

**Release Notes for PacketExpert™ 1G version 25.01.07**

GL's **PacketExpert™ (PXE100)** is a portable Quad Port Ethernet Tester (USB based). It supports 4 Gigabit Ethernet ports and connects to the PC through a USB 2.0 interface. Each GigE port provides independent Ethernet/IP testing at wirespeed for applications such as **BERT, RFC 2544, Smart Loopback, Record/Playback, ExpertSAM™, PacketBroker, Multi-Stream Traffic Generator and Analyzer, and ExpertTCP**. PacketExpert™ also supports all the application testing over **stacked VLAN** (or simply Q-in-Q), and **stacked MPLS** (Layer 2.5).

**Release History**

Description	Version
<b>Enhancements:</b> <b>Client APIs</b> <ul style="list-style-type: none"><li>Python 3.12 support</li></ul> <b>Bug Fixes:</b> <ul style="list-style-type: none"><li>After generating the reports, ARP and Ping stopped functioning for all applications until the test was restarted</li></ul>	<b>25.01.07</b>
<b>Bug Fixes:</b> Ping was not working consistently through the switch for some applications	<b>24.12.24</b>
<b>Enhancements:</b> Removed the PXE106 license for ExpertSAM. ExpertSAM is now available as a Basic License (along with PXE100).	<b>24.1.9</b>
<b>Enhancements:</b> <b>All Port BERT and BERT/Loopback:</b> <ul style="list-style-type: none"><li>Displays warning message when multicast or broadcast source MAC address is configured. Also suggests a unicast MAC address.</li><li>Displays warning message when Locally Administered MAC address is configured.</li><li>Minimum and Maximum Tx rate is calculated and displayed for Variable Frame Size and Fixed IFG (Traffic Generation Type: Variable rate) configuration.</li></ul> <b>Client APIs:</b> <ul style="list-style-type: none"><li>Added ExpertSAM Python/C# Sample applications.</li></ul> <b>Bug Fixes:</b> <b>All Port BERT, BERT/Loopback, ExpertSAM and MTGA:</b> <ul style="list-style-type: none"><li>Now allows to set minimum frame size to 64 bytes (instead of 68).</li></ul> <b>Client APIs:</b> <ul style="list-style-type: none"><li>Fixed few bugs in ExpertSAM Python APIs.</li></ul>	<b>23.2.28</b>
<b>Enhancements:</b> <b>ExpertSAM:</b> <ul style="list-style-type: none"><li>Added multi-device support</li></ul> <b>Bug Fixes:</b> <b>All Applications:</b> <ul style="list-style-type: none"><li>In Report Generation, if the user defined report filename had the '.' character, was missing it. Eg: if the name "BL_2.5G" was given, generated report file name was "BL_2G"</li></ul>	<b>22.10.6</b>

<p><b>AllPortBert:</b></p> <ul style="list-style-type: none"><li>• Could not set the Protocol field to 1(ICMP) in IPv4 configuration tab</li><li>• Bit Error seconds, Sync loss seconds were incorrect in csv reports</li><li>• Removed Instantaneous FDV (us) and Instantaneous Jitter (us) in GUI config/results, and in Reports, as it is not supported</li></ul> <p><b>Bert/Loopback:</b></p> <ul style="list-style-type: none"><li>• Could not set the Protocol field to 1(ICMP) in IPv4 configuration tab</li><li>• Bit Error seconds, Sync loss seconds were incorrect in csv reports</li><li>• Removed Instantaneous FDV (us) and Instantaneous Jitter (us) in GUI config/results, and in Reports, as it is not supported</li><li>• When test is active and BERT\Loopback is closed, application continues to send the traffic</li><li>• Port leaf node in the LHS menu tree was not working correctly in the GUI</li></ul> <p><b>AllPortLoopback:</b></p> <ul style="list-style-type: none"><li>• Linkspeed was not displaying correct value in case of multiple devices</li></ul> <p><b>RFC2544, RFC2544(Single Port):</b></p> <ul style="list-style-type: none"><li>• Could not set the Protocol field to 1(ICMP) in IPv4 configuration tab</li><li>• RFC2544 - low rate latency test - very high latency (wrong latency result)</li></ul> <p><b>Reports:</b></p> <ul style="list-style-type: none"><li>• Frame Loss results were not aligned correctly in the reports</li><li>• Latency graphs had different scale for East--&gt;West and West--&gt;East directions</li><li>• After test completes, the Current Running test display was still showing the last done test, instead of going blank</li></ul> <p><b>MTGA:</b></p> <ul style="list-style-type: none"><li>• Could not set the Protocol field to 1(ICMP) in IPv4 configuration tab</li><li>• The Rx filters were not working correctly when any one of the streams was configured as IP only and the rest as IP/UDP</li><li>• FLR was displaying 0 in MTGA (only for PXE100)</li></ul> <p><b>ExpertSAM:</b></p> <ul style="list-style-type: none"><li>• Could not set the Protocol field to 1(ICMP) in IPv4 configuration tab</li><li>• The Rx filters were not working correctly when any one of the streams was configured as IP only and the rest as IP/UDP</li></ul> <p><b>RecordOnly:</b></p> <ul style="list-style-type: none"><li>• There was a problem with recording, if the record file path had a folder with the "." symbol</li></ul> <p><b>Playback Only:</b></p> <ul style="list-style-type: none"><li>• Playback file info goes blank, when dialogs are changed</li></ul>	
<p><b>Enhancements:</b></p> <ul style="list-style-type: none"><li>• <b>General:</b><ul style="list-style-type: none"><li>➢ Released 32-bit version (in addition to the normal 64-bit version).</li></ul></li><li>• <b>Python Client</b><ul style="list-style-type: none"><li>➢ Low level library was locking the Python Global Interpreter Lock (GIL) while waiting for network I/O. Changed to release the GIL before entering the wait state.</li><li>➢ Added new APIs to be used for ports with 1000BaseT forced speed parameters. (Autonegotiation disabled)</li><li>➢ Added new APIs for starting/stopping BERT on multiple ports together.</li><li>➢ Added additional state checks in the API classes. E.g. now returns error if any API class method is called without initialising.</li></ul></li></ul> <p><b>Bug Fixes:</b></p> <ul style="list-style-type: none"><li>• <b>TM-ATM:</b><ul style="list-style-type: none"><li>➢ Event Data Logger was crashing for higher frame sizes</li></ul></li></ul>	<b>21.10.12</b>

<b>Enhancements:</b> <ul style="list-style-type: none"><li>• <b>RFC2544, RFC2544(Single Port):</b><ul style="list-style-type: none"><li>➢ Added measured Latency display for both Store/Forward and Bit Forward methods (previously was displaying only Bit Forwarding latency value).</li><li>➢ Added user option to use the Throughput test determined bandwidth for Latency test, instead of manual bandwidth configuration.</li></ul></li></ul>	<b>21.9.1</b>
<b>Enhancements:</b> <ul style="list-style-type: none"><li>• <b>C# Client:</b><ul style="list-style-type: none"><li>➢ Added additional APIs that take simple data types such as arrays to help integrate with Labview.</li></ul></li><li>• <b>All Applications:</b><ul style="list-style-type: none"><li>➢ Removed the popup dialog on successful report generation.</li></ul></li><li>• <b>RFC 2544:</b><ul style="list-style-type: none"><li>➢ If any test fails, now results display "Test Failed" instead of the value 0 for Throughput, Latency and Back-to-Back tests in both GUI and reports.</li></ul></li><li>• <b>Record Only:</b><ul style="list-style-type: none"><li>➢ Added multidevice support.</li></ul></li><li>• <b>Playback Only:</b><ul style="list-style-type: none"><li>➢ Added multidevice support.</li></ul></li></ul> <b>Bug Fixes:</b> <ul style="list-style-type: none"><li>• <b>ExpertSAM:</b><ul style="list-style-type: none"><li>➢ ExpertSAM GUI was crashing when invoked with multiple devices.</li></ul></li><li>• <b>RFC 2544:</b><ul style="list-style-type: none"><li>➢ For Frame loss test, if Rx Frames &gt; Tx frames (example: in case of packet duplication), a huge frame loss percentage value was reported. Now, shows 0% frame loss.</li></ul></li></ul>	<b>21.4.6</b>
<b>Enhancements:</b> <ul style="list-style-type: none"><li>• <b>AllPortBert:</b><ul style="list-style-type: none"><li>➢ Ability to disable Auto-negotiation for 1000Base-T (1000 Mbps Electrical) has been added.</li><li>➢ Additional 1000Base-T Interface parameters has been added when Auto Negotiation is disabled.</li><li>➢ Burst mode traffic generation ability has been added.</li></ul></li><li>• <b>RFC 2544 (Single Port):</b><ul style="list-style-type: none"><li>➢ Ability to run RFC2544 test on both ports – Port2 and Port3, separately and independently has been added.</li></ul></li><li>• <b>Client APIs:</b><ul style="list-style-type: none"><li>➢ Consistent return value in Python added.</li><li>➢ Enhanced API classes in both Python and C# to fix few issues.</li><li>➢ Sample application folder structure changed.</li><li>➢ Separated PXE and PXN Client installations to different folders.</li></ul></li></ul>	<b>20.12.16</b>
<b>Enhancements:</b> <ul style="list-style-type: none"><li>• <b>AllPortBert:</b><ul style="list-style-type: none"><li>➢ Ability to disable Auto-negotiation for 1000Base-T (1000 Mbps Electrical) has been added.</li><li>➢ Additional 1000Base-T Interface parameters has been added when Auto Negotiation is disabled.</li><li>➢ Burst mode traffic generation ability has been added.</li></ul></li><li>• <b>RFC 2544 (Single Port):</b><ul style="list-style-type: none"><li>➢ Ability to run RFC2544 test on both ports – Port2 and Port3, separately and independently has been added.</li></ul></li></ul>	<b>20.12.01</b>

**Enhancements:**

- **Warranty changes:**
  - New Software Warranty License has been added.
  - New Application Warranty License has been added.
  - Warranty checking has been added
- **License changes**
  - New License Handling- software does not allow to open the application unless there is a valid license
  - CLI Server license added.
  - Temporary Evaluation License support has been added
- Added the Model Number display in "Device Information" screen
- Removed Model number display from "Current Application" screen
- RFC 2544 (Single Port):
  - Enhanced to support Port3 also (in addition to existing Port2)
- Multi Stream Traffic Generator and Analyzer (MTGA):
  - Added IPv6 support. All streams can now be defined as an IPv4 or IPv6 stream
  - Added new feature "Periodic Logging". Supports periodic logging of results to a text file in CSV (Comma Separated Value) format
- All Port Bert, Bert/Loopback, All Port Loopback, RFC 2544 and MTGA:
  - Added IPv6 NDP (Neighbor Discovery Protocol)
- All Port Bert, Bert/Loopback and RFC 2544:
  - Removed "IPv4 compatible address" and "IPv4 mapped IPV6 address" in IPv6 Address configuration.
- **All Port Bert:**
  - Accuracy of the Tx and Rx Rate (in Port Statistics) display has been improved (through hardware timestamping boost).

