

Test Data Link Layer, Network Layer, & Transport Layer

Generates Full Duplex IP, UDP, or Ethernet Traffic

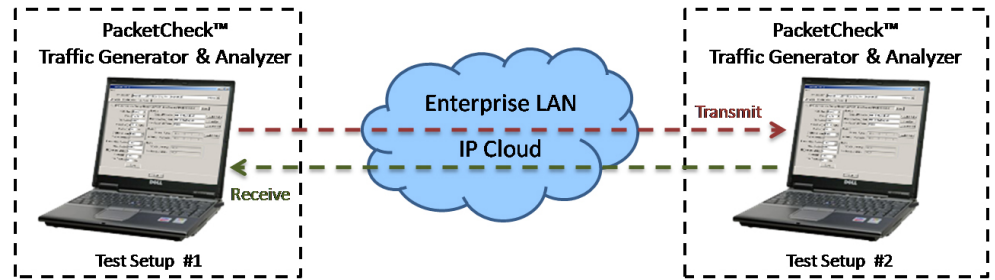
Throughputs Up to 800 Mbps On-demand Bandwidth

Ethernet, IP & UDP Level BER Testing w/ User-defined Patterns

Tx and Rx Packet and Frame Statistics

End-to-End Performance Statistics w/ RTD Measurement

PacketCheck™ - Software Ethernet Tester



GL's **PacketCheck™** is a PC based Ethernet / IP BERT and Throughput test tool that is very easy to use. It truly takes confusion out of Ethernet testing at all protocol layers - from raw Ethernet frames to IP/UDP packets. It can be used as a general purpose Ethernet performance analysis for 10Mbps, 100Mbps and 1Gbps Ethernet local area networks. The **PacketCheck™** makes use of the network interface card (NIC) in the PC to transmit and receive raw Ethernet packets over the network. Throughputs up to 800 Mbps can be easily tested.

The **PacketCheck™** allows generating full duplex (transmit and receive) IP, UDP, or Ethernet traffic with on-demand bandwidth (up to 800 Mbps). Also included is BER testing capability with provision for user-defined test patterns. Users can control the duration of traffic, and specify the frame format Length, type, source IP and MAC address, destination IP and MAC address. The application allows monitoring end to end performance statistics such as total packets, packet loss, out of sequence packets, error packets, correct pattern frames, pattern sync status, and protocol statistics (Total IP packets, UDP Packets, IP/UDP Checksum errors etc).

Assuming that the test is conducted on 2 PCs – a Source and Destination PC, we are considering some common scenarios to explain the configuration of Source and Destination addresses for the tests conducted at layer 2 / 3 / 4.

The Ethernet tester can operate on any of the three layers - Layer 2 (Data Link), Layer 3 (Network), and Layer 4 (Transport) of the OSI reference model.

Main Features

- Test Ethernet traffic of up to 800 Mbps bandwidth.
- Generates full duplex IP, UDP, or Ethernet traffic to transmit and/or receive traffic on any of the three layers (Data Link / Network layer / Transport) with on-demand bandwidth.
- Bit-error-rate testing (BERT) on layer 2, layer 3, and layer 4 with detailed runtime statistics for both Tx and Rx.
- Customizable 2 bytes test patterns.
- Customizable MAC headers like MAC Source/Destination addresses, Length/Type field, and Protocol header like IP Source/destination addresses and UDP Source/Destination Ports.
- 64 bytes to 1518 bytes frame lengths supported.
- Capability to measure the average Round Trip Delay [RTD] value of each packet in μ sec.
- Supports end-to-end (Tx and Rx) performance statistics monitoring.
- Capacity to control the traffic duration with Tx and/or Rx run-time settings in seconds.
- Ethernet Level BERT, Tx and Rx frame statistics.
- IP /UDP level BERT, Tx and Rx packet statistics.
- Provides NIC performance details, such as, Received OK frames, Buffer overflow frames, and Received error frames.

For detailed information on PacketCheck™, refer to <http://www.gl.com/packetcheck.html>



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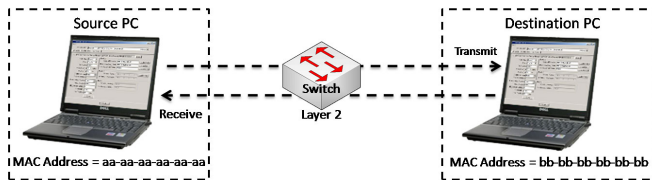
Ethernet BER Testing

