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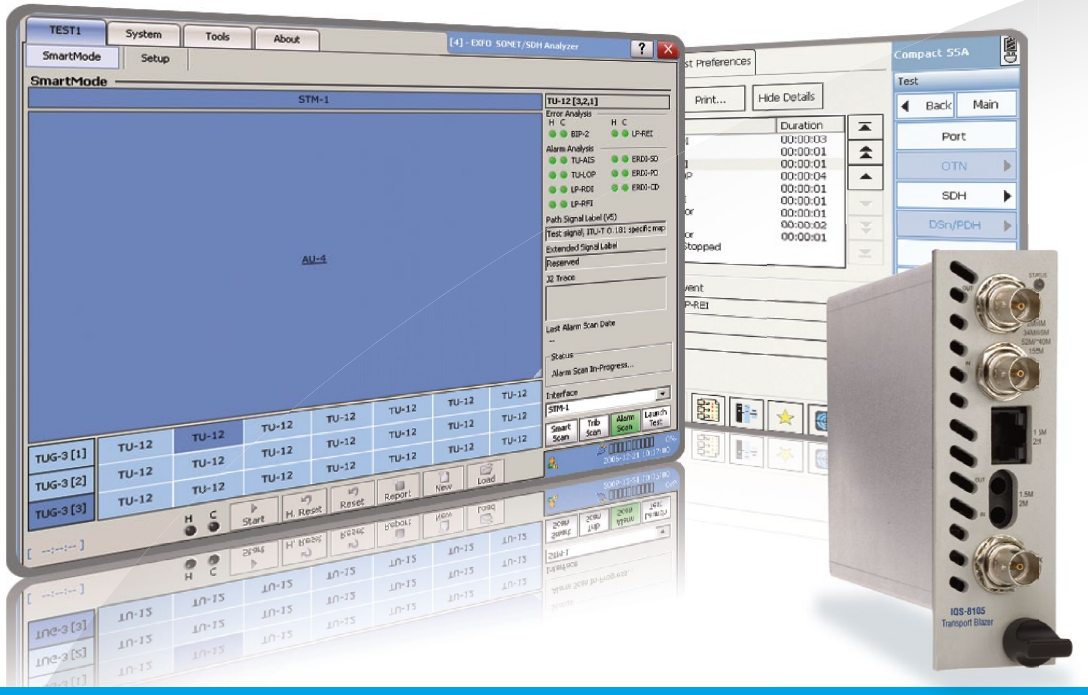
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IQS-8105 Transport Blazer

DSN/PDH AND SONET/SDH ELECTRICAL TEST MODULE





Supports DSn, PDH, SONET and SDH electrical rates up to 155 Mbit/s and is ideally suited for manufacturing and R&D environments.

SPEC SHEET

KEY FEATURES

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

PLATFORM COMPATIBILITY



Platform
IQS-600

TESTING TRADITIONAL AND PACKET-BASED ETHERNET TDM SERVICES

The IQS-8105 Transport Blazer test module is offered on EXFO's IQS-600 Integrated Qualification System and is ideally suited for lab and manufacturing environments. It offers capabilities to test traditional TDM DSn and PDH electrical rates, as well as the SONET and SDH electrical rates up to 155 Mbit/s.

The growing demand for Ethernet-based services to small-and-medium-sized enterprises is driving the need for new technologies such as Ethernet-over-TDM, providing a cost-effective solution to deliver these services. This in turn creates the need for integrated test solutions to test traditional TDM test functions with packet-based Ethernet test functions. The combined test capabilities of the IQS-8105 Transport Blazer module and the IQS-8510B Packet Blazer module will offer customers an integrated test solution for Ethernet-over-TDM devices and networks.

DSn/PDH and SONET/SDH Testing for Lab and Manufacturing Environments

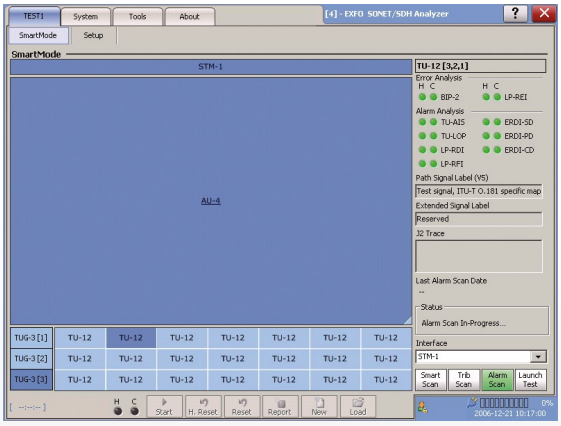
The IQS-8105 Transport Blazer module offers a wide range of TDM and SONET/SDH test functions, allowing users to perform tests ranging from simple bit error rate (BER) testing to advanced characterization and troubleshooting procedures. These functions include:

- 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

SmartMode: Real-Time Signal Structure Discovery and Monitoring

EXFO's IQS-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 testing. SmartMode also provides one-touch test case start, allowing users to quickly configure a desired test path.

