

# G.709 OTN Module Technical Specifications

<b>Optical Level (Rx)</b>	Supported for all optical receive rates. Ranges: 10/10.71 Gbps: -1 dBm to -14 dBm, 2.5/2.67 Gbps: -9 dBm to -28 dBm, Accuracy: $\pm 1.5$ dB	<b>Alarm Detection and Measurement</b>	<b>G.709 OTN:</b> Physical: LOS; OTU: LOF, OOF, OOM, LOM, AIS, IAE, BDI; ODU: AIS, OCI, LCK, BDI TCM: BDI for all six TCM channels <b>SONET:</b> Physical: LOS; Transport O/H: LOF, SEF, AIS-L, RDI-L, K1/K2 change; Path O/H: AIS-P, LOP-P, RDI-P, UNEQ-P, STS pointer change <b>SDH:</b> Physical: LOS; Section O/H: LOF, OOF, MS-AIS, MS-RDI, K1/K2 change; Path O/H: AU-AIS, AU-LOP, HP-RDI, HP-UNEQ, AU pointer change
<b>Optical Line Rates</b>	Framed: OTU2, OTU1; OC-192, OC-48; STM-64, STM-16; Unframed: 10.71/9.95/2.666/2.488 Gbps, Stratum III compliant, offset capability $\pm 100$ ppm	<b>Error Detection and Measurement</b>	<b>G.709 OTN:</b> OTU: Frame (OA1, OA2), MFAS, SM BIP, SM BEI, corrected FEC errors, uncorrectable FEC blocks; ODU: PM BIP, PM BEI, Bit; TCM: BIP and BEI for all six TCM channels <b>SONET:</b> Transport O/H: Frame (A1, A2), B1, B2, REI-L; STS Path O/H: B3, REI-P, Bit <b>SDH:</b> Section O/H: Frame (A1, A2), B1-BIP, B2-BIP, MS-REI; HO Path O/H: B3-BIP, HP-REI, Bit
<b>Wavelength (2.5/2.67 Gbps)</b>	1550 nm and/or 1310 nm	<b>Error/Alarm Generation</b>	Event triggers outputs: OTN/SONET/SDH transmit triggers <b>G.709 OTN Alarms:</b> Physical: LOS; OTU: LOF, OOF, LOM, OOM, AIS, IAE, BDI; ODU: AIS, OCI, LCK, BDI TCM: BDI for each of the six TCM channels <b>G.709 OTN Errors:</b> OTU: Frame (OA1, OA2), MFAS, BIP, BEI, FEC; ODU: BIP, BEI; TCM: BIP, BEI for each of the six TCM channels <b>SONET Alarms:</b> Physical: LOS; Transport O/H: LOF, SEF, AIS-L, RDI-L, K1/K2 change; Path O/H: AIS-P, LOP-P, RDI-P, UNEQ-P, STS pointer change <b>SONET Errors:</b> Transport O/H: Frame (A1, A2), B1, B2, REI-L; STS Path O/H: B3, REI-P, Bit <b>SDH Alarms:</b> Physical: LOS; Section O/H: LOF, OOF, MS-AIS, MS-RDI, K1/K2 change; Path O/H: AU-AIS, AU-LOP, HP-RDI, HP-UNEQ, AU pointer change <b>SDH Errors:</b> Section O/H: Frame (A1, A2), B1 BIP, B2 BIP, MS-REI; HO Path O/H: B3 BIP, HP-REI, Bit
<b>Wavelength (10/10.71 Gbps)</b>	1550 nm	<b>Printing/Beep Requirements</b>	Printing: Supports printing of logged results and screen captures via FTP, serial and USB ports; Beep-on-error: User selectable, audible waveform beep emitted on detection of any valid error-type; User controlled volume
<b>Connectors</b>	FC/PC, SC, ST	<b>Controller Interfaces</b>	Remote control interfaces: LAN (10BaseT), RS-232, GPIB; Peripheral interfaces: USB and/or serial printer PCMCIA modem; 802.11B wireless LAN PCMCIA support
<b>Line code</b>	NRZ	<b>Physical Requirements</b>	AC power voltage range: 90 to 260 Vac nominal Frequency range: 47 to 63 Hz. Total Power Consumption by fully loaded NIC Plus: < 350 VA
