

FTB-8105

Transport Blazer

NETWORK TESTING – TRANSPORT AND DATACOM



Single-slot electrical test module supporting DSn/PDH and SONET/SDH electrical rates up to 155 Mbit/s

- Supports DSn, PDH, SONET and SDH electrical rates up to 155 Mbit/s in a single-slot module
- Dual Rx DSn
- Intuitive, feature-rich user interface with automated test scripting with multi-user remote management capabilities
- EXFO Connect-compatible: automated asset management; data goes through the cloud and into a dynamic database

Platform Compatibility

- FTB-200 Compact Platform
- FTB-500 Platform



EXFO | Connect



Testing Traditional and Packet-Based Ethernet TDM Services

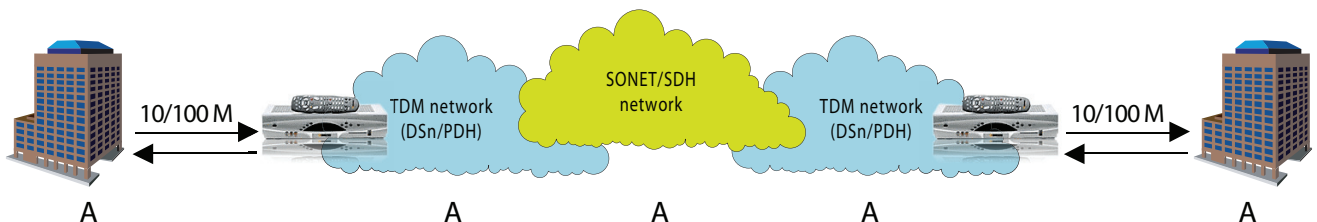
Compatible with the FTB-200 Compact Platform and the FTB-500 Platform, the FTB-8105 Transport Blazer is ideally suited for TDM field service deployment and maintenance activities. This test module offers capabilities to test traditional TDM DSn and PDH electrical rates as well as the SONET and SDH electrical rates of up to 155 Mbit/s.

The growing demand for Ethernet-based services to small and medium sized enterprises is driving the need for new, cost-effective transmission technologies such as Ethernet-over-TDM. This in turn creates the need for solutions to test traditional TDM services with packet-based Ethernet test functions. The combined test capabilities of the FTB-8105 Transport Blazer and the FTB-8510B Packet Blazer modules provide customers with an integrated test solution to efficiently achieve such deployments.

DSn/PDH and SONET/SDH Service Turn-up and Troubleshooting

The FTB-8105 Transport Blazer module offers a wide range of TDM and SONET/SDH test functions, allowing users to perform tests ranging from simple bit error rate (BER) testing to advanced characterization and troubleshooting procedures. These functions include:

- Mixed and bulk payload generation and analysis from 64 kbit/s to 155 Mbit/s
- High-order mappings: STS-1/3c and AU-3/AU-4
- Low-order mappings: VT1.5/2/6 and VC-11/12/2/3
- Section/RS, line/MS, high-order (HO) and low-order (LO) path overhead manipulation and monitoring
- Section/RS, line/MS, high-order and low-order path alarm/error generation and monitoring
- High-order and low-order pointer generation and monitoring
- Tandem connection monitoring
- Performance monitoring: G.821, G.826, G.828, G.829, M.2100, M.2101
- Frequency analysis and power measurement
- Frequency offset generation
- Automatic protection switching and service disruption time measurements
- Round-trip delay measurements
- Independent transmitter and receiver testing
- Through mode analysis
- Programmable error/alarm injection
- DS1/DS3 auto-detection of line code, framing and test pattern
- Dual DS1/DS3 receiver testing
- DS1 FDL
- DS1 loopcodes and NI/CSU loopback emulation
- Fractional T1/E1 testing
- DS3 FEAC

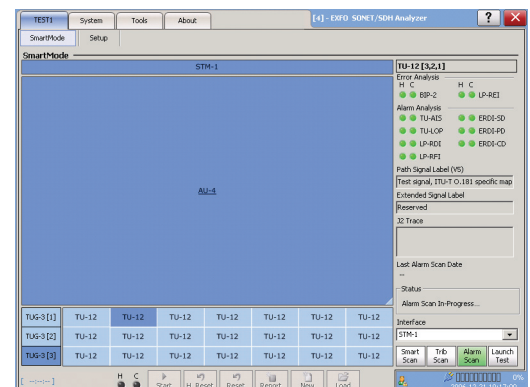


Housed in either the FTB-500 or FTB-200 platform and coupled with the FTB-8510B Packet Blazer, the FTB-8105 is the ideal solution for Ethernet-over-TDM circuit turn-up and troubleshooting.

SmartMode: Real-Time Signal Structure Discovery and Monitoring

EXFO's FTB-8105 Transport Blazer module offers a unique feature called SmartMode. This provides users with full visibility of all high-order (STS/AU) and low-order (VT/TU) mixed mappings within the incoming SONET/SDH electrical test signal.

