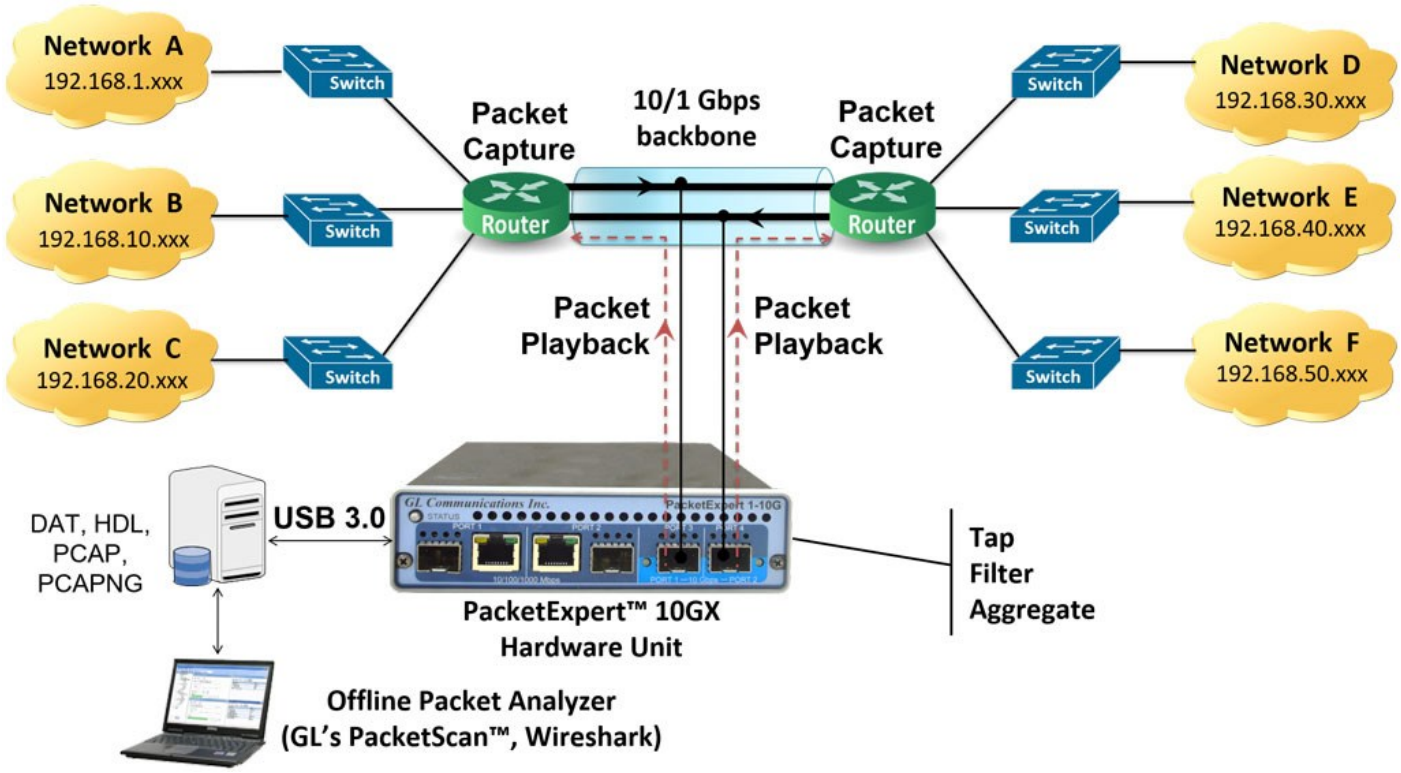
Network Traffic Capture and Replay - PacketExpert™ 10GX

(Tap, Filter, Aggregate, Forward, Record to File)



Overview

The PacketExpert™ 10GX platform supports Record and Playback application for **High-Precision Wirespeed Packet Capture, Forwarding**, **Filter, Drop** (for real-time analysis) **& Storage** (for offline analysis). The application is available as an optional software (PXN105) with PacketExpert™ 10GX Ethernet/ IP Tester.