**20.1.17****Bug Fixes:****All Applications:**

- For tri-speed 1G ports, whenever Auto negotiation is incomplete (eg: when "Forced speed" was selected or Auto negotiation was disabled), was not updating the Link Speed at all. Consequently, was not able to edit the Rate setting because rate is not allowed to be changed when link speed is unknown.
- In GUI, when any pane's top bar was selected and dragged right or left, all GUI pane dialogs disappeared, and never came back
- Application crash fixed. Open multidevice supported application like AllPortBert. Then, open single device supported app like Record Only. Then, go back to the same earlier multidevice supported app. GUI crashed

**CLI Clients:**

- Repeated tests done from CLI clients (Python or C#) was not working correctly for subsequent tests (second repetition onward).
- Python/C# client disconnected randomly for long duration tests

**All Port Bert, Bert/Loopback, All Port Loopback, RFC 2544 and MTGA**

- Ping reply was not working correctly (PacketExpert was not copying the received ICMP Request payload back to the response)
- Reports generated for BERT tests, in case of multiple devices, were wrong, The Bert statistics were wrongly reported. This happened from Device2 onwards.
- RFC 2544, RFC 2544 (Single Port):
  - Start/Stop button was not working correctly (only in case of multiple devices)
- RFC 2544 (Single Port)
  - Starting RFC 2544 on Port2 was wrongly starting on Port3
  - If test is already running on any port, was still allowing to start on a different port causing all results to go wrong

<ul style="list-style-type: none"><li>• <b>MTGA:</b><ul style="list-style-type: none"><li>➢ Results was periodically throwing up large Frame Loss values, and then going back to 0 (even though there was no actual frame loss happening)</li><li>➢ Average Throughput i.e. IR(Average) displayed was increasing over time</li><li>➢ If periodic logging was enabled, and wrong path was given for the log file, application crashed</li></ul></li><li>• <b>Record Only, Record and Playback:</b><ul style="list-style-type: none"><li>➢ When recorded to HDL file format, some packets in between were in error.</li><li>➢ GUI periodically lost focus i.e. focus was taken away from PacketExpert GUI, making it difficult to operate.</li><li>➢ When switched from Playback Only to Record Only, and report was generated, the report showed the older Playback only settings.</li></ul></li><li>• <b>Playback Only, Record and Playback:</b><ul style="list-style-type: none"><li>➢ GUI periodically lost focus i.e. focus was taken away from PacketExpert GUI, making it difficult to operate.</li><li>➢ When NGPCAP format file was played back, the recorded timestamps were not maintained. Instead, rate was always 100%.</li><li>➢ On loading Playback Only application, sometimes, the link status of one of the ports was not reflecting correctly</li></ul></li></ul>	
<p><b>Enhancements:</b></p> <p><b>General:</b></p> <ul style="list-style-type: none"><li>• Ping reply length was fixed to 64 bytes. Now, changed to have the same length as the received Ping Request.</li><li>• Ping reply payload was independent of the received payload. Now, changed to copy the Ping Request payload back into the reply payload.</li></ul> <p><b>RFC 2544 (Single Port):</b></p> <ul style="list-style-type: none"><li>• Now both Port2 and Port3 are supported. Works on either Port2 or Port3 at a time (not both).</li></ul> <p><b>Bug Fixes:</b></p> <ul style="list-style-type: none"><li>• Ping reply was not working properly when VLAN was enabled.</li></ul>	<b>9.2.8</b>
<p><b>Bug Fixes:</b></p> <p><b>PacketBroker:</b></p> <ul style="list-style-type: none"><li>• TTL Trigger #3 was not sending out the TTL signal on filter match</li></ul> <p><b>Record Only, Record and Playback:</b></p> <ul style="list-style-type: none"><li>• Timestamp of recorded packets was not correct</li></ul>	<b>9.1.7</b>
<p><b>Enhancements:</b></p> <p>General:</p> <ul style="list-style-type: none"><li>• Added a new CLI server license (CXE100). This license must be present at the server side for all CLI clients (like TCL, C# and Python) to connect and run PacketExpert</li><li>• CLI clients are no longer installed as part of the software installation. Instead, they have been moved to a separate client installation, that includes all clients - TCL, C# and Python.</li></ul> <p><b>Bug Fixes:</b></p> <p>All Port Bert and RFC 2544:</p> <ul style="list-style-type: none"><li>• While editing MAC address software was hanging</li></ul> <p>All Port Loopback and Bert/Loopback:</p> <ul style="list-style-type: none"><li>• Layer3 Loopback was not working correctly - for IP packets with protocol type other than 4 or 17, Layer3 Loopback was dropping the packets instead of looping them back</li></ul>	<b>8.11.30</b>

<b>Enhancements:</b> <ul style="list-style-type: none"><li>Added new PacketExpertCLI license (CXE100) for all clients-C#, Python and TCL</li></ul>	<b>8.10.26</b>
<b>Enhancements:</b> <ul style="list-style-type: none"><li>Added an .ini file configuration to disable Destination MAC address verification for BERT and BERT\Loopback module</li></ul>	<b>8.10.12</b>
<b>Enhancements:</b> <p>General:</p> <ul style="list-style-type: none"><li>Software does not require Administrator privileges to run anymore. Normal mode works fine.</li><li>Multidevice support has been extended to PacketBroker™ application also</li></ul> <b>Bug Fixes:</b> <p>General:</p> <ul style="list-style-type: none"><li>ARP and Ping were not working properly for multidevice applications</li><li>Fixed an issue in the IP address edit dialog - was not setting the value correctly in some cases</li><li>Fixed several issues related to multidevice applications, like GUI crash, incorrect functionality etc.</li></ul> <p>Record Only:</p> <ul style="list-style-type: none"><li>Was not recording packets at all</li></ul>	<b>8.9.25</b>
<b>Enhancements:</b> <ul style="list-style-type: none"><li>Enhanced and accurate real time graphs for all relevant applications</li><li>Improved accuracy for Maximum FTD (Frame Transfer Delay) and Maximum FDV (Frame Delay Variation), as they are now calculated in the hardware for MTGA and ExpertSAM™ applications</li><li>Removed the application sluggishness when SFP information is displayed</li><li>Several minor GUI Enhancements</li></ul> <b>Bug Fixes:</b> <ul style="list-style-type: none"><li>Half Duplex mode was not being detected</li><li>Few other minor bug fixes</li></ul>	<b>8.3.30</b>
<b>Enhancements:</b> <p><b>ExpertSAM™</b></p> <ul style="list-style-type: none"><li>Performance optimization</li><li>Max FTD and Max FDV calculated in FPGA</li><li>Test continues even if when the verdict is FAIL. Previously test was stopped</li></ul> <p><b>ExpertTCP™</b></p> <ul style="list-style-type: none"><li>Performance optimization</li></ul> <p><b>All Port BERT</b></p> <ul style="list-style-type: none"><li>Changed the implementation of "EnableTx"</li><li>Typo issues in reports are fixed</li></ul> <p><b>BERT\Loopback and All Port Loopback</b></p> <ul style="list-style-type: none"><li>Promiscuous mode</li><li>Option to enable or disable Promiscuous mode in Loopback port</li><li>Loopback port drops Multicast and broadcast frames</li></ul> <p><b>General Updates</b></p> <ul style="list-style-type: none"><li>Modified the updates in SFP details</li><li>Minor bugs in all modules</li></ul>	<b>8.1.12</b>

<p><b>Bug Fixes:</b></p> <p><b>Record Only, Record and Playback applications</b></p> <ul style="list-style-type: none"><li>Timestamp recorded for PCAP, NGPCAP and NTAR file formats was not accurate after the decimal point. It was off by 2 digits, showing a value 100 times the actual value</li></ul> <p><b>Playback Only, Record and Playback applications</b></p> <ul style="list-style-type: none"><li>The timestamps used while playing back the recorded file in PCAP, NGPCAP and NTAR file formats was not accurate in the nanosecond part. It was off by 2 digits, accurate only upto 100s of nanoseconds, instead of nanoseconds</li></ul> <p><b>Bert/Loopback application</b></p> <ul style="list-style-type: none"><li>In Port Statistics, was erroneously updating the "Undersized Frames" counter, for Port4 (Loopback Port) only</li></ul>	<b>7.9.6</b>
<p><b>Enhancements:</b></p> <p><b>Record Only, PacketBroker applications:</b></p> <ul style="list-style-type: none"><li>The "Output TTL Trigger Generation capability (on Filter Match)" feature has been improved to generate triggers more accurately under all conditions</li><li>The default pulse width of the output TTL trigger pulse generated on filter match has been changed to 1 Microsecond (instead of the previous default 4 Microseconds)</li><li>User Manual has been updated with a new section, describing the "output TTL signal(trigger pulse) generation on filter match" feature</li></ul> <p><b>Bug fixes:</b></p> <p><b>Multi-Stream Traffic Generator and Analyzer:</b></p> <ul style="list-style-type: none"><li>In the Horizontal view of Stream Results dialog, streams are now activated/ deactivated correctly</li><li>Length Classified statistics in Port Statistics was getting automatically reset, randomly</li><li>In Loopback Port's statistics, IPChecksum was wrongly displaying the error packet count</li></ul> <p><b>Record Only, Record and Playback:</b></p> <ul style="list-style-type: none"><li>Timestamp for PCAP, NGPCAP, NTAR formats were being recorded in 100s of nanoseconds resolution. Now, changed to full nanosecond resolution</li></ul> <p><b>Record Only, PacketBroker:</b></p> <ul style="list-style-type: none"><li>Port2 filter numbers from 3 - 16 were incorrectly generating output TTL Trigger pulses on TTL Output #1. Similarly, Port3 filter numbers from 3 - 16 were incorrectly generating output TTL Trigger pulses on TTL Output #3. Corrected this - now, just Port2:Filter1 and Port3:Filter1 generates TTL trigger pulses on TTL Output#1 and Output#3 respectively</li></ul>	<b>7.8.18</b>
<p><b>Enhancements:</b></p> <p><b>Record Only application:</b></p> <ul style="list-style-type: none"><li>If filters are disabled for any port, corresponding Filter setup dialog for that port is also fully disabled</li><li>Removed 'Filter Name' column from Filter Setup dialog</li></ul> <p><b>Record Only and PacketBroker applications:</b></p> <ul style="list-style-type: none"><li>If any filter is not activated, corresponding 'NOT' check box is disabled</li><li>If filters are disabled for any port, corresponding Filter setup dialog for that port is also fully disabled</li></ul>	<b>7.8.7</b>

