FTB-8510G
Packet Blazer
NETWORK TESTING–TRANSPORT AND DATACOM

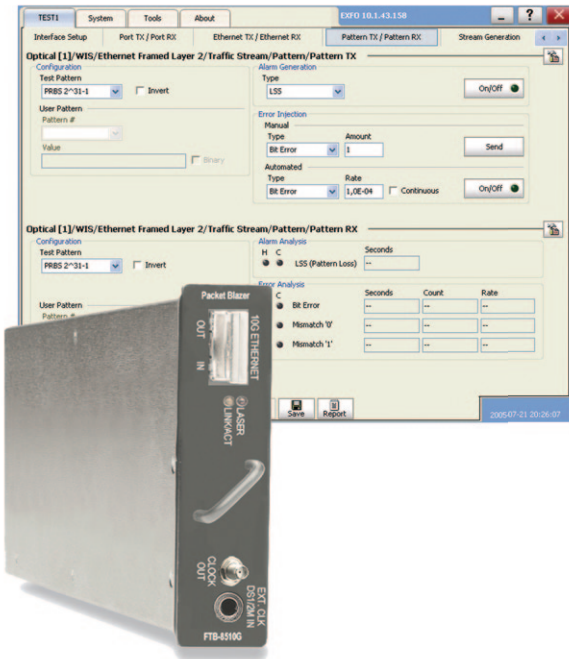## Performance assurance for Ethernet-based services

- Complete EtherSAM (ITU-T Y.1564) test suite. EtherSAM is the new standard for turning up and troubleshooting mobile backhaul and business Ethernet services

- LAN and WAN PHY capability in a single module

- Fully integrated functionality for assessing the performance of Ethernet transport networks

- Packet jitter measurement to qualify Ethernet transport networks for transmission of delay-sensitive traffic such as video and voice-over-IP (VoIP)

- Throughput, back-to-back, latency and frame loss measurements as per RFC 2544 (bidirectional)

- Multistream generation and analysis, allowing quality of service (QoS) verification through VLAN and ToS/DSCP prioritization testing

- Up to 10 Gbit/s full-line-rate data capture and decode

- MPLS, MPLS-TP, PBB-TE and IPv4/IPv6 support for complete Carrier Ethernet validation

- EXFO Connect-compatible: automated asset management; data goes through the cloud and into a dynamic database

Platform Compatibility

- FTB-500 Platform
- FTB-200 Compact Platform

Feature(s) of this product is/are protected by one or more of patent appl. US 2012/0307666 A1 and equivalents in other countries.

COMPLETE IPv6 TESTING

EXFO Connect Compatible

EtherSAM

MEF
METRO ETHERNET FORUM

EXFO | Assessing Next-Gen Networks

The Choice for 10 Gigabit Ethernet Performance Assurance

EXFO's FTB-8510G Packet Blazer™ offers performance assurance for 10 Gigabit Ethernet-based services. Its suite of test applications provides all the measurements required for validating service-level agreements (SLAs) between service providers and their customers. Housed in the FTB-500 Platform or FTB-200 Compact Platform, the FTB-8510G module tests connectivity in its native format: 10GBASE-xR or 10GBASE-xW used for transport of Ethernet-based LAN-to-LAN services. It can also be used to test next-generation SONET/SDH, hybrid multiplexers, dark fiber or xWDM networks running 10 Gigabit Ethernet interfaces.

Combined with its rack-mounted remote test unit counterpart, RTU-310, the FTB-8510G simplifies and speeds up the deployment of Ethernet services.

The FTB-8510G Packet Blazer 10 Gigabit Ethernet Test Module can be housed in the FTB-200 Compact Platform. Also shown in the platform, is the FTB-8510B Ethernet Test Module.

The FTB-8510G Packet Blazer 10 Gigabit Ethernet Test Module can also be combined in the FTB-500 Platform with the FTB-8510B Packet Blazer Ethernet Test Module and the FTB-8130 Transport Blazer Next-Generation SONET/SDH Test Module.

