

OC-3/STM-1 Analysis Card

OC-3/STM-1, STS-1/STM-0, T3, T1, E1 Interfaces

Add/Drop User-Selected PDH Signals to/from an OC-3/STM-1 or STS-1/STM-0

Add/Drop STS-1 to/from OC-3 or STM-0 to/from STM-1

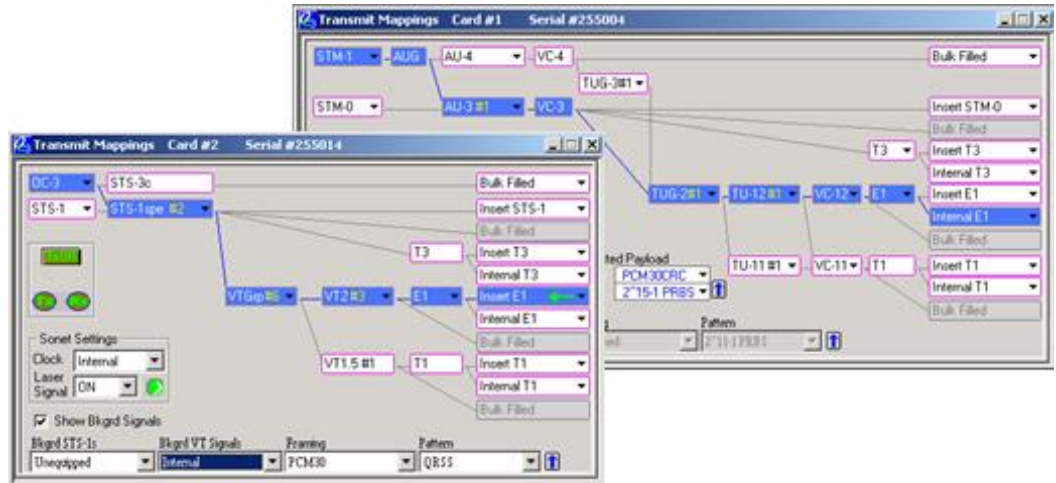
Generate and Monitor SONET or SDH Alarms and Errors

DS0, DS1 or E1 Test and Analysis with GL's Ultra T1 or E1 Cards

DS3 Test and Analysis with GL's Ultra T3 Card

Multiple OC-3/STM-1 Cards in a system

Compatible with GL's T3 and T1/E1 Test Products



Overview

The Ultra OC-3 / STM-1 Card (PCI) plugs into a PC expansion slot for Analyzing, Testing, Simulating, and Monitoring OC-3 / STM-1 and STS-1/STM-0 signals. The card can add and drop T1, E1, T3, STS-1/STM-0 signals to and from an OC-3 / STM-1 signal. It can also add and drop T1 and E1 signals to and from an STS-1/STM-0 signal. The card can generate BERT patterns, internally in all framing modes.

It is ideally suited for Installation, Maintenance, Commissioning, Verification and Manufacturing of SONET/SDH transport networks and network equipments.

For more information on Ultra OC-3/STM-1 Card, refer to <http://www.gl.com/OC-3analyzer.html>

Main Features

- Built in expandability through multi-card support.
- Intuitive and familiar PC based user interface.
- Integrated help information and shallow learning curve to learn to use the system.
- Built in multi-card support, it means that the software and hardware bundle you are buying is fully expandable for your growing needs.
- Also, multi-card support is an added advantage of controlling several cards from the same software which means that:
 - You will have the ability to copy a card configuration from one card to another saving a lot of valuable time from configuring individual cards/equipments one by one.
 - Synchronize two or more card settings or mirror the settings of two cards.
 - Ability to monitor both Eastbound and Westbound signals at the same time using the same equipment
- Ability to configure OC-3/STM-1 analyzer to test optical (OC-3/STM-1) or electrical (STS-1/STM-0) transport signals manually. The intuitive graphical interface let you customize the configuration in an interactive manner.
- Provides options to save the configuration as a profile that meets the operator's requirements. This profile file is then selected to launch the pre-defined measurement. This provides the quickest way to configure the analyzer to multitude of analysis scenarios in the shortest possible time.



