Introduction:

The VCL-2710, IEEE C37.94 to Optical Converter / C37.94 Optical Repeater is a ruggedized, sub-station-hardened converter which converts IEEE C37.94 Multi-Mode signal to Optical Single Mode Optical signal. VCL-2710, IEEE C37.94 to Optical Converter includes the clock receiver, clock generation and clock re-generation functions which allows it to transmit the IEEE C37.94 Multi-Mode signal over a Single-Mode optical fiber link of up to 90 Miles / 150 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, C37.94 to Optical Converter:

The most common application for the VCL-2710 converter is transmit the IEEE C37.94 Multi-Mode signal over an extended single-mode optical fiber link. By simply installing a VCL-2710 converter, the existing IEEE C37.94 data can be transmitted over a single mode optical fiber link without the need to install additional multiplexer 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:

<table>
<thead>
<tr>
<th>Power</th>
<th>Terminal Block, 2-PIN Supply Connector</th>
</tr>
</thead>
<tbody>
<tr>
<td>IEEE C37.94 Interface</td>
<td>ST Connector</td>
</tr>
<tr>
<td>Optical Interface</td>
<td>SFP Module</td>
</tr>
<tr>
<td>External Alarm</td>
<td>Terminal Block, 3-PIN Connector</td>
</tr>
</tbody>
</table>

Chassis:

- DIN Rail Mounting.

Power supply:

<table>
<thead>
<tr>
<th>Power Supply Options (Internal)</th>
<th>24V DC, range 9V DC ~ 36V DC (option)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power Supply Options (External Adapters)</td>
<td>48V DC, range 18V DC ~ 76V DC (Option)</td>
</tr>
<tr>
<td>Power Supply Options (External Adapters)</td>
<td>110V DC and 220V DC</td>
</tr>
</tbody>
</table>

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

Optical Interface Specifications:

- Optical Module Type: SFP
- Connector: LC
- Fiber: Single-mode 1310 nm, 1550 nm
- Distance: ≤ 15 KM, ≤40 KM, ≤80 KM, ≤120 KM, ≤150 KM
- Type: Laser
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**: Complies with ETS 300 019 Class 3.2
- **Storage Temperature**: -40°C to +70°C
- **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**
- **IEC 61000-4-6** (Conducted Immunity)
- **IEC 60068-2-78**
- **CISPR 22 / EN50022 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 61000-4-4**
- **IEC 61000-4-11**
- **GR-1089 Surge and Power Contact**
- **CISPR 22 / EN55022 Class A**
- **ISO 9001 (Part II Sec. 1-4, Part III Sec. 1-5, Part IV, Part 14 Sec. 1-3)**

Chassis:
- RoHS
- CE Marking
- Complies to IEEE and IEC standards
- Complies with FCC Part 68 and EMC FCC Part 15 and CISPR 22 Class A
- Operation ETS 300 019 Class 3.2
- Operation ETS 300 019 Class 3.2
- Transportation ETS 300 019 Class 2.3

Mechanical Specifications

- **Width**: 190.0 MM
- **Height**: 69.0 MM
- **Depth**: 176.5 MM
- **Weight**: 1.5 KG

Ordering Information (Base Unit):

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>VCL-2710-TP-RX-DC024</td>
<td>VCL-TP-RX, C37.94 Optical Repeater / Optical Converter 19-inch, Rack Mount version</td>
</tr>
<tr>
<td>VCL-2710-TP-RX-DC048</td>
<td>VCL-TP-RX, C37.94 Optical Repeater / Optical Converter 19-inch, Rack Mount version</td>
</tr>
</tbody>
</table>

Optional:

- **VCL-EMOD 0444-ACDC 110-220**
  - External Power Supply - DIN Rail Mount Power Supply (External) AC to DC / DC to DC Converter, DRL30-24-1, DIN Rail Mount: may be used to convert:
  - Input 1 x AC Input [90~240V AC, 50-60Hz] or
  - Input 1 x DC Input [110~250V DC]
  - Output 1 x DC Output [24VDC±1.25A, 30W]

Note: 110V AC / 110V DC to 24V DC Converter: External Power Supply - DIN Rail Mount

Select SFP option from below:

- **VCL-EMOD 0262-TP**: Duplex LC, 850nm, 2Km, MM (Multi-Mode)
- **VCL-EMOD 0294-TP**: Duplex LC, 1310nm, 2Km, MM (Multi-Mode)
- **VCL-EMOD 0193-TP**: Duplex LC, 1310nm, 15Km, SM (Single-Mode)
- **VCL-EMOD 0194-TP**: Duplex LC, 1310nm, 40Km, SM (Single-Mode)
- **VCL-EMOD 0348-TP**: Duplex LC, 1550nm, 40Km, SM (Single-Mode)
- **VCL-EMOD 0217-TP**: Duplex LC, 1550nm, 80Km, SM (Single-Mode)
- **VCL-EMOD 0402-TP**: Duplex LC, 1550nm, 120Km, SM (Single-Mode)
- **VCL-EMOD 0171-TP**: Duplex LC, 1550nm, 150Km, SM (Single-Mode)

Technical specifications are subject to changes without notice.
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