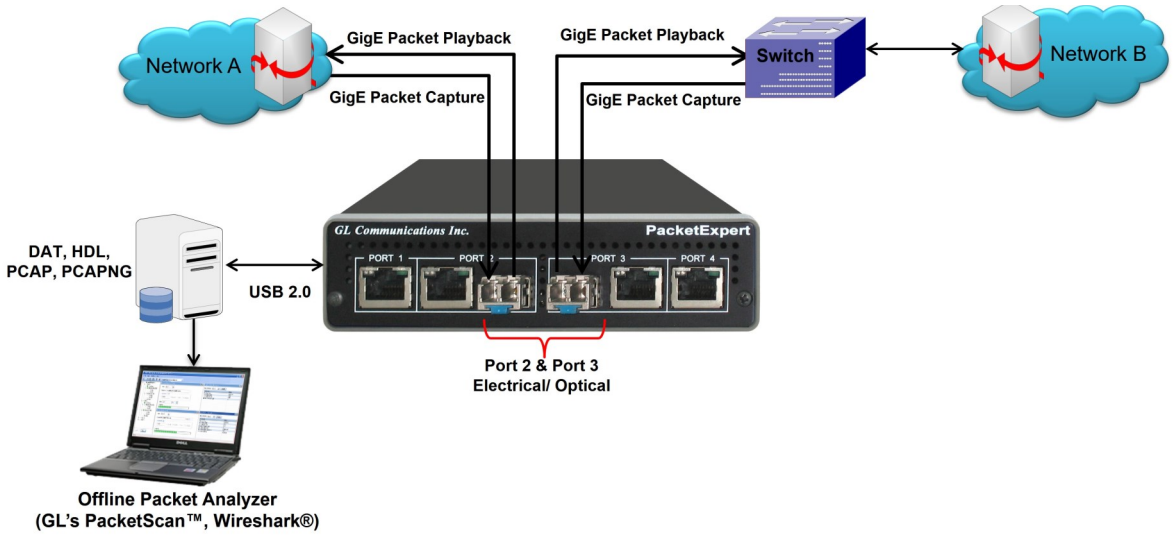
# Wirespeed Packet Capture and Playback (PacketExpert™ 1G)




## Overview

The Record Playback application is designed for High-Precision Wirespeed Packet Forwarding (up to 1 Gbps) , Packet Capture, Filter, Drop (for real-time analysis) and Storage (for offline analysis). The application is available as an optional software with PacketExpert™ 1G, a Quad Port Ethernet / VLAN / MPLS / IP / UDP Tester with 4 Electrical Ethernet ports. 2 of the 4 ports can be Electrical or Optical ports, enabling testing on optical fiber links as well.

The electrical ports support 10 / 100 / 1000 Mbps, and optical ports support 1000 Mbps using SFP. PacketExpert™ 1G is available in portable as well as Rack mount platforms. The portable PacketExpert™ 1G platform supports all the features of high-end taps providing mobility and storage capacity to reach any point in the network.

For both capture and playback, the application supports popular capture file formats such as PCAP / PCAP-NG (Wireshark® formats). The traffic captured on a live network using packet analyzers such as PacketScan™-All IP analyzer or Wireshark® can be easily recreated in the lab using PacketExpert™ Playback feature. The packets captured to an HDL file using PacketExpert™-Record feature can be analyzed and decoded using PacketScan™-All IP analyzer application.

For more details, refer to Wirespeed Ethernet Packet Capture and Playback webpage.