GL Communications Inc.

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Benefits

- **Cost Effective:** Most cost effective and expandable solution for SONET/SDH testing.
- **Comprehensive:** The OC-3/STM-1 and STS-1/STM-0 receivers monitor SONET/SDH signals and present in real-time comprehensive diagnostics of SONET/SDH alarms, errors and pointer justifications.
- **PC Based:** Can convert any PC (Desktop, Lunchbox, or Laptop) to a SONET/SDH analysis, testing, simulating, and monitoring platform. This will maximize the returns from your current investment on desktop / laptop PCs.
- **Complete Solution:** In conjunction with GL's Ultra T1 Card, Ultra E1 Card and Ultra T3 Card in the same PC, the Ultra OC-3/STM-1 Card will provide a complete OC-3/STM-1, DS3, DS1, E1 and DS0 testing solution.
- **Flexible:** Use multiple OC-3/STM-1 cards in the same PC controlled by the same software, or distribute the cards in different PCs, thereby providing the most flexible solution for your unique testing needs.

Supported Signal Mappings

- VC-4 (Bulk filled) --> AU-4 --> STM-1
- STM-0 --> AU-3 --> STM-1 (Add/Drop)
- VC-3 (Bulk Filled) --> AU-3 --> STM-1
- T3 --> AU-3 --> STM-1 (Internal and Add/Drop)
- T3 --> AU-3 --> STM-0 (Internal only)
- E1 --> TU-12 --> TUG-2 --> AU-3 --> STM-0
- E1 --> TU-12 --> TUG-2 --> AU-3 --> STM-1
- E1 --> TU-12 --> TUG-2 --> TUG-3 --> AU-4 --> STM-1
- T1 --> TU-11 --> TUG-2 --> AU-3 --> STM-0
- T1 --> TU-11 --> TUG-2 --> AU-3 --> STM-1
- T1 --> TU-11 --> TUG-2 --> TUG-3 --> AU-4 --> STM-1
- T1 --> TU-12 --> TUG-2 --> AU-3 --> STM-0
- T1 --> TU-12 --> TUG-2 --> AU-3 --> STM-1
- T1 --> TU-12 --> TUG-2 --> TUG-3 --> AU-4 --> STM-1

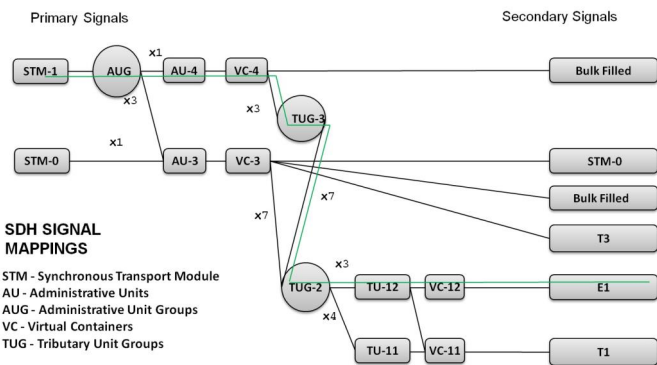


Figure: SDH Signal Mappings

Bit Error Rate (BER) Test

Modify the Framing and Pattern of the transmitted signal as well as set the receive side to listen to a specific payload and pattern. Ability to insert single BERT error (in T3, VC-3 and VC-4 signals) as well as insert errors at a predefined error rate (only in T3 signal)

