If this is your First-Time-Use of PacketExpert™ 1G unit, then we recommend you follow all the steps explained in PacketExpert-1G-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.
- Run T1E1AppList.exe available in the C:\Program Files (x86)\GL Communications Inc\GL Hardware License Installer (or C:\Program Files\GL Communications Inc\GL Hardware License Installer) directory and confirm that the purchased MultiStream Traffic Generator/Analyzer licenses (PXE108) 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.

Quick Verification

In the following test scenario, a single PacketExpert™ 1G unit is used to verify ‘Multi-Stream Traffic Generator/Analyzer’ feature.

‘Multi-Stream Traffic Generator/Analyzer’ test scenario can be demonstrated on 1G ports by looping back Port 2 and Port 3 of PacketExpert™ 1G unit using Ethernet CAT5 cables (for Electrical Interface test). For Optical Interface test, use SFP Transceivers and LC optical cables for connecting Port 2 and Port 3.
The test setup requires 1 PC/laptop which is connected through USB cable of the hardware unit. The following test requires PacketExpert 1G application (PXE100) and ‘Multi-Stream Traffic Generator/Analyzer’ application (PXE108) licenses to be installed on PC. After successful Software installation, plug in the PacketExpert 1G Hardware unit to PC as indicated in the figure below. Then connect Port2 to Port3 of the hardware unit, as shown below:

Note: The above test can be setup using LC optical cables (for Optical Interface) and SFP’s

Step 1: Note down the IP Addresses

The IP Addresses for Ports 2 and 3 on PacketExpert™ are pre-configured as listed below:

- Port2: 192.168.1.101
- Port3: 192.168.1.102

Step 2: Connect the cables

Perform test between Port 2 and Port 3 (Electrical or Optical Interface) of PacketExpert™ 1G unit.

- For Electrical Interface type, directly connect Port 2 and Port 3 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 between Port 2 and Port 3 (refer to figure below)

Note: Make sure SFP is properly locked and the optical cable is properly plugged-in.
Step 3: Launch PacketExpert 1G Application

- Right click on the PacketExpert 1G shortcut icon created on the desktop and select "Run as administrator" to launch PacketExpert 1G application.

**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.

Step 4: Configure Interface parameters

For 1G Electrical or Optical connections,

From the Function Tree, double-click on the Interface to invoke Interface pane on RHS window, select the ports from the Port Selection drop-down list and do the following for both Port 2 and Port 3:

- **Interface Type** = Electrical (or) Optical (depending on the ports connected)
- **Link 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 3
Step 5: Verify Links

- Verify that the Link Status is **UP** on both ports, that is, the **Function Tree** should display Port 2 and Port 3 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™ 1G Quick Install Guide.

Step 6: Stream Configuration

- From the **Function Tree**, double click and invoke **Stream 1** under ‘Stream Config’ option to invoke **Stream Configuration** window in the RHS pane.
- By default, **all 12 streams are selected**.
- By default, each stream is configured for a 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 Port3 Loopback, there is no need to change any settings.

Step 7: Stream Selection

- From the **Function Tree**, 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. Total combined rate for all streams is configured for 375.90 Mbps.
Step 8: Verify Loopback Port Setting

From the Function Tree, 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 9: 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 below.

Step 10: Verify Results and Graphs

- From the Function Tree, 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

<table>
<thead>
<tr>
<th>Stream No.</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
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<tbody>
<tr>
<td>Seconds</td>
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<td>256</td>
<td>256</td>
<td>256</td>
<td>256</td>
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<td>256</td>
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<td>256</td>
<td>256</td>
</tr>
<tr>
<td>TxFrames</td>
<td>81 665</td>
<td>95 028</td>
<td>5 306</td>
<td>90 277</td>
<td>47 811</td>
<td>135 144 403</td>
<td>1 085 992</td>
<td>388 130</td>
<td>11 432 356</td>
<td>921 178</td>
<td>2 369 010</td>
</tr>
<tr>
<td>RxFrames</td>
<td>81 665</td>
<td>95 028</td>
<td>5 306</td>
<td>90 277</td>
<td>47 811</td>
<td>135 144 388</td>
<td>1 085 992</td>
<td>388 130</td>
<td>11 432 356</td>
<td>921 178</td>
<td>2 369 010</td>
</tr>
<tr>
<td>RBytes</td>
<td>49 955 992</td>
<td>48 654 305</td>
<td>4 915 940</td>
<td>124 582 260</td>
<td>49 436 574</td>
<td>17 568 770 440</td>
<td>1 498 668 950</td>
<td>397 446 120</td>
<td>5 852 877 750</td>
<td>184 235 600</td>
<td>307 432 200</td>
</tr>
<tr>
<td>FL Count</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
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<td>0</td>
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<td>FLR</td>
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<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
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</tbody>
</table>

Verify Frame Loss Graph
• From the Function Tree, double-click and invoke FLR Graph on the RHS pane. Observe the FLR (%) values show 0 for all streams.

Verify Throughput:
• 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 values:

- For each stream, verify that the FTD values (Frame Transfer Delay 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 values:
- 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.