## Main Features

- Continuous simultaneous Capture and Playback over Multiple Ports
  - Long Term capture along with real-time transfer to host PC. This allows for huge file capture limited being only the hard disk space
  - Filter for packets of interest, reducing the bandwidth needed to transfer to host. Customizable 16 filters per port of length 40 bytes (Record Only) and 16 bytes (Record and Playback)
  - Continuous Playback on the same port where capture is running or Playback the pre-recorded files
  - Supports simultaneous capture and playback on multiple ports - Port 1, Port 2, Port 3 of PacketExpert™; Port 2 and Port 3 can support Electrical or Optical interfacing
- High Precision Wirespeed Ethernet Packet Forwarding from a captured file to precisely simulate or recreate live network traffic conditions
- Simultaneous Ethernet Packet Capture and Playback on each port independently as well as separately
- DDR2 memory size of 2GB
- Supports user defined Quanta of Pause Frame transmission on each port independently
- Supported output file formats are *.pcap, *.ngcap, *.hdl, and *.dat
- Displays some useful statistics to check the progress of the capture or playback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## Modes of Operation

Record and Playback feature has following modules –

- Record Only mode- Can perform following operations –
  - Capture packets to files simultaneously on 2 GigE ports (electrical or optical)
  - Up to 2 GB of traffic can be captured using the onboard 2 GB memory
- Record Only or Playback Only mode– Can perform following operations –
  - Transmit packets at wirespeed using pre-recorded files simultaneously on up to 3 GigE ports
  - Upto 2 GB of traffic file can be loaded into the onboard 2 GB memory for wirespeed playback

## Capture Packets to File at Wirespeed

The application allows continuous or limited capture of Ethernet packets using the 2 optical or electrical GigE ports. The captured packets are transferred to the host via the USB 2.0 / 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 specified time duration.