SmartMode automatically discovers the signal structure of the STS-n/STM-n electrical rate line, including mixed mappings and virtual concatenation (VCAT) members. In addition to this in-depth multichannel visibility, SmartMode performs real-time monitoring of all discovered high-order paths and user selected low-order paths simultaneously, providing users with the industry's most powerful SONET/SDH multichannel monitoring and troubleshooting solution. Real-time monitoring allows users to easily isolate network faults, saving valuable time and minimizing service disruption. SmartMode also provides one-touch test case start, allowing users to quickly configure a desired test path.



FTB-8105 SmartMode: multichannel signal discovery with real-time alarm scan (shown in the FTB-500 user interface).

Unsurpassed Configuration and Operational Flexibility

Multiplatform Support and Versatility

The FTB-8105 Transport Blazer module, similar to the FTB-8120/8130 modules, is supported and interchangeable on the FTB-500 Platform and the FTB-200 Compact Platform. This cross-platform support provides users with added flexibility by enabling them to select the appropriate platform that suits their testing needs. EXFO is the sole test solution provider to offer this versatility, delivering single to multi-application test solutions with the same hardware module, which in turn dramatically reduces capital expenditures.

Inserted in the FTB-200 Compact Platform, the FTB-8105 Transport Blazer module delivers DSn/PDH and SONET/SDH electrical test functions up to 155 Mbit/s in a small, lightweight platform, ideal for field technicians' installation and commissioning needs.

Using the FTB-500 platform provides users with an all-in-one solution, supporting a mix of SONET/SDH/OTN, Ethernet, Fibre Channel and optical-layer test modules, making it the industry's first truly integrated network testing platform. This modularity enables users to upgrade their systems in the field, according to their testing needs. This multiservice test platform is the ideal solution for field, central office and lab applications.

Remote Management

Through the optional Visual Guardian Lite™ management software, the FTB-8105 Transport Blazer module allows users to perform remote testing and data analysis, as well as remote monitoring via standard Ethernet or remote dial-up connections.

Automated Test Scripting

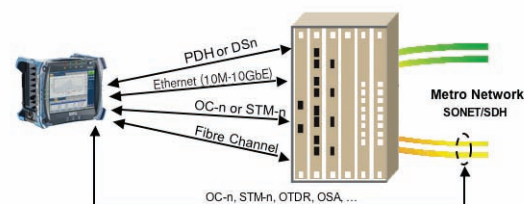
When configured for the FTB-500 platform, the FTB-8105 Transport Blazer comes with a built-in macrorecorder, allowing users to easily record their test actions and automatically create test scripts. This also allows them to build standard test routines that can be easily accessed and run by field technicians with little or no manual intervention.

Test Logger and Reporting

EXFO's FTB-8105 Transport Blazer module supports a detailed test logger and test reporting tools, enabling users to view any errors/alarms that occurred during the test interval, which can then be used for post-processing of results or SLA conformance validation.



The FTB-8105 module is supported on the FTB-200 and the FTB-500 platforms.



With its modular, multislot design, the FTB-500 platform enables users to configure and upgrade their systems in the field according to their testing needs, minimizing capital expenditures.

| ID | Date/Time | Data Path | Event | Duration |
|----|-----------|-----------|--------------|----------|
| 17 | 00:01:40 | AU-4 | HP-RDI | 00:00:03 |
| 18 | 00:01:43 | AU-4 | EJ | 00:00:01 |
| 19 | 00:01:47 | AU-4 | HP-REI | 00:00:01 |
| 20 | 00:01:56 | TU-12 | TU-LOP | 00:00:04 |
| 21 | 00:02:00 | TU-12 | BIP-2 | 00:00:01 |
| 22 | 00:02:02 | TU-12 | LP-REI | 00:00:01 |
| 23 | 00:02:08 | Pattern | Bit Error | 00:00:01 |
| 24 | 00:02:09 | Pattern | LSS | 00:00:02 |
| 25 | 00:02:19 | Pattern | Bit Error | 00:00:01 |
| 26 | 00:02:34 | TEST 1 | Test Stopped | |

Log Details:
ID: 19, Date/Time: 00:01:47, Event: HP-REI
Data Path: ENCL [1]/STM-1e/AU-4 [0,0]
Duration: 00:00:01, Count: 1, Rate: 7.00E-11

Test logger: a detailed, time-stamped list of all events occurring during test execution.

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 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 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



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

Electrical Interfaces

The following section provides detailed information on all supported electrical interfaces.