Key Features

- Complete EtherSAM (ITU-T Y.1564) test suite allowing full validation of today's Ethernet services (bidirectional results through dual test set)*
- Measures throughput, back-to-back, latency and frame loss as per RFC 2544 (bidirectional results through dual test set)
- Multistream generation and analysis, providing per-stream measurements for throughput, latency, frame loss and packet jitter
- LAN PHY and WAN PHY available in a single module
- Simultaneous traffic generation and reception at 100 % wire speed for 10GBASE-SR, -ER, -LR, -SW, -EW or -LW full-duplex interfaces at all valid frame sizes
- Transmits and analyzes up to ten streams, perfect for installing, commissioning and maintaining Ethernet networks
- UDP, TCP and IP header integrity validation
- Easy-to-use smart user interface (SUI) for configurable screens, customization of test suites, as well as real-time and historical performance reporting
- Capability to remote control the Packet Blazer test module with the Visual Guardian Lite software or VNC
- Configurable advanced filters for in-depth network troubleshooting
- PBB-TE and MPLS support for Carrier Ethernet
- Up to 10 Gbit/s full-line-rate data capture and decode
- Smart Loopback
- Service disruption time measurement
- Internet protocol version 6 (IPv6 testing)

* Patent pending
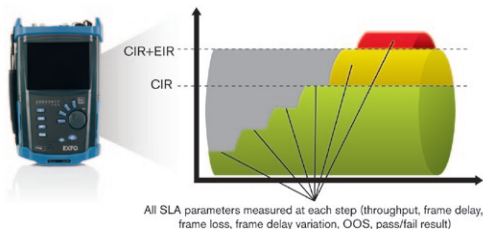
EtherSAM: The New Standard in Ethernet Testing

ITU-T Y.1564 is the new standard for turning up and troubleshooting Carrier Ethernet services. This methodology is completely adapted to today's Ethernet services especially mobile backhaul and commercial services. Up to now, RFC 2544 has been the most widely used methodology. However, it was designed for network device testing in the lab, not for services testing in the field. ITU-T Y.1564 is the first testing standard developed for the field. It has a number of advantages over the RFC 2544 including validation of critical SLA criteria such as packet jitter and QoS measurements. This methodology is also significantly faster, therefore saving time and resources while optimizing QoS.

Contrary to other methodologies, EtherSAM supports new multiservice offerings. It can simulate all types of services that will run on the network and simultaneously qualify all key SLA parameters for each of these services. Moreover, it validates the QoS mechanisms provisioned in the network to prioritize the different service types, resulting in more accurate validation and much faster deployment and troubleshooting. EtherSAM is comprised of two phases, the service configuration test and the service performance test.
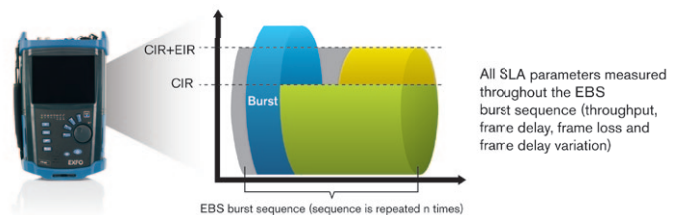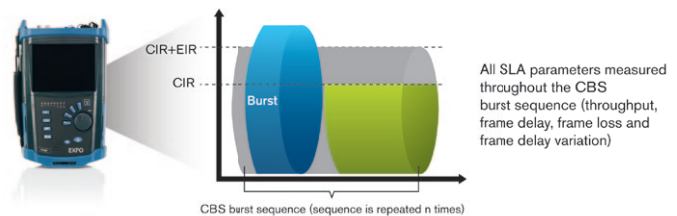
Service Configuration Test

The service configuration test consists in sequentially testing each service. It validates that the service is properly provisioned and that all specific KPIs or SLA parameters are met. A ramp test and a burst test are performed to verify the committed information rare (CIR), excess information rate (EIR), committed burst size (CBS) and excess burst size (EBS).
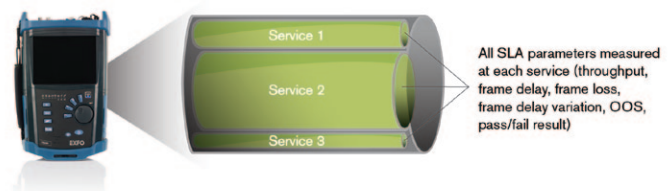
Ramp Test

All SLA parameters measured at each step (throughput, frame delay, frame loss, frame delay variation, OOS, pass/fail result)

Burst Test

All SLA parameters measured throughout the CBS burst sequence (throughput, frame delay, frame loss and frame delay variation)

CBS burst sequence (sequence is repeated n times)

All SLA parameters measured throughout the EBS burst sequence (throughput, frame delay, frame loss and frame delay variation)

EBS burst sequence (sequence is repeated n times)

Service Performance Test

Once the configuration of each individual service is validated, the service performance test simultaneously validates the quality of all the services over time.