<p><b>Bug Fixes:</b></p> <p><b>Record Only application:</b></p> <ul style="list-style-type: none"><li>When recording is started on any port (Port2 or Port3), it automatically enables all filters for that port, even if none of them were enabled</li><li>During recording, particularly at low rates, there is always a difference of 2 frames between "Frames Matched to Filter" and "Transferred Frames" counters. The counts match eventually, when further traffic is received, but if user stops in between, then he would have captured 2 frames less than expected</li><li>'Record Only' application was taking abnormally high CPU even when doing nothing (eg: when just invoked)</li><li>If 'Record Only' application is invoked repeatedly (eg: invoke 'Record Only', and then invoke 'All Port Bert' and then reinvoke 'Record Only' and repeat these steps again and again), CPU usage also increases linearly</li></ul> <p><b>Record Only and PacketBroker applications:</b></p> <ul style="list-style-type: none"><li>When filters are deleted in the "Filter Config" window, "Filter Setup" window displayed wrong Filter Names in both the "Filter List" as well as "Filter Summary"</li><li>In "Filter Setup" window, the 'NOT' checkbox was not displayed correctly on Filter deletion or Filter Activation/Deactivation</li></ul>	
<p><b>Enhancements:</b></p> <ul style="list-style-type: none"><li>When devices are not present, gives correct error message "PacketExpert device not found"</li></ul> <p><b>Bug Fixes:</b></p> <ul style="list-style-type: none"><li>In 'Record and Playback' application, when Port3 link speed is 100 Mbps or 10 Mbps, both Record and Playback were not working. This issue is now fixed.</li></ul>	<b>7.7.6</b>
<p><b>New Applications</b></p> <p><b>ExpertTCP™</b> - ExpertTCP™ test methodology is based on the RFC 6349 to measure TCP throughput, RTT and optimal window size. It has the capability to generate and analyze up to 12 TCP streams of traffic of various packet lengths.</p> <p><b>Enhancements</b></p> <ul style="list-style-type: none"><li>General<ul style="list-style-type: none"><li>➤ Performance enhancements for all applications, especially on PXE112 and PXE124 (multidevice units)</li><li>➤ Improved Application load and exit time</li><li>➤ Improved test Start/Stop time</li><li>➤ Added a new 'Device Information' display, which displays License information for all the applications within the software itself</li><li>➤ Enhanced Splash screen to display the progress and some useful text so that users will know what's happening in the background</li></ul></li><li>All Port Loopback, Bert/Loopback, MTGA (applications having Loopback functionality)<ul style="list-style-type: none"><li>➤ Broadcast and multicast frames are not looped back, they are simply dropped without further processing, except ARP and ICMP Ping packets</li></ul></li><li>All Port Loopback<ul style="list-style-type: none"><li>➤ Promiscuous Mode - If Promiscuous mode is enabled, then all packets irrespective of the Destination MAC address are looped back. If disabled, then only those packets whose Destination MAC address matches the port's hardware MAC address will be looped back and others will be dropped</li></ul></li><li>Multi-Stream Traffic Generator and Analyzer<ul style="list-style-type: none"><li>➤ Added Multidevice support</li><li>➤ Added individual stream Activate/Deactivate at runtime</li></ul></li><li>PacketBroker<ul style="list-style-type: none"><li>➤ Added new Trigger Pulse settings, that allows to configure output trigger pulse width etc.</li></ul></li></ul>	<b>7.6.28</b>



<b>Bug Fixes</b> <ul style="list-style-type: none"><li>• Port Statistics reset was causing UDP/IP checksum errors to be reported</li></ul>	
<p>Released August 30<sup>th</sup>, 2016</p> <p><b>Enhancements:</b></p> <ul style="list-style-type: none"><li>• PacketExpert™ is enhanced to support Multi-Stream Traffic Generator and Analyzer application on Ports #2 (Traffic Generator &amp; Analysis) and Port #3 (Loopback).</li></ul> <p><b>Features:</b></p> <ul style="list-style-type: none"><li>• Temperature and voltage readings are added for all the application</li><li>• SFP parameters information readings for all the application</li><li>• Separate Tx/Rx Start/Stop of All Port BERT in CLI</li></ul> <p><b>Bug Fixes:</b></p> <ul style="list-style-type: none"><li>• BERT bug fixes in AllPortBERT/BERTLoopback/AllPortLoopback applications</li><li>• Downloading correct bitfile for PacketBroker module for 32bit installation</li><li>• Other GUI related bug fixes</li><li>• Updated Documents</li></ul>	<b>6.8.30</b>
<p>Released September 4<sup>th</sup>, 2015</p> <p><b>Enhancements:</b></p> <ul style="list-style-type: none"><li>• PacketExpert™ is enhanced to support PacketBroker application on Ports #2 and #3 (pass-through) and Ports #1 and #4 (Output). The following functionalities are supported –<ul style="list-style-type: none"><li>➢ Wirespeed Capture / Tapping – (Pass Through mode) Capture packets non-intrusively over RJ-45 (Electrical) and SFP (Optical) ports at nano-second precision.</li><li>➢ Wirespeed Filtering (High filter definition flexibility – drill down to the bit level and define mask at bit level, so that each bit can either be filtered or ignored)</li><li>➢ Aggregation (Packets filtered from both ports are aggregated as a single stream and output for analysis)</li><li>➢ Packet Modification (filtered / aggregated packets can be modified to convey useful information like Timestamp, Filter number etc. inband)</li><li>➢ Output (Packets filtered and captured are dropped to output ports #1/#4 for analysis)</li></ul></li></ul> <p><b>Features:</b></p> <ul style="list-style-type: none"><li>• IPLinkSim GUI is modified with no changes in actual working</li><li>• IPLinkSim reordering functionality is modified</li><li>• TCL and C# API (API toolkit) support for all modules</li><li>• Enhanced Splash screen to display text "Initializing" and a progress display to indicate to users that it is still alive, and some background processing is going on</li><li>• Changed Splash screen behaviour to allow to move to background if user wishes, earlier this was not possible</li></ul> <p><b>Bug Fixes:</b></p> <ul style="list-style-type: none"><li>• Forwarding issue PacketBroker is resolved (Applicable to Record Only)</li><li>• PacketBroker variable link speed issue and filter offset issue (Also in Record Only)</li><li>• LED were not blinking for 100/10Mbps line rate issue fixed</li><li>• Other minor bug fixes –<ul style="list-style-type: none"><li>➢ ExpertSAM Crash fix: After a single stream test run, enabling any other stream crashed</li><li>➢ ExpertSAM: Was not resetting Service Performance Verdict for new test</li><li>➢ ExpertSAM: Service Performance Test time was not displayed properly when new test is started (old test values were displayed)</li><li>➢ RFC 2544: Frame Loss Results dialog was crashing after a single frame Size Frame Loss test was run</li></ul></li></ul>	<b>5.9.4</b>
<p>Released January 20<sup>th</sup>, 2015</p> <p><b>Features:</b></p> <ul style="list-style-type: none"><li>• Earlier "Load Module" option is replaced with the "Applications" drop down menu.</li><li>• Dynamic "Devices" drop down menu option, which will appear only when multiple devices are present in the same system.</li></ul>	<b>5.1.20</b>

<p>Released November 18<sup>th</sup>, 2014</p> <p><b>Features:</b></p> <ul style="list-style-type: none"><li>• Renamed SLA testing module to ExpertSAM™</li><li>• CSV reports generation for ExpertSAM™ module</li><li>• PDF report generation on Windows® 8.1 PC</li><li>• TCL script support for IPLinkSim™, ExpertSAM™, Record Only, Playback Only, and Record Playback Modules</li></ul> <p><b>Bug Fixes:</b></p> <ul style="list-style-type: none"><li>• Resolved RFC2544 multi-board issues on low end PCs</li></ul>	<b>4.11.18</b>
<p>Released October 3<sup>rd</sup>, 2014</p> <p><b>Features:</b></p> <ul style="list-style-type: none"><li>• Added new optional application for SLA testing as per Y.1564 standard</li><li>• Multi-board support for All Port BERT, BERT/Loopback, RFC 2544, RFC 2544 (Single Port) and All Port Loopback applications</li><li>• Added Out of Sequence Count/Seconds to BERT and Bert/Loopback applications</li></ul>	<b>4.10.3</b>
<p>Released June 30<sup>th</sup>, 2014</p> <p><b>Features:</b></p> <ul style="list-style-type: none"><li>• RFC2544 Single Port Module implemented in MAPS™ CLI</li><li>• Reports for all Modules in MAPS™ CLI</li></ul> <p><b>Bug Fixes:</b></p> <ul style="list-style-type: none"><li>• Several minor bugs in TCL scripts have been fixed</li></ul>	<b>4.6.30</b>
<p>Released May 30<sup>th</sup>, 2014</p> <p><b>Features:</b></p> <ul style="list-style-type: none"><li>• TCL Scripts have been modified for better usability and simplicity</li><li>• RFC 2544 Frame Loss test final results have been enhanced to give results for all frame rates</li></ul> <p><b>Bug Fixes:</b></p> <ul style="list-style-type: none"><li>• Several minor bugs in TCL scripts have been fixed</li></ul>	<b>4.5.30</b>
<p>Released May 9<sup>th</sup>, 2014</p> <p><b>Features:</b></p> <ul style="list-style-type: none"><li>• Added "Bert/Loopback" and "All Port Loopback" module support to TCL/MAPS scripting. Included are MAPS scripts to implement these modules, and sample TCL scripts that illustrate how to use these MAPS scripts.</li></ul> <p><b>Bug Fixes:</b></p> <ul style="list-style-type: none"><li>• When run for long term (6 hours or more), TCL Client was either crashing or slowing down to a crawl.</li><li>• Float values were not working in Profile Editor</li></ul>	<b>4.5.9</b>
<p>Released April 25<sup>th</sup>, 2014</p> <p><b>Features:</b></p> <ul style="list-style-type: none"><li>• Added 'Send Pause Frame' feature for all modules (except for "All Port Loopback") - changes in GUI, CLI, C/C# APIs</li><li>• Added Tcl Scripting using MAPS CLI Server feature - Initial version only - currently supports BERT and RFC 2544 only (on multiple boards)</li><li>• Added multi-board support for RFC 2544 in MAPS CLI Server/Tcl scripting</li></ul> <p><b>Bug Fixes:</b></p> <ul style="list-style-type: none"><li>• Reading File Info for certain pcap traffic files (with variable frame sizes) was not working properly all the times - it was stopping in between showing lesser number of frames</li></ul>	<b>4.4.25</b>

Released January 31<sup>th</sup> 2014

**Features:**

- Added optical SFP module Information display. When optical ports are enabled, SFP information is displayed - like Connector Type, Link Length, Tx Power, Rx Power, Status etc.

**BERT/Loopback**

- Added Variable rate traffic generation. User can vary the Frame Size and/or the Inter Frame Gap being generated. Fixed, Step and Random modes of variable Frame Size/IFG generation supported.
- Added Frame Delay Variation (FDV) and Jitter Measurement (in addition to the BERT analysis).