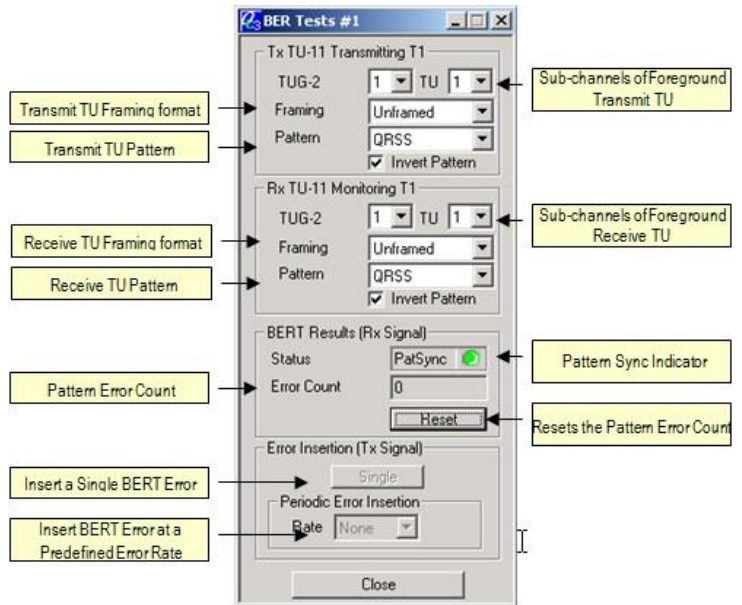


Figure: BER Test Window

Error Insertion and Alarm Generation

Allows you to insert various SDH and secondary signal errors as well as generate various alarms. Depending on the current card configuration, the sub-panels displayed will differ. If the card is looped back to itself (internally using the loopback option or externally using a cable) the alarms generated using this window will be detected on the Monitor Window

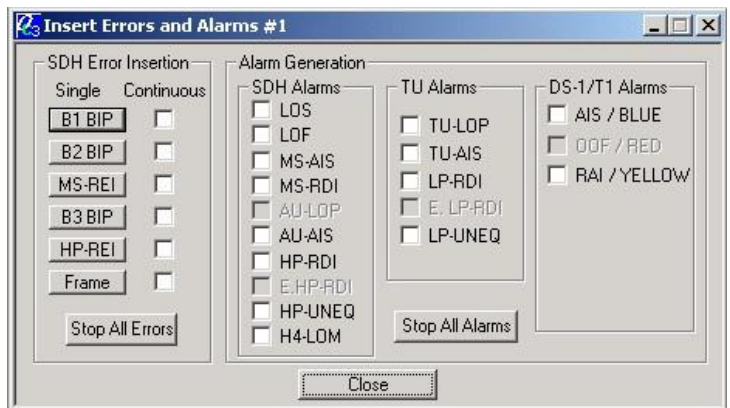


Figure: Error Insertion and Alarm Generation Window



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Specifications

Physical Interfaces

OC-3/STM-1:	SC Connector
STS-1/STM-0/T3:	Male BNC Connector
T1/E1:	RJ48c Connector
External Clock:	MCX Connector
PC Interface:	PCI 2.1 Compliant

OC-3/STM-1 Line Interface

Physical Interface:	SC Connector
Fiber Pigtail:	Single mode, 1310 nm
Pulse Mask:	Meets ITU-T G.957 and Bellcore DR-253-CORE
Line Code:	NRZ
Output Clock Reference:	Recovered OC-3 Clock, External 19.44 MHz, or Internally Generated 155.52MHz \pm 4.6ppm
Rx Sensitivity:	-31 dBm

STS-1/STM-0 Line Interface

Physical Interface:	BNC Male Connectors
Output Clock Reference:	Recovered STS-1/STM-0 Clock, External 19.44 MHz, or Internally Generated 51.84MHz \pm 4.6ppm

T3 Line Interface

Physical Interface:	BNC Male Connectors
Line Code Format:	B3ZS
Framing Format:	M23, C-bit
Input Frequency:	44.736 Mbps
Receiver Interface:	DSX-3 (Terminate or Monitor)
Input Impedance:	75 Ohms
Input Level:	Terminate - 0.09 Vp – 0.85 Vp Monitor 0.025– 0.08 Vp (Up to 26 dB flat loss relative to nominal DSX)
Output Level:	DSX - Per TR-TSY-0004999, 0.75 to 0.85 Vp
Output Clock Source:	Recovered or Internal