| | DS1 | E1/2M | | E2/8M | E3/34M | DS3/45M | | STS-1e/STM-0e/52M | E4/140M | STS-3e/STM-1e/155M | |
|---|--|--|--|--|---|---|---------------------------|--|---|---|--|
| Tx Pulse Amplitude | 2.4 to 3.6 V | 3.0 V | 2.37 V | 2.37 V | 1.0 ± 0.1 V | 0.36 to 0.85 V | | | 1.0 ± 0.1 Vpp | 0.5 V | |
| Tx Pulse Mask | GR-499 Figure 9.5 | G.703 Figure 15 | G.703 Figure 15 | G.703 Figure 16 | G.703 Figure 17 | DS-3 GR-499 Figure 9-6 | 45M G.703 Figure 14 | GR-253 Figure 4-10/4-11 | G.703 Figure 18/19 | STS-3e GR-253 Figure 4-12, 4-13, 4-14 | STM-1e/155M G.703 Figure 4-14/22, 23 |
| Tx LBO Preamplification | Power dBdsx +0.6 dBdsx (0-133 ft) +1.2 dBdsx (133-266 ft) +1.8 dBdsx (266-399 ft) +2.4 dBdsx (399-533 ft) +3.0 dBdsx (533-655 ft) | | | | | 0 to 225 ft 225 to 450 ft | | 0 to 225 ft 225 to 450 ft | | 0 to 225 ft | |
| Cable Simulation | Power dBdsx -22.5 dBdsx -15.0 dBdsx -7.5 dBdsx 0 dBdsx | | | | | 450 to 900 (927) ft | | 450 to 900 (927) ft | | | |
| Rx Level Sensitivity | For 772 kHz: TERM: ≤ 26 dB (cable loss only) at 0 dBdsx Tx DSX-MON: ≤ 26 dB (20 dB resistive loss + cable loss ≤ 6 dB) Bridge: ≤ 6 dB (cable loss only) Note: measurement units = dBdsx | For 1024 kHz: TERM: ≤ 6 dB (cable loss only) MON: ≤ 25 dB (20 dB resistive loss + cable loss ≤ 6 dB) Bridge: ≤ 6 dB (cable loss only) Note: measurement units = dBm | For 1024 kHz: TERM: ≤ 6 dB (cable loss only) MON: ≤ 26 dB (20 dB resistive loss + cable loss ≤ 6 dB) Bridge: ≤ 6 dB (cable loss only) Note: measurement units = dBm | For 4224 kHz: TERM: ≤ 6 dB (cable loss only) MON: ≤ 26 dB (20 dB resistive loss + cable loss ≤ 6 dB) Note: measurement units = dBm | For 17.184 MHz: TERM: ≤ 12 dB (coaxial cable loss only) MON: ≤ 26 dB (20 dB resistive loss + cable loss ≤ 6 dB) Note: measurement units = dBm | For 22.368 MHz: TERM: ≤ 10 dB (cable loss only) DSX-MON: ≤ 26.5 dB (21.5 dB resistive loss + cable loss ≤ 5 dB) Note: measurement units = dBm | | For 25.92 MHz: TERM: ≤ 10 dB (cable loss only) MON: ≤ 25 dB (20 dB resistive loss + cable loss ≤ 5 dB) Note: measurement units = dBm | For 70 MHz: TERM: ≤ 12 dB (coaxial cable loss only) MON: ≤ 26 dB (20 dB resistive loss + cable loss ≤ 6 dB) Note: measurement units = dBm | For 78 MHz: TERM: ≤ 12.7 dB (coaxial cable loss only) MON: ≤ 26 dB (20 dB resistive loss + cable loss ≤ 6 dB) Note: measurement units = dBm | |
| Transmit Bit Rate | 1.544 Mbit/s ± 4.6 ppm | 2.048 Mbit/s ± 4.6 ppm | 2.048 Mbit/s ± 4.6 ppm | 8.448 Mbit/s ± 4.6 ppm | 34.368 Mbit/s ± 4.6 ppm | 44.736 Mbit/s ± 4.6 ppm | | 51.84 Mbit/s ± 4.6 ppm | 139.264 Mbit/s ± 4.6 ppm | 155.52 Mbit/s ± 4.6 ppm | |
| Receive Bit Rate | 1.544 Mbit/s ± 140 ppm | 2.048 Mbit/s ± 100ppm | 2.048 Mbit/s ± 100ppm | 8.448 Mbit/s ± 100 ppm | 34.368 Mbit/s ± 100 ppm | 44.736 Mbit/s ± 100 ppm | | 51.84 Mbit/s ± 100 ppm | 139.264 Mbit/s ± 100 ppm | 155.52 Mbit/s ± 100 ppm | |
| Measurement Accuracy (uncertainty) | Frequency (ppm) | ± 4.6 | ± 4.6 | ± 4.6 | ± 4.6 | ± 4.6 | | ± 4.6 | ± 4.6 | ± 4.6 | |
| | Electrical power (dB) | DSX range: ± 1.0 DSX-MON range: ± 2.0 | NORMAL: ± 1.0 MONITOR: ± 2.0 | NORMAL: ± 1.0 MONITOR: ± 2.0 | NORMAL: ± 1.0 MONITOR: ± 2.0 | NORMAL: ± 1.0 MONITOR: ± 2.0 | | DSX range: ± 1.0 DSX-MON range: ± 2.0 | NORMAL: ± 1.0 MONITOR: ± 2.0 | NORMAL: ± 1.0 MONITOR: ± 2.0 | |
| Peak-to-Peak Voltage | ± 10% down to 500 mVpp | ± 10% down to 500 mVpp | ± 10% down to 500 mVpp | ± 10% down to 400 mVpp | ± 10% down to 200 mVpp | ± 10% down to 200 mVpp | | ± 10% down to 200 mVpp | ± 10% down to 200 mVpp | ± 10% down to 200 mVpp | |
| Frequency Offset Generation | 1.544 Mbit/s ± 140 ppm | 2.048 Mbit/s ± 70 ppm | 2.048 Mbit/s ± 70 ppm | 8.448 Mbit/s ± 50 ppm | 34.368 Mbit/s ± 50 ppm | 44.736 Mbit/s ± 50 ppm | | 51.84 Mbit/s ± 50 ppm | 139.264 Mbit/s ± 50 ppm | 155.52 Mbit/s ± 50 ppm | |
| Intrinsic Jitter (Tx) | ANSI T1.403 section 6.3 GR-499 section 7.3 | G.823 section 5.1 | G.823 section 5.1 | G.823 section 5.1 | G.823 section 5.1 G.751 section 2.3 | GR-449 section 7.3 (categories I and II) | | GR-253 section 5.6.2.2 (category II) | G.823 section 5.1 | G.825 section 5.1 GR-253 section 5.6.2.2 | |
| Input Jitter Tolerance | AT&T PUB 62411 GR-499 section 7.3 | G.823 section 7.1 | G.823 section 7.1 | G.823 section 7.1 | G.823 section 7.1 | GR-449 section 7.3 (categories I and II) | | GR-253 section 5.6.2.2 (category II) | G.823 section 7.1 G.751 section 3.3 | G.825 section 5.2 GR-253 section 5.6.2.3 | |
| Line Coding | AMI and B6ZS | AMI and HDB3 | AMI and HDB3 | HDB3 | HDB3 | B3ZS | | B3ZS | CM1 | CM1 | |
| Input Impedance (Resistive Termination) | 100 ohms ± 5%, balanced | 120 ohms ± 5%, balanced | 75 ohms ± 5%, unbalanced | 75 ohms ± 5%, unbalanced | 75 ohms ± 5%, unbalanced | 75 ohms ± 5%, unbalanced | | 75 ohms ± 5%, unbalanced | 75 ohms ± 10%, unbalanced | 75 ohms ± 5%, unbalanced | |
| Connector Type | BANTAM and RJ-48C | BANTAM and RJ-48C | BNC | BNC | BNC | BNC | | BNC | BNC | BNC | |