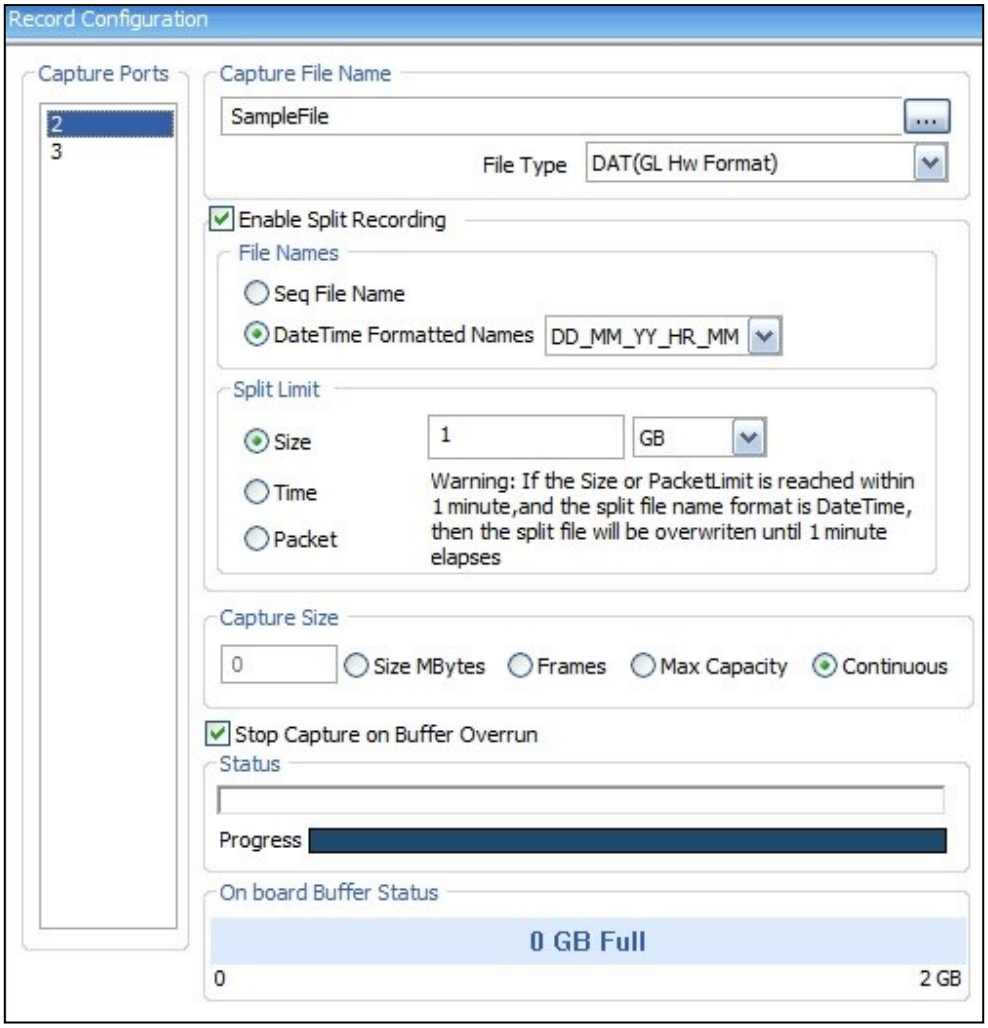



**Figure: Record Configuration**

# Hardware Filters and Triggers

- The Record to File feature includes a powerful “Wirespeed filter” that allows user to filter out unwanted traffic, and continuously capture the traffic of interest
  - Filter packets and record only packets of interest
  - Capture simultaneously on 2 ports with 40 bytes deep filter per port (for record Only module) or on 3 ports with 16 bytes deep filter (for Record and Playback module) and set filter on any one of the ports or all ports
  - Packet filtering can be based on all Layer 2 (Ethernet), Layer 3 (IP) Layer 4 (UDP/TCP) Headers
  - Up to 16 filters can be defined per port. Each filter is up to 40/16 bytes wide
  - Filter can be set to each bit in the packet (Raw mode) or each field (Packet Mode)
  - Generates a trigger (1 Microsecond pulse) for each packet that passes the filter
- Supports both Raw mode/Packet mode filter editing
- In Raw mode, each bit can be set to ‘filtered’ or ‘don’t care’ condition via filter mask
- For each filter, offset can be set to any byte within the packet (from 0 to 2000) which gives flexibility to filter particular fields within protocol headers, and also the payload
- Up to 16 filters can be defined, and “AND” /”OR” condition can be set to all the filters. Further, each filter can be set to either Accept or reject the packet

