



# ORION TELECOM NETWORKS INC.

## VCL-Ethernet over SDH (Ethernet over STM-1)

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### Product Brochure

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## Product Overview

Orion's Ethernet over SDH (STM-1) Equipment is a modular platform unit with two pluggable 155.52Mbps optical / electrical interfaces, which may be used in a point-to-point, chain or ring application to provide a compact, cost effective and flexible solution to deliver multiple Ethernet channels.



**VCL-Ethernet over SDH (STM-1)**

Interface card options include the 4x100BaseT Ethernet interface card (1 VCG, 4 Ports 1 Channel), 4x100BaseT Ethernet interface card (4 VCG, 4 Ports 4 Channels) and Gigabit Ethernet interface card options along with Engineering Order Wire is available. The user removable / replaceable STM-1 Optical / Electrical interface option makes it easy to meet various and changing user requirements. Orion's STM-1, Ethernet and Gigabit Ethernet over SDH Transmission Equipment provides full capability to cross-connect at E1 level between all tributaries. The equipment can be used as Terminal Multiplexer (TM) to build a point-to-point, chain or ring SDH transmission network.

## Features

- 1U height, 19-Inch standard rack-mountable chassis
- Service interfaces
  - › 2 x STM-1 optical interfaces, MSA compliant SFP (pluggable) optical module (LC connector) based design, which supports onsite optical port replacement
  - › 2 x STM-1 electrical interfaces, SFP electrical module (Mini BNC connector) Optional
  - › 4 x 10/100BaseT Ethernet (electric) interface
  - › 10/100BaseT (FE) Ethernet Interface Options
    - ✓ 4 Ports, 4 Channels (4 VCG), and
    - ✓ 4 Ports, 1 Channel (1 VCG)
  - › 1 x GigE (Gigabit) Ethernet interface Options
    - ✓ Optical GigE (Gigabit) Ethernet interface,
    - ✓ Electrical 1000BaseT (Gigabit) Ethernet Interface
- Provides complete diagnostics facilities to the user for monitoring optical ports and provide reading of optical transmit power, optical receive power, laser temperature, bias current in voltage alarms etc.
- Performance Monitoring and Alarms - Error counts for B1, B2, B3
- Performance Analysis - Error Seconds (ES), Several Error Seconds (SES), Unavailable seconds UAS, Higher Order Virtual Container - Remote Error Indication (HOVC-REI), Higher Order Virtual Container - Pointer Justification Event (HOVC-PJE)
- Management and Maintenance interfaces
  - › 10/100BaseT Ethernet management interface
  - › RS232 serial management interface
  - › Remote (Telnet) management interface
  - › Windows XP based Graphical User Interface (GUI)
  - › Windows 7 based Graphical User Interface (GUI)
  - › SNMP V2 Monitoring
  - › Engineering Order Wire (EOW) interface (RJ-11)
  - › NMS (Network Management System) for monitoring multiple units from a single / central location.

