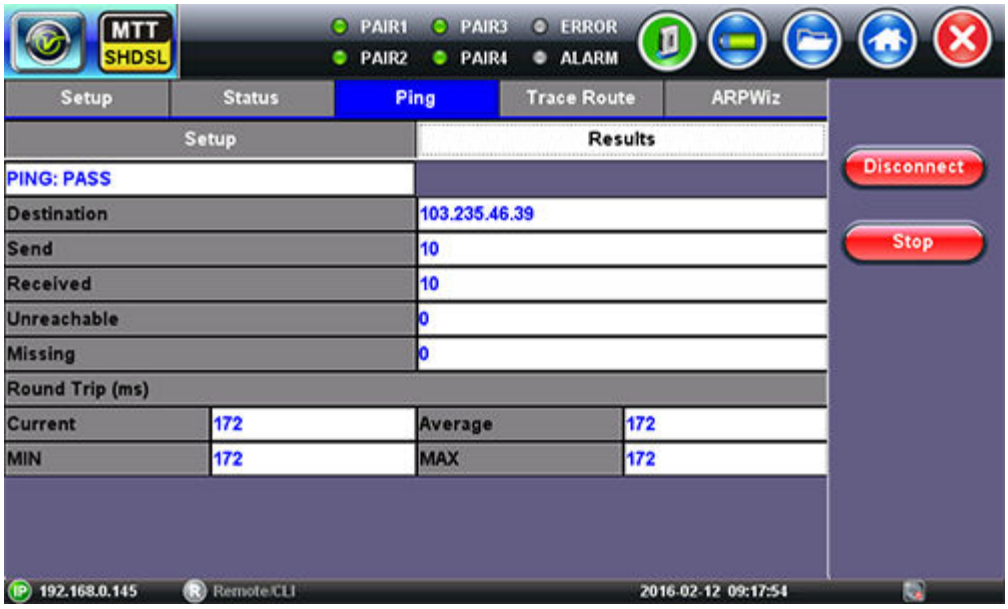
- **Profile:** Delete, Save, Save as..., or Default.
- **Destination:** Enter the destination IP address or URL to ping.
- **Number of Pings:** Press the field and use the alphanumeric keypad to enter the number of ping attempts that will be performed to reach the network device.
    - **Note**: If Continuous Ping is selected, the user is not required to enter the number of pings. The test set will continuously ping the target host until the user presses **Stop**.
- **Length:** Use the alphanumeric keypad to enter the length of the ICMP echo request packet transmitted.
- **Ping/Sec:** Use the alphanumeric keypad to enter the Ping repetition rate (Ping/second) up to 10 pings per second.
- **Time Out:** Time-to-Live (TTL) in milliseconds. Use the alphanumeric keypad to enter the maximum time allowed (in ms, up to 99999ms) between an ICMP ping and echo response.

Once the parameters are configured, press **Start** to begin the test.

Ping Results

Pressing Start will take you to the Result tab and start the Ping test.

- **Destination:** Indicates the destination IP address.
- **Ping status:** In Progress, PASS, or FAIL.
- **Sent, Received, Unreach, Missing:** Number of pings sent, received, unreached or missing. A Ping is counted missing if no response is received before timeout. A Ping is counted unreached if an echo response is received with host unreachable set.
- PING also estimates the round-trip time in milliseconds
    - **Current:** The current time for a Ping request to be answered.
    - **Average:** The average time recorded for a Ping request to be answered.
    - **Max:** The maximum time recorded for a Ping request to be answered.
    - **Min:** The minimum time recorded for a Ping request to be answered.



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6.10.4 Trace Route

Trace Route is a common method used to find the route to the destination IP address or URL. It is often used to identify routing problems and unreachable destinations. All the remote IP addresses and their response times are displayed indicating possible network congestion points.

