VCL-2710, IEEE C37.94
Multi-Mode to Single Mode Optical Converter

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.

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.

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

DIN Rail Mount Version

1U high, standard 19-inch Rack Mount Version

Technical Specifications:

Connector

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

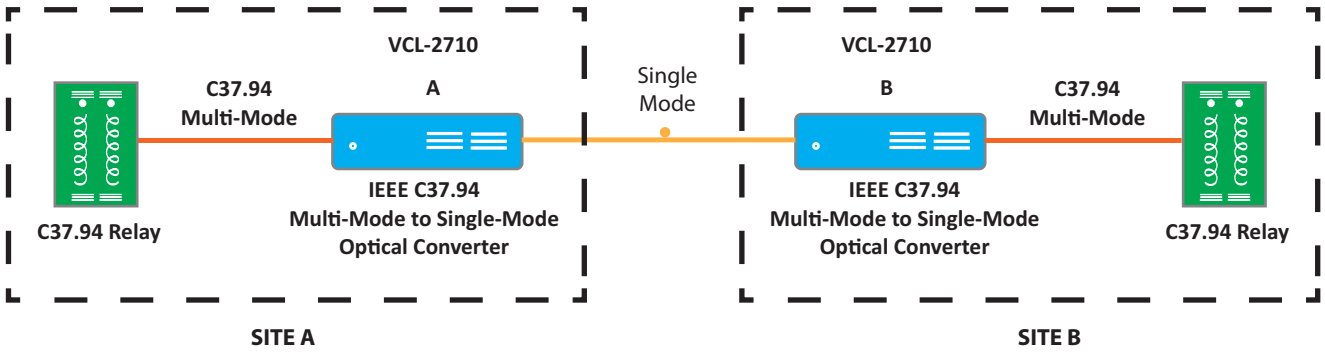
Power Supply

- 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

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

Application Diagram



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	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 Altitude	Up to 3,000 meters above sea level
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 60068-2-2	IEC 60068-2-78
IEC 60068-2-1	IEC 60068-2-14	IEC 60870-2-1
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 61000-4-5	IEC 61000-4-2	IEC 61000-4-8
IEC 61000-4-3 (Radiated Immunity)		IEC 61000-4-4

Electromagnetic Standards Compliance:

- EN 50081-2, EN 50082-2
- IEC 61000-6-2 (Immunity)
- IEC 610000-6-4 (Emission)
- Complies to IEEE and IEC standards

CE Compliance:

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

Other Regulatory Compliances:

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

MTBF:

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

Mechanical Specifications:

DIN Rail Mount Version

- H x W x D: 72.0mm x 190.0mm x 176.5mm
- Weight: 1.5 KG

1U, 19-inch Rack Mount Version

- H x W x D: 44.0mm x 484.0mm x 177.0mm
- Weight: 2.9 KG

Ordering Information:

Part No.	Description:
VCL-2710-DIN-DC018060	VCL-2710, IEEE C37.94 Multi-Mode to Optical Converter DIN Rail Mount Version 1 x 18~60V DC (48V DC nominal) Power Supply Input
VCL-2710-RAC	VCL-2710, IEEE C37.94 Multi-Mode to Optical Converter 19-Inch, Rack Mount Version
Supports:	- 1 x C37.94 Optical INPUT Interface [850nm, MM, 2 x ST (Tx/Rx) connector] - 1 x 1310nm/1550nm (SM) Optical OUTPUT Interface (Without SFP) - Management: Serial Interface (USB) - Installation Kit: System Core Cables, Mounting Hardware, Documentation, User Manual [# Add Power Supply]

 # Add Power Supply Option - DIN Rail (Optional):

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)

Technical specifications are subject to changes without notice.
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