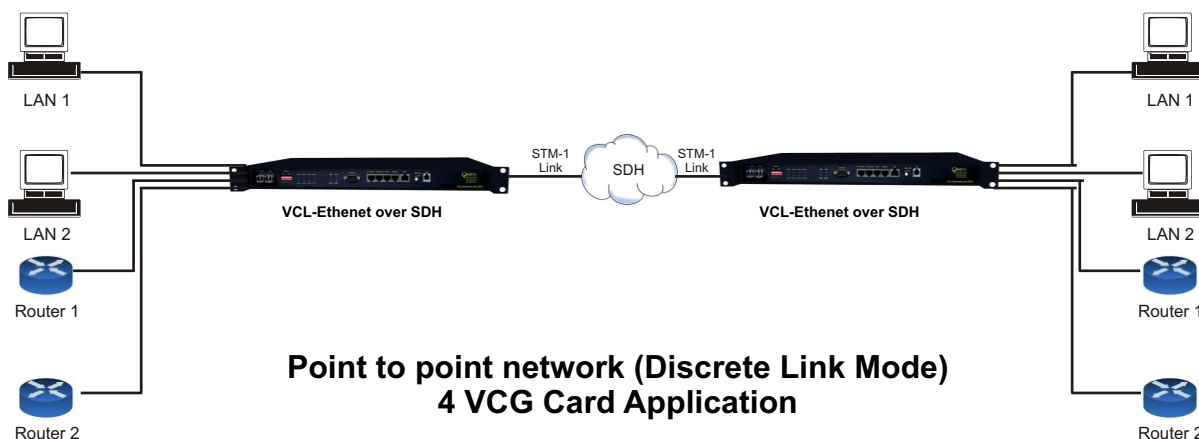
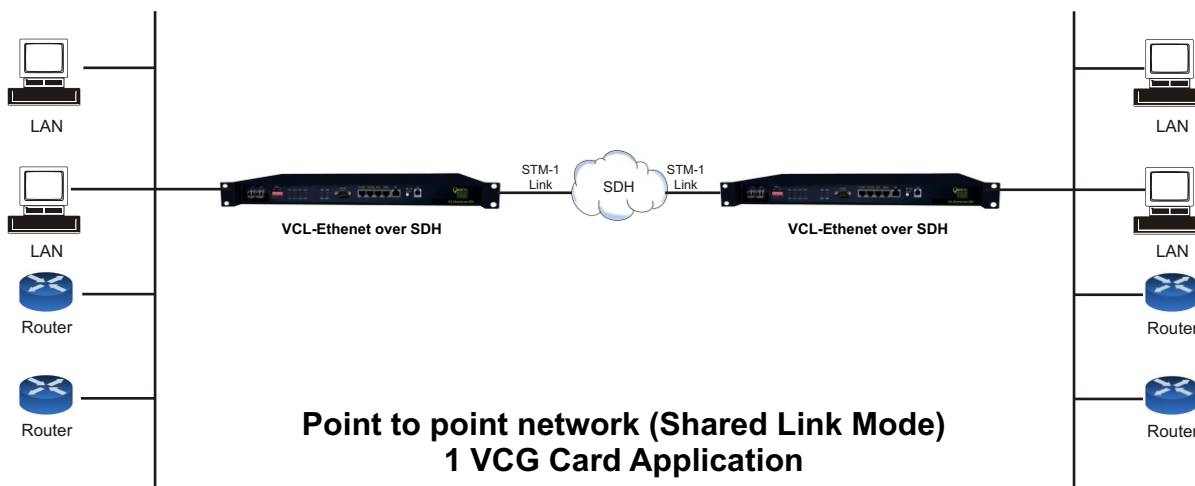
## Features

- Timing mode
  - › Synchronization with STM-1 line timing
  - › External timing source option - 120 Ohms 2Mbps (External Bits Clock)
  - › External timing source - 120 Ohms 2MHz (External TTL Clock) - Factory Configurable
  - › Internal Clock - ITU-T G.813 internal oscillator (Stratum 3)
  - › The timing source can be auto-switched according to default or operator programmed settings
- Ethernet Standards Conformity
  - › Generic Framing Procedure GFP-F compliant with ITU-T G.7041
  - › VCAT compliant with ITU-T G.707 and LCAS compliant with ITU-T G.7042
  - › Ethernet flow control on WAN port and LAN port
  - › Large buffer size upto 410,000 bytes
  - › Maximum Frame length (MTU size):1536 bytes with 4 port 1 channel (1 VCG) Ethernet Card
  - › Maximum Frame length (MTU size):2036 bytes with 4 port 4 channel (4 VCG) Ethernet Card
  - › Auto MID/MID-X for Ethernet Interfaces
  - › Support 802.1Q based VLAN tagging (4 ports 1 channel (1 VCG) Ethernet Card only)
  - › Support Port based VLAN tagging (4 ports 1 channel (1 VCG) Ethernet Card only)
  - › Performance Analysis
    - ✓ All Received Packets
    - ✓ All Transmitted Packets
    - ✓ Received Dropped Packets
- Supports 1+1 Line Protection and Automatic Protection Switching (APS) with less than 50ms recovery
- Supports point-to-point, ring and chain topology (4 VCG card only)
- Local management and network-based management via a unified platform
- Supports Remote Power Down Detection and Auto Laser Shutdown
- Supports STM-1 loop-back for troubleshooting
- 850nm multi-Mode, 1310nm Single Mode and 1550nm Single Mode optical interface options offered
- Ethernet mapping adopts GFP/VC-12 virtual concatenated technology; according with MSTP criterion
- Provides Ethernet over SDH mapping through standard GFP and VC-12 virtual concatenation (VCAT)
- Ethernet bandwidth can be adjusted by the user between 2Mbps ~126 Mbps (VC-12 mapping)
- Supports MAC Address list filtration, learning and updating function
- Easy to operate
- Redundant power supply card options AC+DC, DC+DC and AC+AC.
  - › 110V AC - 240V AC (50/60 Hz) power options available
  - › -48VDC power option available
  - › -24VDC power option available
- Power consumption less than 12W.