The application operates in 3 modes—**Playback Only**, **Record Only** modes. For both Record and Playback, the application supports popular capture file formats such as PCAP/PCAP-NG (Wireshark® formats). The traffic captured on a live network by **Record** application can be analyzed using packet analyzers such as PacketScan™-All IP analyzer. The recorded file can be transmitted using Playback Only application to easily recreate the live network conditions in the lab.

PacketExpert™ 10GX (PXN100) has two 10/1 Gbps Optical/Electrical ports, and two 1000 Mbps Electrical/Optical ports. The 10 Gbps ports can be down-shifted to 1Gbps, thus offering all 4 Electrical/Optical 1G ports for testing. The same two 10 Gbps ports can now be converted to 2.5 Gbps ports with appropriate SFP. It requires additional **PXN101** license installation to run the tests on 2.5G/10G ports. PacketExpert™ 10GX is available in portable as well as mTOP™ rack mount platforms. The portable PacketExpert™ 10GX platform supports all the features of high-end taps providing mobility and storage capacity to reach any point in the network.

For more information, please visit Record and Playback applications webpage.

GL Communications Inc.

818 West Diamond Avenue - Third Floor, Gaithersburg, MD 20878, U.S.A

(Web) www.gl.com - (V) +1-301-670-4784 (F) +1-301-670-9187 - (E-Mail) info@gl.com

Main Features

Record Only Mode

- Simultaneously Record on any 2 ports (10 Gbps / 1 Gbps) simultaneously
- Onboard 8 GB DDR3 memory is available for wirespeed capture

Playback Only Mode

- Simultaneously Playback on all 4x 1 Gbps ports OR on 2x 10 Gbps ports only
- Onboard 8 GB DDR3 memory is available for transmission

Record Packets to File - Features

- Capture packets non-intrusively over 10G Optical/Electrical ports at nano-second precision
- Support for frame lengths from 64 bytes to Jumbo frames (up to 16000 bytes)
- Tapping (Pass through mode), and Tap-Filter-Aggregate modes
- Recording can be done on both the ports simultaneously
- Frames compliant with filtering conditions may be aggregated and saved to hard disk for offline analysis
- Hardware based timestamp provides timesatmp in nano second accuracy
- Hardware based Wirespeed filtering at full line rate (10 Gbps/1Gbps)
- Packets can be captured continuously (till user manually stops the capture or up to hard drive capacity) or limited by a specified size in MB, packet count, time duration, or capture continuously (until the disk is full)
- Supported file formats for recording are *.pcap, *.hdl, *.dat, and *.pcapng/*.ntar
- Ability to capture FCS field bytes and FCS Error frames.
- Supports 16 filters per SFP / Ethernet port
- Customizable filters defined by MAC, VLAN (up to 3 levels), MPLS (up to 3 levels), IP and UDP/TCP layers headers
- Up to 120 bytes wide filter that covers almost entire packet up to UDP
- Supports raw-mode and packet-mode filtering for greater flexibility
- Mask for each bit can be defined, so that each bit can be filtered or left out
- Filter on various header fields like Source/Destination MAC Address, VLAN Id, MPLS Label, Source/Destination Ipv4 Address, Source/Destination UDP ports
- Result count includes the total number of packets received by the port as well as the host, dropped packet, number of bytes written to the file, disk write buffer utilization, and disk write bytes/sec
- Provides Port level statistics like total frames/bytes received, Rx Frame rate, Rx Data rate etc.

Playback from File - Features

- Playback packets from the captured or pre-recorded files
- Playback can be done on two 10G ports or all four 1G ports simultaneously
- Each port can transmit a file separately and independently. ‘As per File’ option allows the users to playback the traffic exactly the same way as it was captured
- Port Mapping option to configure the playback ports, available only for playing the file as per captured file (As per File) option
- Captured traffic on one port can be transmitted on the same or any other port – will be redirected to the correct port at run time
- Packets can be transmitted either continuously, limited by number of packets, or till the end-of-file (EOF)
- Packets transmission is from USB 3.0 to DDR3 and playback is based on time-stamp depending on the captured rate
- Highly accurate Playback based on the recorded nanosecond timestamp
- Supported file formats are DAT (.dat - GL proprietary), HDL (.hdl - GL Proprietary and can be used for offline analysis by GL’s PacketScan™), PCAP (.pcap - used by Wireshark®) and PCAP-NG (.pcapng/.ntar – next generation Wireshark®) formats
- Supports Pause frame transmission with user defined quanta on each port independently
- Displays useful statistics that help user to check the progress of the playback