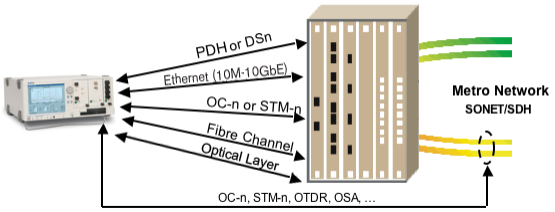


IQS-8105 SmartMode: multichannel signal discovery with real-time alarm scan (shown in the IQS-600 user interface).

UNSURPASSED CONFIGURATION AND OPERATIONAL FLEXIBILITY

Remote Management

The Visual Guardian Lite™ remote management software, supported on all the Transport Blazer and Packet Blazer modules, provides the user with a remote connection to the instrument's graphical user interface. This identical view of the GUI is supported on any Windows-based workstation and allows for simplified remote testing and data analysis, as well as remote monitoring. Up to five simultaneous Visual Guardian Lite sessions can be supported per test module via a standard Ethernet connection to the platform. For remote testing applications, the Visual Guardian Lite software must be ordered separately.



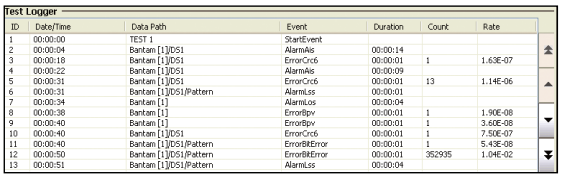
With its modular, multislot design, the IQS-600 platform enables users to configure and upgrade their systems with transport, datacom or optical layer modules according to their testing needs, minimizing capital expenditures.

Automated Test Scripting

The IQS-8105 Transport Blazer supports two methods for automated test scripting. First, by using industry-based SCPI commands, and second, by using a built-in macro recorder that facilitates the recording of test actions and allows to automatically create test scripts. These test scripts can be used as the basis for larger automation routines that can be created in any .NET environment.

Test Logger and Reporting

EXFO's IQS-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.


Test Logger

ID	Date/Time	Data Path	Event	Duration	Count	Rate
1	00:00:00	TEST 1	StartEvent			
2	00:00:04	Bantam [1]/DS1	AlarmAis	00:00:14		
3	00:00:18	Bantam [1]/DS1	ErrorCrc6	00:00:01	1	1.63E-07
4	00:00:22	Bantam [1]/DS1	AlarmAis	00:00:09		
5	00:00:31	Bantam [1]/DS1	ErrorCrc6	00:00:01	13	1.14E-06
6	00:00:31	Bantam [1]/DS1/Pattern	AlarmLss	00:00:01		
7	00:00:34	Bantam [1]	AlarmLos	00:00:04		
8	00:00:38	Bantam [1]	ErrorBpv	00:00:01	1	1.90E-08
9	00:00:40	Bantam [1]	ErrorBpv	00:00:01	1	3.60E-08
10	00:00:40	Bantam [1]/DS1	ErrorCrc6	00:00:01	1	7.50E-07
11	00:00:40	Bantam [1]/DS1/Pattern	ErrorBitError	00:00:01	1	5.43E-08
12	00:00:50	Bantam [1]/DS1/Pattern	ErrorBitError	00:00:01	352935	1.04E-02
13	00:00:51	Bantam [1]/DS1/Pattern	AlarmLss	00:00:04		

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

IQS-600 Integrated Qualification System

The IQS-8105 Transport Blazer modules are housed in the IQS-600 Integrated Qualification System, a scalable modular rack-mount platform that houses a controller, expansion units and a comprehensive range of plug-in test modules ideal for manufacturing, lab and R&D environments. The IQS-600 platform offers up to ten slots that can support any combination of modules from EXFO's full range of industry-proven protocol and optical test modules. Systems can be expanded to support up to 100 test modules. The IQS-600 family is comprised of the IQS-610P, a ten-slot control unit that can support up to nine IQS-610E ten-slot expansion units, and the IQS-605P, a five-slot control unit with an integrated touchscreen.

Combined with the built-in IQS Manager software, the IQS-600 platform provides an easy-to-use environment to manage your modules, configure your system, launch applications and analyze results. The IQS-600 is supplied with LabVIEW drivers and ActiveX/COM interfaces. What's more, it can be controlled using local applications or through GPIB, RS-232 or Ethernet interfaces.