At Layer 2

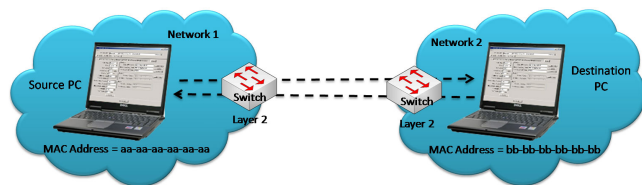
The bridges, switches, and network interface cards (NIC) work at Layer 2 (Data Link) and handle physical addressing, packing data into frames, and sequencing data frames. The Layer 2 consists of Logical Link Control (LLC) and Media Access Control (MAC) sub-layers, which route the packets based on the MAC address. So, only the MAC addresses need to be configured for layer 2 testing. This test is performed to

- Test the capability of the switch to handle the MAC frames at various bandwidths
- Test the forwarding capacity of the switch (based on the MAC addresses)
- Measure the ability of the switch to deliver the frames in sequence
- Verify incoming data by analyzing bit patterns of the received frames

Scenario 1 - Source & Destination PC in the same LAN, connected through a single switch



Scenario 2 - Source & Destination PC located at different LANs connected through multiple switches.



Ethernet BER Testing...

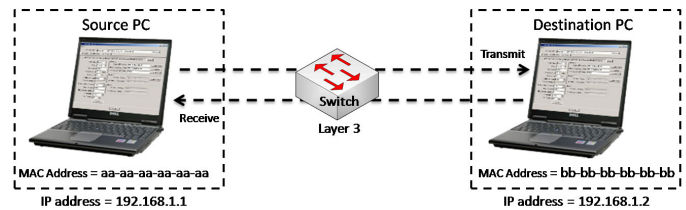
At Layer 3

The Ethernet Tester supports BER testing at Layer 3 as well as Layer 4.

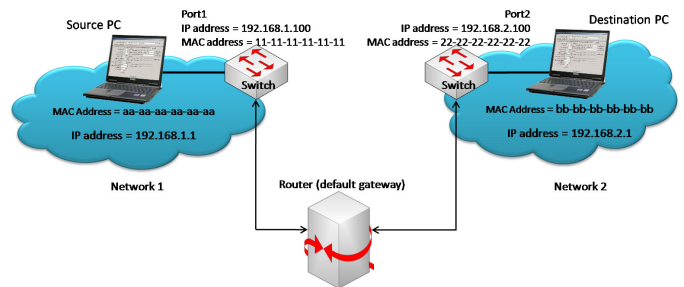
The Network Layer (Layer 3) uses routing technologies to connect various systems within a network or to connect multiple networks together through Gateways. In Layer 3 testing, packets are routed between the Source and Destination PCs based on both the IP address and MAC address. So, both the MAC address and the IP address have to be configured for Layer 3 testing.

Since IP networks encompass various types of physical networks consisting of LAN and WAN links, there is lot of scope for packet modification, packet loss, and out of order packets. GL's PacketCheck™ helps measure these metrics of the IP network.

Scenario 1 - Source & Destination PC are located within the same IP network, and hence are directly reachable.



Scenario 2 - Source & Destination PC are located at different IP networks, and are connected through routers.

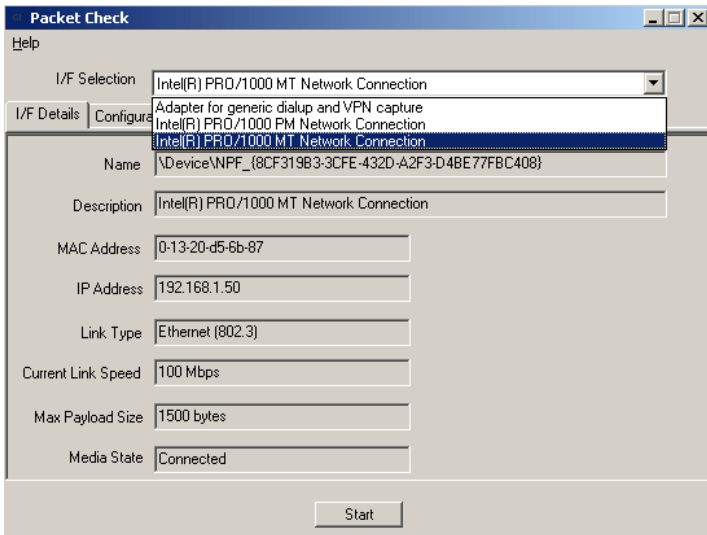


At Layer 4

The Transport Layer (Layer 4), provides end-to-end, error-free reliable data transfer. TCP and UDP are the most common Layer 4 protocols. For Layer 4 testing, source and destination UDP ports need to be configured in addition to MAC and IP addresses.