Pass Through and Output Ports

The PacketExpert™ 10GX hardware unit is equipped with separate 10G and 1G ports. The two RJ-45 (Electrical) and SFP (Optical) ports are capable of 1Gbps. The 10G ports supports only SFP (Optical) interface. The same two 10 Gbps ports can now be converted to 2.5 Gbps ports with appropriate SFP

- If 10G ports (Port#1, Port#2) are configured in Pass-through mode, then 1G (Port#1, Port#2) are Output ports
- If 1G ports (Port#1, Port#2) are configured in Pass-through mode, then 1G (Port#3, Port#4) are Output ports. Thus all four ports supporting 1Gbps

PacketExpert™ unit can be connected to an external storage device or an analyzer for traffic analysis.

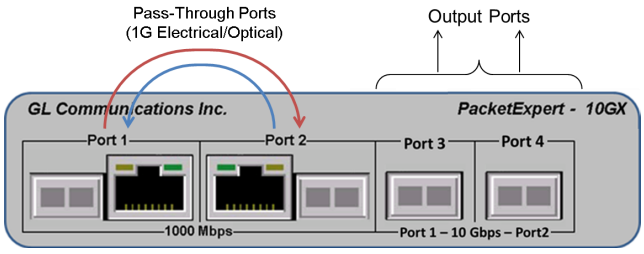
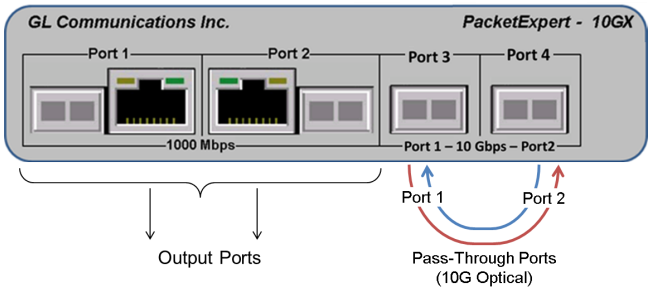


Figure: 1G Electrical/Optical ports in Pass-through mode

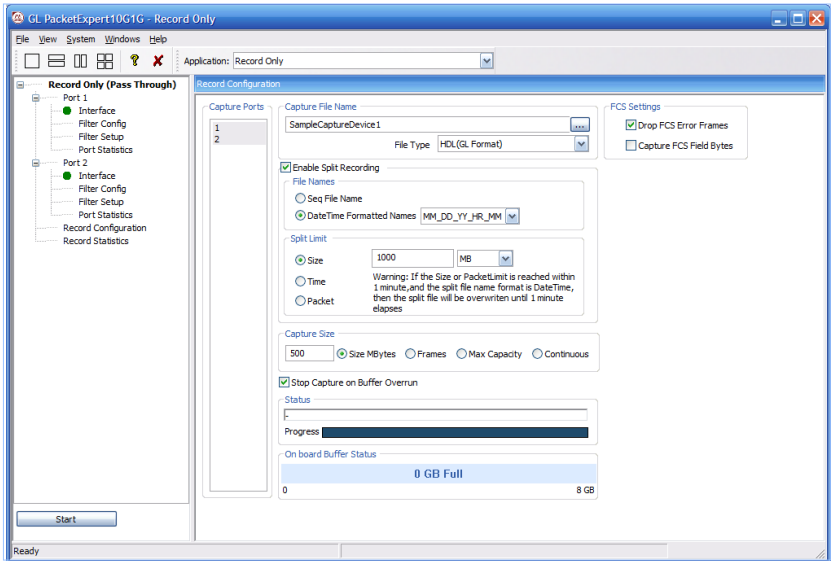


10G Optical only ports in Pass-through mode

Capture Packets to File at Wirespeed

The application allows continuous or limited capture of Ethernet packets using the 10G optical or 1G electrical/optical GigE ports. The captured packets are transferred to the host via the USB 3.0 interface at run time and stored on the host PC's hard disk. The capture can either run continuously or be limited to a specified file size (MB), number of packets, or till the maximum capture capacity of the device.