**4.1.31****Record/Playback**

- Completely changed Record/Playback features, with lots of improvements and new features.
- New Record/Playback feature supports **Wirespeed Capture** - Span mode, **tapping** - Pass Through mode, **Dropping** (Packets filtered and captured are dropped to a different port for analysis), **Wirespeed Filtering, Aggregation** (Packets filtered from both ports are aggregated as a single stream and saved to hard disk for offline analysis), and **Wirespeed Transmission**.
- **Ports 2 and 3 act as Span ports** - filtering and capturing traffic at wirespeed, and transferring the captured file into the host PC for offline analysis
- **Ports 1 and 4 act as Drop ports** - packets filtered and captured on Ports 2 and 3 are dropped to Ports 1 and 4 respectively, with the MAC header overwritten with useful information like the Capture timestamp, Capture port, Filter number etc.
- **Module changes:** Now, there are 4 Record/playback modules:
  1. **Record Only** - Supports Wirespeed capture on 2 ports - Ports 2 and 3, then filter and aggregate to hard disk. Also, supports Pass Through mode i.e. PacketExpert acts as a transparent tap, passing traffic between Ports 2 and 3. Also, supports Packet Dropping - Packets which are filtered and captured on Span ports (Capture Ports) are dropped to the drop ports. Can work in following modes -
    - Tapping or Pass Through mode
    - Tap, Filter, Drop and Aggregate mode
  2. **Playback Only** - Supports Wirespeed file aggregate playback on 3 ports - Ports 1, 2 and 3
  3. **Record and Playback** - Supports simultaneous Record and Playback(aggregate) on 3 ports - 1, 2, and 3, along with Wirespeed filtering. Can work in Capture, Filter and Aggregate mode.
  4. **Record and Playback (Per Port)** - Supports simultaneous Record and Playback (Per Port) on 3 ports - 1, 2 and 3. Can work in Capture, Filter and Individual Port mode.
- **Wirespeed Filter**
  - Up to 40 bytes wide filter that covers almost entire packet up to UDP
  - Offset within the packet so that all the fields, and also the payload can be filtered
  - Raw mode filter editing for maximum flexibility
  - Packet Mode filter editing for user convenience - supports MAC,VLAN (up to 3 levels) MPLS (up to 3 levels), IP and UDP/TCP layers
  - Mask for each bit can be defined, so that each bit can be filtered/left out
- **Nanosecond Precision**
  - Timestamp precision is increased from Microsecond to Nanosecond precision. Captured file will have timestamp in nanosecond precision. While playing back, the timestamp precision maintained will be in nanoseconds. Accuracy is within 10s of nanoseconds.

<ul style="list-style-type: none"><li>• <b>Support NGPCAP format</b><ul style="list-style-type: none"><li>➢ The Next Generation PCAP format (ngpcap) support has been added. Other "*.ngpcap" and "*.ntar" extensions are supported.</li></ul></li><li>• <b>Other Features</b><ul style="list-style-type: none"><li>➢ Lossless Wirespeed Capture - Stop Recording on Buffer Overflow - when on board memory fills up, recording can be stopped for lossless capture</li><li>➢ Continuous recording - continue recording even when on board memory is full, with Discontinuous Recording indication. For lower rates, can capture any amount of data, the limitation only being the hard disk space.</li><li>➢ Playback File as is - sends out traffic exactly like it was captured - maintains timestamp and sends out on the same port as it was captured</li><li>➢ Added Report generation capability</li></ul></li></ul> <p><b>IPLinkSim™</b></p> <ul style="list-style-type: none"><li>➢ Added IP Routing mode - where PacketExpert™ IPLinkSim™ acts as a rudimentary router (limited functionality)</li></ul> <p><b>Bug Fixes</b></p> <ul style="list-style-type: none"><li>➢ In CLI, BERT Results were not displaying properly</li><li>➢ RFC 2544 reports - corrected few mistakes</li><li>➢ IPLinkSim - Changed latency configuration format from floating to integer</li><li>➢ IPLinkSim - Changed resolution of all Percentage configurations to 3 digits after decimal point</li></ul> <p><b>Limitations:</b></p> <ul style="list-style-type: none"><li>• For Record and Playback (Per Port) module only, simultaneous playback on all 3 ports has some problems.</li><li>• Report generation on Windows 8 system does not work properly</li></ul>	
<p>Released July 3<sup>rd</sup>, 2013</p> <p><b>Features:</b></p> <ul style="list-style-type: none"><li>• IPLinkSim™ is enhanced with Memory module check feature. On IPLinkSim™ start, checks if on board memory module (DDR2 RAM) is present or not. If present, starts normally. If memory module is absent throws an error message at the start and do not invoke. This is because the on-board memory module presence is mandatory for IPLinkSim™ module.</li></ul> <p><b>Bug Fixes:</b></p> <ul style="list-style-type: none"><li>• BERT throughput graph was crashing when run for a long time</li><li>• Problem in RFC 2544 Report generation</li></ul>	<b>3.7.3</b>
<p>Released June 28<sup>th</sup> 2013</p> <p><b>Features:</b></p> <ul style="list-style-type: none"><li>• Added following new applications:<ul style="list-style-type: none"><li>• IPLinkSim™</li><li>• Record/Playback</li><li>• RFC 2544 (Single Port)</li></ul></li><li>• Changes in Bert (applies to BERT and BERT/Loopback applications):<ul style="list-style-type: none"><li>a) Changed Rx Traffic LED behavior in BERT results. Now, it works as an Rx Traffic Activity indicator, rather than Rx Traffic Alarm. If traffic is present, green LED is indicated, else stays Idle (grey color). Does not indicate Red LED for no traffic condition, neither indicates Yellow LED denoting Alarm history.</li><li>b) In BERT Result Statistics, removed "No Rx Data Count" and "No Rx Data seconds" counters</li><li>c) CLI - added new commands to handle the following commands:<ul style="list-style-type: none"><li>➢ Separating Tx and Rx for BERT</li><li>➢ Enable/Disable Tx commands</li><li>➢ Process FCS Error commands</li></ul></li><li>d) BERT Event graph, which only displayed Bit Error Events, has been enhanced to display combined Throughput/Bit Error Graph. Now, the graph plots the Port's Throughput as well as Bit Error Events in the same graph.</li></ul></li></ul>	<b>3.6.28</b>

Released May 9 <sup>th</sup> 2013 <b>Features:</b> <ul style="list-style-type: none"><li>• Changed IPLinkSim implementation to check license while start (instead of before downloading bit file). Now, downloads bit file without checking for license, but checks license on start.</li><li>• Disabled memory module check as it's not working properly.</li><li>• Record/Playback module - added sample files - present under Sample Files folder in the installation directory.</li><li>• Record/Playback - changed Playback from File, Packets/second to Rate (with unit)</li></ul> <b>Bug Fixes:</b> <ul style="list-style-type: none"><li>• Record/Playback - user was not able to edit the file name window for both record/Playback dialogs. Now allows.</li><li>• Windows 8 driver installation problem - was not installing drivers properly on Windows 8 PC. Fixed now - needs to be tested.</li></ul>	<b>3.5.9</b>
Released May 2 <sup>nd</sup> 2013 <b>Bug Fixes:</b> <ul style="list-style-type: none"><li>• Record/Playback - Tx from file was not working at all</li></ul>	<b>3.5.2</b>
Released April 30 <sup>th</sup> 2013 <b>Features:</b> <ul style="list-style-type: none"><li>• Fixed few bugs in USB TxRx</li><li>• name change in CLI, and added some missing commands in CLI</li><li>• Default GUI for USB TxRx rearranged to display Tx from file/Rx to file dialogs</li></ul>	<b>3.4.30</b>
Released April 29 <sup>th</sup> 2013 <b>Features:</b> <ul style="list-style-type: none"><li>• Memory module check disabled</li><li>• WAN Emulator changed to IPLinkSim</li><li>• USB TxRx renamed to Playback/Capture</li><li>• USB TxRx - removed TxRx and memory loopback features from GUI</li></ul>	<b>3.4.29</b>
Released April 19 <sup>th</sup> 2013 <b>Features:</b> <ul style="list-style-type: none"><li>• USB TxRx added to GUI and CLI</li></ul>	<b>3.4.19</b>
Released April 5 <sup>th</sup> 2013 <b>Features:</b> <ul style="list-style-type: none"><li>• No new features</li></ul> <b>Bug Fixes:</b> <ul style="list-style-type: none"><li>• Most of the Bugs reported for 3.3.21 version in bug manager. All bugs must be verified for this release</li><li>• In WAN-E, was not detecting the board serial number</li><li>• Default values for WAN-E was not correct (eg: Bandwidth rate = 0, Error Insertion was turned on by default)</li><li>• Packet Reordering count in Link statistics was not proper</li><li>• Packet Reordering stats in Link Statistics was not properly displayed (software bug)</li><li>• FCS Errors/Bit Errors (hardware bug)</li></ul>	<b>3.4.4</b>

<p>Released 2013</p> <p><b>Features:</b></p> <ul style="list-style-type: none"><li>• New BERT graph - combined Throughput and Error Events Graph</li><li>• New RFC 2544 (Single Port) module</li><li>• New GUI skin (looks and feel)</li><li>• WAN-Emulator testing release</li></ul> <p><b>Bug Fixes:</b></p> <ul style="list-style-type: none"><li>• Most of the WAN-E bugs reported in Bug Manager</li></ul>	<b>3.3.21</b>
<p>Released December 18th, 2012</p> <p><b>Enhancements:</b></p> <ul style="list-style-type: none"><li>• <b>API development toolkit included</b> with the installable – Now, the C and C# API development toolkit has been included along with the installable. The PacketExpert™ installation now includes C and C# API dlls, header files, sample codes, and API development guide documents.</li><li>• <b>Reduced Boot up time</b> – Application took a lot of time to initialize hardware and come up. The delay was too long for 12/24 port hardware. Time is now reduced. Now, the time taken to initialize mainly depends on the number of boards and the time taken to download the bit file to each board.</li><li>• <b>BERT/Loopback Multiple Start/Stop</b> – Multiple Start/Stop feature is now added. User can simultaneously start/stop BERT or Loopback on multiple ports from the GUI. When user starts multiple ports, first all Rx is started first, followed by all Tx.</li><li>• <b>Accurate rate calculation in statistics</b> (for BERT/loopback only) – Improved Rate calculation for Data rate and frame rate. Earlier the rate we displayed was fluctuating every second, because of the method we used to get statistics from hardware. Now, using the Timestamp mode in statistics, we are able to calculate and display accurate and non-fluctuating values for Data Rate (in Mbps) and frame rate (in Frames /Sec). Note: This is available in BERT and BERT/loopback module only. Currently, not available in RFC 2544 module.</li><li>• <b>Link Utilization statistic added</b> – Now, an additional statistic is displayed – Link Utilization (in %). PacketExpert™ was displaying only the data rate (or the Layer2 rate). Now, the line rate (or the Layer1 rate) or the percentage of the test traffic occupied on the link is calculated and displayed. This is calculated by including the Ethernet overhead of 20 bytes per frame (12 bytes minimum Inter Frame Gap and 7 bytes Preamble and 1 byte Start of Frame Delimiter (SFD)).</li><li>• <b>Port Statistics made independent of BERT/Loopback Start/Stop</b> – In older versions, Port level Statistics used to be started and stopped, along with Bert/Loopback start/stop. Changed this behavior. Now, Port statistics will not start/stop with Bert/Loopback start/stop but keeps running continuously. User has to manually reset the port stats before starting the BERT test, if needed.</li><li>• <b>"Disable Auto-negotiation"</b> feature enabled for Optical mode also – Earlier, it was not possible to disable auto-negotiation for optical mode. Added this.</li><li>• <b>In GUI, Removed the popup dialog "Select pane"</b> when user clicks on any dialog in the LHS tree, and no pane is selected in the RHS panes – Now, any one pane will be selected and made active and replaced by the selected dialog.</li><li>• <b>In GUI, Tx and Rx config dialogs</b> – depending on the layer selection, all items within the individual tabs – MAC, MPLS, IP and UDP are grayed out. This is to avoid confusing the user.</li></ul> <p><b>Bug Fixes:</b></p> <ul style="list-style-type: none"><li>• C# APIs – many APIs were throwing exceptions. This was mainly due to the use of String Builder in the APIs, which needed to be initialized with a sufficient memory to hold the message strings passed back by the API. Changed all APIs to accept strings instead of String Builder.</li><li>• On 64-bit Windows systems, the data rate reported was wildly varying second to second. Now, the rate reported is constant and very steady.</li><li>• In RFC 2544, for 10 Mbps link speed, the latency value reported was wrong. Now, displays the correct value.</li></ul>	<b>2.12.18</b>

