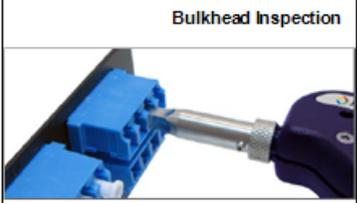
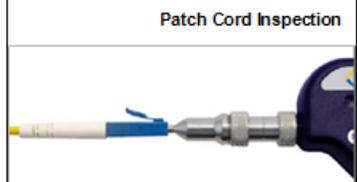
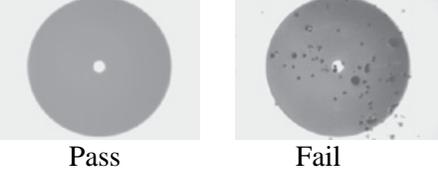


HST Optical Ethernet Quick Card

The document describes how to test Optical Ethernet links using the HST-3000 and Fiber Inspection and Cleaning Gear.

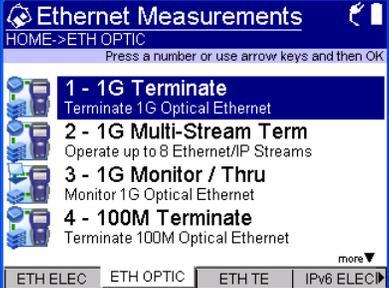
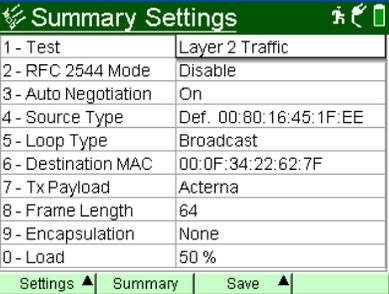
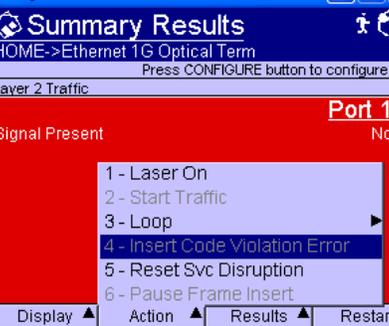
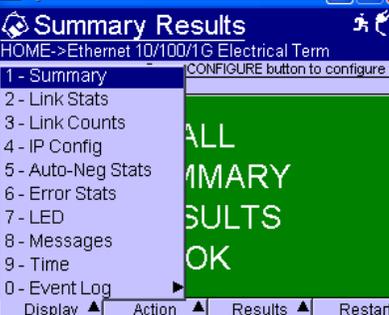
1 Proper Method for Cleaning Fibers

Step	Directions	
1	Install the correct bulkhead or patch cord tip to the probe microscope. Note: Standard Tips require barrel assembly	
2	Insert the probe into the bulkhead or attaché the patch cord to inspect.	
3	Press the Results key to display the results of the scope image	
4	Turn the focus control on the probe to focus the image on the display.	
5	There should not be any dirt on the image. If there is dirt, clean the fiber and then reconnect the fiber. If one is not certain if the fiber is acceptable, clean the fiber and then repeat this step to ensure there is no back reflection or unnecessary attenuation on the link.	
6	If needing to clean the fiber, use an IBC cleaner and remove the tip before cleaning.	
7	Insert the IBC cleaner into the bulkhead and patchcord until you clear a click two times for each piece of gear.	

8	Repeat steps 1-5 (and possibly 8 and 7) until the fiber appears clean. If you repeat this procedure three times and the fiber still appears dirty, throw out the fiber as it is likely scratched.
---	---

2 Setup for Testing an Optical Link with the HST-3000

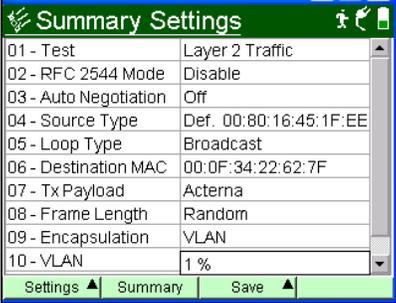
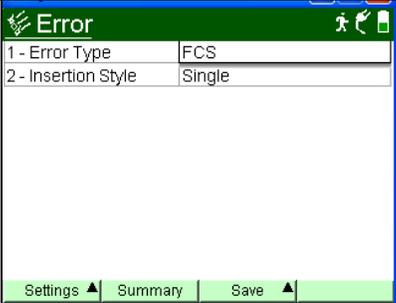
This section describes setup and testing when the location in the field is an optical drop.

