Multi-Stream Traffic Generator & Analyzer - 10G (PXG108)
Quick Verification Guide

If this is your First-Time Use of PacketExpert™ 10G unit, then we recommend you follow all the steps explained in PacketExpert-10G-Quick-Install-Guide before proceeding with the steps below.

Normal Instructions – Follow these precisely

- ‘Multi-Stream Traffic Generator and Analyzer’ is an optional application and requires purchased licenses to be installed.
- Plug-in the USB installation stick (pen drive) provided with the shipment package by GL Communications.
- Execute GLHWLicenseInstaller.exe from the USB Installation Stick to install the optional application licenses.
- Follow onscreen instructions, the license for the purchased optional application will be installed.
- In addition, PXN101 license installation is required to enable testing on 10G ports.
- Run AppList.exe available in the C:\Program Files\GL Communications Inc\GL Hardware License Installer directory and confirm that the optional MultiStream Traffic Generator/Analyzer license (PXG108) is listed against the hardware purchased.

Note: When the application is started, if the following ‘License Error’ is prompted, then you may have not installed the Hardware licenses. You can do so as explained in section above at any time after installing the software.

Note: Ensure that warranty license (GLSupportWarrantyLicenseInstaller_x86.exe) is installed and also confirm that Multi-Stream UDP/TCP Traffic Generator (PXG108) is listed in Warranty Application List. Refer to PacketExpert-10G-Quick-Install-Guide.

Quick Verification

In the following test scenario, a single PacketExpert™ 10G unit is used to verify ‘Multi-Stream Traffic Generator/Analyzer’ feature.

‘Multi-Stream Traffic Generator/Analyzer’ test scenario can be demonstrated on 10G ports by directly connecting Port 1 and Port 2 of PacketExpert™ 10G unit using SFP Transceivers and LC optical cables.

(Or) “Multi Stream Traffic Generator/Analyzer” test scenario can be demonstrated on 1G ports by directly connecting Port 1 to 2 through Ethernet cable (for Electrical Interface test) or SFP Transceivers and LC optical cable (for Optical Interface test).

The test setup requires 1 PC/laptop which is connected through USB cable of the hardware unit. The following test requires PacketExpert 10G application (PXG100) and ‘Multi-Stream Traffic Generator/Analyzer’ application (PXG108) licenses to be installed on PC. After successful Software installation, plug in the PacketExpert 10GHardware unit to PC as indicated in the figure below. Then connect Port1 to Port2 (1G or 10G Ports) of the hardware unit, as shown below (explained in detail in the next section):
**Note:** For 1G ports, the above test can also be setup using LC optical cables (for Optical Interface) and SFP’s

**Step1: Connect the cables**

**For 1G ports:**

Perform test between 1G Port 1 of PacketExpert Unit-1 and 1G Port 2 of PacketExpert Unit-2 (**Electrical or Optical Interface**)

- For **Electrical Interface** type, connect Port 1 of hardware unit-1 to Port 1 of hardware unit-2 using **Ethernet cable** as shown in the figure.
- For **Optical Interface** type, plug-in **SFP Transceivers** to the optical ports and connect **LC optical cable** Port 1 of hardware unit-1 to Port 1 of hardware unit-2 (refer to figure below)

**Note:** Make sure SFP is properly locked and the optical cable is properly plugged-in.

**For 10G ports:**

Perform test between 10G Port 1 of PacketExpert Unit-1 and 10G Port 2 of PacketExpert Unit-2

- Plug-in **SFP Transceivers** to the optical ports and connect **LC optical cable** Port 1 of hardware unit-1 to Port 1 of hardware unit-2 (refer to figure below)

**Note:** Make sure SFP is properly locked and the optical cable is properly plugged-in.
Step 2: Launch PacketExpert 10G Application

- Double click on the PacketExpert 10G shortcut icon on the desktop to launch PacketExpert 10G application as shown in the figure below.
  
  **Note:** If optional license PXN101 (license for 10G ports) is installed, then launch window to select 1G/10G type testing is prompted as shown in the figure. If this license is not installed, then the application is loaded on 1G ports by default.

- Click on **Launch 10G** option, to invoke the application with 10G ports.
- Or click on **Launch 1G** option, to invoke the application with 1G ports.

![PacketExpert 10G Application](image)

**Note:** The application may take some time to get started due to hardware and software initializations.

- By default, the PacketExpert is invoked displaying All Port Bert application. Load Multi-Stream Traffic Generator/Analyzer from the Applications drop-down list as shown in the figure below.

![Application Drop-Down List](image)

Step 3: Configure Interface parameters

**For 10G Optical connections,**

- By default, for both 10G Port1 and Port2, Speed = 10000 Mbps

**For 1G Electrical or Optical connections,**

On the RHS side, in the Interface pane, select the ports from the Port Selection drop-down list and set the following for each port:

- Select Interface Type = Electrical (or) Optical (depending on the ports connected)
- Speed = 1000Mbps
- Click on the Apply button (this will set the Interface Type in the hardware)
- Wait for some time as the port auto-negotiates with its link partner. Verify the following:
  - Auto-Negotiation status = Complete, Speed = 1000 Mbps
  - Similarly, repeat the above procedure for Port 2

![Interface Configuration](image)
Step 4: Verify Links

- Verify that the Link Status is **UP** on both ports, that is, the **Function Tree** should display Port 1 and Port 2 with green LEDs link status (refer to figure). If the LED shows red, then link is down.

