

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

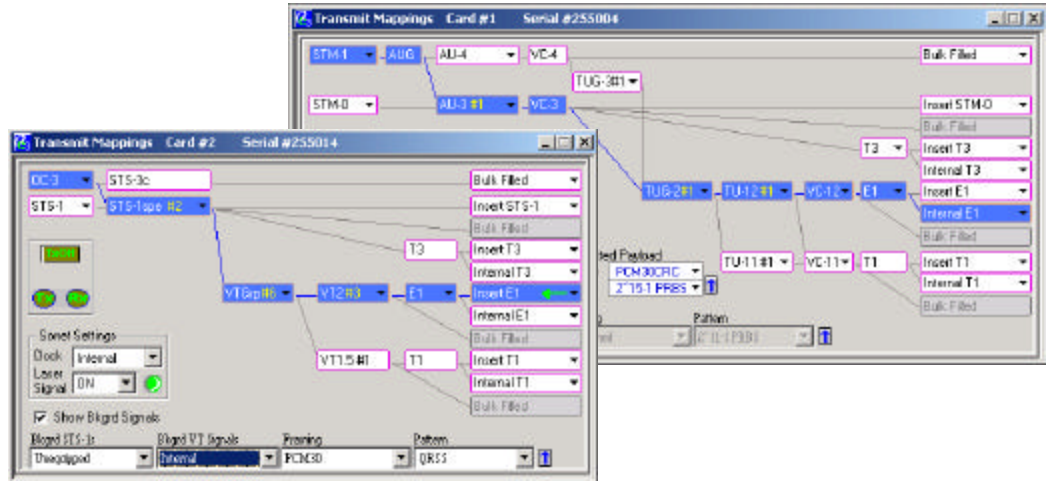
Internally generate BERT patterns in all framing modes

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



Ultra OC-3/STM-1 (PCI) Card 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 board can add and drop T1, E1, T3, or STS-1/STM-0 signals to and from an OC-3/STM-1 signal or T1 and E1 signals to and from an STS-1/STM-0 signal. The board can also generate BERT patterns, internally in all framing modes. Accompanying Windows NT/2000/XP software affords easy operation. It is ideally suited for installation, maintenance, commissioning, verification and manufacturing of SONET/SDH transport networks and network equipment.

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.

Features:

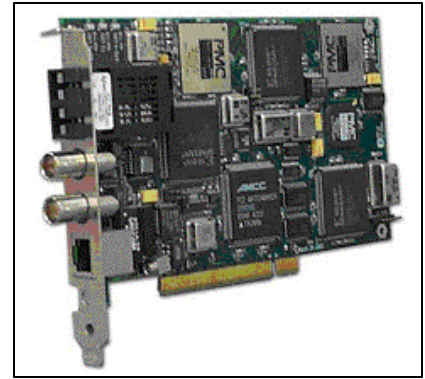
- Easy to use, familiar, windows based, Graphical User Interface
- Internally generate BERT patterns in all framing modes and perform stress test and performance analysis.
- Add/Drop T1, E1, T3, STS-1/STM-0 to/from OC-3/STM-1
- SONET/SDH overhead monitoring and control
- SONET/SDH Alarm and Error generation/detection
- Transmit user-selected T1 (or E1) while remaining T1s (or E1s) are looped back or broadcast, and transmit user-selected STS-1/STM-0 within OC-3/STM-1 while remaining STS-1s/STM-0s are broadcast or looped back
- Internal, External, and Recovered clock sources



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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 V _p – 0.85 V _p Monitor 0.025– 0.08 V _p (Up to 26 dB flat loss relative to nominal DSX)
Output Level:	DSX - Per TR-TSY-0004999, 0.75 to 0.85 V _p
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 dB _{sX} to +6 dB _{sX}
Output Level:	+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)

External Clock Interface

Physical Interface:	MCX Connector
Electrical Standard:	RS485/RS422

SONET/SDH Framing Formats

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

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

Payload Mappings

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

- 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
- [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):	<ul style="list-style-type: none">• STS-1/STS-3c Bulk: $2^{23}-1$ PRBS• VC-3/VC-4 Bulk: $2^{23}-1$ PRBS• T3: 2^9-1 PRBS, $2^{11}-1$ PRBS, $2^{15}-1$ PRBS, $2^{20}-1$ PRBS, $2^{23}-1$ PRBS• E1/T1: QRSS, $2^{11}-1$ PRBS, $2^{15}-1$ PRBS, $2^{20}-1$ PRBS
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>SDH: 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

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.

SDH

Alarm Detection:	LOS, LOF, MS-AIS, MS-RDI, AU-LOP, AU-AIS, HP-RDI, HP-UNEQ, H4-LOM, TU-LOP, TU-AIS, LP-RDI, LP-UNEQ
Error Counting:	Framing error, B1 BIP, B2 BIP, MS-REI, B3 BIP, HP-REI, BERT errors
Signal Traces and Labels:	Regenerator Section trace (J0), Higher Order trail trace (J1), Section sync status (S1), Path signal label (C2), LP Path label (V5)
Other capabilities:	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.

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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Add/Drop Capabilities

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, PCM 30, 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.

Ordering Information

UT401 – Ultra OC-3 Card hardware (Option UT4010 and/or UT4020 required)
UT4010 – OC-3 Analysis Software
UT4020 – STM-1 Analysis Software

* Specifications subject to change without notice