OC-3/12 STM-1/4 LightSpeed1000™ mTOP™ Test Platforms
(Legacy Product)

1U mTOP™ with 3x LightSpeed1000™ Units

mTOP™ Probe with LightSpeed1000™

Stacked 1U mTOP™ with 6x LightSpeed1000™ Units

Overview

GL offers multi-interface test appliance in two variants - mTOP™ 1U/2U rack enclosure and mTOP™ Probe unit.

- The **mTOP™ 1U rack enclosure** can be stacked with multiple LightSpeed1000™ USB units to provide high density form factor solution. Provides space efficiency, but also account for easier scalability and reduced licensing cost per port.
- The **mTOP™ Probe** variant is an all-in-one self-contained test instrument, which includes single LightSpeed1000™ USB units along with necessary PC hardware in a single box. The comprehensive mTOP™ Probe is designed for easier portability and convenient for drive testing

This multi-device hardware unit incorporates all the features of a portable LightSpeed1000™ unit along with the necessary PC hardware with Windows® OS and remote accessibility via Ethernet Remote Desktop.

Each USB unit 4 ports out of which 2 ports are meant for SONET/SDH unchannelized and unframed data. The remaining two ports are meant for SONET/SDH channelized data of carrying many independent unframed/framed T1, E1, T3, and E3 streams. LightSpeed1000™ hardware platform is capable of OC-3/12 and STM-1/4 wire-speed processing on quad optical ports for functions such as wire-speed recording and wire-speed playback of Unchannelized and Channelized ATM, PoS, and RAW Traffic.

For more details, refer [LightSpeed1000™ - High Density mTOP™ Solution](#) webpage.

Main Features

- Wirespeed processing of ATM, PoS or RAW data for Tx and Rx for both ports (*PCIe card only)
- Software selectable OC-3 / OC-12, or STM-1 / STM-4 for Unchannelized ATM, PoS or Transparent Traffic, and Channelized T1, E1, T3, E3 traffic
- Ability to capture/playback to/from disk at full rate in both directions for all ports
- Simultaneous synchronous capture is possible on all optical ports. The captured files can be played back to reproduce the traffic
- Comprehensive transmit/receive testing capabilities; transmitting and verifying data with incrementing sequence numbers with each packet/cell
- Easy to use and flexible Bit Error Rate Test (BERT) application for ATM, POS, and RAW
- mTOP™ rack system provides easier scalability and reduced licensing cost per port
- Flexibility in running multi-interface test from within a single mTOP™ equipment

LightSpeed1000™ Specifications

Interfaces:	• High Performance x4 PCIe Compliance with optimized DMA to perform Rx and Tx packets to/from PC memory • 4 Optical Ports • 2 Unchannelized Ports (STM1/OC3 and STM4/OC12) • 2 Channelized Ports (STM1/OC3) • 1 USB 2.0 Port
Alarm LEDs:	• LOS – LOS (Loss of Signal) is a physical layer error, which indicates loss in optical signal • LOF - LOF (Loss of Frames) becomes active when receiving interface detects errors in the framing pattern for three milliseconds. This will be indicated using the frame alignment bytes A1 and A2. LOF is cleared when two consecutive valid A1/A2 framing patterns are received. • User – A user-defined LED can be configured by the user as per the requirements
Bus Interface:	• PCIe Specification 1.2 Compliant
Power and Dimensions:	• 4.2" x 9.2" • +12 volts, 3.5 Amps
Traffic	• Structured (T1, E1. DS0) • Unstructured (OC3/STM1, OC12/STM4) • Transparent Generic Framing Procedure (GFP) (Raw) • Hardware Filters to filter out and allow only traffic of interest
Regulatory and Compliance	• Telecom (OC3): Telcordia GR-253 (SONET) • ITU-T G.707 (SDH) , G.783 (03/06)
Channelized Protocols (Structured)	• High-Level Data Link Control (HDLC) • Point-to-Point Protocol (PPP), RFC 1662 • Multilink PPP (MLPPP), RFC 1990 • Frame Relay, RFC 1490 • Multilink support over Frame Relay (FRF.12) and MLPPP • ATM IMA • GSM, TRAU, GPRS, UMTS over ATM • SS7, ISDN, CAS, SS1, SSM • V5.x, DCME, FDL (T1 Interface only)