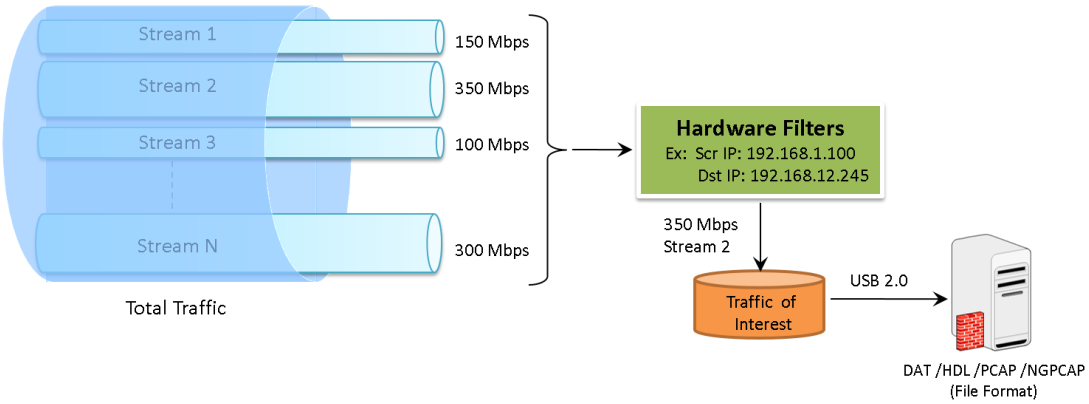



**Figure: Capture Traffic of Interest**

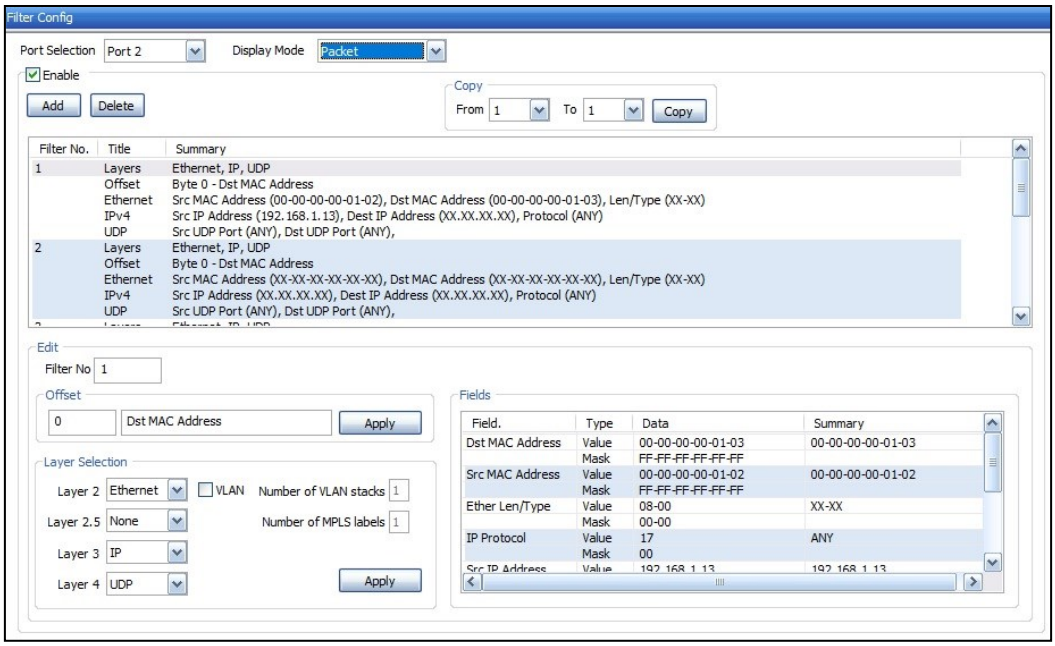



**Figure: Filter Configuration**

## 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 back 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.

- Playback can be done on up to 3 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
- Packets can be transmitted either continuously, limited by number of packets, or till the end-of-file (EOF)
- Packets transmission is from USB2.0/ USB3.0 to DDR2 and playback is based on time-stamp depending on the captured rate

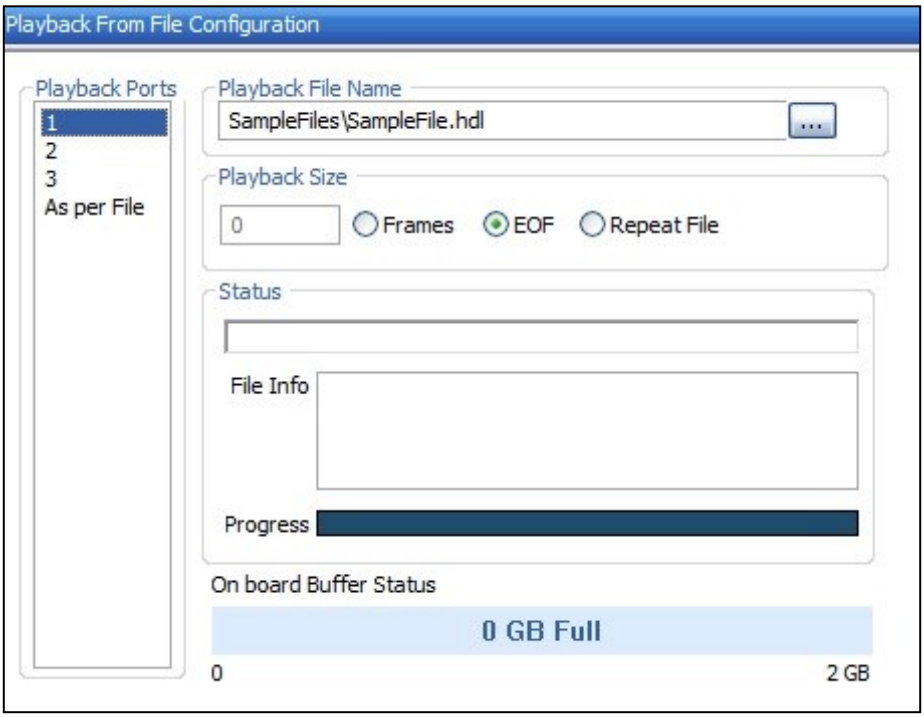



**Figure: Playback From File**

## Command Line Interface (CLI)

PacketExpert™ is enhanced to support Command Line Interface (CLI) with additional CXE100 license to access all the functionalities remotely using Python , C# clients and MAPS™ CLI Server/Client architecture.

