

### Introduction:

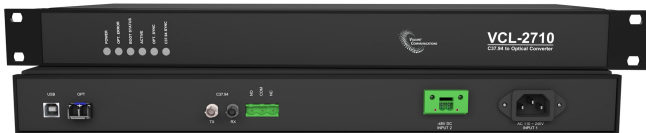
The **VCL-2710, IEEE C37.94 Multi-Mode to Single Mode Optical Converter** is a ruggedized, sub-station-hardened converter that converts IEEE C37.94 Multi-Mode signal to Optical Single-Mode Optical signal. The equipment is designed to extend IEEE C37.94 multi-mode signals over extended single-mode optical fiber spans. The VCL-2710, IEEE C37.94 Multi-Mode to Single Mode Optical Converter includes the clock synchronization and clock re-generation functions which allows it to transmit the IEEE C37.94 multi-mode signal over very long single-mode optical fiber links of up to 50dB optical link loss budget (i.e. typical reach of 167 Miles / 270 Kms).

VCL-2710 is designed for use in point-to-point applications. The VCL-2710 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.

VCL-2710 is available in DIN Rail mount version and 1U high, standard 19-inch rack mount version.

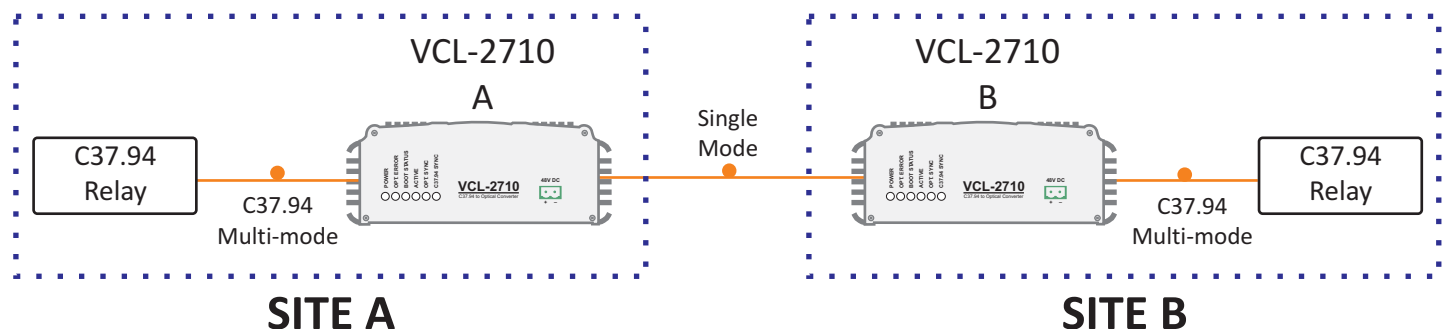


**DIN Rail Mount Version**



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

### Application Diagram



### Features:

- Complies to IEEE C37.94 protocol
- Power Budget 13dB to 50dB in Single Mode
- Single and 1+1 redundant power supply option

The most common application of the VCL-2710 is to allow the user to transmit the existing IEEE C37.94 multi-mode interface over a single-mode optical fiber link without the need to install any additional multiplexers or transmission equipment, which would otherwise be required to inter-connect the IEEE C37.94 Relays between near-end and the far-end substations.

### Technical Specifications:

#### Connectors

Power	Terminal Block, 2-PIN Supply Connector
IEEE C37.94 Interface	ST Connector
Optical Interface	SFP Module
External Alarm	Terminal Block, 3-PIN Connector

#### Chassis:

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

#### Power Supply

- 48V DC (18V to 60V DC)
- 110V DC, 220V DC, 100~240V AC
- Redundant 1+1 power supply option available in 19-inch Rack Mount Version

#### C37.94 Interface Specifications

Number of interfaces per card	1 Tx, 1 Rx
Standards	IEEE C37.94
Optical	820nm / 850nm Multi-Mode
Optical Connector	ST
Optical Transmitter	LED

**Technical Specification:****Optical Interface Specifications**

Optical Module Type	SFP
Connector	LC
Fiber	Single-mode 1310 nm, 1550 nm
Distance	≤ 15 KM, ≤40 KM, ≤80 KM, ≤160 KM, ≤180 KM, ≤200 KM, ≤260 KM, ≤270 KM (typical reach)
Type	Laser