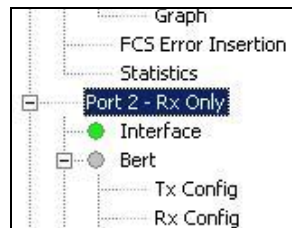
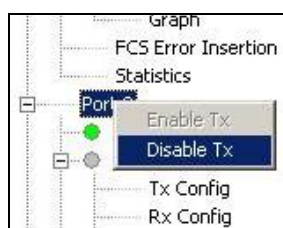
- RFC 2544 latency test was showing the value 0. Bit file was changed to fix this issue.
- In GUI Interface dialog, when Port 2 is set to 10 Mbps auto-negotiation disabled, the Link speed configuration for Port 3 automatically changes to 100 Mbps and vice versa. This was just a GUI display problem and has been fixed.
- On some systems, RFC 2544 Results pane was blank. This was a problem with installation of Teechart6.ocx file on 64-bit Windows systems. Now, works fine.
- RFC 2544 report – The bandwidth was set in %, but, the created report showed the setting in Mbps. Now, shows it in %.
- Fixed the issue of IPv6 addresses (both Source and Destination addresses) not being set properly.
- RFC Interface dialog was not showing the correct port status. There was a port mismatch, and it was showing the wrong port's status. This issue if fixed.

Released March 30<sup>th</sup>, 2012

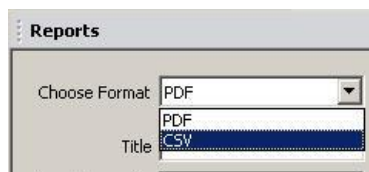
**1.3**

### Changes/Enhancements:

- 1) Disable/Enable Tx option: Option to disable Tx per port, makes the port to operate in Simplex mode (Rx Only). When Tx is disabled, the MAC core is disabled in the hardware, thus inhibiting any Tx traffic, including Ethernet signaling traffic like Pause frames. However, PHY functionalities are unaffected, and auto-negotiation, link status and other functions as usual. NOTE: Currently, this option is supported for "All Port Bert" module only

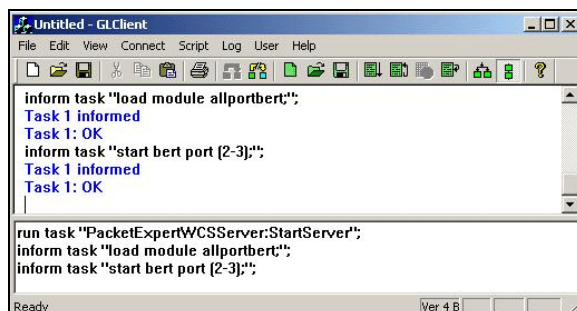


- 2) CSV format has been added for Report generation – both GUI and CLI



- 3) **Command Line Interface (CLI) has been added:** PacketExpert™ supports WCS CLI along with the console based CLI.

The figure below shows WCS based CLI support in PacketExpert™.



### Bug Fixes:

Many CLI bugs have been fixed.



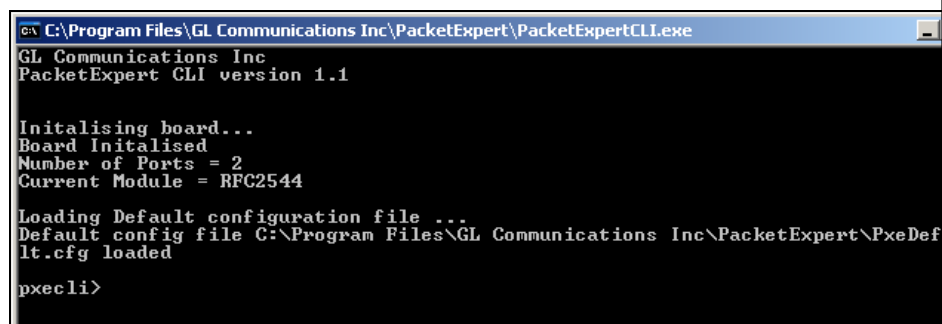
Released January 28th, 2012

**1.2**

**Changes/Enhancements:**

1) **Command Line Interface (CLI) has been added:**

The figure below shows console based CLI support in PacketExpert™. By default, it downloads RFC 2544 bit file and loads a default configuration file. Includes commands to access all functionalities



```
C:\Program Files\GL Communications Inc\PacketExpert\PacketExpertCLI.exe
GL Communications Inc
PacketExpert CLI version 1.1

Initialising board...
Board Initialised
Number of Ports = 2
Current Module = RFC2544

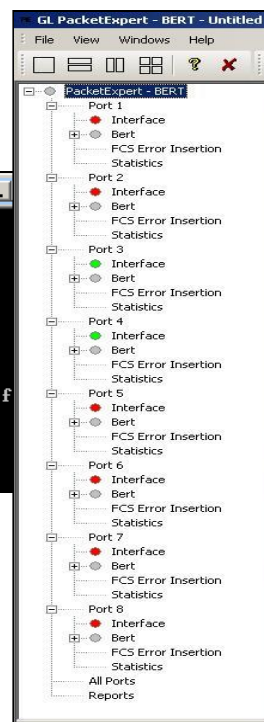
Loading Default configuration file ...
Default config file C:\Program Files\GL Communications Inc\PacketExpert\PxeDefault.cfg loaded
pxecli>
```

The figure below shows WCS based CLI support in PacketExpert™.

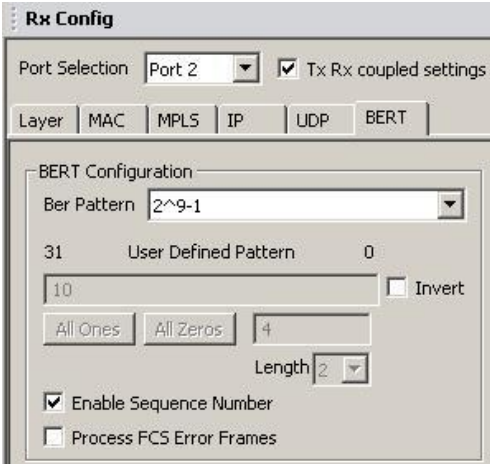
2) **Multi unit support for BERT and Loopback:**

Single GUI now handles multiple PacketExpert™ boards within the system. Note: Multi unit is not supported in RFC2544 module. RFC 2544 only supports Port 2 and Port 3 of the first board detected.

3) **Other Changes** - Read/Write values from hardware. Now, values are always updated to hardware instead of storing in local structures so that values displayed in GUI are set in hardware. (Factory Use)





<p>Released November 16th, 2011</p> <p><b>Changes/Enhancements:</b></p> <p>1) <b>Changes to BERT Results:</b>              Bert Results calculation and display have been changed:</p> <ul style="list-style-type: none"> <li>• Bert Status changes to "NO RX DATA" only if packets are not received for consecutive 10 seconds. Till 10 seconds, it will remain either in "SYNC" or "NO SYNC", depending on the last state.</li> <li>• "Rx Traffic" LED will immediately turn to Red color, on not receiving packets for 1 second. This behavior is unchanged.</li> <li>• "No RX Data Count" and "No Rx Data Seconds" now reflect the "NO RX DATA" condition (instead of Rx Traffic LED). So, only on No Rx Data for 10 seconds, will both of them increment.</li> <li>• "Error Free Seconds" will increment even for No Rx Data condition. So, Total Test Seconds = Error Free Seconds + Bit Error Seconds + Sync Loss Seconds. Error Free Seconds includes the No Rx Data seconds also.</li> </ul> <p>2) <b>Changes to handle FCS Error Frames:</b>              Earlier, FCS error frames were rejected, but now, an option is included to process FCS Error Frames. Now, user can opt to process these frames in BERT. This option has been added to the BERT tab.</p> <p><b>Note:</b> This applies to <b>Rx Config</b> only.</p> 	<p><b>1.1.2</b></p>
<p>Released July 28<sup>th</sup>, 2011</p> <p><b>Changes/Enhancements:</b>              None</p> <p><b>Bug Fixes:</b></p> <ul style="list-style-type: none"> <li>• PacketExpert™ crash – Open PacketExpert™ for the first time, setup IP BERT test between Ports 1 and Port4. Edit IP configuration and save the file. Randomly crashes either while saving or subsequent editing</li> </ul>	<p><b>1.1.1</b></p>

Released July 22, 2011

**Bug Fixes:**

Following bugs have been fixed:

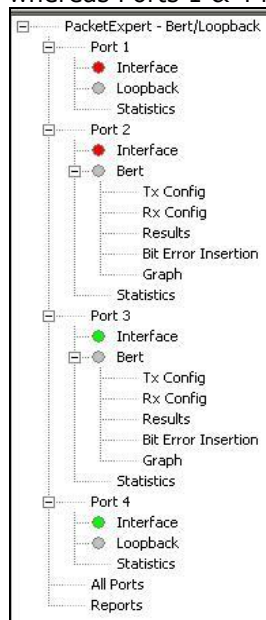
- PING and ARP problem – Ping and ARP not working with 10/100 Mbps link speed. Works fine for 1000 Mbps link speed. Entire Management Frame interface was not working properly for 10/100 Mbps.
- RFC 2544 problem - Tests involving Binary Search (Throughput and Back-to-Back) were failing in some cases, e.g.: If last trial failed, sometimes, test used to declare fail, instead of taking the previous value.
- Problems RFC 2544 Reports due to new additions of S-VLAN and S-MPLS - If we select VLAN and MPLS with enabling IP and UDP and if we generate Report it shows mismatch fields values
- Flow Label Field in RFC 2544 IPv6 – Ipv6 Flow label field takes only 8 bits instead of 20 bits value
- MPLS frame count is incrementing for Layer1 Traffic - First if we select MPLS with layer 2 and then set layer 2 to None and run the test, Rx statistics shows MPLS frames incremented
- IPv6 tab problem – IP tab is not disabled if we select IPv6 in IP tab and if we deselect IP in layer selection
- IP v6 next header value filtering - If we set Next header Value = 6 (TCP) on port 1 and Next header Value = 2(IGMP) on port 2 and run the test, we are getting Sync instead of increment in IP non Test Counter.
- Problem with Frame Sizes 1025 to 1035 with VLAN 3 level stack enabled - If we enable VLAN stack of 3 and send traffic with frame size 1025 to 1035, at Rx side statistics were not incremented for Total frame count and Frame size counters.
- Loopback Statistics for Smart Loop back - If we enable VLAN Stack 3 and MPLS stack 3 with layer as UDP, at the loop back port Statistics, MPLS stack 2 counts is incrementing. Note: if selected frame size is 100 , VLAN and MPLS stack counters were not incrementing.