EXFO's IQS-8105 Transport Blazer Test Module is housed in the IQS-600 Integrated Qualification System, EXFO's powerful lab and manufacturing test platform.

ELECTRICAL INTERFACES

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

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 9-8	**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) Electrical power (db)	± 4.6 DSX range: ± 1.0 DSX-MON range: ± 2.0	± 4.6 NORMAL: ± 1.0 MONITOR: ± 2.0	± 4.6 NORMAL: ± 1.0 MONITOR: ± 2.0	± 4.6 NORMAL: ± 1.0 MONITOR: ± 2.0	± 4.6 NORMAL: ±1.0 MONITOR: ±2.0	± 4.6 DSX range: ± 1.0 DSX-MON range: ±2.0		± 4.6 DSX range: ± 1.0 DSX-MON range: ±2.0	± 4.6 NORMAL: ±1.0 MONITOR: ±2.0	± 4.6 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 B8ZS	AMI and HDB3	AMI and HDB3	HDB3	HDB3	B3ZS		B3ZS	CMI	CMI	
Input Impedance (Resistive Termination)	100 Ω ± 5%, balanced	120 Ω ± 5%, balanced	75 Ω ± 5%, unbalanced	75 Ω ± 5%, unbalanced	75 Ω ± 5%, unbalanced	75 Ω ±5%, unbalanced		75 Ω ±5%, unbalanced	75 Ω ± 10%, unbalanced	75 Ω ± 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) Bridge: ≤ 6 dB (cable loss only)	TERM: = ≤ 6 dB (cable loss only) MON: ≤ 26 dB (resistive loss + cable loss ≤ 6 dB) Bridge: ≤ 6 dB (cable loss only)	≤ 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 B8ZS	AMI and HDB3	AMI and HDB3	
Input Impedance (Resistive Termination)	75 Ω ± 5%, unbalanced	75 Ω ± 5%, unbalanced	75 Ω ± 5%, unbalanced	75 Ω ± 5%, unbalanced
Connector Type	BNC [a]	BNC [a]	BNC	BNC

Note

a. Adaptation cable required for BANTAM.

FUNCTIONAL SPECIFICATIONS

SONET AND DSn		SDH AND PDH	
Optical interfaces	OC-3, OC-12, OC-48	**Optical interfaces**	STM-1, STM-4, STM-16
Available wavelengths (nm)	1310, 1550	Available wavelengths (nm)	1310, 1550
Electrical interfaces	DS1, DS3, STS-1e, STS-3e	**Electrical interfaces** [a]	1.5M (DS1), 2M (E1), 8M (E2), 34M (E3), 45M (DS3), 140M (E4), STM-0e, STM-1e
DS1 framing	Unframed, SF, ESF	2M framing	Unframed, PCM30, PCM31, PCM30 CRC-4, PCM31 CRC-4
DS3 framing	Unframed, M13, C-bit parity	8M, 34M, 140M framing	Unframed, framed
Clocking	Internal, loop-timed, external (BITS), inter-module	Clocking	Internal, loop-timed, external (MTS/SETS), 2 MHz, inter-module
Mappings		**Mappings**	
VT1.5	Bulk, DS1	TU-11-AU-3, TU-11-AU-4	Bulk, 1.5M
VT2	Bulk, E1	TU-12-AU-3, TU-12-AU-4	Bulk, 2M
VT6	Bulk	TU-3-AU-4	Bulk, 34M, 45M
STS-1	Bulk, DS3	TU-2-AU-3, TU-2-AU-4	Bulk
STS-3c	Bulk, E4	AU-4	Bulk, 140M
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	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		**Error insertion**	
DS1	Framing bit, BPV, CRC-6, bit error	E1 (2M)	FAS, CV, CRC-4, E-bit, bit error
DS3	BPV, C-bit, F-bit, P-bit, FEBE, bit error	E2 (8M), E3 (34M), E4 (140M)	FAS, CV, 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	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
OC-3, OC-12, OC-48	Section BIP (B1), line BIP (B2), path BIP (B3), BIP-2, REI-L, REI-P, REI-V, bit error	STM-1, STM-4, STM-16	RS-BIP (B1), MS-BIP (B2), HP-BIP (B3), MS-REI, HP-REI, LP-BIP-2, LP-REI, bit error
Error measurement		**Error measurement**	
DS1	Framing bit, BPV, CRC-6, bit error	E1 (2M)	FAS, CV, CRC-4, E-bit, bit error
DS3	BPV, C-bit, F-bit, P-bit, FEBE, bit error	E2 (8M), E3 (34M), E4 (140M)	FAS, CV, 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	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
OC-3, OC-12, OC-48	Section BIP (B1), line BIP (B2), path BIP (B3), BIP-2, REI-L, REI-P, REI-V, bit error	STM-1, STM-4, STM-16	RS-BIP (B1), MS-BIP (B2), HP-BIP (B3), MS-REI, HP-REI, LP-BIP-2, LP-REI, bit error
Alarm insertion		**Alarm insertion**	
DS1	LOS, RAI, AIS, OOF, pattern loss	E1 (2M)	LOS, LOS Mframe, LOS CRC Mframe, LOF, AIS, TS16 AIS, RAI, RAI Mframe, pattern loss
DS3	LOS, RDI, AIS, OOF, DS3 idle, pattern loss	E2 (8M), E3 (34M), E4 (140M)	LOS, LOF, RAI, AIS, pattern loss
STS-1e, STS-3e, OC-3, OC-12, OC-48	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	STM-0e, STM-1e, STM-1, STM-4, STM-16	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		**Alarm detection**	
DS1	LOS, loss of clock (LOC), RAI, AIS, OOF, pattern loss	E1 (2M)	LOS, LOS Mframe, LOS CRC Mframe, LOC, LOF, AIS, TS16 AIS, RAI, RAI Mframe, pattern loss
DS3	LOS, LOC, RDI, AIS, OOF, DS3 idle, pattern loss	E2 (8M), E3 (34M), E4 (140M)	LOS, LOC, LOF, RAI, AIS, pattern loss
STS-1e, STS-3e OC-3, OC-12, OC-48	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	STM-0e, STM-1e STM-1, STM-4, STM-16	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

