Multi-Functional Ethernet/IP Tester - PacketExpert™ 10GX
(10G, 2.5G, 1G Carrier Grade Ethernet Networks)

Overview
GL’s PacketExpert™ 10GX (PXN100/PXN101) provides comprehensive testing of 10 Gbps, 2.5 Gbps, and 1 Gbps wirespeed Ethernet/IP networks. Each GigE port provides independent Ethernet/VLAN/MPLS/IP/UDP testing at wire-speed. The PacketExpert™ 10GX hardware is more compact with reduced power requirements. It has two 10/1 Gbps Optical ports, and two 1 Gbps Electrical/Optical ports. The 10 Gbps Optical ports can be down-shifted to 1 Gbps, thus allowing all 4 ports for 1 Gbps testing or can be converted to 2.5 Gbps ports using appropriate SFP. Additionally, it adds 12-port user-configurable TTL trigger option as an important enhancement. With additional PXN101 licensing installation the unit supports testing on 10G optical ports.

The following port combinations are available -
- Each port can be either Electrical or Optical
- Switch between Electrical to Optical anytime.

The test tool supports multiple functionalities - Wire speed BERT, Smart Loopback, RFC 2544 Testing, PacketBroker, Record Playback, ExpertSAM™, Multi-Stream UDP/TCP Traffic Generator and Analyzer, and ExpertTCP™. BERT and Smart Loopback features are available on all (4 ports) 1G Electrical or 1G Optical ports.

GL also offers mTOP™ PacketExpert™ 10GX 1U/2U high-density rackmount and mTOP™ Probe with SBC variants. The rack enclosure can be stacked up to 6 PacketExpert™ 10GX USB hardware units to provide high density GigE ports form factor solution for testing GigE switches, routers and network conditions. It’s a perfect ethernet test tool for customers who require multi-port testing but are constrained by lab space.

### Main Features

#### Hardware
- Comprehensive testing of Wirespeed Ethernet/IP networks up to 10 Gbps (1Gbps, 2.5Gbps, 10Gbps)
- Available in Portable or Rackmount (mTOP™ enclosure w/ Single Board Computer)
- Rack-based variants (mTOP™ 1U/2U rackmount enclosures) provide high density GigE ports form factor solution with multiple PacketExpert™ devices.
- Control multiple devices from a single GUI, multiplying the number of ports available per system

#### Ethernet / IP Testing
- Capable of simultaneous generation/reception of Ethernet to IP traffic at 100% at user-defined or auto-negotiated speed
- Traffic options let technicians generate Ethernet to IP frames with user-configurable frame length, and frame size with varying traffic rates
- User selectable Electrical and/or Optical interface for ports allows mixed technology testing.
- **Wire speed BERT, Smart Loopback, RFC 2544, Record and Playback, ExpertSAM™ (Y.1564), IPNetSim™, IPLinkSim™, PacketBroker, Multi-stream Traffic Generation and Analyzer, and ExpertTCP™ (RFC 6349)**
- **Layer-wise Testing** - BERT, RFC 2544 Testing over Framed Ethernet (Layer2), Stacked MPLS (Layer2.5), IP and UDP. BERT testing is also supported on Layer1.
- Ability to define Ethernet, IP and UDP header fields
- Multi-board support for all the applications
- With PXN101 licensing, the unit supports testing on 10G optical ports

#### CLI/ API for Automation and Remote Testing
- PacketExpert™ platforms are based on MAPS™ CLI Server architecture, and can be configured as server-side application based and controlled via standard C#/TCL/Python clients to automate execution of test scripts, read responses etc.
- Capability of automation, remote operation, and multi-site connectivity using C#/TCL/Python clients
- Multiple PacketExpert™ can be controlled remotely from single client application
- Requires additional CXN100 licensing to access functions remotely

#### Wire speed BERT
- BERT is applicable for Layers 1, Ethernet (Layer2), Stacked VLAN (Q-in-Q), Stacked MPLS (Layer 2.5), IP (Layer3) and UDP (Layer4).
- Capable of handling full wire speed BERT, in both directions Electrical/Optical ports.
- Single as well as constant rate Bit Error and FCS Error Insertion.
- Support for frame lengths from 64 bytes to Jumbo frames (up to 16000 bytes).
- User-defined header parameters for MAC, VLAN, MPLS, IPv4/IPv6 and UDP layers.
- Multi-device support for wire-speed BERT and simultaneous BERT/Loopback applications

#### RFC 2544
- RFC 2544 is applicable for Layers Ethernet, MPLS, IPv4/IPv6.
- Supports Throughput, Latency, Frame Loss, and Back-to-Back performance tests
- Uni-directional and bi-directional traffic can be generated and transmitted on single or dual Electrical/Optical ports
- User-defined configuration parameters such as frame size, trial duration, number of trials, etc.
- Multi-device support for single and dual ports RFC 2544 application

#### Loopback
- Loopback is applicable for Layers Ethernet, MPLS, IPv4/IPv6, and UDP.
- Supports both smart loopback (auto layer detection) and user-defined layer-wise loopback capabilities for incoming traffic.
- Multi-device support for all port loopback application
Wire Speed BER Testing