**1.1**

Released May 6, 2011

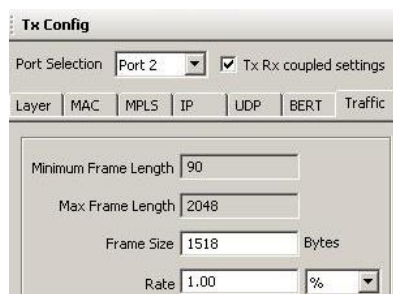
### Changes/Enhancements:

- A new module - 2 Port BERT/2 Port Loopback has been added. Ports 2 & 3 have BERT capability, whereas Ports 1 & 4 has Loopback capability.



**1.0.2.0**

- Stacked VLAN and MPLS support in Loopback - Loopback handles stacked VLAN and stacked MPLS automatically in Smart Loopback
- GUI Changes:
  - Minimum and Maximum Frame Length indication in BERT Traffic configuration:



Due to addition of Stacked VLAN and stacked MPLS, the minimum length required for frame can be > 64. If user configures anything less than this, traffic may not be sent at all. This feature helps to solve this problem. It automatically calculates the minimum frame length based on the entire header configuration and displays the value, so that the user has a clear picture of the minimum frame length needed to configure. Also, any Frame Size configured less than the minimum frame length will be rejected.

Also, the maximum frame length supported also is displayed so that user has an idea of the maximum frame size supported.

b. Cosmetic GUI changes:

Addition of Splash Screen on startup, a dialog prompting user to wait while a new module gets loaded.

- Statistics - alternate colors between rows to enhance visibility, right aligned, Change in some of the names etc.  
 NOTE: RFC 2544 DOES NOT SUPPORT stacked VLAN and stacked MPLS in this release. If VLAN is enabled for RFC 2544, it currently allows only to select 1 level and VLAN Type does not allow to change from 81-00 (equivalent to a single VLAN field). Similarly, Layer selection for RFC 2544 does not allow selecting MPLS and defaults back to None. Also, MPLS tab is not enabled

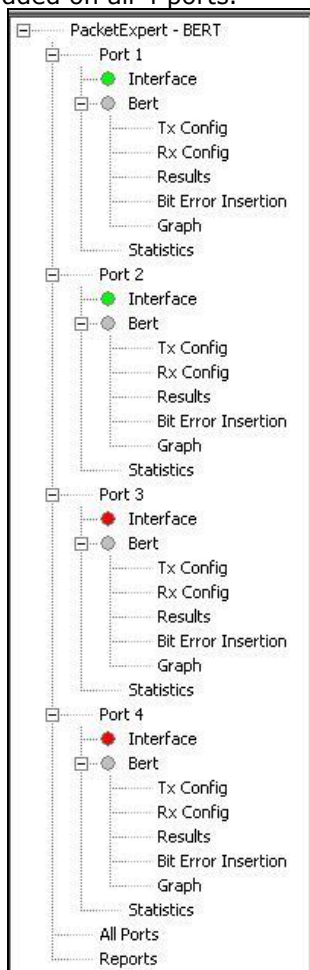
**Limitations/Known Issues:**

- Stacked VLAN and stacked MPLS are supported in BERT and Loopback only. RFC 2544 does not support these features. GUI does not allow selecting these values for RFC 2544.

Released April 15, 2011

**Changes/Enhancements:**

- 4 Port BERT – BERT has been added on all 4 ports.

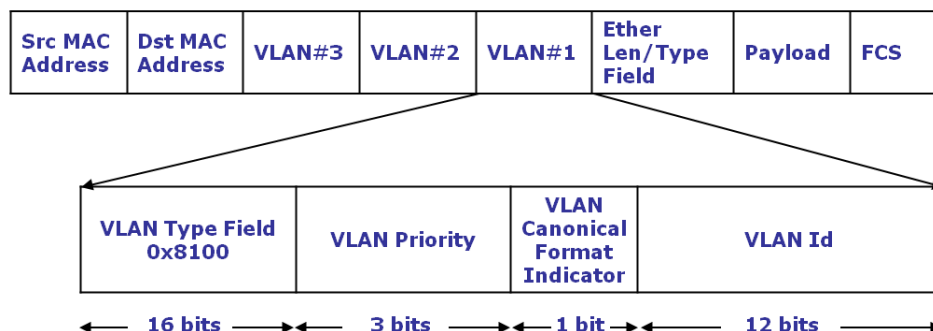


**1.0.1**

- User can run BERT on any port or on all ports simultaneously.
- Stacked VLAN - VLAN has been enhanced to have up to 3 stacked VLANs (QinQ). The configuration is shown below:

The screenshot shows the 'Tx Config' window. Under the 'MAC' tab, 'Source MAC Address' is 00-21-C2-00-03-FC, 'Destination MAC Address' is 00-21-C2-00-03-FD, and 'Length/Type' is 88-b7. The 'VLAN Enable' checkbox is checked, and 'VLAN Stack' is set to 3. Below, three VLANs are configured: VLAN#1 (Type 81-00, ID 1, Priority 1), VLAN#2 (Type 88-A8, ID 22, Priority 3), and VLAN#3 (Type 91-00, ID 333, Priority 7).

- User can enable or disable VLAN completely. If enabled, can select from 1 to 3 levels, numbered VLAN#1, VLAN#2 and VLAN#3. For each VLAN tag, user can specify the VLAN Type Field (user can only select from fixed values, as this field has only few fixed values), specify the VLAN Id and Priority. The sequence of insertion is as shown below:
- VLAN#1 is the innermost tag, followed by VLAN#2 and VLAN#3 is the outermost tag.



NOTE: RFC 2544 and Loopback DO NOT SUPPORT stacked VLAN in this release. If VLAN is enabled for RFC 2544, it currently allows only to select 1 level and VLAN Type does not allow to change from 81-00 (equivalent to a single VLAN field)

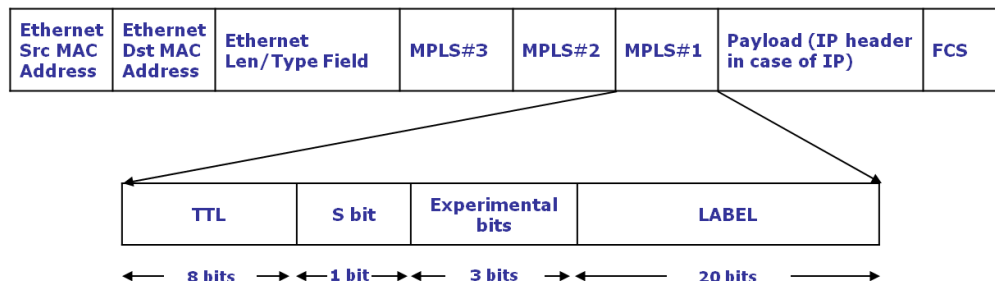
- Stacked MPLS - is added to the packet format. User can select MPLS as the Layer 2.5 as shown below:

The screenshot shows the 'Tx Config' window with the 'Layer/Dir' tab selected. Under 'Layer Selection', 'Layer 2' is set to Ethernet, 'Layer 2.5' is set to MPLS, 'Layer 3' is set to None, and 'Layer 4' is set to None.

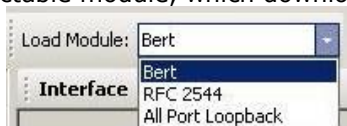
- Layer 2.5 means the higher layer is unaffected by the lower layer i.e. User can select either MPLS/None, in which case payload will be carried on top of MPLS packet or MPLS/IP, in which case IP header will be inserted after MPLS.
- Up to 3 stacked MPLS headers can be configured as shown below:

Non Test VLAN Frames	-	0
Non Test MPLS Frames	-	0
VLAN1 Frames	-	0
VLAN2 Frames	-	0
VLAN3 Frames	-	0
MPLS1 Frames	-	0
MPLS2 Frames	-	0
MPLS3 Frames	-	0

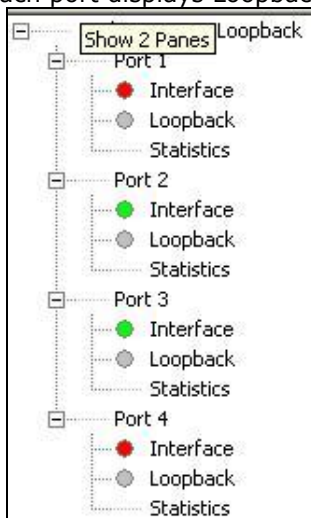
- User can specify MPLS Label Id, CoS bits and TTL for each MPLS label named MPLS#1, MPLS#2 and MPLS#3. The order of insertion is shown below:



- MPLS#1 is the innermost label, while the other two are inserted in the outer levels. S bit indicates whether there are more MPLS labels to follow and is inserted automatically.
- NOTE: RFC 2544 and Loopback DO NOT SUPPORT stacked MPLS in this release. Layer selection for RFC 2544 does not allow selecting MPLS and defaults back to None. Also, MPLS tab is not enabled.
- Statistics Changes - Few additional statistics have been added for VLAN and MPLS:
- All Port Loopback - is moved from Factory Use Menu to the main Load Module menu. All Port Loopback is now a main user selectable module, which downloads a separate bit file:



- All 4 ports can run Loopback. Each port displays Loopback statistics:



### Limitations/Known Issues:

There are many limitations in this release:

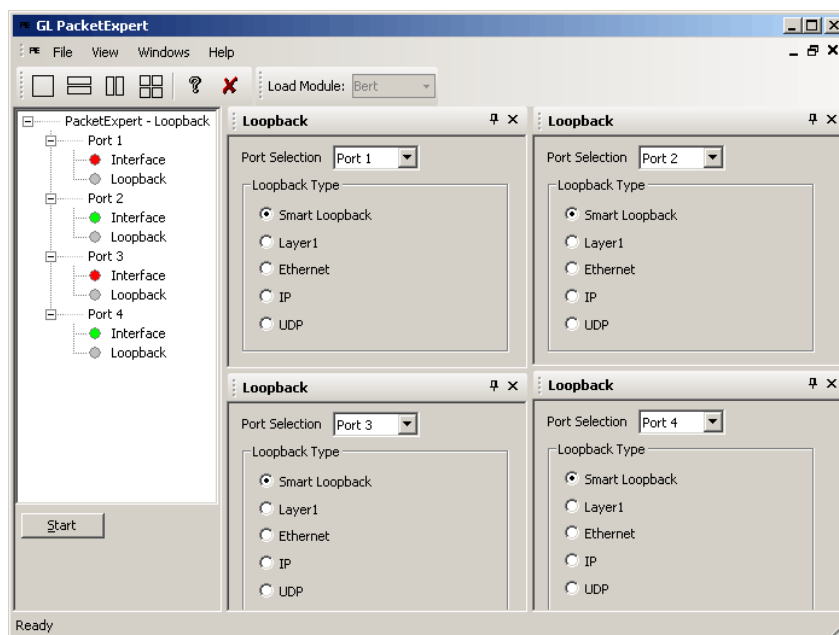
- Stacked VLAN and stacked MPLS are supported in BERT only. RFC 2544 and Loopback do not support these features. GUI does not allow selecting these values for RFC 2544.