The CLI supports all the PacketExpert™ test modules including - All Port Bert, Bert Loopback, All Port Loopback, RFC 2544, Record / Playback, ExpertSAM™, Multi Stream Traffic Generator and Analyzer, ExpertTCP™ and PacketBroker.

# 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

Reset

| Record Statistics | Port 2 | Port 3 | Aggregate |
|---|---|---|---|
| Capture Duration | 00:00:15 | 00:00:15 | 00:00:15 |
| Total Rx Frames | 12 910 | 129 122 | 142 032 |
| Frames not matched to filter | 0 | 0 | 0 |
| Frames matched to filter | 12 908 | 0 | 12 908 |
| Overflowed Frames | 0 | 0 | 0 |
| Overflowed Count | 0 | 0 | 0 |
| Transferred Frames | 12 909 | 129 116 | 142 025 |
| Disk Write Rate (Bytes/Sec) | 1 242 601 | 12 424 788 | 13 667 389 |
| Disk Write Buffer Utilization (%) | - | - | 0.00 |
| Capture File Size (Bytes) | 19 759 086 | 197 627 604 | 217 386 690 |

**Figure: Record Statistics**

## Playback Statistics

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

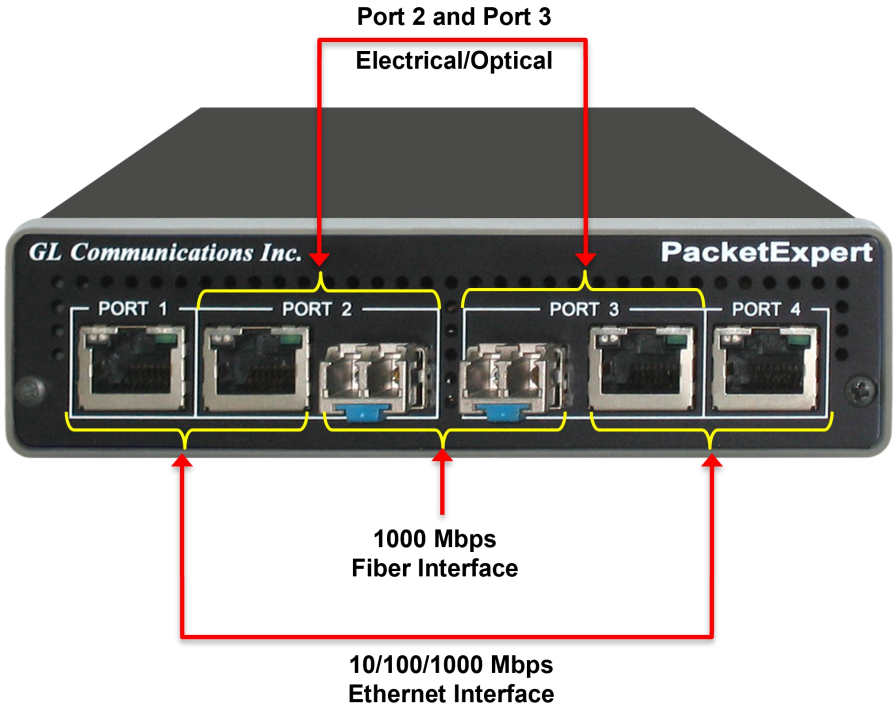
Playback from file Statistics

Reset

| Playback Statistics | Port 1 | Port 2 | Port 3 | Aggregate |
|---|---|---|---|---|
| Playback Time | 00:01:23 | 00:01:23 | 00:01:23 | 00:01:23 |
| Transferred Frames to on board buffer | 65 338 | 65 338 | 65 338 | 196 014 |
| Total Frames transmitted | 361 741 | 361 743 | 361 749 | 1 085 233 |