T1/E1 Line Interface

Physical Interface:	RJ48c Connector
Line Code Format:	AMI or B8ZS (T1), HDB3 (E1)
Input Frequency:	1.544 Mbps (T1) or 2.048 Mbps (E1)
Receiver Interface:	Terminate
Input Impedance:	100 Ohms (T1), 120 Ohms (E1)
Input Level:	+75 mV to 6.0 V base to peak or –30 dBsX to +6 dBsX +3.0 +/-0.2 Base to Peak Selectable 0 to 655 ft. Pulse Equalization Setting for T1 Short Haul, or line build outs for 0 dB to –22.5 dB (T1 Long Haul)
Output Level:	



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Specifications (continued)

External Clock Interface

Physical Interface: SC Connector
 Electrical Standard: RS485/RS422

SONET/SDH Framing Formats

Output Clock Reference:

Payload Mappings

SONET: STS-3, STS-3c, STS-1

SDH: STM-1 (AU-3, AU-4)

SONET

- STS-3c (Bulk Filled) → OC-3
- STS-1 → OC-3 (Add/Drop)
- STS-1 (Bulk Filled) → STS-1
- T3 → OC-3 (Internal and Add/Drop)
- T3 → STS-1 (Internal only)
- E1 → VT-2 → STS-1 (Internal and Add/Drop)
- E1 → VT-2 → OC-3 (Internal and Add/Drop)
- T1 → VT-1.5 → STS-1 (Internal and Add/Drop)
- T1 → VT-1.5 → OC-3 (Internal and Add/Drop)

SDH

- Bulk filled) → AU-4 → STM-1
- STM-0 → AU-3 → STM-1 (Add/Drop)
- VC-3 (Bulk Filled) → AU-3 → STM-1
- T3 → AU-3 → STM-1 (Internal and Add/Drop)
- T3 → AU-3 → STM-0 (Internal only)
- E1 → TU-12 → TUG-2 → AU-3 → STM-0
- E1 → TU-12 → TUG-2 → AU-3 → STM-1
- E1 → TU-12 → TUG-2 → TUG-3 → AU-4 → STM-1
- T1 → TU-11 → TUG-2 → AU-3 → STM-0
- T1 → TU-11 → TUG-2 → AU-3 → STM-1
- T1 → TU-11 → TUG-2 → TUG-3 → AU-4 → STM-1
- T1 → TU-12 → TUG-2 → AU-3 → STM-0
- T1 → TU-12 → TUG-2 → AU-3 → STM-1

T1 □ TU-12 □ TUG-2 □ TUG-3 □ AU-4 □ STM-1

[All the E1 and T1 mappings support internal generation and Add/Drop]

Transmit Capabilities

Payload Source:

Internally generated User Selected Pattern, Added from external source or Looped back from receive signal

Payload test patterns (Inverted or Non-inverted):

- STS-1/STS-3c Bulk: 223-1 PRBS
- VC-3/VC-4 Bulk: 223-1 PRBS
- T3: 29-1 PRBS, 211-1 PRBS, 215-1 PRBS, 220-1 PRBS, 223-1 PRBS
- E1/T1: QRSS, 211-1 PRBS, 215-1 PRBS, 220-1 PRBS



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Specifications (continued)