- Known Issues – There are some known issues –
  - a. There are some known issues with Loopback Statistics – IP related statistics retain their values between successive runs.
  - b. Some problems with Start/Stop Button for Loopback. However, right-click – Start/Stop works fine.

Released November 30, 2010

### Changes/Enhancements:

- Added 4 port loopback option, accessed from View-> All Port Loopback menu. This will put all 4 ports in the loopback mode. Only available options are the Interface options and Loopback settings



**1.0k**

- When this option is selected, a new bit file will be loaded. User can set interface parameters like Electrical/optical selection set the Link speed. Loopback option provides Smart/Layer wise loopback selection.
- Automatic resolution of destination MAC address based on IP settings (for Layer3/4 traffic only) – For Layer3/Layer4 traffic, PacketExpert™ automatically resolves destination MAC address, based on IP destination setting. If IPv4 destination address is the same subnet, destination IP is resolved. Else, default gateway is resolved. The resolved MAC address is used, instead of the user configured MAC address.

### Bug Fixes:

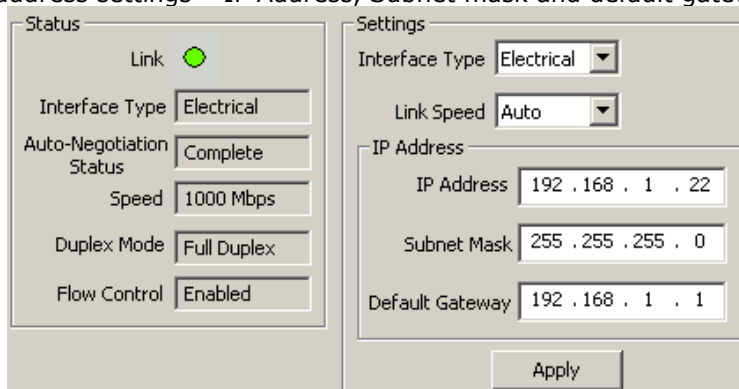
- Customer Reported Bug – VLAN issue with PacketExpert™. Loopback cable between Port 2 and 3. VLAN ID = 100 for Port#2 and 200 for Port#3. PacketExpert™ was reporting RFC pass results!!
- ARP was not working properly for BERT. Now working fine.
- Was not sending ARP request on BERT start to resolve destination MAC address. Fixed now.

Released November 1, 2010

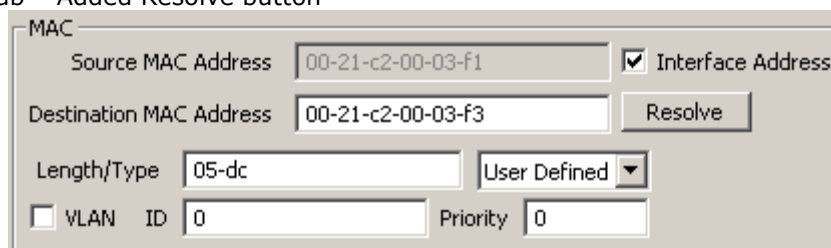
**1.0j-4**

**Changes/Enhancements:**

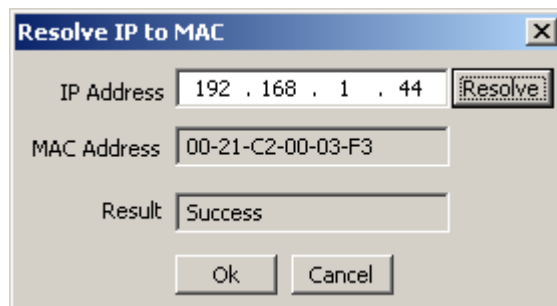
- Interface dialog additions –
  - Added Electrical/Optical Interface type selection (Moved from the main menu)
  - Added Forced Speed selection
  - Added IP address settings – IP Address, Subnet mask and default gateway



- The interface settings are applied to the hardware during these 3 times –
  - When user clicks the “Apply” button
  - On Startup
  - When user opens a new configuration file
  - MAC tab – Added Resolve button



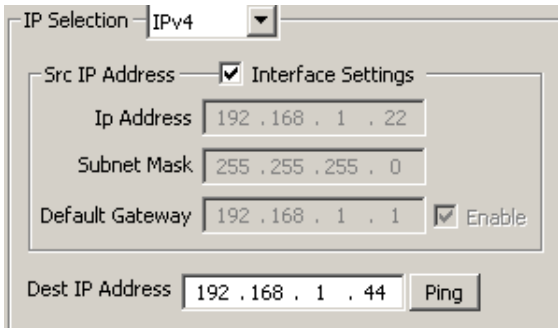
- Clicking on Resolve opens the Resolve dialog, which resolves IP address to MAC address using ARP



- For Layer3/Layer4 testing, it always queries (using ARP) and automatically fills up the destination MAC address, using the destination IP address. If destination IP is in the same subnet, Destination IP is queried. If destination IP is in different subnet, gateway IP is queried.

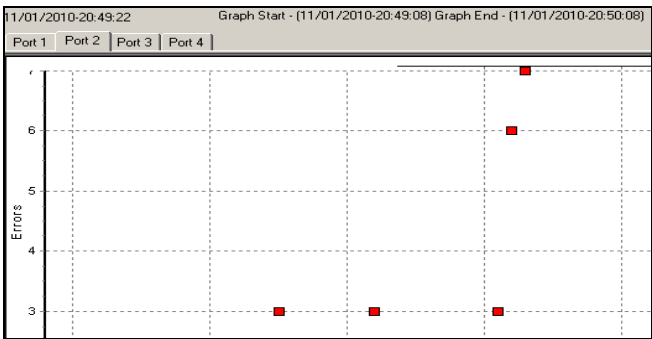


- **IP tab** – for IP Source Address, added Subnet Mask and default Gateway. For destination address, added ping button next to it.

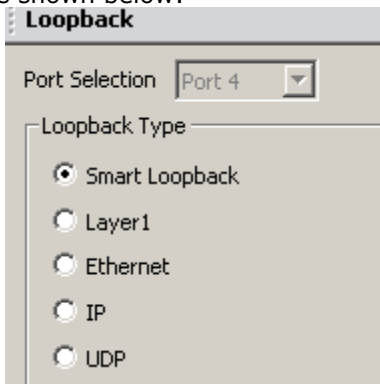


➤ Checking Interface Settings will automatically copy from the Interface dialog settings.

- **BERT Graph** – Changed to points Graph, as shown below



- Loopback – Added Choices as shown below:



- Moved Reports Dialog access to the LHS tree (from the main menu)

Released September 22, 2010

**Changes/Enhancements:**

- Small changes in help file and User guide - added small left out items like All Ports dialog – Config options, Bert Results – Reset, Clear History, and Bit Error etc.

**Bug Fixes:**

- BERT results - Bits Received counter was saturating after exceeding 32 bits value
- When layer =UDP and there is IP checksum error, Valid frames were not incrementing (Correct behavior), but UDP packet count statistics was incrementing (Incorrect Behavior)

**1.0j**

Released September 21, 2010	<b>1.0i</b>
<b>Changes/Enhancements:</b> <ul style="list-style-type: none"><li>Improved Help/User Guide with better screen shots</li></ul> <b>Bug Fixes:</b> <ul style="list-style-type: none"><li>BERT Y-axis error, while running graph stop BERT/loopback and then restart it. Y-axis reinitializes to a seemingly random negative number rather than zero. It treats this random number as zero for plotting purposes</li><li>Pressing Reset on Alarm pane causes error in graph if graph is running, see screenshot</li><li>Help was not invoking from All Ports Dialog and About Dialog.</li><li>Main window used to display "Untitled" always even if a configuration file is loaded. Now displays "Untitled" if no configuration file loaded or the configuration file name</li></ul>	
Released September 20, 2010	<b>1.0h</b>
<b>Changes/Enhancements:</b> <ul style="list-style-type: none"><li>User Manual is included</li><li>Online Help included – accessed from Main window Help-&gt;Help Contents</li><li>Online context sensitive help – clicking F1 on any screen opens up the relevant Help</li><li>Installation guide included</li></ul>	
Released September 16, 2010	<b>1.0g</b>
<b>Changes/Enhancements:</b> <ul style="list-style-type: none"><li>Jumbo Frame feature Added - Max Frame Size increased up to 2048 bytes - both in BERT and RFC 2544. So now, valid Frame Range is 64 bytes to 2048 bytes.</li><li>Statistics – made the following changes:<ul style="list-style-type: none"><li>Removed the following Half duplex counters in Tx and Rx, since we don't support Half Duplex</li><li>Added a new Statistic - "Length Check Errors" to RFC 2544 (not for BERT). This displays the count of wrong length frames received, while running RFC 2544</li><li>Reset – enhanced Reset to handle Reset properly. Provided hardware level reset for BERT. For RFC 2544, reset is handled by software itself. For RFC 2544 tests, we used to reset the Port stats for each and every trial, so that Port stats never reflected the total frames for the entire session (Start to Stop). Now, it displays correctly.</li><li>Look and feel changes - - Grouped related statistics with gap between the groups, Aligned relevant Tx and Rx stats (LHS to RHS alignment)</li></ul></li><li>RFC Results – made these changes:<ul style="list-style-type: none"><li>Changed "Direction" in RFC results to "Completed Tests". This will show which of the 4 tests have completed</li><li>Status shows "Test Done" after test is completed instead of "Idle"</li><li>GUI state automatically comes back to "Start" after test completes (Earlier was still in "Stop" condition, waiting for user to manually stop)</li><li>If Stopped in between, shows status as "Test Stopped" instead of Idle</li><li>If link goes down (Port2 or Port3), then it aborts test immediately and displays status as "Test Aborted - Link Down"</li></ul></li><li>Port Selection Drop down enabled for RFC 2544 "Interface" and "TxRx Config" dialogs (was grayed out earlier).</li><li>IPv6 - Added Filter masks for IPv6 Source Address, Destination Address and Next Header fields. It is considered test packet only if it passes all 3 filters.</li><li>LHS Pane - top item - Changed name from "Configurations" to "PacketExpert - BERT" and "PacketExpert - RFC2544"</li></ul>	

