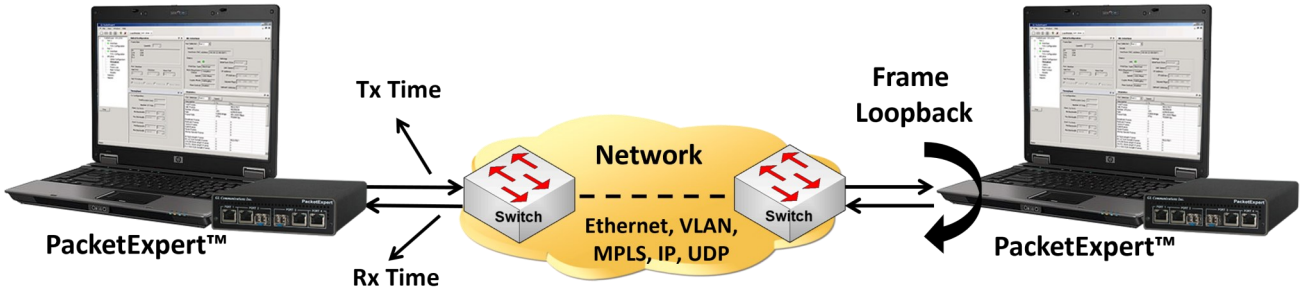
PacketExpert™ - RFC 2544 Testing

Overview

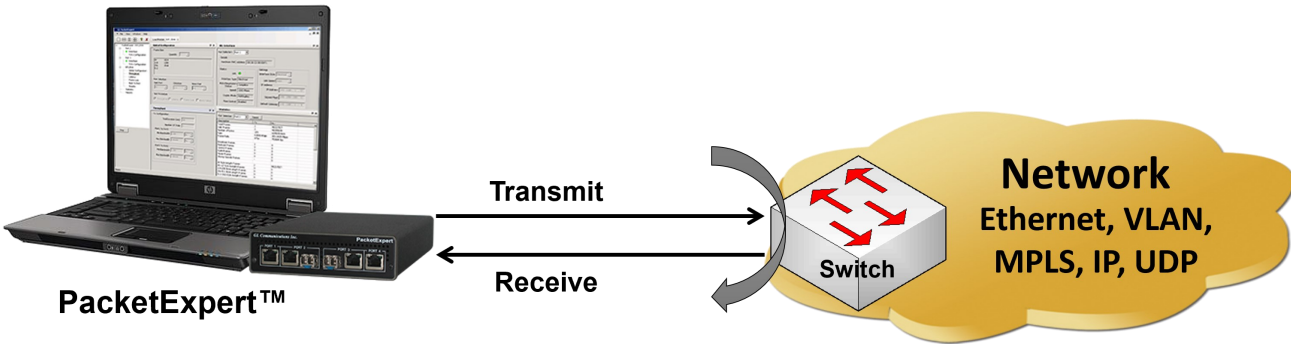
The RFC2544 application is designed to perform a test which includes Throughput, Latency, Frame Loss, and Back-to-Back. Similar to BERT, RFC 2544 can be done over Framed Ethernet (Layer2), Stacked VLAN (Q-in- Q), Stacked MPLS, IP and UDP. The application is available as an basic software with PacketExpert™ 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.



(Latency = Rx Time – Tx Time)

In Single port RFC 2544 test, the PacketExpert™ allows RFC 2544 specific tests on Port #2 or Port #3. The test is setup such that the traffic is transmitted on Port #2 and the PacketExpert™ at the DUT end can be configured to loop the traffic back on the same port



In Dual port RFC 2544 test, the PacketExpert™ allows RFC 2544 specific tests on Port #2 and Port #3. The test is setup such that the traffic can be generated and transmitted on either of the ports (Port #2 or Port #3) and the looped back traffic from the DUT is received on the opposite port validating the test parameters.

For more details, refer to RFC 2544 Network Testing webpage.

