



# ORION TELECOM NETWORKS INC.

## STM-1 63 E1 (Optical / Electrical) Add-Drop SDH Multiplexer

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### Product Brochure

#### **Headquarters: Phoenix, Arizona**

#### **Orion Telecom Networks Inc.**

20100, N 51st Ave, Suite B240,  
Glendale AZ 85308  
Phone: +1 480-816-8672  
Fax: +1 480-816-0115  
**E-mail:** [sales@oriontelecom.com](mailto:sales@oriontelecom.com)  
**Website:** <http://www.oriontelecom.com>

#### **Regional Office: Miami, Florida**

#### **Orion Telecom Networks Inc.**

4000 Ponce de Leon Blvd. Suite 470,  
Coral Gables, FL 33146 U.S.A.  
Phone: 1-305-777-0419,  
**Fax:** 1-305-777-0201  
**E-mail:** [sales@oriontelecom.com](mailto:sales@oriontelecom.com)  
**Website:** <http://www.oriontelecom.com>

## Product Overview

STM-1 63 E1 (Optical / Electrical) Add-Drop SDH Multiplexer unit is a modular platform unit with two 155.52Mbps optical / electrical interfaces, which may be used in a point-to-point, chain or ring application to provide an ultra-compact, cost effective and flexible service platform.



**STM-1 63 E1 (Optical / Electrical)  
Add-Drop SDH Multiplexer**

63xE1 interfaces (120 Ohms [RJ-45] and 75 Ohms [BNC]) 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(SDH) Transmission Equipment provides full capability to cross-connect at E1 level between all tributaries.

The equipment can be used as Terminal Multiplexer (TM) or an Add-Drop-Multiplexer (ADM) to build a point-to-point, ring and chain (add-drop) transmission network.

## Features

- Supports upto 63 E1s
- 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
  - › Maximum 63 E1 interfaces compliant with ITU-T G.703
  - › 120 Ohms E1 and 75 Ohms E1 interfaces options available
- 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

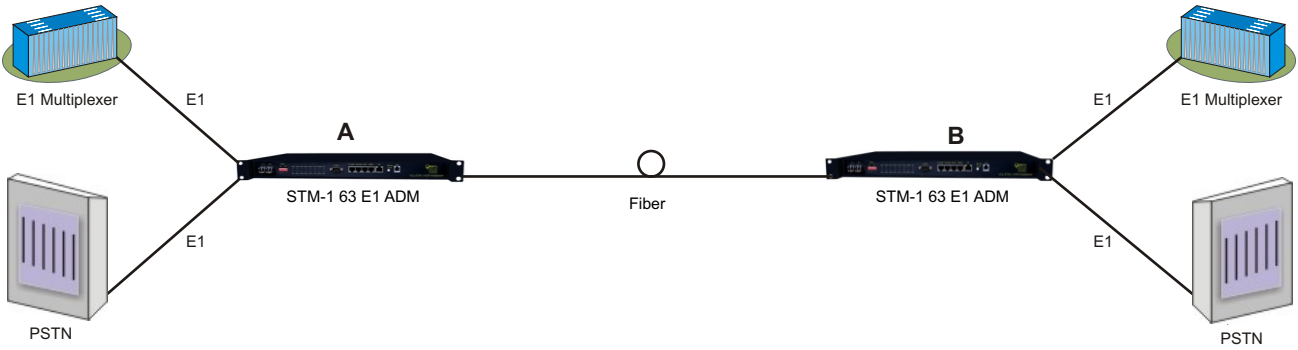
- Timing mode
  - › Synchronization with STM-1 line timing
  - › Synchronization with timing from any of the E1 interfaces
  - › External timing source option - 120 Ohms 2MBps (External Bits Clock)
  - › External timing source - 120 Ohms 2MHz (External TTL Clock) - Factory Configurable
  - › Internal Clock - ITU-T G.813 internal oscillator (Stratum 3)
  - › The timing source can be auto-switched according to default or operator programmed settings
- Supports 1+1 Line Protection and Automatic Protection Switching (APS) with less than 50ms recovery
  - › All 63 VC12s can be mapped (east or west) in 1+1 protection mode
  - › Out of 63 VC12s, 21 VC12s (43-63) can be mapped to either direction (east or west) without protection (1+0)
- Supports point-to-point, ring and chain topology
- Local management and network-based management via a unified platform
- Supports Remote Power Down Detection and Auto Laser Shutdown
- Supports STM-1 and E1 loop-back for troubleshooting
- 850nm multi-Mode, 1310nm Single Mode and 1550nm Single Mode optical interface options offered
- 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
- Power consumption less than 20W.