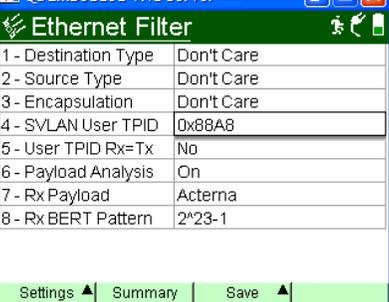
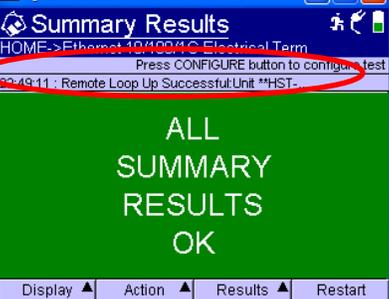
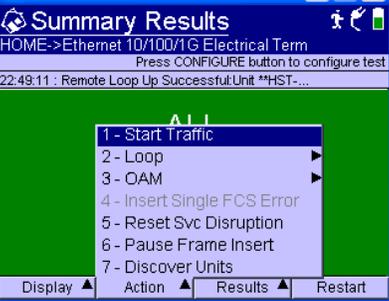
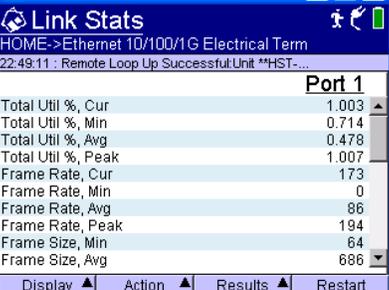
Step	Directions	
1	The first step is turning the unit on and then hitting the home key . Then select the Eth Optical tab and select option 1 1G Terminate .	 <p>The screenshot shows the 'Ethernet Measurements' menu with options: 1 - 1G Terminate, 2 - 1G Multi-Stream Term, 3 - 1G Monitor / Thru, and 4 - 100M Terminate. The 'ETH OPTIC' tab is selected at the bottom.</p>
2	The unit will now boot up. Make sure to insert the proper SFP into the R/T 1 slot (top left of the unit). The proper SFP will be either a 1310nm or 850nm optical SFP depending on the handoff.	
3	The next step is to select Layer 2 Traffic as your Test selection.	
4	Now press the configure button on the tester. Then select RFC 2544 Mode = Disable and Auto Negotiation and depending on the network select On or Off (most likely this will be set to on). Next press the home key .	 <p>The screenshot shows 'Summary Settings' with a list of parameters: 1 - Test (Layer 2 Traffic), 2 - RFC 2544 Mode (Disable), 3 - Auto Negotiation (On), 4 - Source Type (Def. 00:80:16:45:1F:EE), 5 - Loop Type (Broadcast), 6 - Destination MAC (00:0F:34:22:62:7F), 7 - Tx Payload (Acterna), 8 - Frame Length (64), 9 - Encapsulation (None), 10 - Load (50%).</p>
5	Now select the Action tab and then select Laser On .	 <p>The screenshot shows 'Summary Results' for 'Layer 2 Traffic' on 'Port 1'. The 'Signal Present' status is 'No'. A menu is open with options: 1 - Laser On, 2 - Start Traffic, 3 - Loop, 4 - Insert Code Violation Error, 5 - Reset Svc Disruption, 6 - Pause Frame Insert.</p>
6	You should see the screen turn green. If not, select the display key and then select the summary result pane. Then select the restart key on the right side.	 <p>The screenshot shows 'Summary Results' with a menu open listing: 1 - Summary, 2 - Link Stats, 3 - Link Counts, 4 - IP Config, 5 - Auto-Neg Stats, 6 - Error Stats, 7 - LED, 8 - Messages, 9 - Time, 10 - Event Log. The background is green with 'ALL SUMMARY RESULTS OK' text.</p>