PacketExpert™ 10GX supports Wire speed BERT up to 10Gbps simultaneously over Layer 1, Framed Ethernet (Layer2), Stacked VLAN (Q-in-Q), Stacked MPLS (Layer 2.5), IPv4/IPv6, and UDP. It can generate and receive various BER Traffic Patterns, including various industry standard PRBS patterns, User-defined test patterns, Bit Error Insertion, and FCS Error Insertion. Wire speed BERT is also supported on all the four 1000 Mbps Electrical/Optical ports and on two 10 Gbps ports. The screen below displays the PacketExpert™ 10GX GUI, running All Port BER test on all four Port#1, Port#2, Port#3 and Port#4 1G Electrical/Optical ports. Optional sequence number insertion allows detecting out-of-sequence packets and packet loss.

PacketExpert™ 10GX - BERT Testing on 1G Ports

All Port Loopback

PacketExpert™ 10GX supports Loopback capability on all ports (10G- Port#1, Port#2 and 1G – Port#1, Port#2, Port#3, Port#4). PacketExpert™ 10GX supports layer wise (Layer1/Ethernet/IP/UDP) loopback as well as Smart Loopback. During Smart Loopback, PacketExpert™ 10GX analyses incoming traffic, automatically detects and swaps Source and Destination Addresses and sends back the traffic on the same port. Smart Loopback handles stacked VLAN and stacked MPLS automatically.

PacketExpert™ 10GX - All Port Loopback on 1G ports
RFC 2544 Testing

PacketExpert™ 10GX supports RFC 2544 tests on all ports (10G- Port#1, Port#2 and 1G – Port#1, Port#2, Port#3, Port#4) on Layers 2, 2.5, and 3. RFC 2544 tests includes Ethernet Throughput, Latency, Frame Loss, and Back-to-Back performance tests in accordance with RFC 2544 specifications. The test is setup such that the traffic can be generated and transmitted on either of the ports and the looped back traffic from the DUT is received on the opposite port validating the test parameters.

Automation with CLI/APIs

PacketExpert™ supports Command line Interface (CLI) allowing remote accessibility and to control various functionalities through multiple command-line based clients Python and C#.

- Capability of remote operation, automation and multi-site connectivity using TCL, Python, C# clients and MAPS™ CLI server.
- Scripts for MAC, VLAN, MPLS, IP and UDP layers testing
- Multiple PacketExpert™ can be controlled remotely from single client application via MAPS™ CLI server.
- Scripts for Bert, Loopback, RFC 2544, Record Playback, PacketBroker, Multi Stream Traffic Generator and Analyzer, ExpertTCP, IPNetSim, IPLinkSim, and ExpertSAM™ testing
## Specifications

### Portable 10GX Hardware Unit

- **Physical Specification:**
  - Length: 8.45 in. (214.63 mm)
  - Width: 5.55 in. (140.97 mm)
  - Height: 1.60 in (40.64 mm)
  - Weight: 1.66 lbs. (0.75 kg)

### 1U mTOP™ PacketExpert™ 10GX Rack Unit (3 PXN100s)

- **Dimension:** 1U/2U mTOP™ - 19” W x 16” L
- **1U mTOP™ Rackmount Enclosure can support up to 3 PXN100s**
- **2U mTOP™ Rackmount Enclosure can support up to 6 PXN100s**
- **Optional 4 to 12 Port SMA Jack Trigger Board (TTL Input/Output)**

### Stacked 2U mTOP™ PacketExpert™ 10GX Rack Unit

- **Physical Specification:**
  - Length: 10.4 in. (264.16 mm)
  - Width: 8.4 in. (213.36 mm)
  - Height: 3.0 in. (76.2 mm)

### Bus Interface: USB 3.0

### External Power Supply:
- +9 Volts, 2.0 Amps

### Optional 4-Port SMA Jack Trigger Board (TTL Input/Output)

### SBC Specifications:
- Intel Core i3 or optional i7 Equivalent, Win10 64-bit Pro OS
- USB 2.0 or 3.0 Hub, ATX Power Supply
- 240 GB Hard drive, 8G Memory (Min)
- Two HDMI ports (Optional VGA to HDMI interface)

### Interfaces:

- 4 x 1G Base-X Optical OR 10/100/1000 Base-T Electrical
- 2 x 100Mbps Base-FX Optical
- 2 x 2.5 Gbps Electrical Interface
- 2 x 10G Base-SR, -LR -ER Optical only
- Single Mode or Multi Mode Fibre SFP support with LC connector

### Protocols:
- IEEE 802.3ae LAN PHY compliance
- RFC 2544 compliance

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### Buyer’s Guide

- **PXN100** - PacketExpert™ 10GX
- **PXN101** - 10G option for PXN100
- **CXN100** - CLI Server for PXN100
- **PXN112** - PacketExpert™ 10GX – SA (12-Port)
- **PXN124** - PacketExpert™ 10GX – SA (24-Port)

### MT001
- mTOP 1U Rack Mount Enclosure w/SBC (intel core i3)