## Alarm and Indicator Monitoring

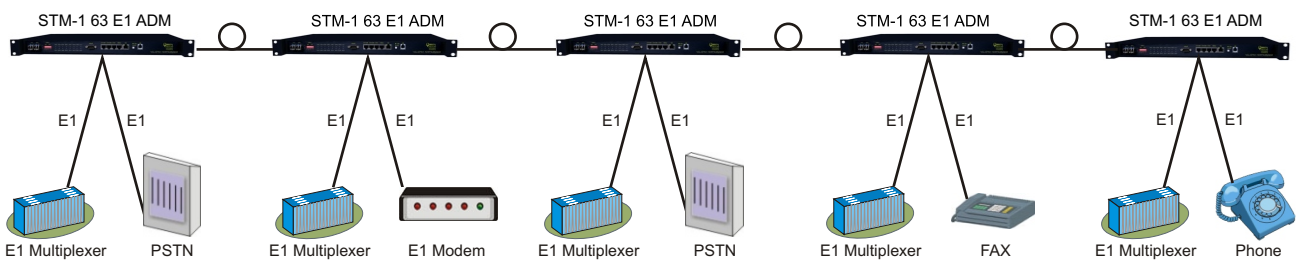
- Power Indicator
- Current Status (integrity and activity) Indicator
- Urgent Alarm Indicator
- Minor Alarm Indicator
- Optical Signal Loss Alarm Indicator
- Remote Device Power-down Indicator
- Auto Laser Shutdown (ALS) Indicator
- Engineering Order-Wire (EOW) Indicator
- Dry contact via 9-pin, D-type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

## Network Application

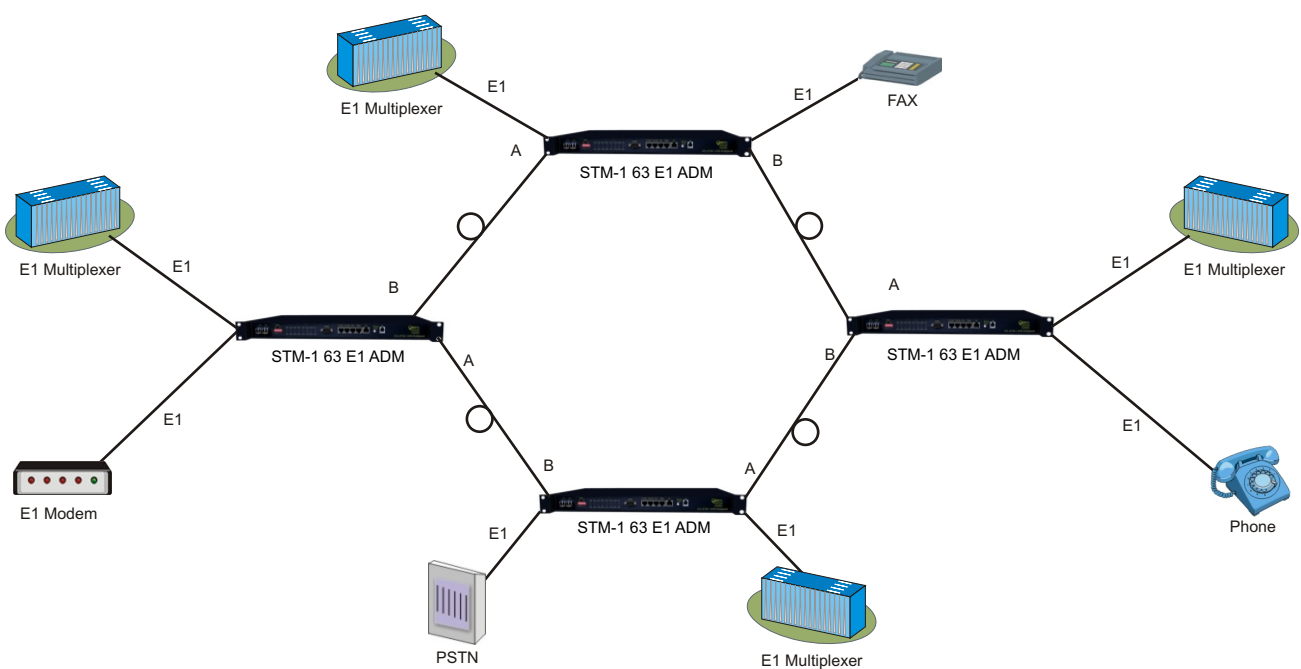
### Point to point network application diagram