SYNCHRONIZATION INTERFACES

| | External Clock DS1/1.5M | External Clock E1/2M | External Clock E1/2M | 2 MHz |
|---|--|---|---|--------------------------|
| Tx Pulse Amplitude | 2.4 to 3.6 V | 3.0 V | 2.37 V | 0.75 to 1.5 V |
| Tx Pulse Mask | GR-499 figure 9.5 | G.703 figure 15 | G.703 figure 15 | G.703 figure 20 |
| Tx LBO Preamplification | Typical power dBdsx +0.6 dBdsx (0-133 ft) +1.2 dBdsx (133-266 ft) +1.8 dBdsx (266-399 ft) +2.4 dBdsx (399-533 ft) +3.0 dBdsx (533-655 ft) | | | |
| Rx Level Sensivity | TERM: ≤ 6 dB (cable loss only) (at 772 kHz for T1) DSX-MON: ≤ 26 dB (20 dB resistive loss + cable loss ≤ 6 dB) Bridge: ≤ 6 dB (cable loss only) | TERM: ≤ 6 dB (cable loss only) MON: ≤ 26 dB (20 dB resistive loss + cable loss ≤ 6 dB) | TERM: ≤ 6 dB (cable loss only) MON: ≤ 26 dB (resistive loss + cable loss ≤ 6 dB) | ≤ 6 dB (cable loss only) |
| Transmission Bit Rate | 1.544 Mbit/s ± 4.6 ppm | 2.048 Mbit/s ± 4.6 ppm | 2.048 Mbit/s ± 4.6 ppm | |
| Reception Bit Rate | 1.544 Mbit/s ± 50 ppm | 2.048 Mbit/s ± 50 ppm | 2.048 Mbit/s ± 50 ppm | |
| Intrinsic Jitter (Tx) | ANSI T1.403 section 6.3 GR-499 section 7.3 | G.823 section 6.1 | G.823 section 6.1 | G.703 table 11 |
| Input Jitter Tolerance | AT&T PUB 62411 GR-499 SECTION 7.3 | G.823 section 7.2 G.813 | G.823 section 7.2 G.813 | |
| Line Coding | AMI and B6ZS | AMI and HDB3 | AMI and HDB3 | |
| Input Impedance (Resistive Termination) | 75 ohms ± 5%, unbalanced | 75 ohms ± 5%, unbalanced | 75 ohms ± 5%, unbalanced | 75 ohms ± 5%, unbalanced |
| Connector Type | BNC ^a | BNC ^a | BNC | BNC |

Note

a. Adaptation cable required for BANTAM.