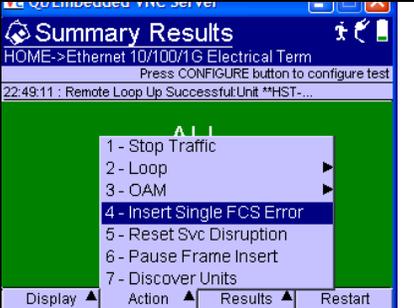
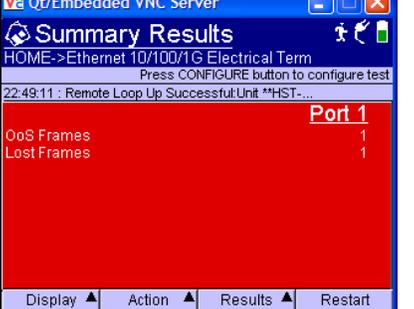
7	The tester is now ready to receive loop commands or proceed to Quick Testing using the HST-3000 (Section 3)
---	---

3 Quick Testing Using the HST-3000

This section describes how to quickly check an active link exists between two test sets. This test proves that the link exists and will detect if errors occur. After this section is complete one can safely run the RFC 2544 test to validate the pipe.

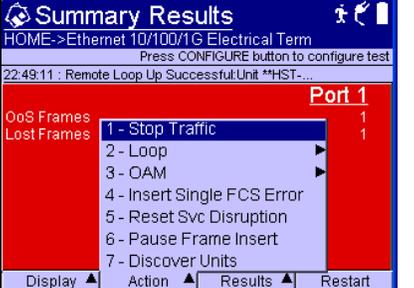
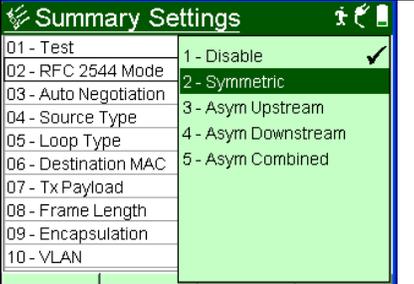
Step	Directions																							
1	This section continues from section 2 and having setup both ends of the link. If you have not completed the appropriate section, please do so at this time.																							
2	<p>Press the configure button. Tap the left and right arrows until you get to the Summary Settings Screen.</p> <p>Then Select:</p> <ul style="list-style-type: none"> • Loop Type -> Broadcast • Tx Payload -> Acterna • Frame Length -> Random • Encapsulation -> Most Likely this will be VLAN tagged though it depends on the location and network • VLAN ID and Priority -> Depends on Network, see work order • Traffic Load -> again depends on network, see work order. If unknown enter 1%. 	 <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2">Summary Settings</th> </tr> </thead> <tbody> <tr><td>01 - Test</td><td>Layer 2 Traffic</td></tr> <tr><td>02 - RFC 2544 Mode</td><td>Disable</td></tr> <tr><td>03 - Auto Negotiation</td><td>Off</td></tr> <tr><td>04 - Source Type</td><td>Def. 00:80:16:45:1F:EE</td></tr> <tr><td>05 - Loop Type</td><td>Broadcast</td></tr> <tr><td>06 - Destination MAC</td><td>00:0F:34:22:62:7F</td></tr> <tr><td>07 - Tx Payload</td><td>Acterna</td></tr> <tr><td>08 - Frame Length</td><td>Random</td></tr> <tr><td>09 - Encapsulation</td><td>VLAN</td></tr> <tr><td>10 - VLAN</td><td>1 %</td></tr> </tbody> </table>	Summary Settings		01 - Test	Layer 2 Traffic	02 - RFC 2544 Mode	Disable	03 - Auto Negotiation	Off	04 - Source Type	Def. 00:80:16:45:1F:EE	05 - Loop Type	Broadcast	06 - Destination MAC	00:0F:34:22:62:7F	07 - Tx Payload	Acterna	08 - Frame Length	Random	09 - Encapsulation	VLAN	10 - VLAN	1 %
Summary Settings																								
01 - Test	Layer 2 Traffic																							
02 - RFC 2544 Mode	Disable																							
03 - Auto Negotiation	Off																							
04 - Source Type	Def. 00:80:16:45:1F:EE																							
05 - Loop Type	Broadcast																							
06 - Destination MAC	00:0F:34:22:62:7F																							
07 - Tx Payload	Acterna																							
08 - Frame Length	Random																							
09 - Encapsulation	VLAN																							
10 - VLAN	1 %																							
3	<p>Tap the Right arrow until you get the Ethernet Tab. Select Frame Type -> DIX.</p> <p>Please note that if you are running across a switched service you have to set the Destination MAC equal to the far end's Source MAC address on both testsets.</p>																							
4	<p>Tab right to select the Error Page. Make sure that</p> <ul style="list-style-type: none"> • Error Type -> FCS • Insertion Type -> Single 	 <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2">Error</th> </tr> </thead> <tbody> <tr><td>1 - Error Type</td><td>FCS</td></tr> <tr><td>2 - Insertion Style</td><td>Single</td></tr> </tbody> </table>	Error		1 - Error Type	FCS	2 - Insertion Style	Single																
Error																								
1 - Error Type	FCS																							
2 - Insertion Style	Single																							