<ul style="list-style-type: none"> <li>• Changed Menu item View-&gt;"Config Option" to "Load Module"</li> <li>• Changes in initial values</li> </ul> <p><b>Bug Fixes:</b></p> <ul style="list-style-type: none"> <li>• Loopback is reporting IP Checksum errors even I have enabled "Auto" within BERT Tx - Was not enabling Checksum Error check for Loopback</li> <li>• Graph is not working as intended. It just reports 1 Error all the time even there are more errors within a second.</li> <li>• When auto error insertion is started and later you switch screens for the same panel, it does not preserve status and rate of auto error insertion</li> <li>• After starting auto error insertion, it should disable rate selection.</li> <li>• Destination MAC address is auto-populating incorrectly, on all of my boards it is populating as 00-21-c2-00-03-ee for port 2 and 00-21-c2-00-03-ed for port 3.</li> <li>• Destination MAC auto-populates incorrectly in BERT too</li> <li>• Register Access - Fixed Read/Write EMAC bug - was not reading/writing EMAC properly</li> <li>• For BERT, was not populating the Src MAC Address properly (when "Interface Address" was checked)</li> <li>• When Loopback is running on Port4, still allows to change from Electrical to Optical</li> <li>• P2 &lt;- P3 was not working properly for RFC 2544</li> <li>• BERT - IP header total length: Its always 4 more.</li> <li>• Frame Loss Test was not working correctly for Bidirectional test</li> <li>• Bert - When Port4 (Loopback) is reset, was causing Bit Errors in Port2 (Bert)</li> <li>• Bert - was not displaying latest stats on Stop Bert or Loopback</li> <li>• Reset Port stats were not working properly for RFC 2544.</li> <li>• P3 -&gt; P2 was not working through switch. Problem was with the Learning Frame - we were sending Learning frame with the wrong MAC address, causing switch to block the traffic</li> <li>• Filter mask for IPv6 Protocol (Next Header) field was not setting properly</li> </ul>	
<p>Released September 10, 2010</p> <p><b>Changes/Enhancements:</b></p> <ul style="list-style-type: none"> <li>• Contains new BERT bit file, which fixes Loopback bugs (accidentally sent old bit file for 1.0e release)</li> <li>• TChart included in the installation</li> </ul>	<p><b>1.0f</b></p>

Released September 7, 2010

**Changes/Enhancements:**

**Overall:**

- MAC Dialog – Added checkbox to automatically fetch and fill up interface address for Source MAC address
- Packet Configuration dialog (both BERT and RFC 2544) – disabled MAC/IP/UDP configuration tab based on Layer selection
- Removed unsupported features under the LHS tree. Eg: Under Port4, BERT has been removed.
- Disabled Port Drop down for each window. This is because, not all features are applicable for each port. E.g.: Bert should have only Port2 in the drop down.
- Similarly, removed the global port dropdown for both BERT/RFC 2544
- Added multiple instance handling – now, only one instance of PacketExpert™ allowed per PC.
- Changed the name of the executable to "PaketExpert.exe" from the old "EthernetTester.exe"
- Changed the application logo from "ET" to "PE"
- Statistics screen( both BERT and RFC 2544) – was not displaying the bottom 2 or 3 items properly – now shows clearly
- Statistics screen – proper and consistent capitalization of all the names
- Statistics screen - "Multiple Collision Frames" renamed to "Multiple Collision Frames"
- Removed CAP,NUM,SCRL displayed on bottom RHS corner
- Provided a proper default configuration file, which displays proper values on startup

**1.0e**

**RFC 2544:**

- Changed Names – "Test Duration" to "Trial Duration", "Start Bandwidth" to "Min Bandwidth", "End Bandwidth" to "Max Bandwidth"
- Changed P1 and P2 to P2 and P3 respectively, everywhere for RFC 2544
- Changed order of tests to match RFC 2544 spec – Throughput, Latency, Frame Loss, Back to Back – changed in the execution order also
- Changed order of appearance in the LHS tree also – moved Frame Loss above Back to Back
- Interface dialog - Was Refreshing the Hw MAC address constantly, making it difficult to right click and Copy – Changed, now does not refresh every second
- Startup screen - changed the default display to show the first three tests
- RFC 2544 Global Configuration – changed Source and destination Port to "East" and "West" port
- Disabled East and West port drop down. Now, it's fixed to East Port = P2 and West Port = P3
- Bandwidth – Changed from integer to decimal – 0.01 to 100.00 range
- All RFC 2544 screens – Changed "Number of Trails" to "Number of Trials"
- "USecs" in Latency tab changed to "us"
- Results screen- was not displaying bottom items – Fixed this
- Results screen- scroll was not coming back up again – Fixed this

**BERT:**

- Changed default Port number = 2 for BERT for all default windows

**Bug Fixes:**

- Run any test on IP layer, with VLAN enabled observe no Rx Frames
- Run bidirectional test on IP layer, observe no Rx Frames, first time. Second time works
- Run unidirectional test on IP layer, observe no Rx Frames
- Starting P3 -> P2 test actually starts P2 -> P3 test itself
- 1In Frame Loss test, if the first rate i.e. 100% failed, was not going to 90% and below steps. Was sending at 100% rate for all the steps.
- For Frame Loss test, if the first iteration (say at 100%) fails, the correct frames for the next iteration (for 90%) was not sent
- After Saving report, an error message pops up.
- In Loopback Statistics, IP and UDP Checksum errors are not incrementing.
- Open Report Generation window and Save. Observe Crash
- Continuous bit error insertion stops when single error is inserted.
- More trials in a test won't work in RFC 2544
- Layer 3 Loopback with PRBS pattern reports bit Errors.
- Application crashes when we invoke graph pane second time.
- Test report is not saving in folder, which does not have PacketExpertReport.exe file.
- In BERT test reports displays same start and test time while running test.
- Loopback traffic is not segregating into IP and UDP in statistics pane
- For layer 3 & layer 4 Loopback test addresses are not swapping.
- BERT is crashing when stop button is invoked
- RFC2544 optical interface back-to back test reports less frames/burst
- Bit Error history LED turns to red when test is stopped.
- PacketExpert™ optical mode displays 10 mbps half duplex.
- Traffic rate option is not working
- In BERT bit errors are incrementing and reporting out of sync.
- Huge files are creating when generating test report
- RFC 2544 test at layer 3 & 4 is not working
- Some 32-bit user pattern goes out of sync when errors are inserted.
- Frame loss result displaying problem for more than one frame size.
- For unidirectional test (P1->P2) P2->P1 column displays as running.

Released August 2010

**Enhancements:**

Application now uses the new PacketExpert™ driver GUID - {7F4C80BA-1F21-4c27-9D7B-22F5A3462FFE} instead of the old GL USB ETHERNET TESTER GUID - {6A64CB9F-3899-4D85-9037-393CB3FD2C91}. The new GUID matches with the one Peter put in the PacketExpert™ INF file. This fixes the application invoke problem when PacketExpert™ USB driver is selected during 1.0c installation.

**Bug Fixes:**

- Continuous bit error insertion stops when single error is inserted.
- Reports out of sync and bit error when we Reset statistics on port 4
- Loopback traffic is not segregating into IP and UDP in statistics pane
- Loop back test cannot be terminated
- For layer 3 & layer 4 Loopback test addresses are not swapping – fixed to report Sync status.
- Traffic rate option is not working – fixed to work in BERT mode

<ul style="list-style-type: none"><li>• Huge files are creating when generating test report – fixed to generate proper test reports.</li><li>• RFC 2544 test at layer 3 &amp; 4 is not working – fixed to display incrementing Rx frames and test is successful</li><li>• Some 32-bit user pattern goes out of sync when errors are inserted – fixed to sync even with continuous error insertion.</li><li>• BERT is crashing when test is stop button is invoked while test is running - fixed</li><li>• Frame loss result displaying problem for more then one frame size – fixed to display frame size results correctly for all frame size.</li><li>• For unidirectional test (P1-&gt;P2) P2-&gt;P1 column displays as running – fixed to display “running” status instead of “idle”.</li><li>• RFC2544 optical interface is not working – fixed, which displays incrementing tx and rx frames count</li><li>• RFC2544 optical interface back-to back test reports less frames/burst – fixed to report frames/burst same as compare to electrical interface test.</li><li>• Throughput bidirectional test tries to compute infinitely for certain conditions - fixed to compute and display the final result.</li></ul>	<b>1.0 d</b>
<p>Release August 2010</p> <p><b>Enhancements:</b></p> <ul style="list-style-type: none"><li>• Module Integration - Single GUI for both BERT and RFC 2544. Both bit files must be present under \BitFiles folder.MasterLayout.cfg must be modified to indicate the appropriate bit file as shown below: ; Xilinx load file XilinxLoadFile=ethernet_test.bin BERT_XilinxLoadFile=top_bert1_lb1.bin RFC2544_XilinxLoadFile=top_rfc_bidirectional.bin</li><li>• Bi-Directional RFC - has been implemented for all tests</li><li>• Graphs for all 4 RFC 2544 tests have been added. Throughput, Latency and Back-To-Back have bar graph, while Frame Loss has Line graph.</li><li>• Report Generation has been added for both BERT and RFC 2544. Depending on the active application, BERT/RFC 2544 report will be generated. For RFC 2544 graphs are also exported to the report.</li><li>• Port Configuration - Each Port can be independently switched from Electrical to Optical and vice versa.</li></ul> <p><b>Note: In Optical mode, it works only at 1000 Mbps speed (not at 10/100 speeds)</b></p> <ul style="list-style-type: none"><li>• For RFC 2544, Learning Frames has been added. Before start of each trial, Learning frames are sent. For Layer2, currently, a test frame is constructed and sent just so that the Layer2 switching device can fill up its tables (similar to bridge learning). For IP or UDP layers, ARP frames are sent (as recommended by RFC 2544)</li><li>• After test has started, we respond to ARP requests (again currently only for L3/L4).</li><li>• Statistics screen has been added to RFC 2544.</li><li>• Address Filtering is turned on for RFC 2544. MAC Src/Dst address, IP Src/Dst addresses and UDP Src/Dst Ports are filtered for incoming frames.</li><li>• Register Access - added access to EMAC and MDIO (PHY) registers in addition to the existing FPGA registers.</li></ul> <p><b>Bug Fixes:</b></p> <ul style="list-style-type: none"><li>• UDP checksum bug has been fixed – It was sending UDP Packets with wrong Checksum.</li><li>• Earlier GUI allowed 4 bytes payload, which was wrong - now restricted to 2 bytes only.</li></ul>	<b>1.0 c</b>