All SLA parameters measured at each service (throughput, frame delay, frame loss, frame delay variation, OOS, pass/fail result)

EtherSAM Bidirectional Results

EXFO's EtherSAM approach proves even more powerful as it executes the complete ITU-T Y.1564 test with bidirectional measurements. Key SLA parameters are measured independently in each test direction, thus providing 100 % first-time-right service activation–that is the highest level of confidence in service testing.

Round-trip results only

Simultaneous independant results for each test direction for individual service
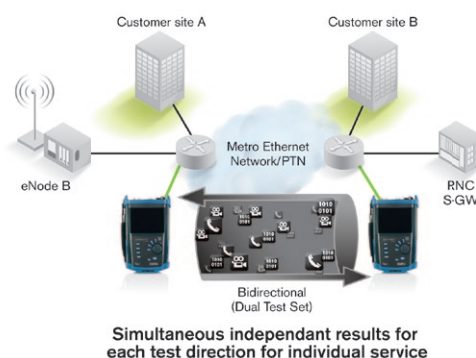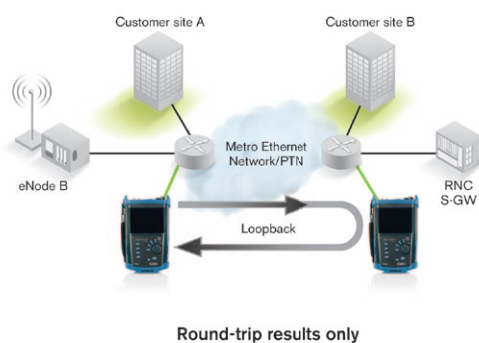
RFC 2544 Test Suite

The FTB-8510G Packet Blazer can perform the RFC 2544 test suite for 10 GbE LAN/WAN interface at all frame sizes and at full line rate, allowing the provider to certify that the circuit is efficient and error-free at 100 % utilization.

The Packet Blazer supports automated RFC 2544 testing, including throughput, latency, burst (back-to-back) and frame loss. Automation also provides ease of use for field technicians by enabling accurate, efficient measurements and results through a clear and simple pass/fail indication. In addition, the Packet Blazer generates reports that can be given to customers for future reference related to their specific SLAs.
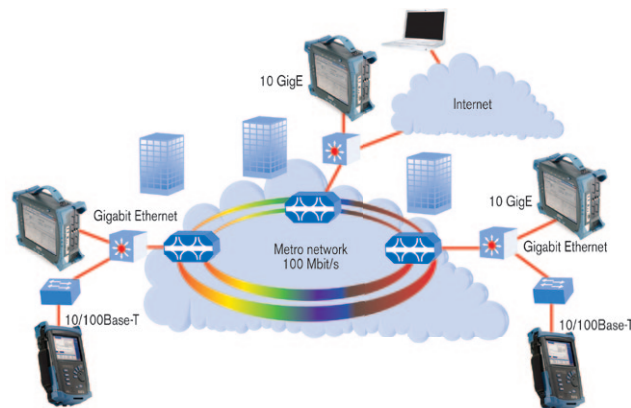
Testing can be performed end-to-end or end-to-core, depending on the SLA. Remote testing is also possible.

Efficient Testing Leads to Reliable Performance

## MPLS, MPLS-TP and PBB-TE: Carrier Ethernet Transport Solution Testing

As technologically-sophisticated business and residential consumers continue to drive demand for premium, high-bandwidth data services such as voice and video, service providers worldwide are evolving their transport infrastructures to support these bandwidth and quality intensive services. No longer is an all-IP core sufficient; providers must now expand their IP convergence to the edge/metro network, in a cost-effective, quality-assured manner. Ethernet has long been accepted as an inexpensive, scalable data networking solution in LAN environments. The stringent QoS expectations require solutions that tap into the cost-effectiveness of Ethernet without sacrificing the benefits of connection-oriented (albeit it costly) TDM solutions such as SONET/SDH.

