

# OC-1/STM-0 through OC-12/STM-4 Module Technical Specifications

<b>Requirements</b>	Meets the requirements of GR-253 (SONET) and ITU-T G.707 (SDH)		VT CV, Path FEBE, VT FEBE, pattern bit, STSX-1 BPV (performance measurements per G.821, G.826, M.2101.1)
<b>Line Interface</b>	STS-1, OC-1, OC-3, OC-12, STM-0, STM-1, STM-4, STM-0e, STM-1e	<b>Datcom Channel (DCC)</b>	Tx and Rx: Any 8-bit value in any byte D1 to D12, PRBS 2 <sup>7</sup> -1 normal or inverted on D1 to D3, PRBS 2 <sup>7</sup> -1 normal or inverted on D4 to D12, DCC connector on D1 to D3, DCC connector on D4 to D12
<b>Line Code</b>	<b>SONET:</b> NRZ, STS-1: B3ZS <b>SDH:</b> NRZ, scrambled, STM-0e: B3ZS; STM-1e: CMI	<b>Alarm Detection</b>	Pattern sync, LOF, LOS, OOF, MS-AIS, MS-RDI, AU-AIS, AU-LOP, HP-RDI, HP-UNEQ, RS-TIM, HP-TIM, HP-PLM, TU-AIS, TU-LOP, LP-RDI, LP-PLM, LP-UNEQ, LP-TIM
<b>Mapping</b>	<b>SONET:</b> DS3, STS-3c/Bulk fill, STS-12c/Bulk fill, ATM/STS-1, ATM/STS-3c, ATM/STS-12c, Full SPE/Bulk fill, VT1.5/Bulk fill (per ANSI T.105.02) <b>SDH:</b> AU-4-4c, STM-4/1/0: AU-4-4c, AU-4/C-4, AU-4/C-3, AU-4/C-2, AU-4/C-12, AU-4/C-11, AU-3/C-3, AU-3/C-2, AU-3/C-12, AU-3/C-11, Full SPE/Bulk fill, VT1.5/Bulk fill (per ITU-T G.707)	<b>Alarm Generation</b>	LOF, LOS, AIS-L, RDI-L, LOP-P, AIS-P, RDI-P, UNEQ-P, MS-AIS, MS-RDI, AU-AIS, AU-LOP, HP-RDI, HP-NEQ, TU-AIS, TU-LOP, LP-RDI, LP-UNEQ, LP-RFI, FERF, Yellow, VT ( <b>SONET:</b> LOM-V, LOP-V, AIS-V, RFI-V, RDI-V, UNEQ-V; <b>SDH:</b> TU-LOM, TU-LOP, TU-AIS, LP-REI, LP-RDI, LP-UNEQ)
<b>Framing</b>	A1 and A2 bytes	<b>Patterns</b>	2 <sup>15</sup> -1 PRBS, 2 <sup>15</sup> -1 PRBS inverted, 2 <sup>23</sup> -1 PRBS, 2 <sup>23</sup> -1 PRBS inverted, 2 <sup>31</sup> -1 PRBS, 2 <sup>31</sup> -1 PRBS inverted, all 0's, all 1's, user-defined 32-bit pattern, AU-4-4c, C-4: PRBS (normal & inverted): 2 <sup>15</sup> -1, 2 <sup>20</sup> -1, 2 <sup>23</sup> -1, 2 <sup>31</sup> -1, any 32-bit user pattern; C-3, C-2, C-12, C-11: PRBS (normal & inverted): 2 <sup>9</sup> -1, 2 <sup>15</sup> -1, 2 <sup>20</sup> -1, 2 <sup>23</sup> -1, any 32-bit user pattern (per ITU-T 0.151)
<b>Line Rate</b>	Tx: N x 51.84 MHz Stratum III-compliant Rx: N x 51.84 MHz	<b>Pointer Control</b>	AU: New value, single adjustments (increment or decrement), burst 2 <sup>8</sup> adjustments, increment-decrement, decrement-increment, NDF control, AU frequency offset: +100 ppm; TU: New value, single adjustments (increment or decrement), NDF control, TU frequency offset: +100 ppm
<b>Input Signal Measurement</b>	Optical power meter: 0 to -26 dBm, ±1.5 dB Electrical: Peak voltage range: +0.31 to +1.2 Vp; Frequency measurement range: N x 51.84 MHz ±800 ppm (up to STM-4)	<b>Control and Monitoring</b>	Line OH/Multiplexer Section OH (LOH/MSOH): Transmit and receive any 8-bit pattern in all slots for any overhead byte specified; Transmit control over bytes: Tx/Rx Transport; Regenerator Section OH: A1, A2, C1, D1-D12, E1, E2, F1, K1, K2, S1, M1, Z1, Z2; Path OH (POH): C2, F2, G1, J1 (Trace), Z3, Z4, Z5, K3, N1; Receive monitor: SOH/RSOH/LOH/MSOH: all bytes; SOH/RSOH: all bytes; HP OH: All bytes; POH: all bytes; LP OH: V5, J2 (Trace), N2, K4; VT OH: V1, V2
<b>Synchronization</b>	Internal, received SONET/SDH signal, BITS (1.544 Mbps), SETS (2.048 Mbps)	<b>Intrusive / Non-intrusive Through Mode</b>	Provides the ability to regenerate optical signal and optionally modify section and line overhead bytes
<b>Impedance</b>	Electrical: 75 ohm +5% unbalanced	<b>Error Injection</b>	B1, B2, REI-L, B3, REI-P, BIT, MS-REI, HP-REI, Line CV, Path FEBE, VT FEBE, pattern bit
<b>Automatic Configuration</b>	Automatically configures test set to the incoming signal framing, line code, and pattern (per ITU-T G.707, G.703, 0.151)	<b>Error Injection Rate</b>	BIT: Single, 10 <sup>9</sup> to 10 <sup>3</sup> , user-programmable; other errors: Single, 10 <sup>9</sup> to maximum, user-programmable
<b>Level (Tx)</b>	<b>STM-0/1/4, OC-1/3/12 1550:</b> 0 dBm typical, single-mode, long reach, 1480 to 1580 nm, 1554 nm typical <b>1310 nm:</b> -5 dBm typical, single-mode, intermediate/long reach, 1260 to 1360 nm, 1308 nm typical	<b>Slot width</b>	Single
<b>Level (Rx)</b>	<b>STM-0/1/4, OC-1/3/12:</b> -7 to -26 dBm, -30 dBm typical minimum @ 10 <sup>-10</sup> BER @ 2 <sup>23</sup> -1 PRBS <b>STM-1/STM-0e:</b> -15 dBdsx flat loss and terminated: 900 ft of RG-59 <b>STM-1e:</b> STM-1 terminated mode per G.703 1998 (Section 3.1, 3.2, 3.3): up to 12.7 dB of cable loss		
<b>Level (Tx) Electrical</b>	STS-1/STM-0e/1e: 1.03 Vp +10%		
<b>Spectral Range</b>	1290 to 1600 nm		
<b>Connectors</b>	Optical: FC-PC, SC, ST Electrical: STM-0e/STM-1e: BNC 75 ohm		
<b>Error Measurement</b>	B1, B2, REI-L, B3, REI-P, HP-REI, BIT, NDF errors LP-BIP (BIP-2), MS-REI, LP-REI, BPV, AU-NDF errors, TU-NDF errors, Section CV, Line CV, Line FEBE, Path CV,		



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