The complete onboard 8 GB memory is available for wirespeed capture in Record Only mode. While in Record and Playback mode, onboard 4GB memory is available, each for capturing and transmission of data. User can capture useful amount of data at wirespeed (up to 10 Gbps) for later analysis.



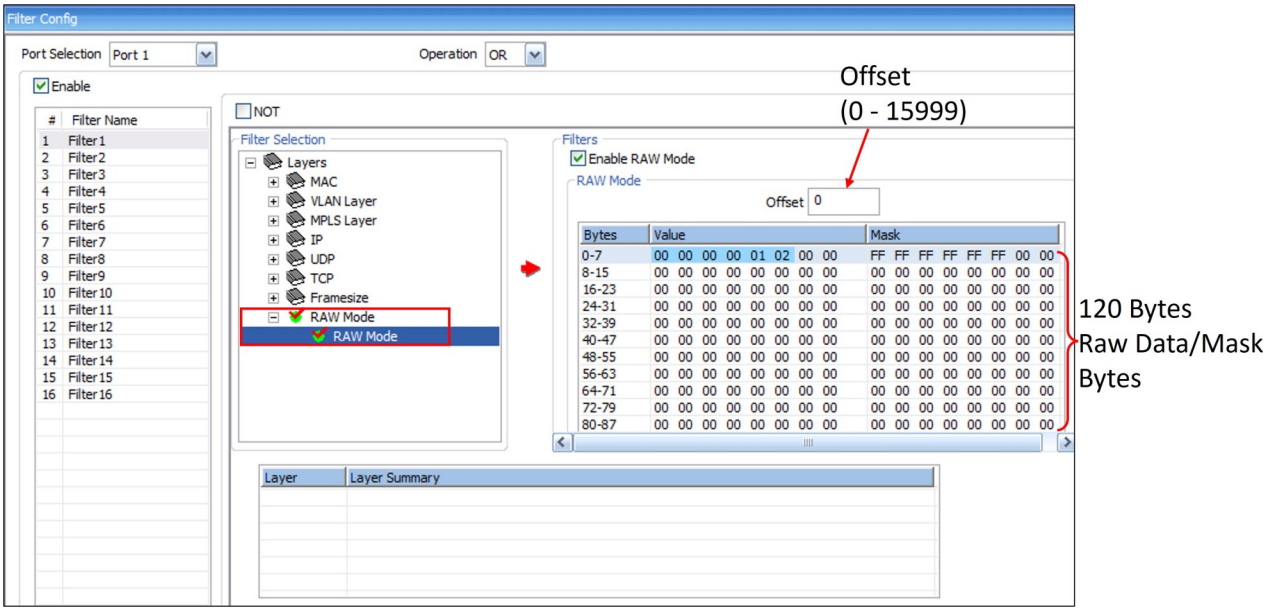
Record to File Configuration

Hardware Filters

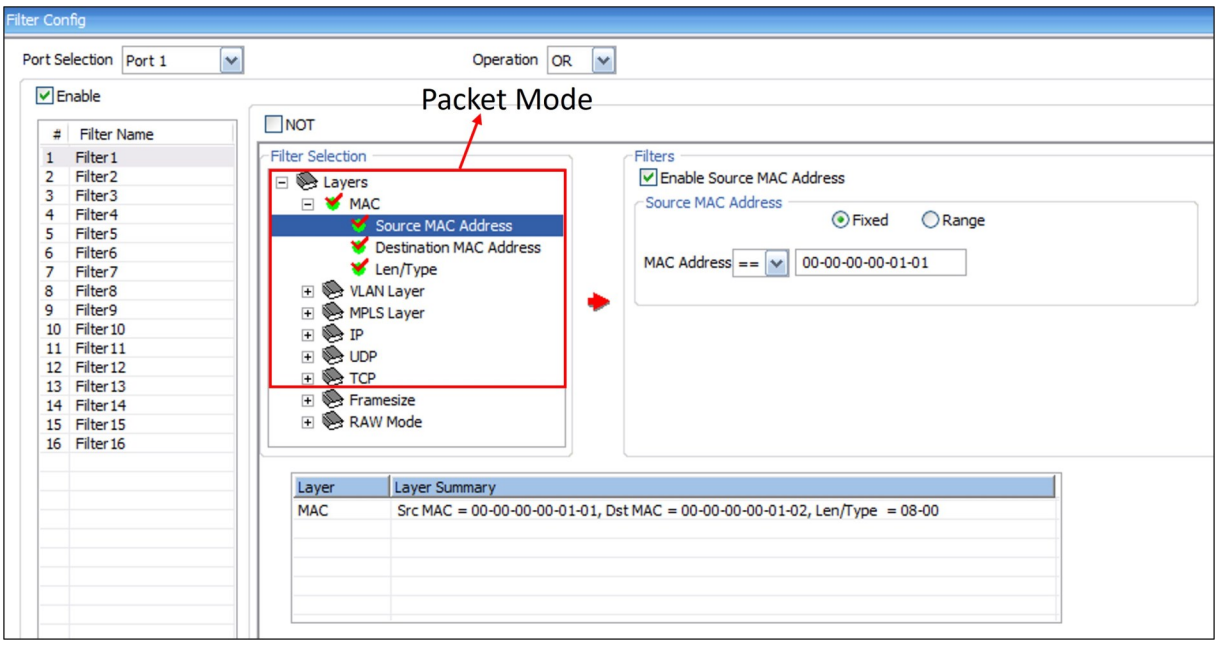
The application includes a powerful “Wirespeed filter” feature that allows user to filter-in, and continuously capture only the traffic of interest.

- Captured traffic on pass-through ports are filtered as per the filter criteria
- In real-time up to 16 simultaneous filters per port each of length 120 bytes
- Edit the raw filter bytes and Mask and Individual Filter Fields
- Filter can be set to each bit in the packet (Raw mode)
- Create filters by editing the individual fields of the incoming packet's Layer stack in Packet mode

- In Raw mode, each bit can be set to ‘filtered’ or ‘don’t care’ condition via filter mask.
- In Packet mode, the layer stack parameter can be set to fixed value, or randomize by providing the min and max range, or can even set to ANY to filter all traffic.
- For each filter, offset can be set to any byte within the packet (from 0 to 15999) which gives flexibility to filter any fields within any protocol headers, and even the payload.