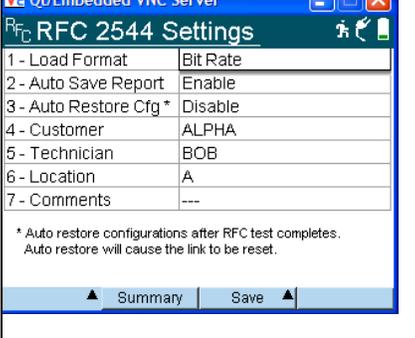
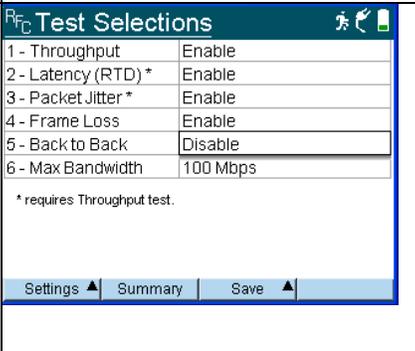
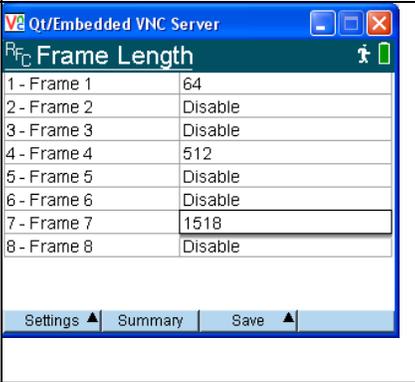
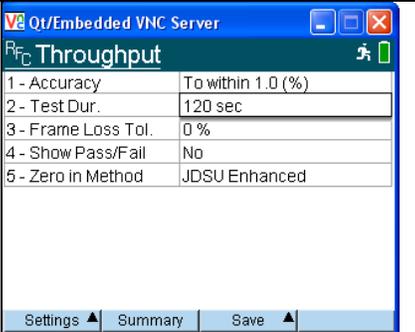
5	<p>Tap right to select the Ethernet Filter Tab. Make sure that Destination Type -> Don't Care Source Type -> Don't Care Encapsulation -> Don't Care Payload Analysis -> On Rx Payload -> Acterna</p>	
6	<p>Next press the home key. Then select Restart.</p>	
7	<p>Now to Loop up the far end select the Action Key, then select #2 Loop and then Select #1 Loop Up.</p>	
8	<p>You should see a message at the top stating "Remote Loop Up Successful..."... If you do not see this message please double-check your settings. If the message still does not appear repeat steps 1-6 for the far end tester.</p>	
9	<p>Now select the Action key and then select Start Traffic. Check that the Frame LED on the top of the unit becomes illuminated.</p>	
10	<p>Press the right arrow to see the Link Stats and ensure that frames are being received (Total Util % Cur is >0).</p>	