- If the link status is **Down**, refer to **troubleshooting** steps explained in PacketExpert™ 10G Quick Install Guide.

Step 5: Stream Configuration

- From the Function Tree, under Port1, double click and invoke **Stream1** under ‘**Stream Config**’ option to invoke **Stream Configuration** window in the RHS pane.

- By default, all 16 streams are configured with different set of parameters.

  Eg: Stream1 generates EMIX frame sizes (5 frame sizes from 96 to 1024), and is configured for Layer4 (UDP) with VLAN (both C-Tag and S-Tag) etc. IP streams are all configured for Source IP addresses in the range 192.168.1.101, 102, 103 etc., while the Destination IP addresses are configured in the range 192.168.1.201, 202, 203 etc. Source MAC address for all streams are the same, while destination MAC addresses are randomly configured.

- As we are testing against **Port2 Loopback**, there is no need to change any settings.

Step 6: Stream Selection

- From the **Function Tree**, under Port1, double click on **Stream Selection** to invoke Stream Selection window on RHS pane.

- The configured streams are displayed along with Frame Size and the Rate (Mbps) settings.

- By default, all Streams are selected. The Rate and Frame sizes are configured to test a wide range as shown in the figure.

- For 10G port, total combined rate for all streams is configured for full line rate of 10,000 Mbps (Remaining available bandwidth is 0 Mbps)

- For 1G port, total combined rate for all streams is configured for almost full line rate of 999.2 Mbps (Remaining available bandwidth is 0.8 Mbps)
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Step 7: Verify Loopback Port Settings

- From the Function Tree, under Port2, double click on Loopback Config to invoke Loopback Configuration window in one of the RHS panes. Verify that ‘Smart Loopback’ is selected. This will make the Loopback to automatically traverse each packet’s headers and swap each layer's Source and Destination Address/Port automatically.

Step 8: Start ‘Multi-Stream Traffic Generator and Analyzer’

- Click Apply & Start to apply all the configurations for various streams and start the ‘Multi-Stream Traffic Generator/Analyzer’ application. This will take some time, as the configuration needs to be downloaded to the hardware. The progress is indicated in a progress bar as shown in the figure.

Step 9: Verify Results and Graphs

- From the Function Tree, under Port1, double-click and invoke Multi-Stream traffic generator and analyzer Results on the RHS pane, as shown in the figure.
- Observe the Information Rate (Current/ Min/ Max/ Avg) which indicates the throughout rate of each stream.
- Use the Vertical button to change the view to Vertical orientation.
Verify TxFrames, RxFrames and Frame Loss Count and Ratio:

- For each stream, verify that RxFrames = TxFrames, and FL Count (Frame Loss Count) and FLR (Frame Loss Ratio) = 0

Verify Frame Loss Graph:

- From the Function Tree, under Port1 → expand Graphs, double-click and invoke FLR Graph on the RHS pane. Observe the FLR (%) values show 0 for all streams.

Verify Throughput Results:

- For each stream, verify that the IR values (Information Rate values) – IR (Curr) – Information Rate (Current), IR (Min) – Information Rate (Minimum), IR (Max) – Information Rate (Maximum) and IR (Avg) - Information Rate (Average) are close to the configured values as shown below:
Verify Throughput Graph:
- From the **Function Tree**, double-click and invoke **IR Graph** on the RHS pane. Observe the IR (Mbps) for each stream reflects the value shown in the **Results** dialog.
- In the graph dialog, uncheck all streams, and check each individual stream to view the graph for only that stream. Verify that the IR shown matches with the tabular values in the results dialog.

Verify Latency Result:
- For each stream, verify that the FTD values (Frame Transfer Delay values) – FTD (Curr) – Frame Transfer Delay (Current), FTD (Min) – Frame Transfer Delay (Minimum), FTD (Max) – Frame Transfer Delay (Maximum) and FTD (Avg) - Frame Transfer Delay (Average) are showing relevant values as shown below.

Verify Latency Graph:
- From the Function Tree, double-click and invoke **FTD Graph** on the RHS pane. Observe the FTD (msec) values for each stream reflects the value shown in the Results dialog.
Verify Jitter Results:

- For each stream, verify that the FDV values (Frame Delay Variation values) – FDV (Curr) – Frame Delay Variation (Current), FDV (Min) – Frame Delay Variation (Minimum), FDV (Max) – Frame Delay Variation (Maximum) and FDV (Avg) - Frame Delay Variation (Average) are showing relevant values as shown below.

Verify Jitter Graph:

- From the Function Tree, double-click and invoke FDV Graph on the RHS pane. Observe the FDV (msec) values for each stream reflects the value shown in the Results dialog.