### Chain network application diagram



### Ring network application diagram



## 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 or<br>- STM-1 SDH single electrical or double electrical ports (1+1 protection) supported<br>- 63 E1 - 120 Ohms or 75 Ohms |

### 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<br>(- 11 dBm to - 2.5 dBm - as may be ordered) |
| Receive sensitivity              | S 1.1, L 1.1, L 1.2<br>(- 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        |

## E1 Interface Specification - 120 Ohms

|                                |                          |
|--------------------------------|--------------------------|
| Number of E1s (Max) per system | 63 E1 Interfaces         |
| Line Rate per E1               | (2.048 Mbps ± 50 bps)    |
| Line Code                      | HDB3                     |
| Framing Structure              | As per ITU (CCITT) G.704 |
| Framing Options                | Un-Framed/PCM 30/PCM 31  |
| Electrical                     | As per ITU-T G.703       |
| Jitter                         | As per ITU-T G.823       |
| Impedance                      | 120 Ohms balanced        |
| Nominal Pulse Width            | 244ns                    |
| Connector                      | RJ-45 (F)                |

## E1 Interface Specification - 75 Ohms

|                                |                          |
|--------------------------------|--------------------------|
| Number of E1s (Max) per system | 63 E1 Interfaces         |
| Line Rate per E1               | (2.048 Mbps ± 50 bps)    |
| Line Code                      | HDB3                     |
| Framing Structure              | As per ITU (CCITT) G.704 |
| Framing Options                | Un-Framed/PCM 30/PCM 31  |
| Electrical                     | As per ITU-T G.703       |
| Jitter                         | As per ITU-T G.823       |
| Impedance                      | 75 Ohms unbalanced       |
| Nominal Pulse Width            | 244ns                    |
| Connector                      | BNC                      |

## E1 port (TU 12) Performance Analysis

- Error Bits (EB)
- Error Seconds (ES)
- Several Error Seconds (SES),
- Unavailable seconds (UAS)
- Remote Error Indication (REI)
- Code Violation (CV)

## Clock Synchronization Options

|                               |   |
|-------------------------------|---|
| Clock Synchronization options | Synchronization with STM-1 line timing  |
|                               | Synchronization with timing from any of the E1 interfaces (63 E1 tributary interfaces)      |
|                               | 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 |
|------------------------------|-----------------|

## 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 | < 20 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        | 3.75 kg                    |