Functional Specifications

SONET AND DSn

| | |
|--|--|
| Electrical interfaces | DS1, DS3, STS-1e, STS-3e |
| DS1 framing | Unframed, SF, ESF |
| DS3 framing | Unframed, M13, C-bit parity |
| Clocking | Internal, loop-timed, external (BITS), inter-module |
| Mappings | |
| VT1.5 | Bulk, DS1 |
| VT2 | Bulk, E1 |
| VT6 | Bulk |
| STS-1 | Bulk, DS3 |
| STS-3c | Bulk, E4 |
| SONET overhead analysis and manipulation | A1, A2, J0, E1, F1, D1-D12, K1, K2, S1, M0, E2, J1, C2, G1, F2, H4, Z3, Z4, Z5, N1, N2, Z6, Z7 |
| Error insertion | |
| DS1 | Framing bit, BPV, CRC-6, bit error |
| DS3 | BPV, C-bit, F-bit, P-bit, FEBE, bit error |
| STS-1e, STS-3e | Section BIP (B1), line BIP (B2), path BIP (B3), BIP-2, REI-L, REI-P, REI-V, BPV, FAS, bit error |
| Error measurement | |
| DS1 | Framing bit, BPV, CRC-6, bit error |
| DS3 | BPV, C-bit, F-bit, P-bit, FEBE, bit error |
| STS-1e, STS-3e | Section BIP (B1), line BIP (B2), path BIP (B3), BIP-2, REI-L, REI-P, REI-V, BPV, FAS, bit error |
| Alarm insertion | |
| DS1 | LOS, RAI, AIS, OOF, pattern loss |
| DS3 | LOS, RDI, AIS, OOF, DS3 idle, pattern loss |
| STS-1e, STS-3e | LOS, LOF, SEF, AIS-L, RDI-L, AIS-P, LOP-P, LOM, PDI-P, RDI-P, ERDI-PCD, ERDI-PPD, ERDI-PSD, UNEQ-P, AIS-V, LOP-V, RDI-V, ERDI-VCD, ERDI-VPD, ERDI-VSD, RFI-V, UNEQ-V, pattern loss |
| Alarm detection | |
| DS1 | LOS, loss of clock (LOC), RAI, AIS, OOF, pattern loss |
| DS3 | LOS, LOC, RDI, AIS, OOF, DS3 idle, pattern loss |
| STS-1e, STS-3e | LOS, LOC, LOF, SEF, TIM-S, AIS-L, RDI-L, AIS-P, LOP-P, LOM, PDI-P, RDI-P, ERDI-PCD, ERDI-PPD, ERDI-PSD, PLM/SLM-P, UNEQ-P, TIM-P, AIS-V, LOP-V, RDI-V, ERDI-VCD, ERDI-VPD, ERDI-VSD, RFI-V, UNEQ-V, TIM-V, PLM/SLM-V, pattern loss |

Frequency alarm on all supported interfaces.

| | |
|-----------------|--|
| Patterns | |
| DS0 | 2E9-1, 2E11-1, 2E20-1, 1100, 1010, 1111, 0000, 1-in-8, 1-in-16, 3-in-24, 32 bit programmable (inverted or non-inverted), bit errors |
| DS1 | 2E9-1, 2E11-1, 2E15-1, 2E20-1, 2E23-1, 2E31-1, 1100, 1010, 1111, 0000, QRSS, 1-in-8, 1-in-16, 3-in-24, 32 bit programmable (inverted or non-inverted), T1-DALY, 55-Octet, bit errors |
| DS3 | 2E9-1, 2E11-1, 2E15-1, 2E20-1, 2E23-1, 2E31-1, 1100, 1010, 1111, 0000, QRSS, 1-in-8, 1-in-16, 3-in-24, 32 bit programmable (inverted or non-inverted), bit errors |
| VT1.5/2/6 | 2E9-1, 2E11-1, 2E15-1, 2E20-1, 2E23-1, 2E31-1, 1100, 1010, 1111, 0000, QRSS, 1-in-8, 1-in-16, 32 bit programmable (inverted or non-inverted), bit errors |
| STS-1, STS-3c | 2E9-1, 2E11-1, 2E15-1, 2E20-1, 2E23-1, 2E31-1, 1100, 1010, 1111, 0000, 1-in-8, 1-in-16, 32 bit programmable (inverted or non-inverted), bit errors |

Pattern loss and bit error generation and analysis supported on all patterns.