Frequency alarm on all supported interfaces.

Note

a. 1.5M (DS1) and 45M (DS3) interfaces discribed under SONET and DSn column.

FUNCTIONAL SPECIFICATIONS

SONET AND DSN		SDH AND PDH	
Patterns		**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	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
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	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
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	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 [a], 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	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
STS-1, STS-3c/12c/48c	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/AU-4c/16c	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.

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 bit/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 IQS-8105.	
ITU-T recommendation G.821 G.826 G.828 G.829 M.2100 M.2101	Performance monitoring statistics ES, EFS, EC, SES, UAS, ESR, SESR, DM ES, EFS, EB, SES, BBE, UAS, ERS, SESR, BBER ES, EFS, EB, SES, BBE, SEP, UAS, ESR, SESR, BBER, SEPI ES, EFS, EB, SES, BBE, UAS, ESR, SESR, BBER ES, SES, UAS, ESR, SESR 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 › Pointer increment and decrement › Pointer jump with or without NDF › Pointer value	Analysis › 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 IQS-8105 transmitter back to its receiver after crossing a far-end loopback. Measurements are supported on all supported IQS-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 optical line (OC-3/12/48, STM-1/4/16).
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.

Note

a. Not supported for E4 (140M).

ADDITIONAL TEST AND MEASUREMENT FUNCTIONS

NI/CSU loopback emulation	Ability to respond to DS1 in-band/out-of-band loopcodes.
DS3 FEAC	Support for DS3 far-end alarms and looopback 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), option 2 [b], is used to monitor the performance of a subsection of a SONET/SDH path routed via different network providers. The IQS-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	Wide range of SCPI commands powerful enough to provide repeatable testing of complex configuration, yet simple enough to create a STS-1e test in as little as eight SCPI commands. The IQS-8105 also includes an intuitive macro recorder enabling users to easily record test actions and automatically create test scripts in VB.Net.
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	Available with Windows-based remote management software known as Visual Guardian Lite (optional software package). This allows users to remotely monitor and control the IQS-8105 module via standard Ethernet connection.

SPECIFICATIONS

IQS-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

Temperature		
operating	0 °C to 40 °C	(32 °F to 104 °F)
storage	–40 °C to 60 °C	(–40 °F to 140 °F)
Size (H x W x D)	125 mm x 36 mm x 282 mm	(4 15/16 in x 1 7/16 in x 11 1/8 in)
Weight (without transceiver)	0.5 kg	(1.1 lb)

Notes

a. HOP and LOP supported.

b. G.707 option 2.

ORDERING INFORMATION

IQS-8105-XX-XX

Model

Test options [a]
- SONET
- SDH
- SONET-SDH
- 00 = Without SONET/SDH software

Options [a]
- DSN [c]
- PDH [d]
- G.747
- DUAL-RX
- DS1-FDL
- DS3-FEAC
- IPV6
- SMARTMODE [b]

Example: IQS-8105-DSN-DUAL-RX

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.

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