**Environmental**

Operating Temperature	-20°C to +60°C
Maximum Operating Humidity	95% R.H., Non-Condensing
Maximum Operating Humidity	Humidity
Maximum Operating Humidity	Up to 3,000 meters above sea Level Altitude
Operation	Complies with ETS 300 019 Class 3.2
Storage Temperature	-40C to +70C
Storage	Complies with ETS 300 019 Class 1.2
Maximum Storage Humidity	98% R.H., Non-Condensing
Maximum Storage Humidity	Up to 3,000 meters above sea level Altitude
Transportation	Complies with 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 60068-2-6	IEC 60068-2-2
IEC 60068-2-78	IEC 60068-2-1	IEC 60068-2-14
CISPR 32 / EN55022 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 61000-4-3 (Radiated Immunity)	IEC 61000-4-8	
IEC 61000-4-2	IEC 61000-4-10	Telcordia GR-1089 Surge and Power Contact
IEC 61000-4-4	IEC 61000-4-11	

**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:**

- Immunity as per EN 60255-26
- Low voltage directive as per EN 60255-27

**Other Regulatory Compliances:**

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

**Ordering Information:**

Part No.	Description:
VCL-2710-DIN-DC018060	VCL-2710, IEEE C37.94 Multi-Mode to Single-Mode Converter DIN Rail Mount Version Supports: - 1 x C37.94 Optical INPUT Interface [850nm, MM, ST connector] - 1 x C37.94 protocol compliant Optical OUTPUT Interface (Without SFP) - 1 x 18~60V DC (48V DC nominal) Power Supply Input - Management: Serial Interface (USB, RS-232) - Installation Kit: System Core Cables, Mounting Hardware, Documentation, User Manual
VCL-2710-RAC	VCL-2710, IEEE C37.94 Multi-Mode to Single-Mode Converter 19-Inch, Rack Mount Version Supports: - 1 x C37.94 Optical INPUT Interface [850nm, MM, ST connector] - 1 x C37.94 protocol compliant Optical OUTPUT Interface (Without SFP) - Management: Serial Interface (USB, RS-232) - Installation Kit: System Core Cables, Mounting Hardware, Documentation, User Manual [# Add Power Supply]

**# 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]

**# Add Power Supply Option 19-inch Rack Mount (any one option):**

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]

## # Select SFP option from below:

VCL-EMOD 0193-C37	SFP Transceiver, Duplex LC, 13dB, 1310nm, 9 Miles / 15Km, SM (Single-Mode)
VCL-EMOD 0194-C37	SFP Transceiver, Duplex LC, 29dB, 1310nm, 25 Miles / 40Km, SM (Single-Mode)
VCL-EMOD 0217-C37	SFP Transceiver, Duplex LC, 34dB, 1550nm, 49 Miles / 80Km, SM (Single-Mode)
VCL-EMOD 0402-C37	SFP Transceiver, Duplex LC, 36dB, 1550nm, 99 Miles / 160Km, SM (Single-Mode)
VCL-EMOD 0171-C37	SFP Transceiver, Duplex LC, 46dB, 1550nm, 111 Miles / 180Km, SM (Single-Mode)
VCL-EMOD 0244-C37	SFP Transceiver, Duplex LC, 47dB, 1550nm, 124 Miles / 200Km, SM (Single-Mode)
VCL-EMOD 0364-C37	SFP Transceiver, Duplex LC, CWDM, 46dB, 1550nm, 161 Miles / 260Km, SM (Single-Mode)
VCL-EMOD 0490-C37	SFP Transceiver, Duplex LC, CWDM, 50dB, 1550nm, 167 Miles / 270Km, SM (Single-Mode)

## Mechanical Specifications:

## DIN Rail Mount Version

Width	190.0 MM
Height	72.0 MM
Depth	176.5 MM
Weight	1.5 KG

## Mechanical Specifications:

## 1U, 19-inch Rack Mount Version

Width	484 MM
Height	44.0 MM
Depth	252 MM
Weight	3.5 KG

Technical specifications are subject to changes without notice.

All brand name and trademarks are the property of their respective owners.

Revision – 2.0, July 20, 2020

## U.S.A.

Valcomm Technologies Inc.  
4000 Ponce de Leon Blvd.,  
Suite 470, Coral Gables,  
FL 33146, U.S.A.

**E-mail:** us@valiantcom.com

## U.K.

Valiant Communications (UK) Ltd  
Central House Rear Office  
124 High Street, Hampton Hill  
Middlesex, TW12 1NS, U.K.

**E-mail:** gb@valiantcom.com

## INDIA

Valiant Communications Limited  
71/1, Shivaji Marg,  
New Delhi - 110015,  
India

**E-mail:** mail@valiantcom.com