SDH AND PDH

| | |
|---|--|
| Electrical interfaces ^a | 1.5M (DS1), 2M (E1), 8M (E2), 34M (E3), 45M (DS3), 140M (E4), STM-0e, STM-1e |
| 2M framing | Unframed, PCM30, PCM31, PCM30 CRC-4, PCM31 CRC-4 |
| 8M, 34M, 140M framing | Unframed, framed |
| Clocking | Internal, loop-timed, external (MTS/SETS), 2 MHz, inter-module |
| Mappings | |
| TU-11-AU-3, TU-11-AU-4 | Bulk, 1.5M |
| TU-12-AU-3, TU-12-AU-4 | Bulk, 2M |
| TU-3-AU-4 | Bulk, 34M, 45M |
| TU-2-AU-3, TU-2-AU-4 | Bulk |
| AU-4 | Bulk, 140M |
| SDH overhead analysis and manipulation | A1, A2, J0, E1, F1, D1-D12, K1, K2, S1, M0, E2, J1, C2, G1, F2, F3, K3, N1, N2, K4, H4 |
| Error insertion | |
| E1 (2M) | FAS, CV, CRC-4, E-bit, bit error |
| E2 (8M), E3 (34M), E4 (140M) | FAS, CV, bit error |
| STM-0e, STM-1e | RS-BIP (B1), MS-BIP (B2), HP-BIP (B3), MS-REI, HP-REI, LP-BIP-2, LP-REI, CV, FAS, bit error |
| Error measurement | |
| E1 (2M) | FAS, CV, CRC-4, E-bit, bit error |
| E2 (8M), E3 (34M), E4 (140M) | FAS, CV, bit error |
| STM-0e, STM-1e | RS-BIP (B1), MS-BIP (B2), HP-BIP (B3), MS-REI, HP-REI, LP-BIP-2, LP-REI, CV, FAS, bit error |
| Alarm insertion | |
| E1 (2M) | LOS, LOS Mframe, LOS CRC Mframe, LOF, AIS, TS16 AIS, RAI, RAI Mframe, pattern loss |
| E2 (8M), E3 (34M), E4 (140M) | LOS, LOF, RAI, AIS, pattern loss |
| STM-0e, STM-1e | LOS, LOF, OOF, MS-AIS, MS-RDI, AU-AIS, AU-LOP, H4-LOM, HP-PDI, ERDI-PSD, ERDI-PCD, ERDI-PPD, HP-UNEQ, TU-AIS, LP-RFI, LP-RDI, ERDI-VCD, ERDI-VPD, ERDI-VSD, LP-RFI, LP-UNEQ, pattern loss |
| Alarm detection | |
| E1 (2M) | LOS, LOS Mframe, LOS CRC Mframe, LOC, LOF, AIS, TS16 AIS, RAI, RAI Mframe, pattern loss |
| E2 (8M), E3 (34M), E4 (140M) | LOS, LOC, LOF, RAI, AIS, pattern loss |
| STM-0e, STM-1 | LOS, LOF, LOC, OOF, RS-TIM, MS-AIS, MS-RDI, AU-AIS, AU-LOP, H4-LOM, HP-RDI, ERDI-PSD, ERDI-PCD, ERDI-PPD, HP-PLM/SLM, HP-UNEQ, HP-TIM, TU-AIS, LP-RFI, LP-RDI, ERDI-VCD, ERDI-VPD, ERDI-VSD, LP-RFI, LP-UNEQ, LP-TIM, LP-PLM/SLM, pattern loss |
| Patterns | |
| E0 (64K) | 2E9-1, 2E11-1, 2E20-1, 1010, 1100, 1111, 0000, 1-in-8, 1-in-16, 3-in-24, 32 bit programmable (inverted or non-inverted), bit errors |
| E1 (2M) | 2E9-1, 2E11-1, 2E15-1, 2E20-1, 2E23-1, 2E31-1, 1100, 1010, 1111, 0000, 1-in-8, 1-in-16, 3-in-24, 32 bit programmable (inverted or non-inverted), bit errors |
| E2 (8M), E3 (34M), E4 (140M) | 2E9-1, 2E11-1, 2E15-1, 2E20-1, 2E23-1, 2E31-1, 1100, 1010, 1111, 0000, 1-in-8, 1-in-16, 3-in-24 ^b , 32 bit programmable (inverted or non-inverted), bit errors |
| TU-11/12/2/3 | 2E9-1, 2E11-1, 2E15-1, 2E20-1, 2E23-1, 2E31-1, 1100, 1010, 1111, 0000, 1-in-8, 1-in-16, 32 bit programmable (inverted or non-inverted), bit errors |
| AU-3/AU-4 | 2E9-1, 2E11-1, 2E15-1, 2E20-1, 2E23-1, 2E31-1, 1100, 1010, 1111, 0000, 1-in-8, 1-in-16, 32 bit programmable (inverted or non-inverted), bit errors |

Notes

- a. 1.5M (DS1) and 45M (DS3) interfaces described under SONET and DSn column.
- b. Not supported for E4 (140M).