<b>Test Patterns</b>	2 <sup>15</sup> -1, 2 <sup>16</sup> -1 inverted, 2 <sup>23</sup> -1, 2 <sup>23</sup> -1 inverted 2 <sup>31</sup> -1, 2 <sup>31</sup> -1 inverted (future support for PRBS: 2 <sup>9</sup> -1, 2 <sup>9</sup> -1 inverted, 2 <sup>11</sup> -1, 2 <sup>11</sup> -1 inverted, 2 <sup>20</sup> -1, 12 <sup>20</sup> -1 inverted)	<b>Environmental</b>	Operating temperature: 0 to 40° C (32 to 113° F). Storage temperature: -20 to 70° C (-4 to 158° F). Humidity: 15 to 95% relative humidity at 40° C (104° F)
<b>Clock References</b>	Internal, recovered, external clock inputs BITS (1.5 Mbps), SETS (2 Mbps): Bantam (100 ohm balanced), 8 KHz, 1.544 KHz, 2.048 KHz and 10 MHz via a shared, 75 ohm, unbalanced BNC connector	<b>Board Dimensions</b>	Single slot width within NIC platforms
<b>Frequency Offset</b>	Offset capability $\pm 100$ ppm	<b>Module Weight</b>	0.68 kg (< 1.5 lbs)—covers rates from 2.5 to 10.71 Gbps
<b>Service Disruption</b>	Supported for OTN and all SONET/SDH optical mappings; Supports transmission and reception of linear and ring-mode command sequences (OTN compliant with G.783, G.784)		
<b>Automatic Protection Switching</b>	Supported for OTN and SONET/SDH signals; accuracy is one frame duration		
<b>Round Trip Delay Measurement</b>	Supported for OTN and SONET/SDH signals; accuracy is one frame duration		
<b>Drop/Insert Functionality</b>	SONET/SDH payload drop/insert capabilities		
<b>Control and Monitoring</b>	<b>OC-192/OC-48:</b> Overhead: Transmit control over bytes: Transport OH: A1, A2, C1, Z0, D1-D12, E1, E2, F1, K1, K2, J0 (Trace), Z1, Z2; Path OH: C2, F2, G1, J1 (Trace), Z3, Z4, Z5; Receive monitor: Transport OH: All bytes; Path OH: All bytes <b>STM-64/STM-16:</b> Overhead: Transmit control over bytes: MSOH: A1, A2, Z0, D1-D12, E1, E2, F1, K1, K2, J0 (Trace), Z1, Z2; HP OH: C2, F2, G1, J1 (Trace), F3, K3, N1; Receive monitor: RSOH: All bytes HP OH: All bytes		
<b>SONET/SDH Pointer Adjustment Control</b>	The following pointer adjustment controls are provided as standard for STS-Nc/AU-4-Nc and STS/AU payload pointers: Single bursts, Increment/decrement, T1X1 sequences, pointer with NDF, pointer without NDF, SPE offset AU: New value, single adjustments (increment or decrement), increment-decrement, decrement-increment, NDF control, AU frequency offset: $\pm 100$ ppm		

Specifications are subject to change without notice.



www.Lightwave.com  
info@Lightwave.com

Americas  
Corporate Headquarters  
15550 Lightwave Drive  
Clearwater, FL 33760  
Toll free: +1 877 442 DIGL  
T: +1 727 442 6677  
F: +1 727 442 5660

Europe/Middle East/Africa  
Eastway Enterprise Centre  
7 Paynes Park  
Hitchin Hertfordshire  
England SG5 1EH  
T: +44 (0) 1462 429719  
F: +44 (0) 1462 429760

Asia/Pacific Rim  
Braeside Grove  
Unit 4, Sibthorpe Street  
Braeside, Victoria,  
Australia 3195  
T: +61.3.9587 4900  
F: +61.3.9587 4990