Filter Configuration in Raw Mode



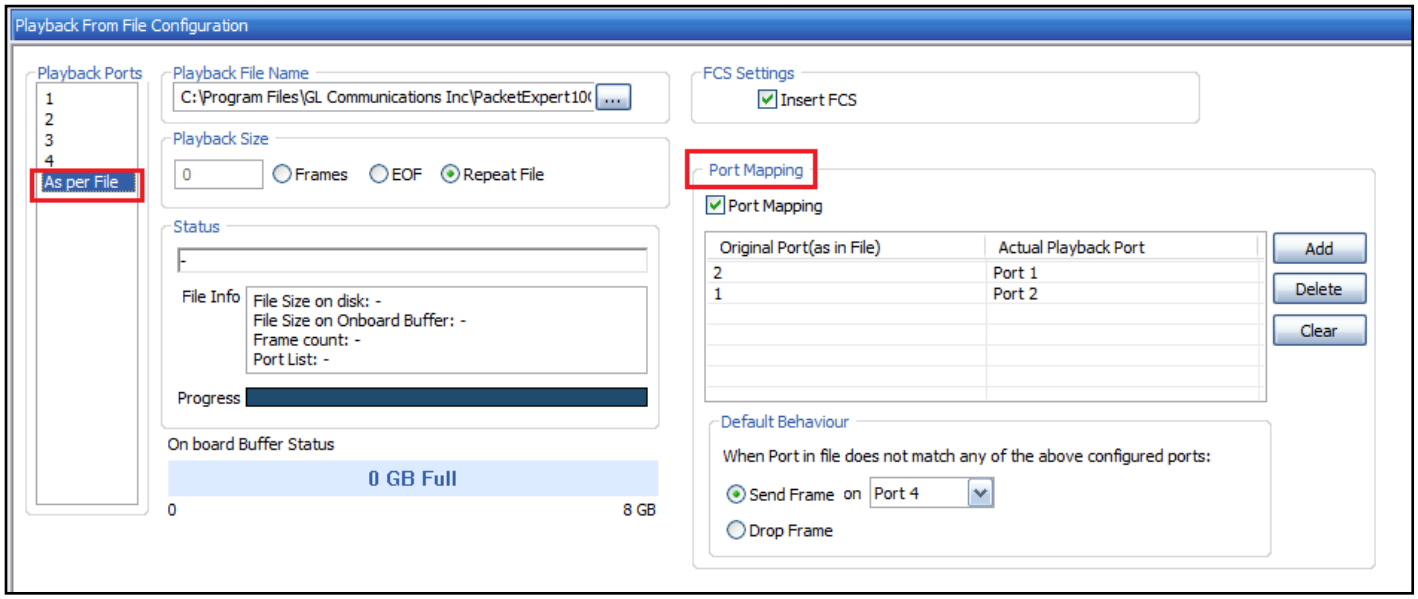
Filter Configuration in Packet Mode

Playback Packets from File at Wirespeed

The application allows continuous or limited transmission of packets from the captured or pre-recorded files.

Most important feature of the playback application is that the traffic can be played at exactly the same way as it was captured. During playback, the relative timestamps for each packet transmitted is maintained exactly like in the source file. Since playback happens in the hardware, it can achieve sub microsecond accuracy in maintaining the timestamps.

- Files can be played on two 10G / four 1G ports simultaneously.
- Each port can transmit a file separately and independently. 'As per File' option allows the users to playback the traffic exactly the same way as it was captured.
- Supports Port Mapping option to configure the playback ports, available only for playing the file in as per captured file (As per File) option
- Packets can be transmitted either continuously (Repeat File), or limited by number of packets, or play till the end-of-file (EOF).
- The pre-recorded file is transferred to the onboard memory completely, before playback starts. The traffic reproduced is highly accurate, as playback is based on the timestamp stored in the header.
- Supported file formats for capture and playback are DAT, HDL, PCAP, and PCAP-NG.

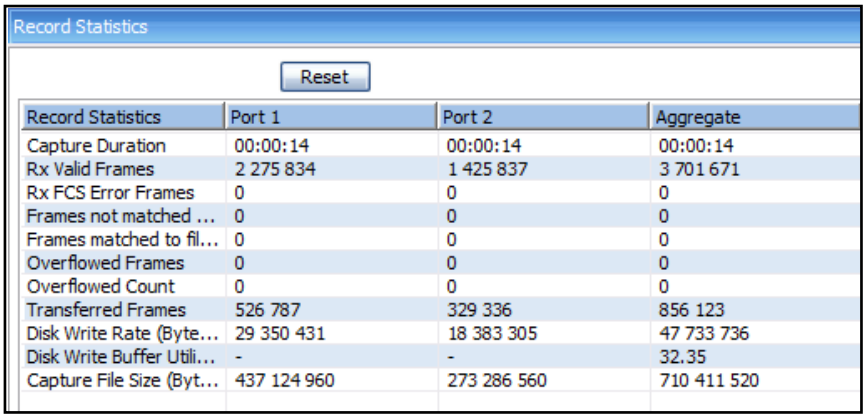


Playback From File - Port Mapping

Statistics

Capture Statistics

Record statistics display includes Capture Duration, Total Rx Frames, Frames not matched to filter, Frames matched to filter, Overflowed Frames, Overflowed Count, Transferred Frames, Disk Write Rate (bytes/sec), Disk Write Buffer Utilization (%), and Capture File Size.