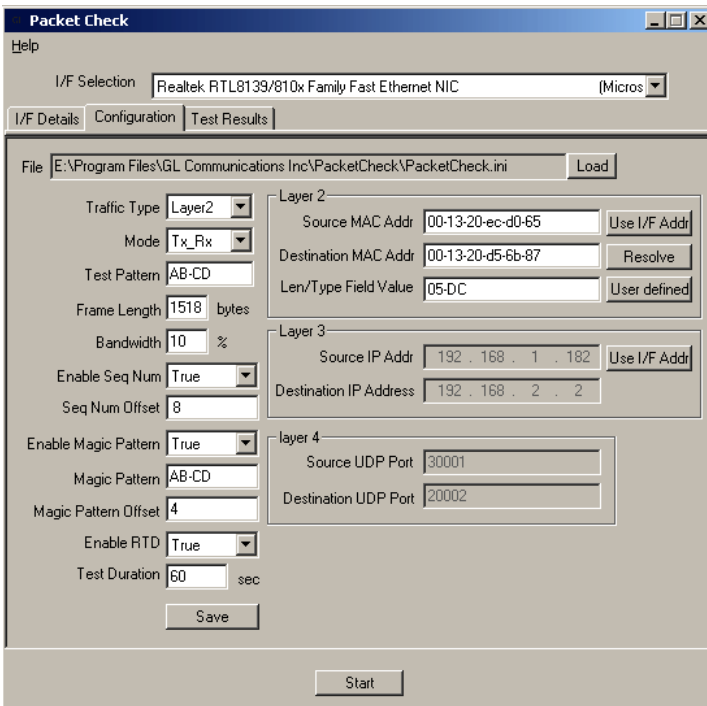
I/F (Interface) Selection and Details

The MAC address and IP address of the available network cards in a PC are automatically displayed using I/F (Interface) selection option in the GUI.



Parameter Configuration

Various test parameters can be configured for all the PCs connected to DUTs before starting the test using the Configuration GUI window. Some key parameters include – layer selection, Tx/Rx/Loopback mode selection, Seq Num, Magic Pattern, Bandwidth, Test Pattern, RTD (μ sec), and so on.



Tx & Rx Statistics and Results

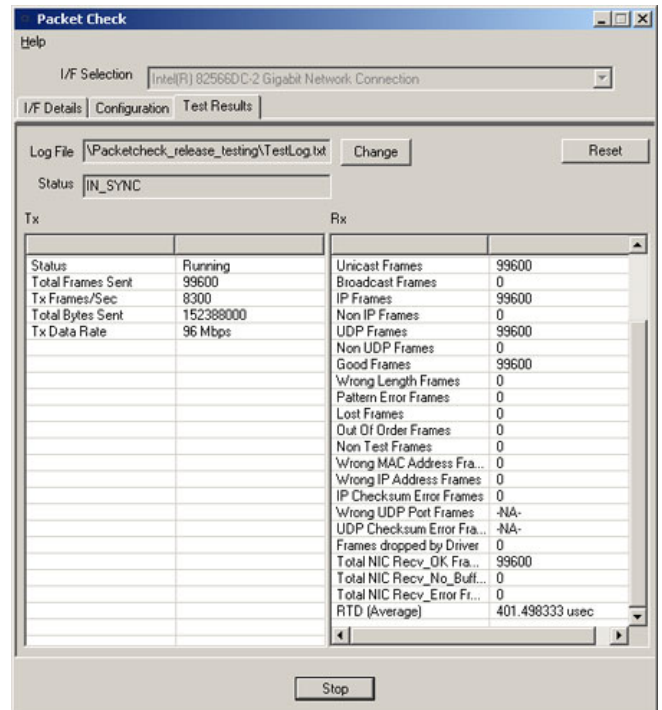
The Ethernet tester displays 'SYNC' when pattern received matches with preconfigured pattern. In addition, the following Tx/Rx statistics are displayed -

Tx Statistics

- Displays execution status for TX
- Total Frame Sent – gives the total number of frames being transmitted
- Tx Frames/Sec – is the number of frames transmitted per second
- Total Bytes Sent – is the total number of bytes transmitted
- Tx Data Rate – gives total data rate at which the data is being transmitted

Rx Statistics

- Displays execution status for RX
- Total Frames Received, Broadcast and Unicast frames, Total Good Frames Received, Total Wrong Length Frames, Total Lost Frames, Total Out Of Order Frames, RTD (μ sec), and other details.