### Alarm and Indicator Monitoring

- Power Indicator
- Current Status (integrity and activity) Indicator
- Urgent Alarm Indicator
- Minor Alarm Indicator
- Optical Signal Loss Alarm Indicator
- Remote Device Power-down Indicator
- Ethernet Card Status Indicator
- General Alarm Indicator for Ethernet Card (including Link-down of Ethernet Port)
- Auto Laser Shutdown (ALS) Indicator
- Engineering Order-Wire (EOW) Indicator
- Ethernet Link Indicator
- Ethernet Speed Indicator
- Dry contact via 9-pin, D-type male connector
- Buzzer Alarm
- SNMP Diagnostic and Monitoring

### Network Application



## Technical Specifications

### Network Topology and Interfaces

Network topology	Point to point network, Ring and Chain
Service interfaces	STM-1 SDH single optical or double optical ports (1+1 protection) supported - 10/100BaseT Ethernet - 10/100/1000BaseT or 1000Base-FX GigE

### STM-1 Electrical Interface - Technical Specifications

Data Rate	155.52 Mbps
Standard	ITU-T G.703 Compliant
Line Code	CMI
Physical Connector	Mini BNC
Automatic 1+1 line protection	Less than 50 ms switching / recovery

### STM-1 Optical Interface - Technical Specifications

Data Rate	155.52 Mbps
Standard	ITU-T G.957 compliant
Bit rate	155.520Mbps
Coding	NRZ
Connector	LC
Light source	Class 1 Laser
Wave length	850nm/1310nm/1550nm (optional) - 1310nm Std.
Transmit power	S 1.1, L 1.1, L 1.2 (- 11 dBm to - 2.5 dBm - as may be ordered)
Receive sensitivity	S 1.1, L 1.1, L 1.2 (- 28 dBm to - 34 dBm - as may be ordered)
Automatic 1+1 Line Protection	Less than 50 ms switching / recovery
Automatic Laser Shut Down Option	User selectable options

### STM-1 Monitoring and Performance Analysis

Performance Monitoring and Alarms	Error counts for B1, B2, B3
Performance Analysis	Error Seconds (ES), Several Error Seconds (SES), Unavailable Seconds UAS, Higher Order Virtual Container - Remote Error Indication (HOVC-REI), Higher Order Virtual Container - Pointer Justification Event (HOVC-PJE)

### Optical Interfaces

Type	Wavelength (nm)	Mean launched power (dBm)	Receiver sensitivity (dBm)	Receiver overload (dBm)	Connector	Configuration
Double fibers, Two Direction	1310	-8 ~ -12	-36	-3	LC	Standard (S1.1)
	1310	0 ~ -5	-36	-3	LC	Optional (L1.1)
Single fiber, One Direction	1310/1550	-8 ~ -14	-30	-3	LC	Optional
	1310/1550	0 ~ -5	-30	-3	LC	Optional

### 1 VCG - Ethernet Interface Specification: 10/100BaseT (Electrical)

Number of Interfaces	4
Number of VCG/Channel	1
Interface Types	10/100BaseT
Ethernet Mode	Half/Full
MDI/MDI-X Support	Yes
VCAT Compliance	ITU-T G.707
LCAS Compliance	ITU-T G.7042
GFP-F	ITU-T G.7041
Frame Size	1536 bytes
Transmission Bit Rate	10/100 Mbps
Connectors	RJ-45 Electrical
802.1Q MAC packet transparent transmission supported	
Ethernet data rate can be adjusted from 2M to 100M	

#### 4 VCG - Ethernet Interface Specification: 10/100BaseT (Electrical)

Number of Interfaces	4
Number of VCG/Channels	4
Interface Types	10/100BaseT
Ethernet Mode	Half/Full
MDI/MDI-X Support	Yes
VCAT Compliance	ITU-T G.707
LCAS Compliance	ITU-T G.7042
GFP-F	ITU-T G.7041
Frame Size	2036 bytes
Transmission Bit Rate	10/100 Mbps
Connectors	RJ-45 Electrical
802.1Q MAC packet transparent transmission supported	
Ethernet data rate can be adjusted from 2M to 126M	

#### GigE - Ethernet Interface Specification

Number of Interfaces	2 Electrical (Comply with IEEE 802.3ab)
	1 Optical - Optional (Comply with IEEE 802.3z)
Interface Types	10/100/1000BaseT or 1000Base-FX (LC)
MDI/MDI-X Support	Yes (Electrical port)
VCAT Compliance	ITU-T G.707
LCAS Compliance	ITU-T G.7042
GFP-F	ITU-T G.7041
Frame Size	1552 bytes
Transmission Bit Rate	10/100/1000 Mbps
Connectors	RJ-45 Electrical / LC - Optical
802.1Q MAC packet transparent transmission supported	
Ethernet data rate can be adjusted from 2M to 126M	