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Main Features

- Throughput, back-to-back, latency and frame loss testing supporting uni-directional and bi-directional traffic between ports
- Supports RFC 2544 on single or dual electrical / optical ports
- Includes various parameter configurations such as Test Selection, Frame Sizes selection, Unidirectional/Bidirectional, Number of trials, Trial Duration, and many more
- User-defined options to configure various packet header parameters, like MAC addresses, IP addresses, UDP ports, VLAN ID, MPLS Labels, and more
- Results are displayed in both tabular as well as graphical format
- Command Line Interface for automated testing and remote accessibility using API clients C#, Python and MAPS™ Client Server architecture

Global Configuration

Global configuration includes various parameter configurations such as Test Selection, Frame Sizes, Unidirectional / Bidirectional, Number of Trials, Trial Duration, and many more. User-defined options to configure various packet header parameters such as, MAC addresses, IP addresses, UDP ports, VLAN ID, MPLS Labels, and others.

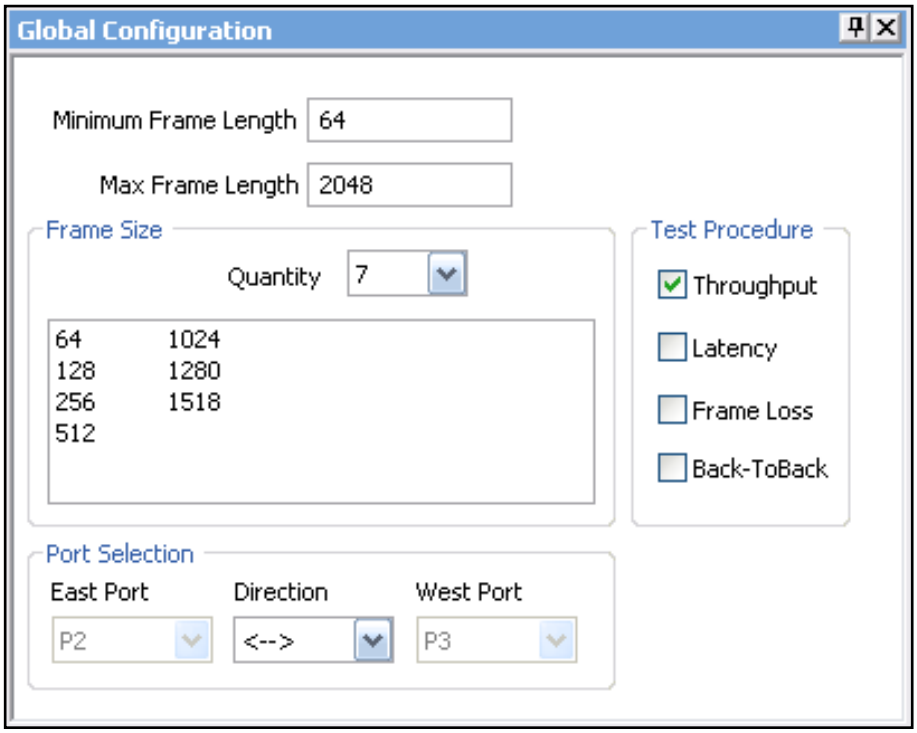


Figure: Global Configuration (Dual Port)

RFC 2544 Test Results

Results are displayed in both tabular as well as graph format. Supports test report generation in both PDF and CSV formats.

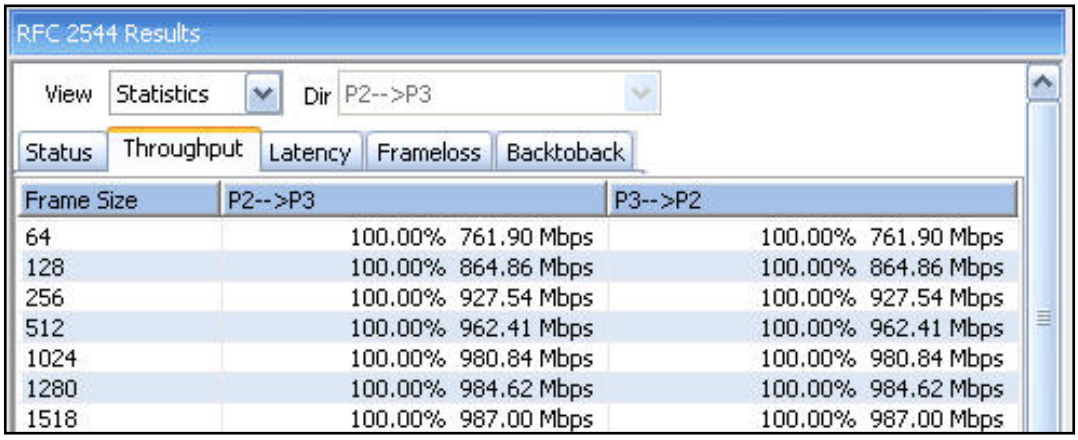
Status – displays test status such as In Progress, Completed, and Aborted. In addition, it displays status of learning frames and test frames for the current trial along with Bandwidth, Frame Size, and Frame Count.