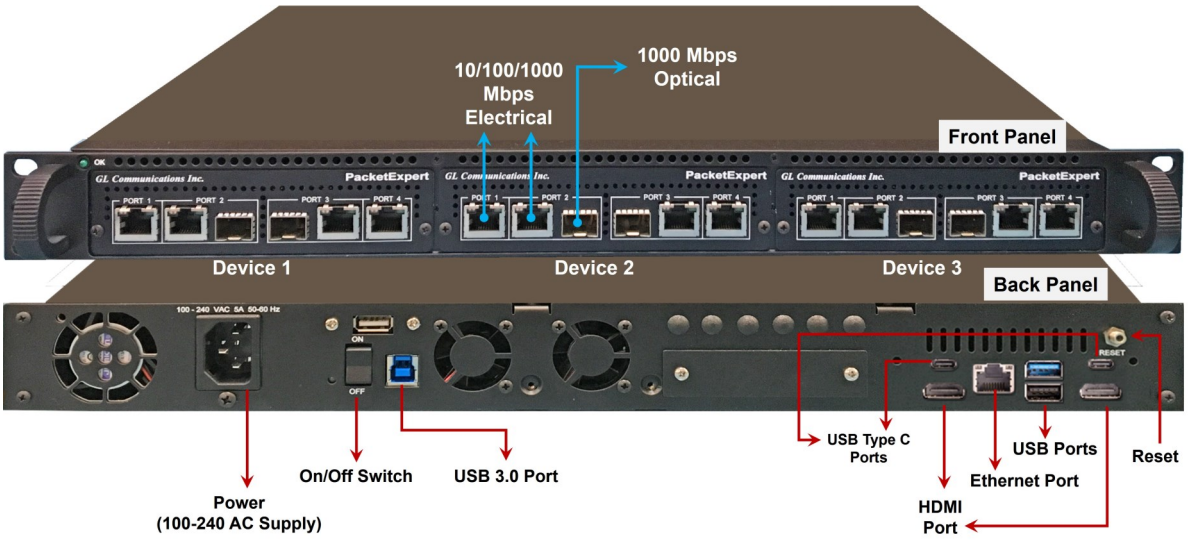
**Figure: Playback Statistics**

# Portable PacketExpert™ 1G Specifications




| | |
|---|---|
| **Interfaces** | • 2 x 10 / 100 / 1000 Base-T Electrical only<br>• 2 x 1000 Base-X Optical OR 10/100/1000 Base-T Electrical<br>• Single Mode or Multi Mode Fiber SFP support with LC connector |
| **Protocols** | • RFC 2544 compliance |
| **Bus Interface** | • USB 2.0 or USB 3.0 |
| **Power** | • +12 Volts (Medical Grade), 3 Amps |
| **Temperature** | • Operating Temperature: +5 to +40C<br>• Non-Operating Temperature: -30 to +60C |
| **Humidity** | • Operating Humidity: 0% to 80% RH<br>• Non-Operating Humidity: 0% to 95% RH |
| **Altitude** | • Operating Altitude: Up to 10,000 feet<br>• Non-Operating Altitude: Up to 50,000 feet |
| **Physical Specification** | • Length: 8.45 in. (214.63 mm)<br>• Width: 5.55 in. (140.97 mm)<br>• Height: 1.60 in (40.64 mm)<br>• Weight: 1.66 lbs. (0.75 kg) |