PacketCheck™ CLI

PacketCheck™ can be accessed through a GUI as well as through Command Line Interface (CLI). Testing with PacketCheck™ CLI is same as the GUI based application, which includes configuring interface parameters using PacketCheck.ini file, Tx Rx BER Testing, and viewing test results using PacketCheck™ CLI in detail.

```
GL Communications - PacketCheck,Version 1.6
-----TX Stats-----
Status = Running
Total Frames Sent = 221610
Tx Frames/Sec = 8372
Total Bytes Sent = 339063300
Tx Data Rate = 93 Mbps
-----RX Stats-----
Status = Running
Total Frames Received = 221448
Rx Frames/Sec = 8210
Total Bytes Received = 337922488
Rx Data Rate = 93 Mbps
Unicast Frames = 221445
Broadcast Frames = 3
IP Frames = 221448
Non IP Frames = 0
UDP Frames = 221448
Non UDP Frames = 0
Good Frames = 221443
Wrong Length Frames = 5
Pattern Error Frames = 0
Lost Frames = 0
Out Of Order Frames = 0
Non Test Frames = 5
Wrong MAC Address Frames = 0
Wrong IP Address Frames = 2
IP Checksum Error Frames = 0
Wrong UDP Port Frames = -NA-
UDP Checksum Error Frames = -NA-
Frames dropped by Driver = 0
Total NIC Recv_OK Frames = 221446
Total NIC Recv_No_Buffer Frames = 0
Total NIC Recv_Error Frames = 0
RTD (Average) = 10070.536732 usec
```

```
GL Communications - PacketCheck,Version 1.6
Tx Data Rate = 4094 Kbps
-----RX Stats-----
Status = Running
Total Frames Received = 58110
Rx Frames/Sec = 518
Total Bytes Received = 56345998
Rx Data Rate = 3996 Kbps
-----TX Stats-----
Status = Running
Total Frames Sent = 39226
Tx Frames/Sec = 497
Total Bytes Sent = 56220176
Tx Data Rate = 5574 Kbps
-----RX Stats-----
Status = Running
Total Frames Received = 59070
Rx Frames/Sec = 903
Total Bytes Received = 57160662
Rx Data Rate = 5988 Kbps
-----TX Stats-----
Status = Running
Total Frames Sent = 40153
Tx Frames/Sec = 872
Total Bytes Sent = 57568727
Tx Data Rate = 7 Mbps
-----RX Stats-----
Status = Running
Total Frames Received = 60492
Rx Frames/Sec = 1337
Total Bytes Received = 58523994
Rx Data Rate = 7 Mbps
-----Test Completed-----
Press <Enter> to proceed
```

Result Log

A BER test log file contains the results for the latest test conducted, as the log file will be overwritten for each test. This file gives the summary report of the test currently concluded.

```
TestLog2.txt - Notepad
-----Test Statistics-----
-----TX STATISTICS-----
Total Frames Sent = 48000
Tx Frames/Sec = 800
Total Bytes Sent = 73440000
Tx Data Rate (Average) = 9 Mbps
-----RX STATISTICS-----
Total Frames Received = 44316
Rx Frames/Sec (Average) = 738
Total Bytes Received = 67613328
Rx Data Rate (Average) = 8 Mbps
Total Unicast Frames Received = 44310
Total Broadcast Frames Received = 6
Total IP Frames Received = 44316
Total Non IP Frames Received = 0
Total NonTest Frames Received = 9
Total Wrong
Total Pattern
Total Lost P
Total Out of
Total IP Che
Total Good P
-----Test Configuration-----
Driver Status Traffic Type = Layer2
Total Frames Mode = LoopBack
NIC Stats---- Test Pattern = ab-cd
Total NIC Re Frame Length = 1518 bytes
Total NIC Re Bandwidth = 10%
Total NIC Re Enable Seq Num = true
RTD (Average) Test Duration = 60 seconds
Source MAC Address = 0-1c-c0-20-3c-3b
Destination MAC Address = 0-d0-dd-e-37-6b
Length/Type Field value = 8-0
-----Test Statistics-----
-----TX STATISTICS-----
Total Frames Sent = 37729
Tx Frames/Sec = 628
Total Bytes Sent = 56679016
Tx Data Rate (Average) = 7 Mbps
-----RX STATISTICS-----
Total Frames Received = 41358
Rx Frames/Sec (Average) = 689
Total Bytes Received = 56901345
RX Data Rate (Average) = 7 Mbps
```

Buyers Guide

[ETH100](#) – PacketCheck™

Related Software

[PKS100](#) - PacketGen™ (includes PacketScan™)

[PKV100](#) - PacketScan™ (Online and Offline)

[PKB100](#) - RTP Toolbox™

[PKS110](#) - Packet H. 323

[IPN010](#) - IPNetSim™ - 100Mbps of through bandwidth

[IPN100](#) - IPNetSim™ - 1Gbps of through bandwidth

[IPN400](#) - IPNetSim™ - 1Gbps w/ 4 links through bandwidth

[PKS120](#) - Message Automation & Protocol Simulation (MAPS) for SIP

[PKS121](#) - MAPS - SIP Conformance Test Suite (Test Scripts)

[PKS122](#) - MAPS for MEGACO

[PKS123](#) - MAPS MEGACO Conformance Test Suite



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