Smart solutions for smart networks

Version 1.2

VCL-MX-1554-RAC

QUAD IEEE C37.94 TO E1 CONVERTER

Introduction

The **VCL-MX-1554-RAC**, Quad (x4) IEEE C37.94 to E1 Converter is a ruggelized and robust, sub-station-hardened protocol converter that converts up to 4 x IEEE C37.94 interfaces to 4 x E1 interfaces. **VCL-MX-1554-RAC** supports point-to-point and point-to-multipoint applications for Differential and Distance Teleprotection.

The most common application for the **VCL-MX-1554-RAC** converter is for transmitting IEE C37.94 data over E1 network between sub-stations. By installing a **VCL-MX-1554-RAC** converter, the existing IEEE C37.94 interfaces from differential protection relays can be transmitted over the E14 network without incurring large capex or without the tiresome task of having to replace or rewire the IEEE C37.94 relays which need to be interconnected to the far end substations over E1 (SDH) transmission links.

VCL-MX-1554-RAC meets and complies with the IEC-61850-3; EMI, EMC, Surge and Temparature specifications making it suitable for sub-station installation to provide uninterrupted service even in the most demanding and harsh environments.

Latency:

- 250µs (i.e. 0.25ms) total, in an end-to-end (in a back-to-back) deployment.

E1 Interfaces Specifications

Interface per unit	4
Conformity (electrical)	ITU-T G.703
Frame structure	As per ITU-T G.704
Code	HDB3, 50% Duty Cycle
Nominal Impedance	120 Ohms Balanced 75 Ohms Unbalanced (option)
Nominal pulse width	244 ns
Pulse mask	As per ITU Rec. G.703
Jitter tolerance	As per ITU G.823
Frame alignment	As per ITU G.732

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IEEE C37.94 Interface Specifications Option #1:

Interface per unit	4 (4 Tx, 4 Rx)
Conformity (electrical)	IEEE C37.94
Optical connector	ST
Optical Transmitter	LED
Optical	820nm/850nm Multi-Mode

IEEE C37.94 Interface Specifications Option #2:

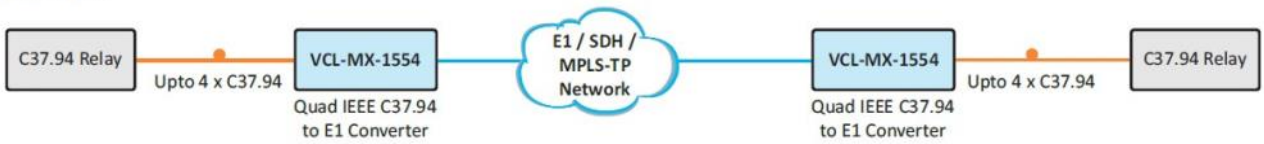
Interface per unit	4 (4 Tx, 4 Rx)
Conformity (electrical)	Modulation as per IEEE C37.94
Optical connector	LC (SFP)
Optical Transmitter	Laser
Optical	820nm/850nm Multi-Mode 1310nm/1550nm Single Mode

Management and Monitoring:

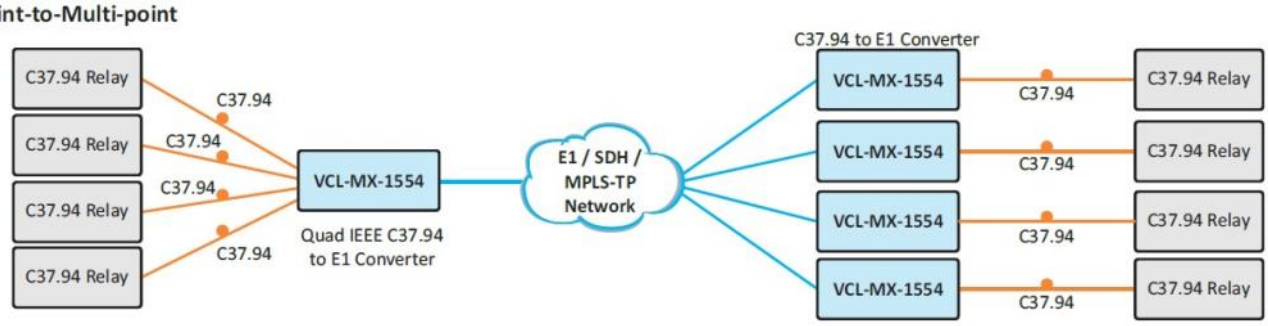
- Serial RS232 and USB interfaces for local terminal access
- 10/100BaseT Ethernet Interface for remote access over an IP network
- Encrypted Password Protection
- Telnet (with cler text disable option)
- SSH—Secure remote access using Secure Shell Protocol over IP links
- SNMPv2/SNMPv3 Traps and NMS for secure, rela time remote monitoring
- Centralised NMS option for remote monitoring and management of up to 2.000 units from central site over an IP network
- LED Alarm inicators
- Dry Contact external alarm relay o connect an external alarm on an annunciator panel, which can be wired up for either NO or NC condition