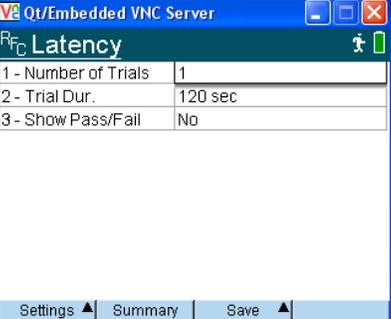
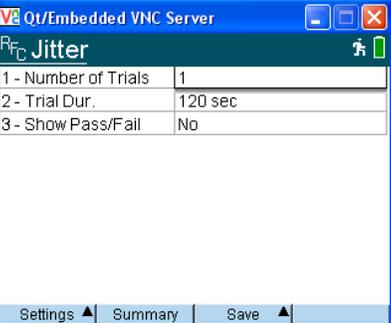
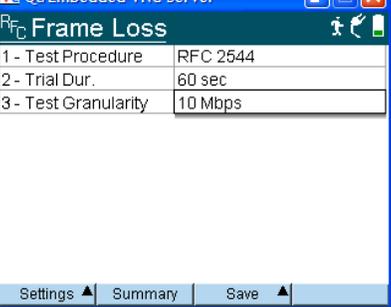
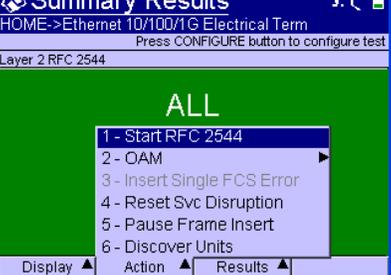
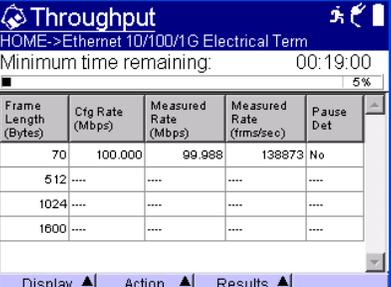
11	Now press the left arrow to go back to the summary page. Check that the summary page remains green. Select the Action button and select Insert Single FCS Error .	
12	Check that the screen has turned red and a single error has appeared on the screen.	
13 Quick test is now complete. Please proceed to the next section RFC 2544 testing.		

4 RFC 2544 Testing Using the HST-3000

This section describes how to validate the link between two locations. The output of this test is a go or no go on the quality of the link and the results can be saved for further analysis. This section is expected to take approximately 20 minutes for testing.

Step	Directions	
1	This section continues from 4.3. If you have not completed that section, please do so at this time. If you are ready to proceed, press the action key and select Stop traffic .	
2	Press the configure button. Tap the left and right arrows until you get to the Summary Settings Screen. Then select RFC 2544 Mode and press Symmetric .	

