Validate Performance of Ethernet-IP Networks and Devices from 10BASE-T up to 10 Gbps

Up to Four 1 Gbps Electrical (Base-T) or Optical (Base-X) Ports

Two 10 Gbps Optical Ports (10G/1G BASE-SR, -LR -ER Full-Duplex SFP)

1 to 12 TTL Programmable I/O

Wire Speed BERT, RFC 2544, Smart Loopback

PacketBroker, Record Playback, ExpertSAM™

Multi-Stream Traffic Generator & Analyzer and ExpertTCP™

Layer 2/3 + Multi-Port Ethernet Switch (and Router) Testing

Testing Multi-Protocol Label Switching (Stacked MPLS), Q-in-Q (Stacked VLAN) Enabled Networks

End-to-End Testing of 10G/1G Networks for Testing Triple-Play Services (Voice, Video, and Data)

CLI/API for Automation, Remote, and Multi-Service Testing

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

Overview

GL’s PacketExpert™ 10GX (PXN100/PXN101) provides comprehensive testing of 10 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 1Gbps, thus allowing all 4 ports for 1 Gbps testing. 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.

In 1G mode, following possibilities are available—

- Each port can be either Electrical or Optical.
- Switch between Electrical to Optical anytime
- Any combination Electrical/Optical ports is possible
  - All Electrical, All Optical
  - 1 Electrical, 3 Optical
  - 2 Electrical, 2 Optical
  - 3 Electrical, 1 Optical

The test tool packs multiple functionalities - Wire speed BERT, Smart Loopback, RFC 2544 Testing, PacketBroker, Record Playback, ExpertSAM™, Multi-Stream UDP/TCP Traffic Generator and Analyzer, and ExpertTCP™ functionalities. 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 rackmount variants within which up to 6 PacketExpert™ 10GX hardware are stacked 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
- 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 lets 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.
- Testing with stacked MPLS,VLAN (Q-in-Q) – up to 3 levels
- 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, IP and UDP layers.
- Multi-device support for wire-speed BERT and simultaneous BERT/Loopback applications

### Loopback
- Loopback is applicable for Layers 2, 2.5, 3, and 4.
- 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
- Layer 1 – Loops back incoming packets as is
- Ethernet – Swaps Source and Destination MAC addresses before sending back the packet
- IP – Swaps Source and Destination MAC addresses, IP addresses before sending back the packet.
- UDP - Swaps Source and Destination MAC addresses, Destination IP addresses, and UDP ports before sending back the packet.
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), IP 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 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.
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.

PacketExpert™ 10GX - RFC2544 Testing on 10G Ports

Report Generation

Report generation option helps to create consolidated reports in CSV and PDF file formats for each test types. The following sample CSV and PDF reports generated for ‘All ports BERT’ test includes Interface, BERT Statistics, Tx/Rx Statistics, Tx/Rx Configuration details for each of the Electrical and Optical ports.

BERT on 10G ports - CSV Report

BERT on 10G ports - PDF Report
Specifications

**Portable 10GX Hardware Unit**

**Interfaces:**
- 4 x 1G Base-X Optical OR 10/100/1000 Base-T Electrical
- 2 x 100Mbps Base-FX Optical
- 2 x 10G Base-SR, -LR-ER Optical only
- Single Mode or Multi Mode Fibre SFP support with LC connector
- Optional 4-Port SMA Jack Trigger Board (TTL Input/Output)

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

**Bus Interface:**
- USB 3.0

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

**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)

**Buyer’s Guide**

PXN100 - PacketExpert™ 10GX
PXN101 - 10G option for PXN100
CXN100 - CLI Server for PXN100
PXN105 - Wire speed Record /Playback
PXN106 - ExpertSAM™
PXN107 - PacketBroker
PXN108 - Multi Stream Traffic Generator and Analyzer
PXN108 - ExpertTCP™
MT001 - mTOP™ 1U Rack Mount Enclosure w/SBC
MT002 - mTOP™ 1U Rack Mount Enclosure w/o SBC