

**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**

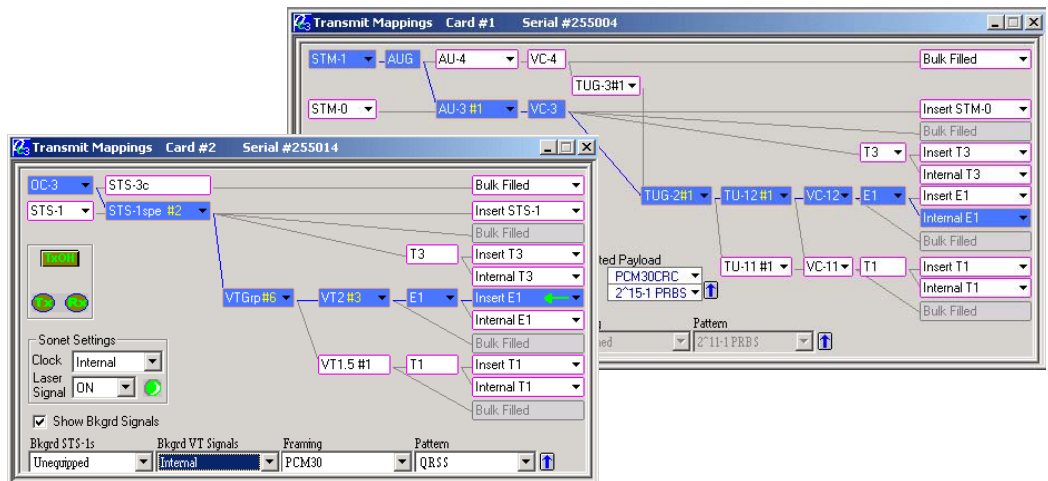
**DS0, DS1 or E1 Test and Analysis with GL's Ultra T1 or E1 Cards**

**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**

**OC-3/STM-1 Analysis Card**



**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
- Remote control, scripting & automation using Client-Server technology

For more details, visit <http://www.gl.com/OC-3analyzer.html>



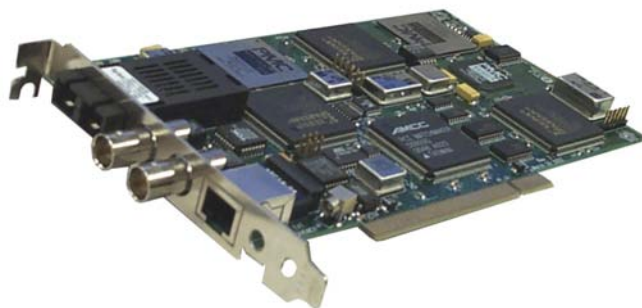
**GL Communications Inc.**

818 West Diamond Avenue - Third Floor Gaithersburg, MD 20878 • (V) 301-670-4784 (F) 301-670-9187  
 Web Page Address: <http://www.gl.com/> • E-Mail Address: [info@gl.com](mailto:info@gl.com)

# 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:	<b>Terminate</b> - 0.09 Vp – 0.85 Vp <b>Monitor</b> 0.025– 0.08 Vp (Up to 26 dB flat loss relative to nominal DSX)
Output Level:	<b>DSX</b> - 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
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)  $\rightarrow$  OC-3
- STS-1  $\rightarrow$  OC-3 (Add/Drop)
- STS-1 (Bulk Filled)  $\rightarrow$  STS-1
- T3  $\rightarrow$  OC-3 (Internal and Add/Drop)
- T3  $\rightarrow$  STS-1 (Internal only)
- E1  $\rightarrow$  VT-2  $\rightarrow$  STS-1 (Internal and Add/Drop)
- E1  $\rightarrow$  VT-2  $\rightarrow$  OC-3 (Internal and Add/Drop)
- T1  $\rightarrow$  VT-1.5  $\rightarrow$  STS-1 (Internal and Add/Drop)
- T1  $\rightarrow$  VT-1.5  $\rightarrow$  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"><li>• <b>STS-1/STS-3c Bulk:</b> <math>2^{23}-1</math> PRBS</li><li>• <b>VC-3/VC-4 Bulk:</b> <math>2^{23}-1</math> PRBS</li><li>• <b>T3:</b> <math>2^9-1</math> PRBS, <math>2^{11}-1</math> PRBS, <math>2^{15}-1</math> PRBS, <math>2^{20}-1</math> PRBS, <math>2^{23}-1</math> PRBS</li><li>• <b>E1/T1:</b> QRSS, <math>2^{11}-1</math> PRBS, <math>2^{15}-1</math> PRBS, <math>2^{20}-1</math> PRBS</li></ul>
Alarm Generation	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 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 PDH: <b>T1:</b> AIS, RAI <b>E1:</b> LOF, AIS, RAI <b>T3:</b> LOS, AIS, IDLE
Error Insertion	SONET: Framing error, CV-S, CV-L, REI-L, CV-P, REI-P, BERT errors (Single or Periodic error insertion capability) SDH: Framing error, B1 BIP, B2 BIP, MS-REI, B3 BIP, HP-REI, BERT errors
Signal Traces and Labels:	SONET: Section trace (J0), Path trace (J1), Section sync status (S1), Path signal label (C2), VT Path signal label (C5) SDH: Regenerator Section trace (J0), Higher Order trail trace (J1), Section sync status (S1), HP Path label (C2), LP Path label (V5)
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
<b>Receive Capabilities</b>	<b>SONET</b>
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. <b>SDH</b>
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. <b>PDH</b>
Alarm Detection:	<b>T1:</b> AIS, OOF, RAI <b>E1:</b> AIS, OOF, RAI, CAS-MFL, RMFAI <b>T3:</b> LOS, FERF, OOF, AIS, IDLE, RED

#### **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 <b>SDH</b>
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.

#### **Ordering Information**

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

#### **Buyers 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)  
[UT4011](#) - Windows Client/Server Scripted Control SW - Automation & Remote Control of OC-3/STM-1 Card over TCP/IP (SONET Version)  
[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  
\*Specifications and features subject to change without notice.