#### Ethernet port (1 VCG/4 VCG/GigE) Performance Analysis

- All Received Packets
- All Transmitted Packets
- Received Dropped Packets

### Clock Synchronization Options

Clock Synchronization options	Synchronization with STM-1 line timing
	External timing source option - 120 Ohms 2Mbps (External Bits Clock)
	External timing source - 120 Ohms 2MHz (External TTL Clock) - Factory Configurable
	Internal Clock - ITU-T G.813 internal oscillator (Stratum 3)
	The timing source can be auto-switched according to default or operator programmed settings

### Engineering Order Wire (EOW)

Engineering Order Wire (EOW)	RJ-11 connector
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### NMS

- Graphical User Interface (GUI) Windows XP / Windows Vista compatible
- SNMP V2 based NMS

### Power Supply Options

DC Mains Input	- 48VDC (range -36V DC to -75V DC)
AC Main Input	100V AC to 240V AC, 50 / 60 Hz
Power Protection	1+0 (AC, DC), 1+1 (AC+AC, AC+DC, DC+DC)
Power Consumption	< 12 Watts

### Operating Conditions

Ambient temperature	-10°C ~ +60°C
Relative humidity	<90% (Non condensing)

### Mechanical Specifications

Rack Mounting	Standard 19 Inch. DIN Rack
Height	44 mm.
Depth	256 mm.
Width	440 mm.
Weight	3.25 kg

### Ordering Information

S. No.	Part	Description
1	VCL-ETH-o-SDH	Ethernet over SDH (STM-1) - Optical/Electrical (Without interfaces or power supply). 1U high, 19" Rack Mount Version.

Specify the following options before ordering:

#### STM-1 Port Options

S. No.	Part	Description
1	OPT-1+0-1310-20KM	1 x Optical SFP - 1310nm, 20KM S1.1 (LC)
2	OPT-1+1-1310-20KM	2 x Optical SFP - 1310nm, 20KM S1.1 (LC)
3	OPT-1+0-1310-40KM	1 x Optical SFP - 1310nm, 40KM L1.1 (LC) - <b>Std.</b>
4	OPT-1+1-1310-40KM	2 x Optical SFP - 1310nm, 40KM L1.1 (LC)
5	OPT-1+0-1550-80KM	1 x Optical SFP - 1550nm, 80KM L1.2 (LC)
6	OPT-1+1-1550-80KM	2 x Optical SFP - 1550nm, 80KM L1.2 (LC)
7	OPT-1+0-1550-120KM	1 x Optical SFP - 1550nm, 120KM L1.2 (LC)
8	OPT-1+1-1550-120KM	2 x Optical SFP - 1550nm, 120KM L1.2 (LC)
9	ELE-1+0	1 x Electrical SFP (mini BNC)
10	ELE-1+1	2 x Electrical SFP (mini BNC)

#### Ethernet Options

S. No.	Part	Description
1	4ETH-1VCG	1 x 4 Ethernet Card- 1 Channel, 4 Ethernet Ports (RJ-45)
2	4ETH-4 VCG	1 x 4 Ethernet Card- 4 Channel, 4 Ethernet Ports (RJ-45)- <b>Std</b>
3	GigE-opt	1 x Gigabit Optical Ethernet Card- (LC)
4	GigE-elec	1 x Gigabit Electrical Ethernet Card- (RJ-45)

#### Power Supply Options

S. No.	Part	Description
1	DC-1+0-24	1 x DC Input - 24VDC (range 18V to 36V)
2	DC-1+0-48	1 x DC Input - 48VDC (range 36V to 75V) - <b>Std.</b>
3	DC-1+1-24	1+1 (redundant) DC Inputs - 48VDC (range 18V to 36V)
4	DC-1+1-48	1+1 (redundant) DC Inputs - 48VDC (range 36V to 75V)
5	AC-1+0	1 x AC Mains Input 110Volts-240 Volts, 50Hz/60Hz
6	AC-1+1	1+1 (redundant) AC Mains Input 110Volts-240 Volts, 50Hz/60Hz.

**Note:** Std. denotes Standard configuration

Note: \_\_\_\_\_

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Technical specifications are subject to changes without notice.  
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