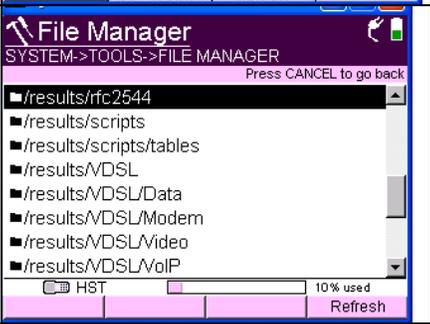
<p>3</p>	<p>Tap right to select the RFC 2544 Settings. Make sure that</p> <p>Load Format -> Bit Rate Auto Save Report -> Enable Auto Restore Cfg* -> Disable</p> <p>You can also enter the customer, location, technician and any comments you have that you wish to be stored on the final report.</p>	 <p>The screenshot shows the 'RFC 2544 Settings' window with the following configuration:</p> <table border="1"> <tr><td>1 - Load Format</td><td>Bit Rate</td></tr> <tr><td>2 - Auto Save Report</td><td>Enable</td></tr> <tr><td>3 - Auto Restore Cfg *</td><td>Disable</td></tr> <tr><td>4 - Customer</td><td>ALPHA</td></tr> <tr><td>5 - Technician</td><td>BOB</td></tr> <tr><td>6 - Location</td><td>A</td></tr> <tr><td>7 - Comments</td><td>---</td></tr> </table> <p>* Auto restore configurations after RFC test completes. Auto restore will cause the link to be reset.</p>	1 - Load Format	Bit Rate	2 - Auto Save Report	Enable	3 - Auto Restore Cfg *	Disable	4 - Customer	ALPHA	5 - Technician	BOB	6 - Location	A	7 - Comments	---		
1 - Load Format	Bit Rate																	
2 - Auto Save Report	Enable																	
3 - Auto Restore Cfg *	Disable																	
4 - Customer	ALPHA																	
5 - Technician	BOB																	
6 - Location	A																	
7 - Comments	---																	
<p>4</p>	<p>Tap right to select the Test Selections. Make sure that</p> <p>Throughput -> Enable Latency (RTD)* -> Enable Packet Jitter * -> Enable Frame Loss -> Enable Back to Back -> Disable Max Bandwidth -> this will change at each location but should be the CIR for the circuit.</p>	 <p>The screenshot shows the 'Test Selections' window with the following configuration:</p> <table border="1"> <tr><td>1 - Throughput</td><td>Enable</td></tr> <tr><td>2 - Latency (RTD) *</td><td>Enable</td></tr> <tr><td>3 - Packet Jitter *</td><td>Enable</td></tr> <tr><td>4 - Frame Loss</td><td>Enable</td></tr> <tr><td>5 - Back to Back</td><td>Disable</td></tr> <tr><td>6 - Max Bandwidth</td><td>100 Mbps</td></tr> </table> <p>* requires Throughput test.</p>	1 - Throughput	Enable	2 - Latency (RTD) *	Enable	3 - Packet Jitter *	Enable	4 - Frame Loss	Enable	5 - Back to Back	Disable	6 - Max Bandwidth	100 Mbps				
1 - Throughput	Enable																	
2 - Latency (RTD) *	Enable																	
3 - Packet Jitter *	Enable																	
4 - Frame Loss	Enable																	
5 - Back to Back	Disable																	
6 - Max Bandwidth	100 Mbps																	
<p>5</p>	<p>Tap right to select the Frame Length Tab. Make sure that</p> <p>The smallest possible Frame Length is selected (this will be either 64, 68, 70, or 72 depending on the settings). To do this go to Frame Length 1 and select the value.</p> <p>Select 512 entry 4.</p> <p>Select 1518 or 1522 (whichever one you are allowed to select) in entry 7.</p> <p>Make all the rest of the entries disabled</p> <p>Please see picture for a correct sample setup.</p>	 <p>The screenshot shows the 'Frame Length' window with the following configuration:</p> <table border="1"> <tr><td>1 - Frame 1</td><td>64</td></tr> <tr><td>2 - Frame 2</td><td>Disable</td></tr> <tr><td>3 - Frame 3</td><td>Disable</td></tr> <tr><td>4 - Frame 4</td><td>512</td></tr> <tr><td>5 - Frame 5</td><td>Disable</td></tr> <tr><td>6 - Frame 6</td><td>Disable</td></tr> <tr><td>7 - Frame 7</td><td>1518</td></tr> <tr><td>8 - Frame 8</td><td>Disable</td></tr> </table>	1 - Frame 1	64	2 - Frame 2	Disable	3 - Frame 3	Disable	4 - Frame 4	512	5 - Frame 5	Disable	6 - Frame 6	Disable	7 - Frame 7	1518	8 - Frame 8	Disable
1 - Frame 1	64																	
2 - Frame 2	Disable																	
3 - Frame 3	Disable																	
4 - Frame 4	512																	
5 - Frame 5	Disable																	
6 - Frame 6	Disable																	
7 - Frame 7	1518																	
8 - Frame 8	Disable																	
<p>6</p>	<p>Tap right to select the Throughput. Make sure that</p> <p>Accuracy -> To within 0.1 (Mbps) Test Dur. -> 120 sec Frame Loss Tol -> 0Mbps Show Pass/Fail -> No Zero in Method -> JDSU Enhanced</p>	 <p>The screenshot shows the 'Throughput' window with the following configuration:</p> <table border="1"> <tr><td>1 - Accuracy</td><td>To within 1.0 (%)</td></tr> <tr><td>2 - Test Dur.</td><td>120 sec</td></tr> <tr><td>3 - Frame Loss Tol.</td><td>0 %</td></tr> <tr><td>4 - Show Pass/Fail</td><td>No</td></tr> <tr><td>5 - Zero in Method</td><td>JDSU Enhanced</td></tr> </table>	1 - Accuracy	To within 1.0 (%)	2 - Test Dur.	120 sec	3 - Frame Loss Tol.	0 %	4 - Show Pass/Fail	No	5 - Zero in Method	JDSU Enhanced						
1 - Accuracy	To within 1.0 (%)																	
2 - Test Dur.	120 sec																	
3 - Frame Loss Tol.	0 %																	
4 - Show Pass/Fail	No																	
5 - Zero in Method	JDSU Enhanced																	