ADDITIONAL TEST AND MEASUREMENT FUNCTIONS

| | |
|--|--|
| Power measurements | Supports power measurements, displayed in dBm (dBdsx for DS1), for optical and electrical interfaces. |
| Frequency measurements | Supports clock frequency measurements (i.e., received frequency and deviation of the input signal clock from nominal frequency), displayed in ppm and b/s (bps), for optical and electrical interfaces. |
| Frequency offset generation | Supports offsetting the clock of the transmitted signal on a selected interface to exercise clock recovery circuitry on network elements. |
| Dual DSn receivers | Supports two DS1 or DS3 receivers, allowing users to simultaneously monitor two directions of a circuit under test in parallel, resulting in quick isolation of the source of errors. |
| Performance monitoring | |
| The following ITU-T recommendations, and corresponding performance monitoring parameters, are supported on the FTB-8105. | |
| ITU-T recommendation | Performance monitoring statistics |
| G.821 | ES, EFS, EC, SES, UAS, ESR, SESR, DM |
| G.826 | ES, EFS, EB, SES, BBE, UAS, ERS, SESR, BBER |
| G.828 | ES, EFS, EB, SES, BBE, SEP, UAS, ESR, SESR, BBER, SEPI |
| G.829 | ES, EFS, EB, SES, BBE, UAS, ESR, SESR, BBER |
| M.2100 | ES, SES, UAS, ESR, SESR |
| M.2101 | ES, SES, BBE, UAS, ESR, SESR, BBER |
| Pointer adjustment and analysis | |
| Generation and analysis of HO/AU and LO/TU pointer adjustments as per GR-253, and ITU-T G.703 | |
| Generation | Analysis |
| <ul style="list-style-type: none"> • Pointer increment and decrement • Pointer jump with or without NDF • Pointer value | <ul style="list-style-type: none"> • Pointer increments • Pointer decrements • Pointer jumps (NDF, no NDF) • Pointer value and cumulative offset |
| Programmable error/alarm injection | Ability to inject errors/alarms in the following modes: Manual, Constant Rate, Burst, Periodic Burst and Continuous. |
| Service disruption time (SDT) measurements | The service disruption time test tool measures the time during which there is a disruption of service due to the network switching from the active channels to the backup channels. User-selectable triggers: All supported alarms and errors. Measurements: last disruption, shortest disruption, longest disruption, average disruption, total disruption, and service disruption count. |
| Round-trip delay (RTD) measurements | The round-trip delay test tool measures the time required for a bit to travel from the FTB-8105 transmitter back to its receiver after crossing a far-end loopback. Measurements are supported on all supported FTB-8105 interfaces and mappings. Measurements: last RTD time, minimum, maximum, average, measurement count (no. of successful RTD tests), failed measurement count. |
| APS message control and monitoring | Ability to monitor and set up automatic protection switching messages (K1/K2 byte of SONET/SDH overhead). |
| Synchronization status | Ability to monitor and set up synchronization status messages (S1 byte of SONET/SDH overhead). |
| Signal label control and monitoring | Ability to monitor and set up payload signal labels (C2, V5 byte of SONET/SDH overhead). |
| Through mode | Ability to perform Through mode analysis of any incoming electrical (DSn, PDH) and STS-1/3e, STM-1e. |
| M13 mux/demux | Ability to multiplex/demultiplex a DS1 signal into/from a DS3 signal. (Note: E1 to DS3 mux/demux available with G.747 software option.) |
| DS1 FDL | Support for DS1 Facility Data Link testing. |
| DS1 loopcodes | Support for generation of DS1 in-band loopcodes with the availability of up to 10 pairs of user-defined loopcodes. |
| NI/CSU loopback emulation | Ability to respond to DS1 in-band/out-of-band loopcodes. |
| DS3 FEAC | Support for DS3 far-end alarms and loopback codewords. |
| DS1/DS3 auto detection | Ability to automatically detect DS1/DS3 line coding, framing and test pattern |
| Tandem connection monitoring (TCM) ^a | Tandem connection monitoring (TCM) is used to monitor the performance of a subsection of a SONET/SDH path routed via different network providers. The FTB-8105 supports transmitting and receiving alarms and errors on a TCM link; also, transmission and monitoring of the tandem connection (TC) trace can be generated to verify the connection between TCM equipment. Error generation: TC-IEC, TC-BIP, TC-REI, OEI Error analysis: TC-IEC, TC-REI, OEI, TC-VIOL Alarm generation: TC-RDI, TC-UNEQ, ODI, TC-LTC, TC-IAIS Alarm analysis: TC-TIM, TC-RDI, TC-UNEQ, ODI, TC-LTC, TC-IAIS |

ADDITIONAL FEATURES

| | |
|--------------------------------------|---|
| Scripting | The built-in scripting engine and embedded macro-recorder provide a simple means of automating test cases and routines. Embedded scripting routines provide a powerful means of creating advanced test scripts. Available for the FTB-500 platform. |
| Reports | Supports generation of test reports in .html, .csv, .txt, .pdf formats. Contents or reports are customizable by the user. |
| Power-up and restore | In the event of a power failure to the unit, the active test configuration and test logger are saved and restored upon bootup. |
| Store and load configurations | Ability to store and load test configurations to/from non-volatile memory. |
| Alarm hierarchy | Alarms are displayed according to a hierarchy based on root cause. Secondary effects are not displayed. This hierarchy serves to facilitate alarm analysis. |
| Configurable test views | This 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 | Provides the ability for a user to set pre-defined test start and stop times. |
| Remote control | Remote management software. This allows users to remotely monitor and control the FTB-8105 module via standard Ethernet connection. |

Note

a. HOP and LOP supported.