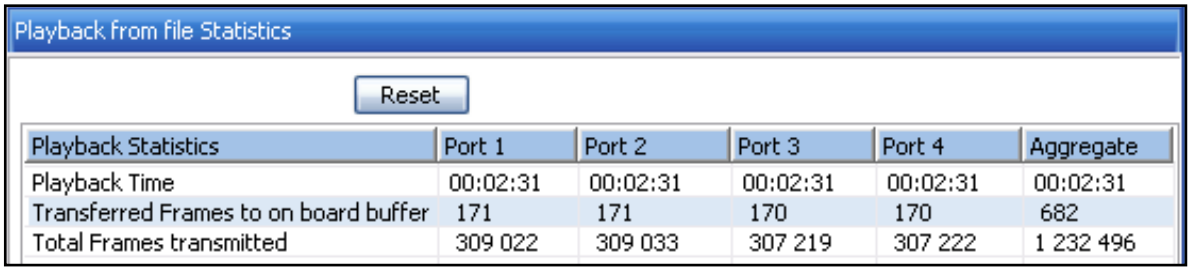


Record Statistics	Port 1	Port 2	Aggregate
Capture Duration	00:00:14	00:00:14	00:00:14
Rx Valid Frames	2 275 834	1 425 837	3 701 671
Rx FCS Error Frames	0	0	0
Frames not matched ...	0	0	0
Frames matched to fil...	0	0	0
Overflowed Frames	0	0	0
Overflowed Count	0	0	0
Transferred Frames	526 787	329 336	856 123
Disk Write Rate (Byte...	29 350 431	18 383 305	47 733 736
Disk Write Buffer Utili...	-	-	32.35
Capture File Size (Byt...	437 124 960	273 286 560	710 411 520

Record Statistics

Playback Statistics

Playback from file statistics includes Playback time, Total number of transferred frames to onboard buffer, and Total frames transmitted parameters.

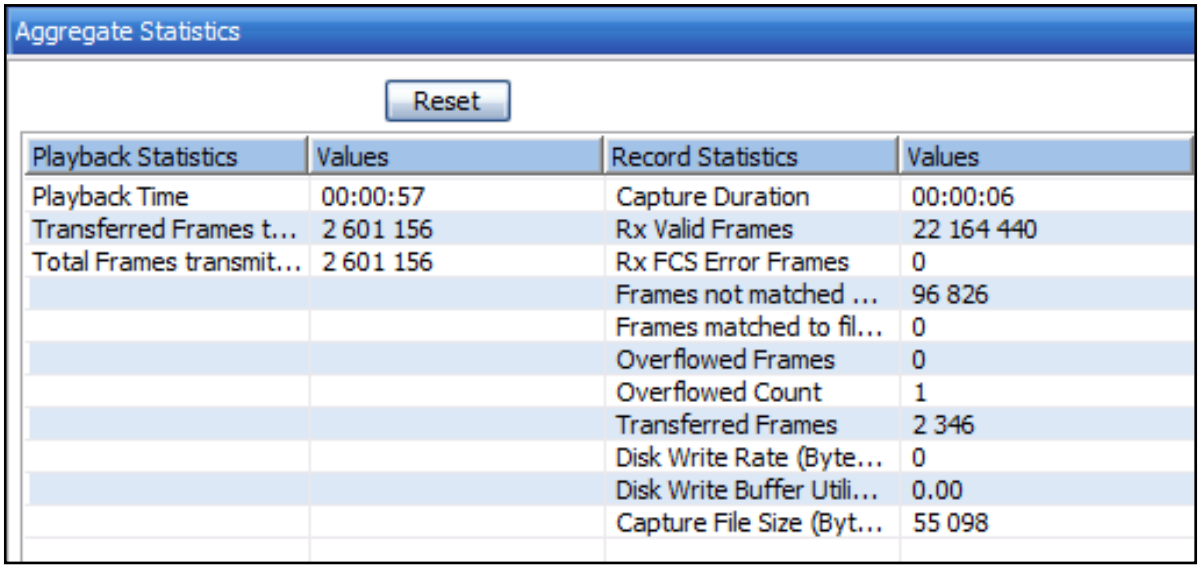


Playback Statistics	Port 1	Port 2	Port 3	Port 4	Aggregate
Playback Time	00:02:31	00:02:31	00:02:31	00:02:31	00:02:31
Transferred Frames to on board buffer	171	171	170	170	682
Total Frames transmitted	309 022	309 033	307 219	307 222	1 232 496

Playback Statistics

Capture and Playback Aggregate Statistics

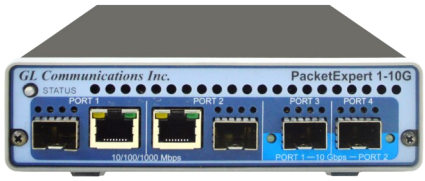
Aggregate Statistics displays both recording and playback statistics for both the ports.