Ethernet tunneling technologies such as Provider Backbone Bridge-Traffic Engineering or PBB-TE (also referred to as PBT) and transport MPLS address these requirements. These technologies enable connection-oriented Ethernet, providing carriers with a means of offering scalable, reliable and resilient Ethernet services. The PBB-TE and MPLS options on the FTB-8510G Packet Blazer offer service providers a comprehensive field tool to efficiently qualify Ethernet services from end to end, validating metro and core tunneling technologies.

EtherBERT™

Ethernet is increasingly carried across a variety of layer 1 media over longer distances. This creates a growing need for the certification of Ethernet transport on a bit-per-bit basis, which can be done using bit-error-rate testing (BERT).

BERT uses a pseudo-random binary sequence (PRBS) encapsulated into an Ethernet frame, making it possible to go from a frame-based error measurement to a bit-error-rate measurement. This provides the bit-per-bit error count accuracy required for acceptance testing of physical-medium transport systems. BERT-over-Ethernet should usually be used when Ethernet is carried transparently over layer 1 media, in cases such as Ethernet over DWDM, CWDM or dark fiber.
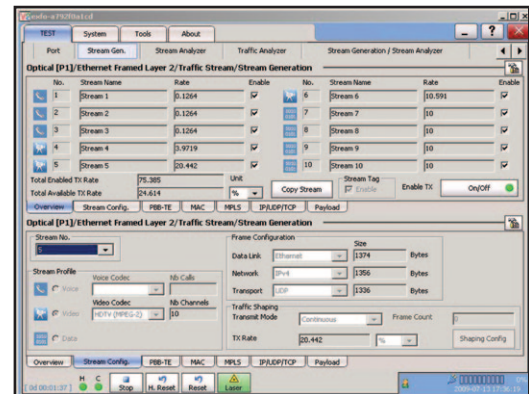
Multistream bandwidth profiles.
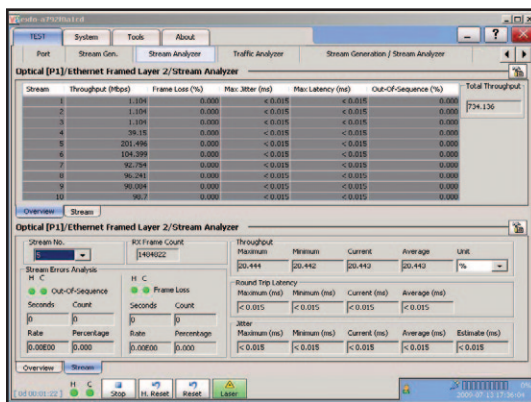
Statistics for each stream.

Ethernet QoS Measurements

Data services are making a significant shift toward supporting a variety of applications on the same network. Multiservice offerings such as triple-play services have fuelled the need for QoS testing to ensure the condition and reliability of each service and fully qualify SLA parameters. The FTB-8510G Packet Blazer allows service providers to simultaneously simulate and qualify different applications through its multistream application. The user has the capability to configure up to ten streams with different Ethernet and IP QoS parameters such as VLAN ID (802.1Q), VLAN Priority (802.1p), VLAN stacking (802.1ad Q-in-Q), ToS and DSCP. Specific stream profiles to transmit VoIP, video and data can be selected for each stream. Throughput, latency, frame loss and packet jitter (RFC 3393) measurements are also available simultaneously for each stream, allowing fast and in-depth qualification of all SLA criteria.

Ethernet Advanced Troubleshooting

The FTB-8510G provides a number of advanced features essential for in-depth troubleshooting in the event of network failures or impairments. The advanced filtering option allows the user to configure up to ten filters with each up to four operands, which will be applied to the received Ethernet traffic. Detailed statistics are available for each configured filter providing the user with critical information required to pinpoint specific problems. Additionally, the FTB-8510G supports a traffic scan feature that allows quick identification and monitoring of VLAN and MPLS flows on the network. This can help clearly identify top bandwidth users.

The FTB-8510G also supports full-line-rate data capture and decode. This key troubleshooting tool enables field technicians to easily identify complex network issues. The comprehensive capture feature includes the capability to configure capture filters and triggers to quickly zero-in on network events.