Throughput – Throughput results are displayed in terms of bandwidth (both in percentage as well as Mbps) for each frame size. Graphically, it is plotted as throughput vs frame size.

Latency – Latency values are displayed in terms of microseconds for each frame size. Graphically, the latency value is plotted against frame size.

Back-to-Back – Back-to-Back values are displayed in terms of the burst size (in milliseconds) for each frame size. Graphically, the burst size is plotted against frame size.

Frame Loss – Frame Loss results are displayed in terms of the throughput (in percentage) measured over the range of input rates (in percentage) for each frame size. Graphically, for each frame size, the throughput is plotted against the test rate.



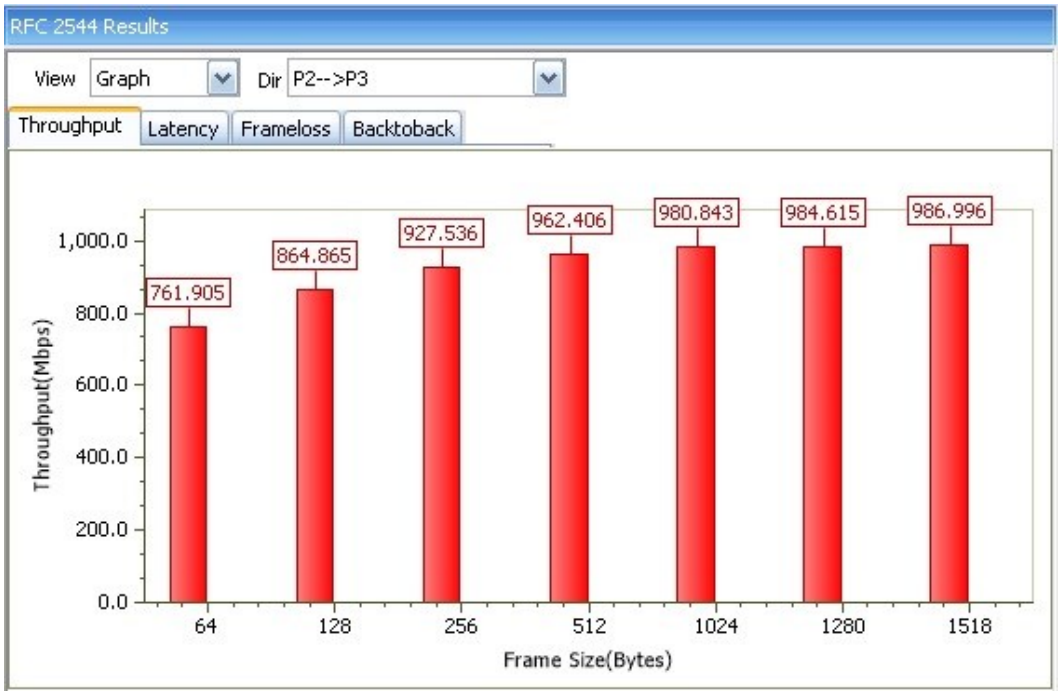
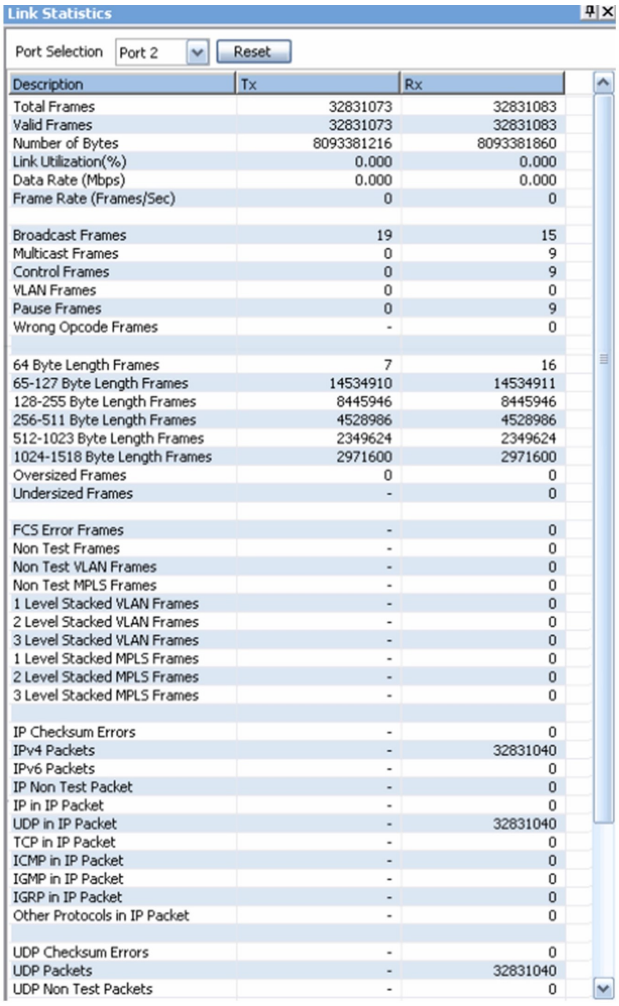