Playback Statistics	Values	Record Statistics	Values
Playback Time	00:00:57	Capture Duration	00:00:06
Transferred Frames t...	2 601 156	Rx Valid Frames	22 164 440
Total Frames transmit...	2 601 156	Rx FCS Error Frames	0
		Frames not matched ...	96 826
		Frames matched to fil...	0
		Overflowed Frames	0
		Overflowed Count	1
		Transferred Frames	2 346
		Disk Write Rate (Byte...	0
		Disk Write Buffer Utili...	0.00
		Capture File Size (Byt...	55 098

Aggregate Statistics

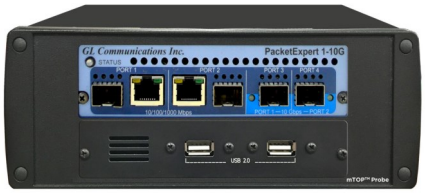
Specifications



Portable 10GX Hardware Unit

1U mTOP™ PacketExpert™ 10GX Rack Unit

Stacked 2U mTOP™ PacketExpert™ 10GX Rack Unit



PacketExpert™ 10GX mTOP™ Probe

Physical Specification:
Length: 8.45 in. (214.63 mm)
Width: 5.55 in. (140.97 mm)
Height: 1.60 in (40.64 mm)
Weight: 1.713 lbs. (0.75 kg)

- **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)
- **Weight:** (not including the rails)
  1U with 3x PXN100 : 11 lbs
  2U with 6x PXN100 : 22 lbs

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:

- +12 Volts (Medical Grade), 3 Amps (For portable units having serial number ≥ 188400)
- +9 Volts, 2 Amps (For portable units having serial number < 188400)
- Optional 4-Port SMA Jack Trigger Board (TTL Input/Output)

SBC Specifications:

- Intel Core i3 or optional i7 NUC Equivalent,
- Windows® 11 64-bit Pro Operating System
- USB 3.0 and USB 2.0 Ports, ATX Power Supply
- USB Type C Ports, Ethernet 2.5GigE port
- 256 GB Hard drive, 8G Memory (Min)
- Two HDMI ports

SBC Specifications:

- Intel Core i3 or optional i7 NUC Equivalent,
- Windows® 11 64-bit Pro Operating System
- USB 3.0 and USB 2.0 Ports
- 12V/3A Power Supply
- USB Type C Ports, Ethernet 2.5GigE port
- 256 GB Hard drive, 8G Memory (Min)
- Two HDMI ports

Temperature: Operating Temperature
0° C to +50° C (only up to operating altitude of 5000 feet, and for Optical SFPs only i.e. Non Electrical SFPs)
+5° to +40° C (for operating altitude up to 10,000 feet, and for both Electrical and Optical SFPs)
Non-Operating Temperature: -30° to +60° C

Humidity: Operating Humidity: 0% to 80% RH
Non-Operating Humidity: 0% to 95% RH

Altitude: Operating Altitude: up to 10,000 feet
Non-Operating Altitude: up to 50,000 feet

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/Optical Interface
2 x 10G Base-SR, -LR -ER Electrical/Optical Interface
Single Mode or Multi Mode Fiber SFP support with LC connector
Protocols:
IEEE 802.3ae LAN PHY compliance
RFC 2544 compliance

Pelican Carry Case

Buyer's Guide

Item No	Product Description
PXN105	Wire speed Record /Playback 10GX
PXN101	10G and 2.5G option for PXN100
CXN100	CLI Server for PXN100

Item No	Related Hardware
PXN100	PacketExpert™ 10GX
PXE100	PacketExpert™ 1G
PXN112G	PacketExpert™ 10GX – SA (12-Port)
PXN124G	PacketExpert™ 10GX – SA (24-Port)
MT001	mTOP™ 1U rackmount w/ SBC
MT002	mTOP™ 1U rackmount w/o SBC

Item No	Related Software
PXN107	PacketBroker 10GX
PXN108	Multi-Stream UDP/TCP Traffic Generator and Analyzer
IPN507	IPNetSim™ and IPLinkSim™ options for PXN100

Note: PCs which include GL hardware/software require Intel or AMD processors for compliance.

For more information, please visit Record and Playback applications webpage.

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