EXFO CONNECT

EXFO | Connect

AUTOMATED ASSET MANAGEMENT.
PUSH TEST DATA **IN THE CLOUD**. GET CONNECTED.

EXFO Connect pushes and stores test equipment and test data content automatically in the cloud, allowing you to streamline test operation from build-out to maintenance.

EXpert Test Tools on the FTB-200 Platform

EXpert Test Tools is a series of platform-based software testing tools that enhance the value of the FTB-200 platform, providing additional testing capabilities without the need for additional modules or units.

EXPERT TEST TOOLS

EXpert VoIP TEST TOOLS

EXpert VoIP generates a voice-over-IP call directly from the test platform to validate performance during service turn-up and troubleshooting.

• Supports a wide range of signaling protocols, including SIP, SCCP, H.248/Megaco and H.323

• Supports MOS and R-factor quality metrics

• Simplifies testing with configurable pass/fail thresholds and RTP metrics

EXpert VoIP TEST TOOLS

EXpert IP integrates six commonly used datacom test tools into one platform-based application to ensure that field technicians are prepared for a wide range of testing needs.

• Rapidly performs debugging sequences with VLAN scan and LAN discovery

• Validates end-to-end ping and traceroute

• Verifies FTP performance and HTTP availability

EXpert IPTV TEST TOOLS

This powerful IPTV quality assessment solution enables set-top-box emulation and passive monitoring of IPTV streams, allowing quick and easy pass/fail verification of IPTV installations.

• Real-time video preview

• Analyzes up to 10 video streams

• Comprehensive QoS and QoE metrics including MOS score

Functional Specifications (Cont'd)

OPTICAL INTERFACES

Optical interfaces	10 GigE LAN and 10 GigE WAN [a]
Available wavelengths	850, 1310 and 1550 nm

ELECTRICAL INTERFACES

Electrical interfaces	External clock DS1/E1 and clock output	
External clock DS1/E1	Line coding	DS1: AMI and B8ZS
		E1: AMI and HDB3
	Termination mode	DS1/E1: Term
	Framing	DS1: SF and ESF
		E1: PCM30, PCM30CRC, PCM31 and PCM31CRC
	Clocking	Internal, external (BITS) and recovered
Clock output	Clock out	Clock out divider: 16, 32 and 64