7	Tap right to select the Latency . Make sure that Number of Trials -> 1 Trial Dur. -> 120 sec Show Pass/Fail -> No																										
8	Tap right to select the Jitter . Make sure that Number of Trials -> 1 Trial Dur. -> 120 sec Show Pass/Fail -> No																										
9	Tap right to select the Frame Loss . Make sure that Test Procedure -> RFC 2544 Trial Dur. -> 60 sec Test Granularity -> 10 Mbps																										
10	Next press the home key. Then select Restart .																										
11	Now select the Action key and then select Start Traffic .																										
12	The RFC 2544 test will automatically run through all of its tests and save results to the unit. A bar at the top will display the minimum time remaining for the test to be completed.	 <table border="1"> <thead> <tr> <th>Frame Length (Bytes)</th> <th>Cfg Rate (Mbps)</th> <th>Measured Rate (Mbps)</th> <th>Measured Rate (frms/sec)</th> <th>Pause Det</th> </tr> </thead> <tbody> <tr> <td>70</td> <td>100.000</td> <td>99.988</td> <td>138873</td> <td>No</td> </tr> <tr> <td>512</td> <td>....</td> <td>....</td> <td>....</td> <td>....</td> </tr> <tr> <td>1024</td> <td>....</td> <td>....</td> <td>....</td> <td>....</td> </tr> <tr> <td>1600</td> <td>....</td> <td>....</td> <td>....</td> <td>....</td> </tr> </tbody> </table>	Frame Length (Bytes)	Cfg Rate (Mbps)	Measured Rate (Mbps)	Measured Rate (frms/sec)	Pause Det	70	100.000	99.988	138873	No	512	1024	1600
Frame Length (Bytes)	Cfg Rate (Mbps)	Measured Rate (Mbps)	Measured Rate (frms/sec)	Pause Det																							
70	100.000	99.988	138873	No																							
512																							
1024																							
1600																							

13	The link has now been fully tested. In the next section one can download the results to USB and view them on a laptop to determine if the link passed or failed final inspection.
----	---

5 Downloading Results on the HST-3000 (via USB)

This section describes how to download results via USB from the HST-3000

Step	Directions	
1	Connect the USB Flash Drive to the HST-3000's USB port on the top of the mainframe.	
2	Press the green Power Key to turn on the HST-3000.	
3	Press the System Navigation key, and press the TOOLS soft key. Press the Up Arrow or Down Arrow key to select File Manager , then press the OK key to manage user files in the file system.	
4	Using the OK key, Up Arrow key, and Down Arrow key, navigate to the desired file. To go to RFC 2544 results select results/rfc 2544 folder. Press the Action Soft key and select Copy to USB. Repeat step 3 for all desired files.	
5	Power cycle the HST-3000 by Pressing the green power button to turn the unit off.	
6	Disconnect the USB Flash Drive from the HST-3000's USB port on the top of the mainframe and load it onto a PC for analysis	