Figure: RFC 2544 Throughput Statistics and Graph

Port Level Statistics

Detailed statistics per port are provided. In addition to statistics such as Frame Count, Frame Rate, Link Utilization, others are provided based on various categories like Frame Type (Unicast/Broadcast/Multicast, VLAN), Frame Lengths (64, 65-127, 1024-1518, Oversized, Undersized), Protocol Type (IPv4, IPv6, UDP, TCP, ICMP, IGRP, etc.). VLAN Statistics (per Stack position), MPLS Statistics (per stack position) are also displayed for the configured stacks.



Description	Tx	Rx
Total Frames	32831073	32831083
Valid Frames	32831073	32831083
Number of Bytes	8093381216	8093381860
Link Utilization(%)	0.000	0.000
Data Rate (Mbps)	0.000	0.000
Frame Rate (Frames/Sec)	0	0
Broadcast Frames	19	15
Multicast Frames	0	9
Control Frames	0	9
VLAN Frames	0	0
Pause Frames	0	9
Wrong Opcode Frames	-	0
64 Byte Length Frames	7	16
65-127 Byte Length Frames	14534910	14534911
128-255 Byte Length Frames	8445946	8445946
256-511 Byte Length Frames	4528986	4528986
512-1023 Byte Length Frames	2349624	2349624
1024-1518 Byte Length Frames	2971600	2971600
Oversized Frames	0	0
Undersized Frames	-	0
FCS Error Frames	-	0
Non Test Frames	-	0
Non Test VLAN Frames	-	0
Non Test MPLS Frames	-	0
1 Level Stacked VLAN Frames	-	0
2 Level Stacked VLAN Frames	-	0
3 Level Stacked VLAN Frames	-	0
1 Level Stacked MPLS Frames	-	0
2 Level Stacked MPLS Frames	-	0
3 Level Stacked MPLS Frames	-	0
IP Checksum Errors	-	0
IPv4 Packets	-	32831040
IPv6 Packets	-	0
IP Non Test Packet	-	0
IP in IP Packet	-	0
UDP in IP Packet	-	32831040
TCP in IP Packet	-	0
ICMP in IP Packet	-	0
IGMP in IP Packet	-	0
IGRP in IP Packet	-	0
Other Protocols in IP Packet	-	0
UDP Checksum Errors	-	0
UDP Packets	-	32831040
UDP Non Test Packets	-	0