TESTING

EtherSAM (ITU-T Y.1564)	Capability to perform the service configuration test, including the ramp and burst tests, and service performance test as per ITU-T Y.1564. Tests can be performed to a loopback or dual test set mode for bidirectional results.
RFC 2544	Throughput, back-to-back, frame loss and latency measurements according to RFC 2544. Frame size: RFC-defined sizes, user-configurable (bidirectional).
BERT	Unframed layer 1 up to layer 4 with or without VLAN Q-in-Q.
Patterns (BERT)	PRBS 2E9-1, PRBS 2E11-1, PRBS 2E15-1, PRBS 2E20-1, PRBS 2E23-1, PRBS 2E31-1, and up to ten user patterns.
Error insertion (BERT)	FCS, bit, 64B/66B Block.
Error measurement	LAN/WAN: jabber/giant, runt, undersize, oversize, FCS, 64B/66B Block.
	WAN: B1, B2, B3, REI-L, REI-P, UDP, TCP and IP header checksum.
Error measurement (BERT)	Bit error, bit mismatch 0, bit mismatch 1, performance monitoring (G.821 and G.826).
Alarm insertion	LOS, link down, local fault, remote fault, LSS (BERT).
	WAN: SEF, LOF, AIS-L, RDI-L, AIS-P, RDI-P, LCD-P, LOP-P, ERDI-PSD, ERDI-PCD, ERDI-PPD, UNEQ-P.
Alarm detection	LOS, link down, local fault, remote fault, frequency offset, LSS (BERT).
	WAN: SEF, LOF, AIS-L, RDI-L, AIS-P, RDI-P, LCD-P, LOP-P, ERDI-PSD, ERDI-PCD, ERDI-PPD, PLM-P, UNEQ-P, Link (WIS).
Service disruption time measurement (BERT)	Defect or No Traffic mode. Disruption time statistics include shortest, longest, last, average, total and count.
Multistream generation	Capability to transmit up to ten streams. Configuration parameters are: packet size, transmission mode (N-Frames, Burst, N-Burst, Ramp, N-Ramp and Continuous), MAC source/destination address, VLAN ID, VLAN priority, IP source/destination address, ToS field, DSCP field, TTL, UDP/TCP source/destination port and payload. Selectable predefined stream profiles for voice, video and data streams. VoIP codecs (G.711, G.723.1, G.729), video (MPEG-2 SDTV, MPEG-2 HDTV, MPEG-4 HDTV).
Multistream analysis	Capability to analyze packet jitter, latency, throughput, frame loss and out-of-sequence per-stream statistics.
VLAN stacking (Q-in-Q)	Capability to generate streams with up to three layers of VLAN (including IEEE802.1ad QinQ tagged VLAN) and to filter received traffic by VLAN ID or VLAN priority at any of the stacked VLAN layers.
Traffic filtering	Capability to analyze the incoming traffic and provide statistics according to a set of up to ten configurable filters. Filters can be configured for MAC source/destination address, VLAN ID, VLAN priority, IP source/destination address, ToS field, DSCP field, TCP source/destination port and UDP source/destination port. VLAN filtering can be applied to any of the stacked VLAN layers.
Ethernet statistics	Multicast, broadcast, unicast, N-unicast, pause frame, frame size distribution, bandwidth, utilization, frame rate, frame loss, out-of-sequence frames, in-sequence frames.
Packet jitter statistics	Delay variation statistics (ms): min., max., last, average, jitter measurement estimate.
Flow control injection (frame analyzer)	Packet pause time.
Flow control statistics (frame analyzer and RFC 2544)	Pause time, last pause time, max. pause time, min. pause time, paused frames, abort frames, frames Tx, frames Rx.
Advanced filtering [a]	Capability to configure up to ten filters of four fields each that can be combined with AND/OR/NOT operations. A mask is also provided for each field value to allow for wildcards. Complete statistics are gathered for each defined filter.
Data capture [a]	Capability to perform 10G full-line-rate data capture and decode. Capability to configure detailed capture filters and triggers as well as capture slicing parameters.
Traffic scan [a]	Capability to scan incoming live traffic and auto-discover all VLAN/VLAN Priority and MPLS ID/COS flows. Capability to provide statistics for each flow including frame count and bandwidth.
PBB-TE [a]	Capability to generate and analyze streams with PBB-TE data traffic, including configuration of B-MAC (source and destination), B-VLAN and I-tag (as per 802.1ah), and to filter received traffic by any of these fields.
MPLS [a]	Capability to generate and analyze streams with up to two layers of MPLS labels and to filter received traffic by MPLS label or COS.
IPv6 [a]	Capability to perform BERT, RFC 2544, traffic generation and analysis and Smart Loopback tests over IPv6. Ping, traceroute, neighbor discovery and stateless auto-configuration.

ADDITIONAL TEST AND MESUREMENT FUNCTIONS

Power measurement	Supports optical power measurement, displayed in dBm.	
Frequency measurement	Supports clock frequency offset generation and measurements (i.e., received frequency and deviation of the input signal clock from nominal frequency).	
Frequency offset generation		
	Range	±120 ppm
	Resolution	±1 ppm
	Accuracy (uncertainty)	±4.6 ppm
Frequency offset measurement		
	Range	±150 ppm
	Resolution	±1 ppm
	Accuracy (uncertainty)	±4.6 ppm
Signal label control and monitoring	Ability to configure and monitor J0 trace, J1 trace and payload signal label C2 (WAN).	
Dual test set	Performs end-to-end, bidirectional performance testing (as required by leading standards bodies)—remote Packet Blazer controlled via the LAN connection under test.	
DHCP client	Capability to connect to a DHCP server to obtain its IP address and subnet mask to connect to the network.	
Smart Loopback	Capability to return traffic to the local unit by swapping packet overhead up to layer 4 of the OSI stack.	
IP tools	Capability to perform ping and traceroute functions.	

