



||| Bhumika International Inc.

E2, 2Mbps x 4 Opti Multiplexer

Integrated E2, OLTE and Multiplexer

Product Brochure & Data Sheet

BHUMIKA INTERNATIONAL INC.

812 - 350 WEBB DRIVE

MISSISSAUGA, ONTARIO, L5B3W4, CANADA

Phone: +1 (416) 930 2931

E-mail: info@bhumika.ca

Website: <http://www.bhumika.ca>

INDEX

S.No.	Particulars	Pg. No.
1.	Description - Integrated Solution E2 Multiplexer and 8Mbps Optical Line Transmission Equipment	3
2.	Features & Highlights	3
3.	Product Front & Rear View	4
4.	Alarms	5
5.	Loopbacks	5
6.	System Specifications	6



Description - E2, 2Mbps x 4 - Opti Multiplexer (Integrated E2, OLTE & Multiplexer)

VCL - E2, Opti Multiplexer (4E1) is an Integrated OLTE and multiplexer / demultiplexer unit, based on PDH (Plesiochronous Digital Hierarchy) technology . It multiplexes four 2.048 Mbps (hereafter referred to 2Mbps) E1 tributaries into a single 8 Mbps, E2 stream and then transports it as an optical signal on a Single Mode, 1300nm optical fiber cable, without the use of ant signal repeaters up to a distance of over 50 KM (Optical Loss Budget $\geq 30\text{dBm}$). The muldex also does the reverse processing i.e. demultiplexing a received optical signal into four 2Mbps E1 tributaries.

Bhumika's Opti Multiplexer solution multiplexes, 4 E1 stream into one 8 Mb signal and then transport it on a 1300 nm Single Mode Optical Fiber pair. On the de-multiplex side, it receives the optical signal and de-multiplexes it into 4, electrical E1 signals.

The card uses one E1 quad line unit for interfacing to E1 streams. This device provides data and extracted jitter free clock meeting the G.703 standards. The jitter attenuater meet G.735 specifications. The multiplexer device provides for in-built DPLL circuits for recovery of received E1 clocks. The device provides various alarm conditions as per draft G.775 recommendations. These include loss of signal at E1, loss of signal at E2, loss of frame sync at E2, detection of AIS at E2 and bit error exceeding 1 in 1000. The output of the mux chip is connected to E2 line interface unit which provides the HDB3 coder along with clock extraction. The control functions are carried out by a micro controller.

The power supply module accepts -48VDC input and provides 5V output required for the operation of the card.

FEATURES & HIGHLIGHTS

- A compact solution that performs E1 to E2 multiplexing and de-multiplexing and provides an 8Mbps optical interface (8Mbps OLTE) in a single card
- Conforms to ITU recommendations G.742
- Performs Second order Mux as per G.742
- Loss of signal and AIS detection as per G.775
- Tributary and higher order loop backs supported
- Supports tributary loopbacks for commands received from far end based on stuff bit polarity
- Single-card implementation
- Highly reliable and compact.
- Standard CCITT Interfaces
- Class I Laser.
- Remote and local terminal monitoring and control through a PC Com port using VCL-Opti Multiplexer, Network Management System.
- Extensive alarms and status indication facility.
- Operates on nominal - 48V DC input
- Distributed on-board power supply.
- Microprocessor controlled with powerful diagnostic facilities for both remote and local systems.
- Local and remote loopback facility for the 8Mbps stream for diagnostics.
- Programmable auto-laser shut down feature for greater safety.
- Capable of synchronizing on any of the clock sources - internal, or extracted (loop-timed).

Front View

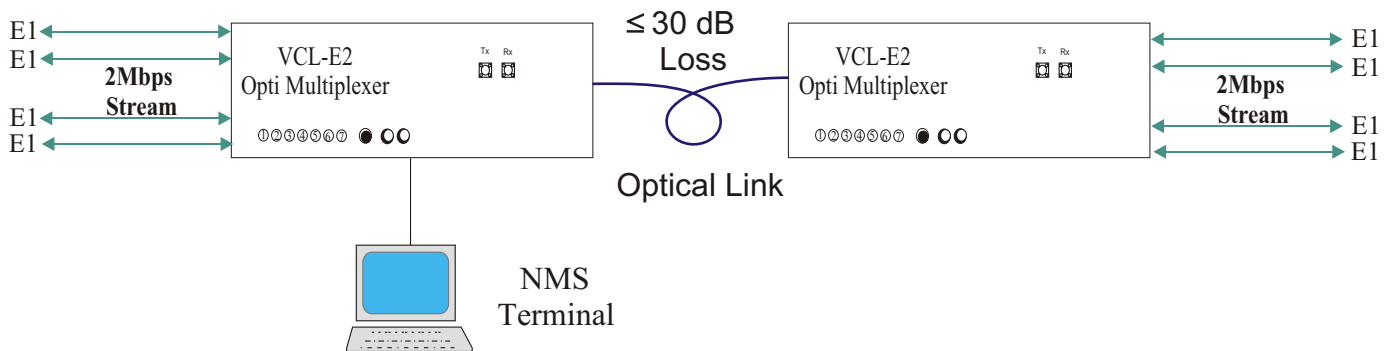


EXTERNAL INTERFACES AND CONNECTORS :

VCL Opti Multiplexer unit provides the following interfaces to the external world:

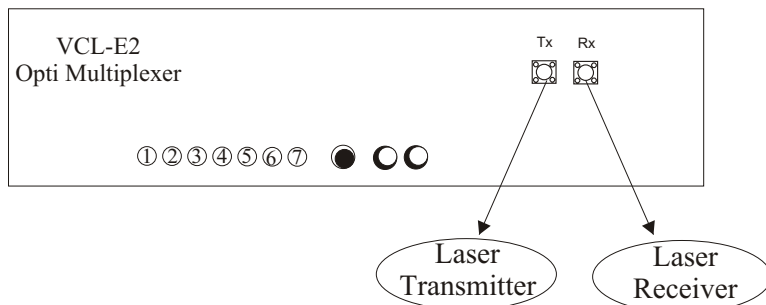
- 4, Primary rate 2Mbps & 120 Ohms balanced E1 interfaces
- 1300nm, Single Mode optical fiber interface, Tx and Rx through FC/PC Connectors
- -48V input for on-board power supply
- RS232 interface for connection to Network Management System, used for configuration and monitoring of the Opti Multiplexer system.
- 2 External alarm extensions for visual and

E2, Opti Multiplexer - Basic Application



E2, Integrated 8Mbps OLTE and Multiplexer

Front View of Shelf

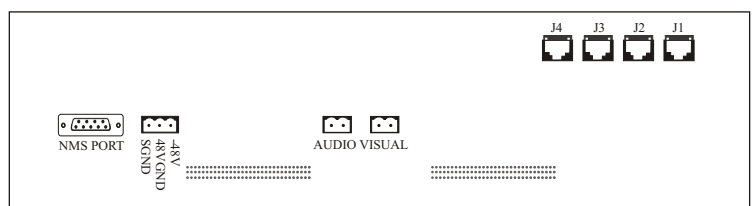


- 1 +5 VDC present
 - 2 -48 VDC present
 - 3 Loss of signal at 2Mbps - channel 4
 - 4 Loss of signal at 2Mbps - channel 3
 - 5 Loss of signal at 2Mbps - channel 2
 - 6 Loss of signal at 2Mbps - channel 1
 - 7 AIS at 8Mbps
 - 8 Optical signal - Sync
- Green = Sync., Optical signal present
Red = Loss of Sync., Optical signal absent.

Mechanical Specification

Width : 480 mm
Depth : 280 mm
Height : 90 mm
Weight : 4.20 Kg

Rear View of Shelf



ALARMS

The equipment provides the following alarms through visual indications:

- Power supply failure alarm
- Higher order loss of signal alarm
- Higher order AIS indication alarm
- Loss of frame sync alarm
- Bit error rate alarm
- Loss of signal alarm for each tributary
- Remote alarm

The equipment provides the following alarms and monitoring facilities through visual indications and Windows based GUI.

- Loss of Digital Signal (TLOS)
- Optical signal detection (SIG-DET)
- BER3
- BER6
- Laser Bias Current (LBIASC)
- Optical Loss of frame (OPLOF)
- End of Life Detect (Optical module)
- Optical Transmit disable (OPTITXDIS)
- Auto-Laser Off
- Prompt Alarm
- Loop Back detection
- The equipment provides for loop backs for diagnostic purposes

These alarm condition except PSU failure, are extended to the bay top by two potential free make contacts. These alarms, optionally, are also transmitted over the RS232 serial link.

LOOPBACKS

The card provides option to exercise the following

- Remote alarm send
- Individual tributary remote loopbacks
- Higher order local loopback
- Higher order remote loopbacks

These options can be exercised through RS232 interface and in addition through this port it is possible to inject PRBS pattern on any of the tributaries and also to check the received PRBS pattern on any tributary.

SYSTEM SPECIFICATIONS

TECHNICAL SPECIFICATIONS

2Mbps, E1 Electrical Interface

Number	1	Maximum Output Jitter	$\leq 0.05UI$
Nominal bit rate	2048kbps	Maximum Input Jitter	
Bit rate tolerance	50ppm	20Hz to 93 Hz	1.5UI
Termination Impedance	120 Ohms	700Hz to 100Hz	0.2UI
Line code	HDB3	Connectivity	RJ-45 Connectors
Frame structure	as per G.704	Cable	120 ohms, balanced
Electrical Interface	as per G.703	Permissible Attenuation	6 dB (max) @1024 Khz

Return Loss at input port:

51.2 Khz to 102.4 Khz	>12dB
102.4KHz to 2048 Khz	>18dB
2048 Khz to 3072 Khz	>14dB

8 Mbps, Optical Interface

TRANSMITTER:

Type of Transmitter	Class I Laser
Number	1
Nominal bit rate	8.448 Mbps, +/-30PPM kbps
Transmit wavelength	1310nm
Transmit output	0dBm to -3dBm (average)
Extinction ratio	>1:10
Transmit Spectral Width	<4nm

RECEIVER:

Number	1
Receiver sensitivity	-37dBm (typical) -36dBm (min)
Receive wavelength	1310nm
Operating wavelength range	1280-1335nm
Receiver dynamic range	$\leq 20dBm$
Optical Connectors	FC-PC connector

Safety

- Class I Laser
- Meets the optical safety requirements: G.958, IEC-825-1
- Auto Laser Shut Down in case of fiber break.

Power Supply

-48VDC (-40 to -60VDC) Input

Alarms:

External Alarms: Audio and Visual

Connectors:

2Mbps ports RJ-45 Female, Balanced Pair-120 Ohms

8Mbps optical FC/PC

Power Consumption

Power Consumption 7.2 watts

Technical specification are subject to change without notice.
All brand names and trademarks are the property of their respective owners.
VCL-E2 2Mbps Opti Multiplexer, Revision 03, April 20th, 2006.
Bhumika International Inc. -2006

BHUMIKA INTERNATIONAL INC.
812 - 350 WEBB DRIVE
MISSISSAUGA, ONTARIO, L5B3W4, CANADA
Phone: +1 (416) 930 2931
E-mail: info@bhumika.ca
Website: <http://www.bhumika.ca>