Alarm Generation	<p>SONET: LOS, LOF, AIS-L, RDI-L, LOP-P, AIS-P, RDI-P, UNEQ-P, LOM-P, LOP-V, AIS-V, RDI-V, UNEQ-V</p> <p>SDH: LOS, LOF, MS-AIS, MS-RDI, AU-LOP, AU-AIS, HP-RDI, HP-UNEQ, H4-LOM, TU-LOP, TU-AIS, LP-RDI, LP-UNEQ</p> <p>PDH: T1: AIS, RAI E1: LOF, AIS, RAI T3: LOS, AIS, IDLE</p>
Error Insertion	<p>SONET: Framing error, CV-S, CV-L, REI-L, CV-P, REI-P, BERT errors (Single or Periodic error insertion capability)</p> <p>SDH: Framing error, B1 BIP, B2 BIP, MS-REI, B3 BIP, HP-REI, BERT errors</p>
Signal Traces and Labels:	<p>SONET: Section trace (J0), Path trace (J1), Section sync status (S1), Path signal label (C2), VT Path signal label (C5)</p> <p>Regenerator Section trace (J0), Higher Order trail trace (J1), Section sync status (S1), HP Path label (C2), LP Path label (V5)</p>
Background Channel settings:	Same as Foreground (Broadcast), Same as Received (Loopback), Unequipped or User Selected Pattern (Background VT payload)
Other capabilities:	Set APS messages (K1 and K2), Monitor outgoing SPE/AU pointers
Receive Capabilities	SONET
Alarm Detection:	LOS, LOF, AIS-L, RDI-L, LOP-P, AIS-P, RDI-P, UNEQ-P, LOP-V, LOM-P, AIS-V, RDI-V, UNEQ-V
Error Counting:	Framing Error, CV-S, CV-L, REI-L, CV-P, REI-P, CV-V, REI-V, BERT errors
Signal Traces and Labels:	Section trace (J0), Path trace (J1), Section sync status (S1), Path signal label (C2), VT Path signal label (C5)
Other capabilities:	Monitor incoming TOH, POH. Monitor incoming APS messages (K1 and K2), Monitor incoming SPE pointers, Count Pointer Justifications, Detect NDF (New Data Flag) etc.
Alarm Detection:	SDH
Error Counting:	LOS, LOF, MS-AIS, MS-RDI, AU-LOP, AU-AIS, HP-RDI, HP-UNEQ, H4-LOM, TU-LOP, TU-AIS, LP-RDI, LP-UNEQ
Signal Traces and Labels:	Framing error, B1 BIP, B2 BIP, MS-REI, B3 BIP, HP-REI, BERT errors
Other capabilities:	Regenerator Section trace (J0), Higher Order trail trace (J1), Section sync status (S1), Path signal label (C2), LP Path label (V5)
Alarm Detection:	Monitor incoming RS-OH, MS-OH and HO-POH, Monitor incoming APS messages (K1 and K2), Monitor incoming AU pointers. Count Pointer Justifications, Detect NDF (New Data Flag) etc.
Alarm Detection:	PDH
Alarm Detection:	T1: AIS, OOF, RAI E1: AIS, OOF, RAI, CAS-MFL, RMFAI T3: LOS, FERF, OOF, AIS, IDLE, RED



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Specifications (continued)

Add/Drop Capabilities	SONET
Add/Drop to/from OC-3:	STS-1, T3, E1 or T1
Add/Drop to/from STS-1:	T1 or E1
	SDH
Add/Drop to/from STM-1:	STM-0, T3, E1 or T1
Add/Drop to/from STM-0:	T1 or E1
Frequency Measurements	SONET: OC-3 or STS-1 with 1Hz discrimination, 4.6ppm accuracy
	SDH: STM-1 or STM-0 with 1Hz discrimination, 4.6ppm accuracy
PDH Framing Formats	
DS3/T3:	C-bit Parity, M23
DS1/T1:	Unframed, D4, ESF
E1:	Unframed, PCM30, PCM30CRC, PCM31, PCM31CRC
Alarm and Error Logging	Alarms and Errors can be logged continuously to a file.
Coupled or Independent Settings	Transmit and Receive settings can be set as coupled to change them simultaneously or they can be set as independent.
Coupled or Independent Settings	UT401 – Ultra OC-3 Card hardware (Option UT4010 and/or UT4020 required) UT4010 – OC-3 Analysis Software
	UT4020 – STM-1 Analysis Software

Buyer's guide

- [UT401](#) - OC-3 / STM-1 Analysis Card (Option UT4010 and/or UT4020 required)
- [UT4010](#) - OC-3 Analysis Software (OC-3, STS-1, T3, E1, T1 SONET Analysis Software)
- [UT4020](#) - STM-1 Analysis Software (STM-1, STM-0, T3, E1, T1 SDH Analysis Software)
- [UT4021](#) - Windows Client/Server Scripted Control SW – Precise & Sequential Control of OC-3/STM-1 Card over TCP/IP (SDH Version)

Related Hardware

[SA019](#) - Fiber Optic Cable with SC Connectors - 2m (6.5 ft.) length



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