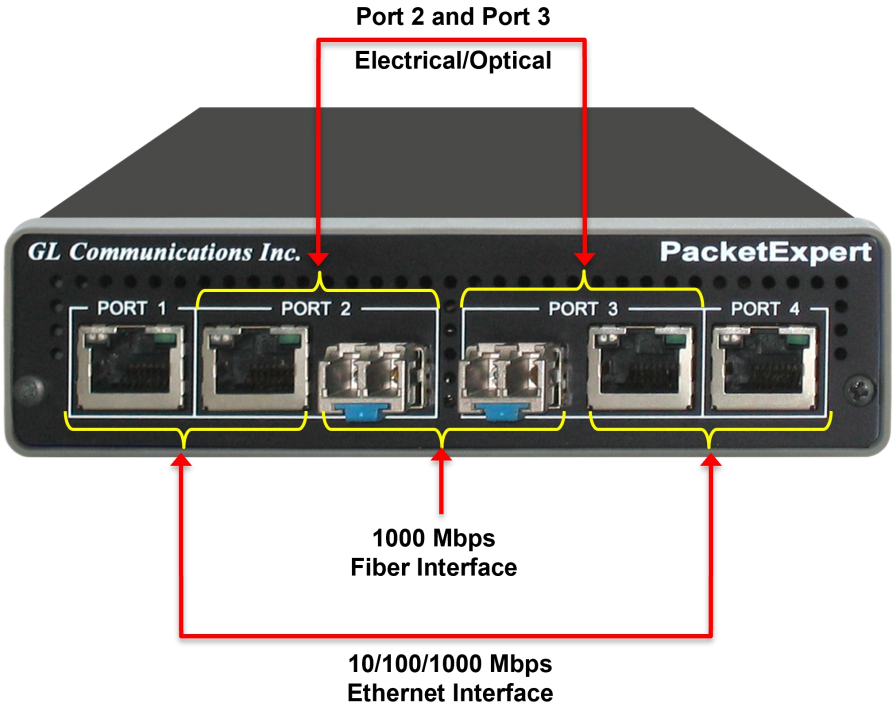
Figure: Port Level Statistics

Command Line Interface (CLI)

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

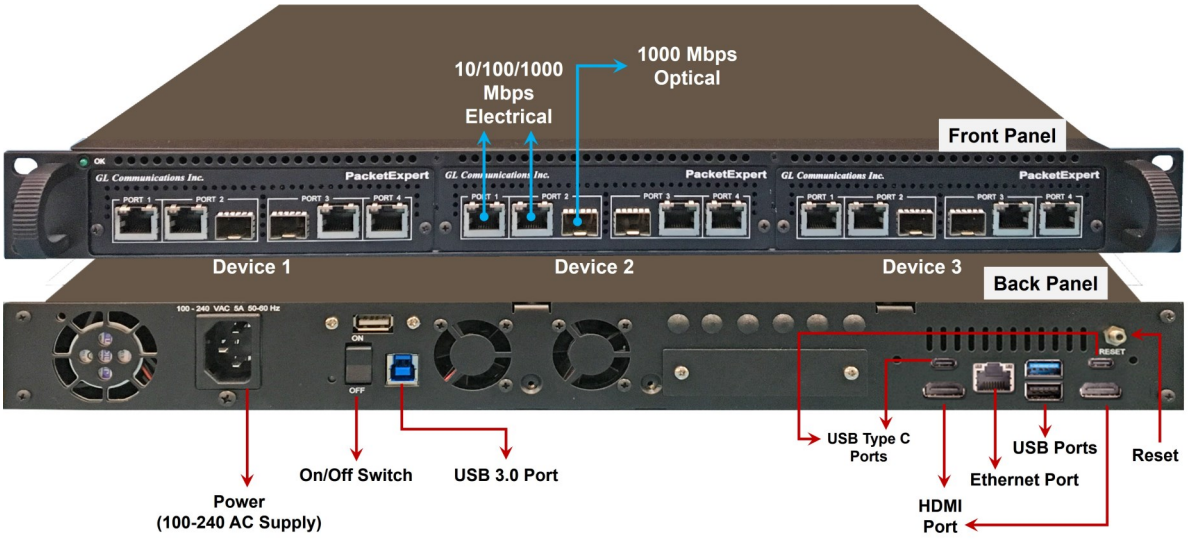
The CLI supports all the PacketExpert™ test modules including - All Port Bert, Bert Loopback, All Port Loopback, RFC 2544, Record Playback, ExpertSAM™ and PacketBroker.