Application Diagrams:

Point-to-Point



Point-to-Multi-point



Technical Specifications

Management

- 1 x RJ45 Interface (10/100BaseT)
- Telnet (with clear text disable option)
- SSH, SNMPv2, SNMPv3
- 1 x Serial USB

Connectors

Power	Terminal Block, 2-PIN Supply Connector for DC C14 Connector for AC
IEEE C37.94 Interface	ST / LC
E1 Interface	RJ45 (F) / BNC (F) Connector

Power Supply 1+1 Redundant options

- 48 VDC; 110 VDC; 220 VDC
- 90~240 VAC, 50/60 Hz

Environmental

Operating Temperature	-20°c to +60°C
Max. Operating Humidity	95% R.H., Non-Condensing
Max. Operating Altitude	Up tp 3.000 meters above sea level
Operation	ETS 300 019 Class 3.2
Storage Temperature	-40°C to +70°C
Storage	ETS300 019 Class 1.2
Max. Storage Humidity	98% R.H., Non-condensing
Max. Storage Altitude	Up to 3.000 meters above sea level
Transporetation	ETS300 019 Class 2.3

Electromagnetic Standards Compliance

- EN 50081-2, EN 50082-2
- IEC 61000-6-2 (Immunity)
- IEC 61000-6-4 (Emission)
- Complies to IEEE and IEC standards

CE Compliance

- Low Voltage Directive 2014/35/EU
- Electromagnetic Compatibility 2014/30/EU

Other Regulatory Compliances

- RoHS, Meets CE Requirements
- Complies with FCC Part 68 and EMC FCC Part 15

EMI, EOther Regulatory Compliances

EN 50081-2	EN 50082-2	IEC 60068-2-29
IEC 61000-4-6	IEC 60068-2-2	IEC 60068-2-78
(Conducted Immunity)	IEC 60068-2-1	IEC 60068-2-14
CISPR 31 / EN55032 Class A (Conducted Emission and Radiated Emission)		
ISS 9000 (Part II Sec. 1-4, Part III Sec. 1-5, Part IV , Part 14 Sec. 1-3)		
IEC 60870-2-1	IEC 61000-4-5	IEC 61000-4-8
IEC 61000-4-3 (Radiated Immunity)	IEC 61000-4-2	IEC 61000-4-4

Mechanical Specifications

- H x W x D: 44 x 484 x 390 mm
- Weight: 2.3 Kg
- 1U, 19-Inch Rack Mountable

Ordering Information

Part #	Description
VCL-MX-1554-RAC-ST	Quad IEEE C37.94 to E1 Converter for Differential and Distance Teleprotection 19-Inch Rack Mountable Supports: • 4 x C37.94, Tx, 820nm/850nm, MM, ST • 4 x C37.94, Rx, 820nm/850nm, MM, ST • [# Add E1 Option] • [# Add Power Supply Option] **Management:** 1 x RJ45 Interface (10/100BaseT) Telnet (with clear disable option), SSH, SNMP and 1 x Serial USB **Installation Kit:** system Core Cables, Mounting Hardware, Documentation
VCL-MX-1554-RAC-LC	Quad IEEE C37.94 to E1 Converter for Differential and Distance Teleprotection 19-Inch Rack Mountable Supports: • 4 x C37.94 protocol Otptical Interface (without SFP, SFP to be ordered separately) • [# Add E1 Option] • [# Add Power Supply Option] **Management:** 1 x RJ45 Interface (10/100BaseT) Telnet (with clear disable option), SSH, SNMP and 1 x Serial USB **Installation Kit:** system Core Cables, Mounting Hardware, Documentation
# Add E1 Option	
120	4 x 120 Ohms 2.048Mbps (RJ45 Female)
075	4 x 75 Ohms 2.048Mbps E1 (BNC Female)
# Add Redundant (1+1) Power Supply Option	
AC220	100~240VAC, 50/60Hz Power Supply Input
DC048	48 VDC (18~60VDC) Power Supply Input
DC220	220 VDC (90~250VDC) Power Supply Input
# Add SFP Option	
VCL-EMOD 0469-C37	SFP Transceiver, Duplex LC, 14dB, 850nm, 1.24Miles/2Km, MM (Multi-Mode)
VCL-EMOD 0294-C37	SFP Transceiver, Duplex LC, 12dB, 1310nm, 1.24Miles/2Km, MM (Multi-Mode)
VCL-EMOD 0193-C37	SFP Transceiver, Duplex LC, 143dB, 1310nm, 9.32Miles/15Km, SM (Single Mode)
*** Add Accessories**	
VCL-HRNS 1273	Optical Patch Cord Connectorized Cable [2LC-2LC, 3m, MM]
VCL-HRNS 1301	Optical Patch Cord Connectorized Cable [2ST-2LC, 3m, MM]
VCL-HRNS 1229	Optical Patch Cord Connectorized Cable [2LC-2LC, 3m, SM]
VCL-HRNS 1247	75 Ohm Connectorized Cable [BNCM-BNCM, 3 meter]

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