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LightSpeed1000™ Specifications

Channelized File based High Throughput HDLC Record/ Playback (HdlcHpio)	Below table shows number of channels supported by Channelized HDLC High Throughput Record/ Playback application.
	PC Used for Below Test / Measurements : Windows 10 64-bit OS, Core i7 4770 CPU @ 3.40 GHz, 10 GB RAM

	HPIO- TS (64kbps) (XX634)	HPIO (Hyperchannels) (XX634)
OC3 E1	supports all timeslots. 63 ports x 31 TS= 1953	supports all 63 ports
OC12 E1	Supports only 75 ports 75 ports x 31 TS= 2325 TS	Supports all 252 ports
OC3 T1	Supports all timeslots. 84 ports x 24 TS= 2016	Supports all 84 ports
OC12 T1	Supports 2640 timeslots. 110 ports x 24 TS= 2640	Supports 255 ports out of 336 ports

Channelized Multi-Channel HDLC Emulation and Analysis (HDLCTerr)	Below table shows number of channels supported by Channelized HDLC Emulation and Analysis application.
	PC Used for Below Test / Measurements: Windows 10 64-bit OS, Core i7 4770 CPU @ 3.40 GHz, 10 GB RAM

	HDLCTERR- TS (64kbps) (XX634)	HDLCTERR- Hyperchannel (XX634)
OC3 E1	Supports 1701 TS. (63 ports*27 TS)	Supports all 63 Ports
OC12 E1	Supports 1701 TS. (63 ports*27 TS)	Supports all 252 Ports
OC3 T1	Supports 1040 TS. (80 ports*13 TS)	Supports all 84 Ports
OC12 T1	Supports 1040 TS. (80 ports*13 TS)	Supports 255 ports out of 336 ports

LightSpeed1000™ Specifications

UnChannelized Protocols (Unstructured)	• Packet Over Sonet/SDH (PoS) compliance - RFC 2615(1619)/1662 • ATM User Network Interface (UNI) Specification and the ATM physical layer for Broadband ISDN according to CCITT Recommendation I.432
Clock	• Internal or Recovered • Hardware based precise time-stamping of cells with 10 nsec resolution, 1 ppm accuracy
Functional Specifications	Support for Channelized OC3 to T1, Channelized STM1 to E1, full, fractional, or channelized T1/E1 Up to 84 T1 per port (or 2* 84 = 168 T1s per card) Up to 63 E1 per port (or 2* 63 = 126 E1s per card) **SONET multiplexing:** OC3 -> STS-3 -> STS-1 -> VTG -> VT1.5 -> T1 -> N x DS-0 OC3 -> STS-3 -> STS-1 -> VTG -> VT2-> E1 -> N x DS-0 **SDH multiplexing:** STM1 -> AUG -> AU-4 -> VC-4 -> TUG-3 -> TUG-2 -> TU-12 -> VC-12 -> E1 STM1 -> AUG -> AU-4 -> VC-4 -> TUG-3 -> TUG-2 -> TU-11 -> VC-11 -> T1 STM1 -> AUG --> AU-3 -> VC-3 --> TUG-2 --> TU-12 -> VC-12 --> E1 STM1 -> AUG --> AU-3 -> VC-3 --> TUG-2 --> TU-11 -> VC-11 --> T1
Physical Layer Alarms and Error Counts	**On SONET and SDH** Alarms - Loss of Light (LOL), Loss of Signal (LOS), Out of Frame (OOF), Loss of Frame (LOF), Alarm Indication Signal (AIS), Remote Defect Indication (RDI), and Automatic protection switch byte failure (APSBF) • Line, Path, and Section error counts - Bit-Interleaved Parity (BIP), Remote Error Indication (REI) • FCS, Rx / Tx Abort, and MIN / MAX Length **T1/E1** Sync Loss, HDB3 Violation, Carrier Loss, Frame Error, Remote, Distant MF, AIS, BPV Errors, CRC Errors, Frame Errors, Transmit Under Run, Receive Over Run
Loopback Capabilities	• Line, Diagnostic, and PL3 Loopback at SONET SDH level • Software loopback at T1/E1 levels
Monitoring Applications	**For T1/E1** • Byte Values, Binary Byte Values, Signaling Bits, DC Offset, Frequency, • Power Level, Multi-frame Data, Timeslot Displays, ASCII Timeslot Display, • Oscilloscope and Spectral Displays provide graphical analysis of signals **On SONET and SDH** • Monitoring Alarms and Error Counts
Intrusive Test Applications	**For T1/E1** • Bit error rate testing (BERT) pattern generation and detection per channel • Transmit Tone, Transmit Gaussian Noise, Transmit Multiframe • Transmit Signaling Bits, and Rx-to-Tx loopback

