

# VCL-2709

## IEEE C37.94 TO E1 CONVERTER

### INTRODUCTION:

The **VCL-2709, IEEE C37.94 to E1 Converter** is a ruggedized and robust, sub-station-hardened protocol converter that converts IEEE C37.94 data to E1 data. VCL-2709 supports point-to-point applications.



**1U high, standard 19-inch Rack Mount Version**

**VCL-2709, IEEE C37.94 to E1 equipment** includes precise clock recovery and clock re-generation functions which allows the transmission of IEEE C37.94 channels over an E1/SDH network for error free transmission.

**VCL-2709** is available in DIN Rail mount version and 1U high, standard 19-inch rack mount version.



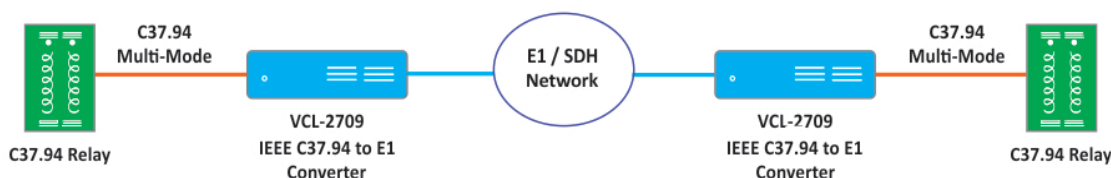
**DIN Rail Mount Version**

The most common application for the VCL-2709 converter is for augmenting legacy IEEE C37.94 data transmission over an E1 network between two sub-stations. By installing a VCL- 2709 converter, the existing IEEE C37.94 interfaces from protection relays can be transmitted over the E1 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.

- Number of C37.94 interfaces per card: 1
- Number of interfaces: 1 E1 (2.048 Mbit/s) Interface (Electrical G.703)

**VCL-2709** meets and complies with the IEC-61850-3, EMI, EMC, Surge and Temperature specifications making it suitable for sub-station installations to provide uninterrupted service even in the most demanding and harsh environments.

### Application Diagram:



### TECHNICAL FEATURES:

#### Connectors:

- Power: Terminal Block, 2-PIN Supply Connector
- IEEE C37.94 Interface: ST Connector / LC Connector (SFP)
- E1 Interface: RJ45 (F) / BNC (F) Connector

#### Power Supply:

- Internal: 48V DC (18V to 60V DC)
- External Adapters: 110V DC, 220V DC, 100~240V AC

#### C37.94 Interface Specifications:

Interfaces per card	1 Tx, 1 Rx
Standards	IEEE C37.94
Optical connector	ST or LC (SFP)
Optical Transmitter	LED
Optical	820nm/850nm Multi-Mode 1310nm/1550nm Single-Mode

#### E1 Interface Specifications:

Number of interfaces	1 E1 Interface
Conformity (electrical)	G.703
Frame structure	As per ITU (CCITT) G.704
Code	HDB3, 50 % Duty Cycle
Nominal Impedance	120 Ohms balanced / 75 Ohms Unbalanced
Nominal pulse width	244 ns
Pulse mask	As per ITU (CCITT) Rec. G.703
Jitter tolerance	As per ITU (CCITT) G.823
Frame alignment	As per ITU (CCITT) G.732

#### Regulatory Compliances:

- RoHS
- CE Marking
- Complies with FCC Part 68 and EMC FCC Part 15
- Telcordia GR-1089 Surge and Power Contact

#### MTBF:

- Per MIL-HDBK-217F: ≥ 37 years @ 24C
- Per Telcordia SSR 332, Issue 1: ≥ 42 years@ 24C

#### Chassis:

- DIN Rail Mounting
- 1U high, 19-inch Rack Mounting

**TECHNICAL SPECIFICATION:**

**Environmental:**

Operating Temperature	-20°C to +60°C
Maximum Operating Humidity	95% R.H., Non-Condensing
Maximum Operating Altitude	Up to 3,000 meters above sea Level
Operation	ETS 300 019 Class 3.2
Storage Temperature	-40C to +70C
Storage	ETS 300 019 Class 1.2
Maximum Storage Humidity	98% R.H., Non-Condensing
Maximum Storage Altitude	Up to 3,000 meters above sea Level
Transportation	ETS 300 019 Class 2.3