Portable PacketExpert™ 1G Specifications



Interfaces	• 2 x 10 / 100 / 1000 Base-T Electrical only • 2 x 1000 Base-X Optical OR 10/100/1000 Base-T Electrical • 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 • Non-Operating Temperature: -30 to +60C
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
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)

mTOP™ PacketExpert™ 1G Rack Specifications



Interfaces	12 Total Ethernet Ports (HD-PacketExpert-12) • mTOP™ System (embedded SBC, 3x PXE100) • PacketExpert™ 1G (PXE100) interfaces - – 6x 1000 Base-X Optical OR 10/100/1000 Base-T Electrical – 6x (10/100/1000) Base-T Electrical 24 Total Ethernet Ports (HD-PacketExpert-24) • mTOP™ System (embedded SBC, 6x PXE100) • PacketExpert™ 1G (PXE100) interfaces - – 12x 1000 Base-X Optical OR 10/100/1000 Base-T Electrical – 12x (10/100/1000) Base-T Electrical
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
External Dimension	• Length: 16 Inches • Width: 19 Inches • Height: 2x 1U mTOP™ (HD-PacketExpert-24) or 1U mTOP™ (HD-PacketExpert-12)
Power Supply	• ATX Power Supply
Order Information	• PXE100 - PacketExpert™ Options • MT001/MT001E (1U) • MT001+MT002/ MT001E+MT002 (Stacked 1U)

mTOP™ 1G Probe Specifications

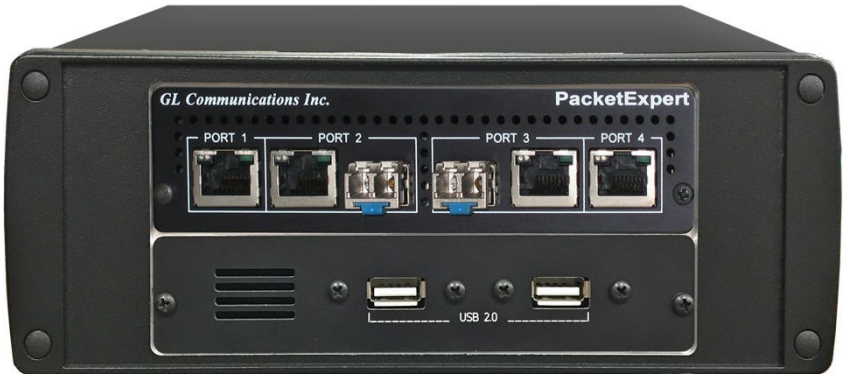


Figure: mTOP™ Probe with 1G Hardware Unit + SBC

Interfaces	• 4x Total Ethernet ports • 2x 10/100/1000 Base-T Electrical only • 2x 1000 Base-X Optical OR 10/100/1000 Base-T Electrical • Single Mode or Multi Mode Fiber SFP support with LC connector
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/9A Power Supply • USB Type C Ports, Ethernet 2.5GigE port • 256 GB Hard drive, 8G Memory (Min) • Two HDMI ports
External Dimension	• Length: 10.4 inches • Height: 3 inches • Width: 8.4 inches
Power Supply	• 12 Volts (Medical Grade), 3 Amps
Order Information	• PXE100 • MT005/MT005E

Pelican Carry On Case

Buyer's Guide

Item No	Product Description
PXE100	PacketExpert™ 1G
CXE100	CLI support for PXE100
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
PXE105	Wire speed Record/Playback 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 RFC 2544 Network Testing webpage.

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