SPECIFICATIONS

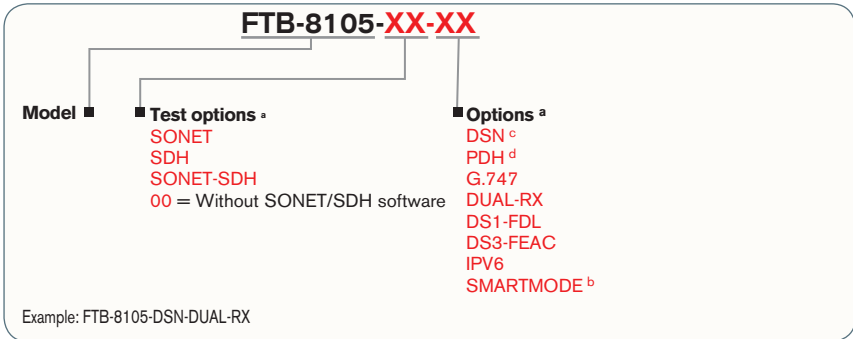
FTB-8105
DSn/PDH
Electrical analyzer module supporting up to 155 Mbit/s rates

Test Interfaces
DSn: DS1, DS3, Dual DS1 Rx, Dual DS3 Rx
PDH: E1, E2, E3, E4
SONET: STS-1, STS-3
SDH: STM-0e, STM-1e

GENERAL SPECIFICATIONS

| FTB-8105 | |
|------------------------------|---|
| Weight (without transceiver) | 0.5 kg (1.1 lb) |
| Size (H x W x D) | 96 mm x 25 mm x 288 mm (3 3/4 in x 1 in x 11 3/8 in) |
| 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



- Notes**
- a. Multiple options can be purchased to suit the required test application.
 - b. Must be combined with SONET or SDH options.
 - c. Always included.
 - d. Included with SDH and SONET-SDH.

Complementary Products

FTB-8080 Sync Analyzer

The FTB-8080 Sync Analyzer is a comprehensive test solution for telecom network synchronization assurance, monitoring and troubleshooting applications. It offers a full range of wander and sync testing functionalities, including graphical display of TIE, MTIE and TDEV parameters, as well as comparison to ITU/ANSI/TS standards and user-definable masks. The companion Sync View software suite allows remote data retrieval and test case setup, eliminating the need to visit test sites during prolonged monitoring periods. The FTB-8080 can be used in conjunction with an FTB-8105, FTB-8115 and FTB-8120/8130 module to provide wander measurements up to OC-192/STM-64 rates.

For more information on the FTB-8080, please refer to its detailed product specification sheet at <http://documents.EXFO.com/specsheets/FTB-8080-ang.pdf>

FTB-8115 Transport Blazer SONET/SDH Test Module

EXFO's FTB-8115 Transport Blazer test module combines advanced DSn/PDH and SONET/SDH test functions in a single unit, eliminating the need for multiple, purpose-built test platforms for the commissioning or troubleshooting of T1/E1 to OC-48/STM-16 circuits. The extensive list of DSn, SONET, PDH and SDH features available on the FTB-8115 Transport Blazer allows users to perform a wide range of tests from simple bit-error-rate (BER) analysis to more advanced network characterization and troubleshooting.

For more information on the FTB-8115, please refer to its detailed product specification sheet at <http://documents.EXFO.com/specsheets/FTB-8115-ang.pdf>

FTB-8120/8130 Transport Blazer Next-Generation SONET/SDH Test Modules

The FTB-8120 (2.5/2.7 Gbit/s) and FTB-8130 (10/10.7 Gbit/s) Transport Blazer test modules combine advanced DSn/PDH, SONET/SDH, next-generation SONET/SDH and optical transport network (OTN) test functions, eliminating the need for multiple purpose-built test platforms when commissioning or troubleshooting SONET/SDH, OTN and new data-aware SONET/SDH circuits. These modules offer DS0/E0 to OC-192/STM-64 testing in a single unit, and they perform Ethernet-over-SONET/SDH (EoS) testing via optional support for GFP, VCAT and LCAS. Thanks to the SmartMode functionality, they also enable signal structure discovery for rates of up to 10 Gbit/s, with simultaneous monitoring of all discovered STS/AU and user selected VT/TU channels.

For details on the FTB-8120/8130 modules, please refer to the detailed product specification sheet at <http://documents.EXFO.com/specsheets/FTB-8120-8130-ang.pdf>

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EXFO is certified ISO 9001 and attests to the quality of these products. This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation. EXFO has made every effort to ensure that the information contained in this specification sheet is accurate. However, we accept no responsibility for any errors or omissions, and we reserve the right to modify design, characteristics and products at any time without obligation. Units of measurement in this document conform to SI standards and practices. In addition, all of EXFO's manufactured products are compliant with the European Union's WEEE directive. For more information, please visit www.EXFO.com/recycle. Contact EXFO for prices and availability or to obtain the phone number of your local EXFO distributor.

For the most recent version of this spec sheet, please go to the EXFO website at <http://www.EXFO.com/specs>

In case of discrepancy, the Web version takes precedence over any printed literature.