**EMI, EMC, Surge Withstand and other Compliances:**

EN 50081-2	EN 50082-2	IEC 60068-2-29
IEC 61000-4-6 (Conducted Immunity)	IEC 60068-2-2	
IEC 60068-2-78	IEC 60068-2-1	IEC 60068-2-14
CISPR 32 / EN55032 Class A (Conducted Emission and Radiated Emission)		
IS 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 61000-4-2
IEC 61000-4-3 (Radiated Immunity)	IEC 61000-4-8	IEC 61000-4-4
Telcordia GR-1089 Surge and Power Contact		

**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

**Mechanical Specifications:**

**DIN Rail Mount Version**

- H x W x D: 72.0mm x 190.0mm x 177.0mm
- Weight: 1.5 KG

**1U, 19-inch Rack Mount Version**

- H x W x D: 44.0mm x 484.0mm x 177.0mm
- Weight: 3.0 KG

**ORDERING INFORMATION:**

Part No.:	Description
VCL-2709-DIN-ST	IEEE C37.94 to E1 Converter DIN Rail Mount Version - 1 x C37.94, Tx, 820nm, MM, ST - 1 x C37.94, Rx, 820nm, MM, ST
VCL-2709-DIN-LC	IEEE C37.94 to E1 Converter DIN Rail Mount Version - 1 x IEEE C37.94 modulation 820nm/1310nm/1550nm Optical Interface <b>(SFP to be ordered separately)</b>
VCL-2709-RAC-ST	IEEE C37.94 to E1 Converter 19-Inch, Rack Mount Version - 1 x C37.94, Tx, 820nm, MM, ST - 1 x C37.94, Rx, 820nm, MM, ST
VCL-2709-RAC-LC	IEEE C37.94 to E1 Converter 19-Inch, Rack Mount Version - 1 x IEEE C37.94 modulation 820nm/1310nm/1550nm Optical Interface <b>(SFP to be ordered separately)</b>

**[# Add E1 and Power Supply]**

- Management: Serial Interface (USB)
- Installation Kit: System Core Cables, Mounting Hardware, Documentation, User Manual

**Select SFP option from below:**

VCL-EMOD 0469-C37	SFP Transceiver, Duplex LC, 14dB, 820nm, 1 Mile / 2Km, MM
VCL-EMOD 0193-C37	SFP Transceiver, Duplex LC, 13dB, 1310nm, 9 Miles / 15Km, SM

**Add E1 Option (Any One):**

120	1 x E1 (120 Ohms, RJ45 F) port
075	1 x E1 (75 Ohms, 2xBNC F) port

**Add Power Supply Option - DIN Rail:**

DC018060	1 x 18~60V DC (48V DC nominal) Power Supply Input
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**Add Power Supply Option - 19-inch Rack: (Any One)**

AC220	1 x 110~240V AC Power Supply Input
AC220R	2 x 110~240V AC Power Supply Input [Redundant]
DC048	1 x 48V DC Power Supply Input
DC220	1 x 110~250V DC Power Supply Input
DC048R	2 x 48V DC Power Supply Input [Redundant]
DC220R	2 x 110~250V DC Power Supply Input [Redundant]

**Add Power Supply Option - DIN Rail**

VCL-EMOD 0444-AC220	External Power Supply - DIN Rail Mount Power Supply (External) AC to DC Converter, DRL30-24-1, DIN Rail Mount: - Input : 1 x AC Input [90~240V AC, 50-60Hz] Output: 1 x DC Output [24VDC~1.25A, 30W]
VCL-EMOD 0444-DC220	External Power Supply - DIN Rail Mount Power Supply (External) DC to DC Converter, DRL30-24-1, DIN Rail Mount: - Input: 1 x DC Input [110~250V DC] Output: 1 x DC Output [24VDC~1.25A, 30W]



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