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mTOP™ Rack Specifications

Figure: mTOP™ Rackmount LightSpeed1000™

Space Requirements

- Height: stacked 2U Rack unit [Total space—2U]
- Length: 16 Inches
- Width: 19 Inches

Embedded PC Specifications

- 2U 19" Rack Mount Enclosure w/Rails, Multiple Interface TDM/Optical/Packet w/Single Board Computer (SBC)
- Intel Core i3 or optional i7 NUC Equivalent, Windows® 11 64-bit Pro Operating System
- USB 2.0 or and USB 3.0 Ports, ATX Power Supply
- USB Type C ports, Ethernet 2.5GigE port
- 256 GB Hard drive, 8G Memory (Min)
- Two HDMI ports for display

LightSpeed1000™ interfaces

- High Performance x4 PCIe Compliance with optimized DMA to perform Rx and Tx packets to/from PC memory.
- 4 Optical Ports - 2 Unchannelized Ports (STM1/OC3 and STM4/OC12) 2 Channelized Ports (STM1/OC3)
- 1 USB 2.0 Port
- LOS, LOF, User-defined LEDs

Refer OC-3/STM-1 and OC-12/STM-4 Analysis Price List

mTOP™ Probe Specifications

Figure: mTOP™ Probe LightSpeed1000™ (Front Panel)

Space Requirements

- Length: 10.4 inches
- Height: 3 inches
- Width: 8.4 inches

SBC Specifications

- Intel Core i3 or optional i7 NUC Equivalent, Windows® 11 64-bit Pro Operating System
- USB 2.0 or and USB 3.0 Ports, 12V/3A Power Supply
- USB Type C ports, Ethernet 2.5GigE port
- 256 GB Hard drive, 8G Memory (Min)
- Two HDMI ports for display

LightSpeed1000™ interfaces

- High Performance x4 PCIe Compliance with optimized DMA to perform Rx and Tx packets to/from PC memory.
- 4 Optical Ports - 2x Unchannelized Ports (STM1/OC3 and STM4/OC12), 2x Channelized Ports (STM1/OC3)
- LOS, LOF, User-defined LEDs
- External USB based Wi-Fi adaptor

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Buyer's Guide

Item No	Product Description
LTS100	Lightspeed1000™ - OC-3/12 STM-1/4 PCIe Card
LTS105	Lightspeed1000™ - Portable OC-3/12 STM-1/4 USB Unit
MT001	mTOP™ 1U Rack Mount Enclosure w/SBC (Intel i3 Core)
MT001E	mTOP™ 1U Rack Mount Enclosure w/SBC (Intel i7 Core)
MT002	mTOP™ 1U Rack Mount Enclosure w/o SBC
MT005	mTOP™ Probe (Portable Stand-alone unit) (Intel NUC i3 Core)
MT005E	mTOP™ Probe (Portable Stand-alone unit) (Intel NUC i7 Core)

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