# mTOP™ PacketExpert™ 1G Rack Specifications




| | |
|---|---|
| **Interfaces** | 12 Total Ethernet Ports (HD-PacketExpert-12)<br>• mTOP™ System (embedded SBC, 3x PXE100)<br>• PacketExpert™ 1G (PXE100) interfaces -<br>– 6x 1000 Base-X Optical OR 10/100/1000 Base-T Electrical<br>– 6x (10/100/1000) Base-T Electrical<br>24 Total Ethernet Ports (HD-PacketExpert-24)<br>• mTOP™ System (embedded SBC, 6x PXE100)<br>• PacketExpert™ 1G (PXE100) interfaces -<br>– 12x 1000 Base-X Optical OR 10/100/1000 Base-T Electrical<br>– 12x (10/100/1000) Base-T Electrical |
| **SBC Specifications** | • Intel Core i3 or optional i7 NUC Equivalent,<br>• Windows® 11 64-bit Pro Operating System<br>• USB 3.0 and USB 2.0 Ports, ATX Power Supply<br>• USB Type C Ports, Ethernet 2.5GigE port<br>• 256 GB Hard drive, 8G Memory (Min)<br>• Two HDMI ports |
| **External Dimension** | • Length: 16 Inches<br>• Width: 19 Inches<br>• Height: 2x 1U mTOP™ (HD-PacketExpert-24) or 1U mTOP™ (HD-PacketExpert-12) |
| **Power Supply** | • ATX Power Supply |
| **Order Information** | • PXE100 - PacketExpert™ Options<br>• MT001/MT001E (1U)<br>• MT001+MT002/ MT001E+MT002 (Stacked 1U) |

# mTOP™ 1G Probe Specifications

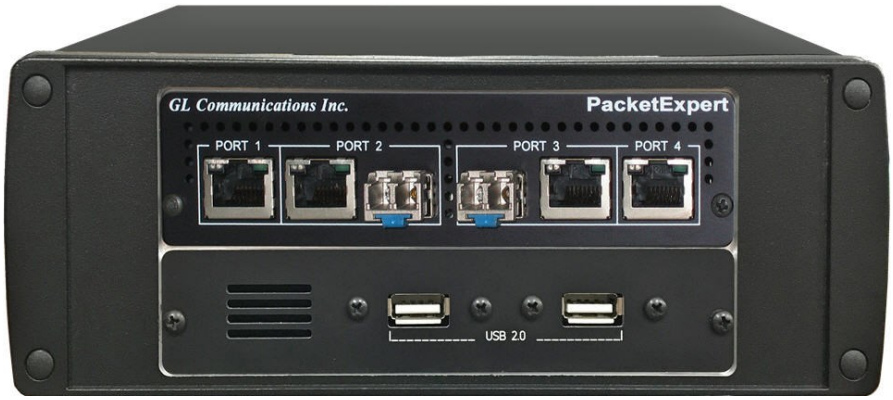



**Figure: mTOP™ Probe with 1G Hardware Unit + SBC**

| | |
|---|---|
| **Interfaces** | • 4x Total Ethernet ports<br>• 2x 10/100/1000 Base-T Electrical only<br>• 2x 1000 Base-X Optical OR 10/100/1000 Base-T Electrical<br>• Single Mode or Multi Mode Fiber SFP support with LC connector |
| **SBC Specifications** | • Intel Core i3 or optional i7 NUC Equivalent,<br>• Windows® 11 64-bit Pro Operating System<br>• USB 3.0 and USB 2.0 Ports, 12V/9A Power Supply<br>• USB Type C Ports, Ethernet 2.5GigE port<br>• 256 GB Hard drive, 8G Memory (Min)<br>• Two HDMI ports |
| **External Dimension** | • Length: 10.4 inches<br>• Height: 3 inches<br>• Width: 8.4 inches |
| **Power Supply** | • 12 Volts (Medical Grade), 3 Amps |
| **Order Information** | • PXE100<br>• MT005/MT005E |

**Pelican Carry On Case**

# Buyer's Guide

| Item No | Product Description |
|---|---|
| PXE105 | Wire speed Record/Playback 1G |
| CXE100 | CLI support for PXE100 |

| Item No | Related Hardware |
|---|---|
| PXE100 | PacketExpert™ 1G Portable |
| PXE104 | PacketExpert™ - SA (4 ports) 1G |
| PXE112 | PacketExpert™ -SA (12 Ports) 1G |
| PXE124 | PacketExpert™ -SA (24 Ports) 1G |

| Item No | Related Software |
|---|---|
| PXE107 | PacketBroker 1G |
| PXE108 | Multi Stream Traffic Generator and Analyzer 1G |
| PXE108 | ExpertTCP™ 1G |

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

For more details, refer to Wirespeed Ethernet Packet Capture and Playback webpage.

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