ADDITIONAL FEATURES

Expert mode	Ability to set thresholds in RFC 2544 and BERT mode to provide a PASS/FAIL status.
Scripting [b]	The built-in Visual Basic .NET scripting engine and embedded macrorecorder provide a simple means of automating test cases and routines. Embedded scripting routines provide a powerful means of creating advanced test scripts.
Event logger	Supports logging of test results, and the ability to print, export (to a file), or export the information contained in the logging tool.
Power up and restore	In the event of a power failure to the unit, the active test configuration and results are saved and restored upon bootup.
Save and load configuration	Ability to store and load test configurations to/from non-volatile memory.
Configurable test views [b]	Allows users to customize their test views; i.e., to dynamically insert or remove test tabs/windows, in addition to creating new test windows, so as to accurately match their testing needs.
Configurable test timer	Allows a user to set a specific start and stop time for tests.
Test favorites	Capability to select and load from predefined or user-modified test conditions.
Report generation	Ability to generate test reports in the following user-selectable formats: .pdf, .html, .txt and .csv.
Graph	Allows to graphically display the test statistics of the performance (RFC 2544) and frame analysis tests.
Screen capturing	Capability to gather a snap-shot of the screen for future use.
Logger printing [c]	Capability to send logger messages to a supported local printer.
Remote control	Remote control through Visual Guardian Lite software or VNC.

Notes

a. Available as an option.　　b. Available on the FTB-200 platform only.　　c. Available on the FTB-500 and IQS-600 platforms only.

MODULE SPECIFICATIONS

	FTB-8510G-LAN	FTB-8510G-WAN	FTB-8510G-LAN/WAN
Port	One 10 Gigabit Ethernet port	One 10 Gigabit Ethernet port	One 10 Gigabit Ethernet port
Connector type	LC	LC	LC
Optical transceiver	850 nm optics (10GBASE-SR)	850 nm optics (10GBASE-SW)	850 nm optics (10GBASE-SR/-SW)
	1310 nm optics (10GBASE-LR)	1310 nm optics (10GBASE-LW)	1310 nm optics (10GBASE-LR/-LW)
	1550 nm optics (10GBASE-ER)	1550 nm optics (10GBASE-EW)	1550 nm optics (10GBASE-ER/-EW)
Port capacity	Full-line-rate traffic generation and analysis	Full-line-rate traffic generation and analysis	Full-line-rate traffic generation and analysis
Ethernet testing	RFC 1242, RFC 2544, RFC 3393, multistream traffic generation and analysis, EtherBERT	RFC 1242, RFC 2544, RFC 3393, multistream traffic generation and analysis, EtherBERT	RFC 1242, RFC 2544, RFC 3393, multistream traffic generation and analysis, EtherBERT

GENERAL SPECIFICATIONS

Size (H x W x D)	96 mm x 25 mm x 280 mm	(3 ¾ in x 1 in x 11 in)
Weight (without transceiver)	0.5 kg	(1.2 lb)
Temperature		
operating	0 °C to 40 °C	(32 °F to 104 °F)
storage	−40 °C to 60 °C	(−40 °F to 140 °F)

ORDERING INFORMATION

MODULE

FTB-8510G-XX-XX

■ Model
FTB-8510G-LAN = Packet Blazer 10 GigE, 1 port 10 Gigabit Ethernet
LAN PHY (10.3125 Gbit/s)
FTB-8510G-WAN = Packet Blazer 10 GigE, 1 port 10 Gigabit Ethernet WAN PHY
(9.953 Gbit/s)
FTB-8510G-LAN/WAN = Packet Blazer 10 GigE, 1 port 10 Gigabit Ethernet
LAN and WAN PHY (10.3125 and 9.953 Gbit/s)

Example: FTB-8510G-LAN-MPLS

■ Other options
00 = Without other options
PBB-TE = PBB-TE testing
MPLS = MPLS testing
Adv_filtering = Advanced filtering capabilities
IPv6 = IPv6 testing capabilities
EtherSAM = EtherSAM (ITU-T Y.1564) testing capabilities
Data_Capture = Data capture and decode capabilities
TRAFFIC-SCAN = VLAN/MPLS traffic scan

TRANSCEIVER

FTB-85900 = 10GBase-SR/-SW (850 nm, LAN/WAN PHY) LC connectors;
optical XFP transceiver module for 8510G Packet Blazer

FTB-85901 = 10GBase-LR/-LW (1310 nm, LAN/WAN PHY) LC connectors;
optical XFP transceiver module for 8510G Packet Blazer

FTB-85902 = 10GBase-ER/-EW (1550 nm, LAN/WAN PHY) LC connectors;
optical XFP transceiver module for 8510G Packet Blazer

EXFO
Assessing
Next-Gen Networks