Trace Route setup tab:

The following setup selections are available:

- **Profile:** Delete, Save, Save as..., Default. Select Default to recall a trace route file or create a new test
- **Destination:** Enter the IP address or URL of the network device to be detected
- **Time Out:** Enter the maximum time allowed between an ICMP echo and response at each hop
- **Max Hop:** Enter the maximum number of network devices the packet is allowed to transit

Once the parameters are configured, press **Start** to begin the test.

Results:

- **Hop:** Order of the routers on the route
- **TTL:** Time to reach each router on the route
- **Address:** Address of each router on the route

***Note**: If there is no response from a particular hop, an asterisk will be displayed.*

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7.0 Warranty and Software

Warranty Period: The warranty period for hardware, software and firmware is stated in the Warranty Card that came with the product (identified by the affixed serial number label). Coverage starts on the date of shipment to the customer The warranty period for battery pack, LCD, LCD touch panel, LCD protective cover, and accessories (including but not limited to patch cords, AC adaptor, SFP, USB adaptors, carrying case, carrying pouch) is limited to one (1) year.

Hardware Coverage: VeEX Inc. warrants hardware products against defects in materials and workmanship. During the warranty period, VeEX will, at its sole discretion, either

- Repair the products
- Replace hardware which proves to be defective

provided that the products that the customer elects to replace is returned to VeEX Inc. by the customer along with proof of purchase within thirty (30) days of the request by the customer, freight prepaid.

Software Coverage: VeEX Inc. warrants software and firmware materials against defects in materials and workmanship. During the warranty period, VeEX will, at its sole discretion, either

- Repair the products
- Replace the software and/or firmware which prove to be defective

provided that the products that the customer elects to replace is returned to VeEX Inc. by the customer along with proof of purchase within thirty (30) days of the request by the customer, freight prepaid.

Additionally, during the warranty period, VeEX Inc. will provide, without charge to the customer, all fixes, patches and enhancements to the purchased software, firmware and software options. VeEX Inc. does not warrant that all software or firmware defects will be corrected. New enhancements attached to a software option require the option to be purchased (at the time of order or the time of upgrade) in order to benefit from such enhancements.

Limitations: The warranty is only for the benefit of the customer and not for the benefit of any subsequent purchaser or licensee of any merchandise (hardware, software, firmware and/or accessories).

Revoking the warranty: VeEX Inc. does not guarantee or warrant that the operation of the hardware, software or firmware will be uninterrupted or error-free. The warranty will not apply in any of the following cases:

- Improper or inadequate maintenance by the customer
- Damage due to software installed by the customer on the unit without prior authorization (written) from VeEX Inc.
- Unauthorized alteration or misuse
- Damage occurred from operating the unit from outside of the environmental specifications for the product
- Improper installation by the customer

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8.0 Product Specifications

The product specifications are available for download in PDF format on the VeEX customer website. Please note that Adobe Reader version 9.0 or higher is needed to open and view the file.

To get the latest free version of Adobe Reader, click here.

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9.0 Certifications and Declarations

Declaration of Conformity

What is CE?

The CE marking is a mandatory European marking for certain product groups to indicate conformity with the essential health and safety requirements set out in European Directives. To permit the use of a CE mark on a product, proof that the item meets the relevant requirements must be documented.
Use of this logo implies that the unit conforms to requirements of European Union and European Free Trade Association (EFTA). EN61010-1

For a copy of the CE Declaration of Conformity relating to VeEX products, please contact VeEX customer service.

ROHS Statement

What is RoHS?

RoHS is the acronym for Restriction of Hazardous Substances. Also known as Directive 2002/95/EC, it originated in the European Union and restricts the use of specific hazardous materials found in electrical and electronic products. All applicable products imported into the EU market after **July 1, 2006** must pass RoHS compliance.

Click here for ROHS Statement relating to VeEX products

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10.0 About VeEX

VeEX Inc., the Verification EXperts, is an innovative designer and manufacturer of test and measurement solutions addressing numerous technologies. Global presence through a worldwide distribution channel provides uncompromised product support.

Visit us online at www.veexinc.com for latest updates and additional documentation.

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