**Ordering Information**

**A VCL-STM-1-63E1 SDH Multiplexer Common Equipment**

| S. No. | Part               | Description   | Remarks                |
|--------|--------------------|---|------------------------|
| 1      | VCL-STM-1-63E1-075 | VCL-STM-1-63E1 SDH Multiplexer<br>STM-1 (1+1) SDH Add-Drop Multiplexer with 63E1<br>19-inch 1U High Rack Mount version<br>Supports :<br>- 2 x STM-1 Ports (1+1) [SFP based / without SFPs]<br>- 63 x E1 [75 Ohm DB37 (M)]<br>- 1 x Systems Core Cables, Installation Accessories, Documentation, System User Manual / Disk etc (Set)<br>- OAM: EOW, SNMP, EMS, NMS<br>* Add Power Supply Option from below  | CORE UNIT without PSUs |
| 2      | VCL-STM-1-63E1-120 | VCL-STM-1-63E1 SDH Multiplexer<br>STM-1 (1+1) SDH Add-Drop Multiplexer with 63E1<br>19-inch 1U High Rack Mount version<br>Supports :<br>- 2 x STM-1 Ports (1+1) [SFP based / without SFPs]<br>- 63 x E1 [120 Ohm DB37 (M)]<br>- 1 x Systems Core Cables, Installation Accessories, Documentation, System User Manual / Disk etc (Set)<br>- OAM: EOW, SNMP, EMS, NMS<br>* Add Power Supply Option from below | CORE UNIT without PSUs |

**B Power Supply Options**

| S. No. | Part   | Description   | Remarks         |
|--------|--------|---|-----------------|
| 1      | AC220  | 1 x 100-240V AC Power Supply Input                                      | Any one option. |
| 2      | DC048  | 1 x (-) 48V DC Power Supply Input                                       |                 |
| 3      | ACDC   | 1 x 100-240V AC Power Supply Input<br>1 x (-) 48V DC Power Supply Input |                 |
| 4      | AC220R | 2 x 100-240V AC Power Supply Input [Redundant]                          |                 |
| 5      | DC048R | 2 x (-) 48V DC Power Supply Input [Redundant]                           |                 |



**C STM-1 SFP Options**

| S. No. | Part          | Description   | Remarks                      |
|--------|---------------|---|------------------------------|
| 1      | VCL-EMOD 0193 | 155Mbps SFP Transceiver, SDH/STM-1, SONET/OC-3, Fast Ethernet, S-1.1, Duplex LC, 1310nm, 15Km, SMF, +3.3V             | Maximum 2 SFPs per CORE UNIT |
| 2      | VCL-EMOD 0194 | 155Mbps SFP Transceiver, SDH/STM-1, SONET/OC-3, Fast Ethernet, L-1.1, Duplex LC, 1310nm, 40Km, SMF, +3.3V             |                              |
| 3      | VCL-EMOD 0217 | 155Mbps SFP Transceiver, SDH/STM-1, SONET/OC-3, Fast Ethernet, L-1.2, Duplex LC, 1550nm, 80Km, SMF, +3.3V             |                              |
| 4      | VCL-EMOD 0156 | 155Mbps SFP Transceiver, SDH/STM-1, SONET/OC-3, LR-2/LR-3, Fast Ethernet, L-1.2, Duplex LC, 1550nm, 120Km, SMF, +3.3V |                              |
| 5      | VCL-EMOD 0243 | 155Mbps SFP Transceiver, SDH/STM-1, SONET/OC-3, L-1.2, Duplex LC, 1550nm, 150Km, SMF, +3.3V                           |                              |

**D Cables and Accessories Options**

| S. No. | Part          | Description   | Remarks                  |
|--------|---------------|---|--------------------------|
| 1      | VCL-HRNS 1246 | 8E1 75 Ohm Connectorized Cable [DB37F-16BNCF]             | As per Site requirement. |
| 2      | VCL-HRNS 1255 | 8E1 120 Ohm Connectorized Cable [DB37F-8RJ45F]            |                          |
| 3      | VCL-HRNS 1229 | Optical Patch Cord Connectorized Cable [2LC-2LC, 3m, SM]  |                          |
| 4      | VCL-HRNS 1238 | Optical Patch Cord Connectorized Cable [2LC-2LC, 10m, SM] |                          |
| 5      | VCL-HRNS 1242 | Optical Patch Cord Connectorized Cable [LC-FC, 10m, SM]   |                          |
| 6      | VCL-HRNS 1243 | Optical Patch Cord Connectorized Cable [2LC-2FC, 10m, SM] |                          |
| 7      | VCL-HRNS 1239 | Optical Patch Cord Connectorized Cable [LC-SC, 10m, SM]   |                          |
| 8      | VCL-HRNS 1258 | Optical Patch Cord Connectorized Cable [2LC-2SC, 10m, SM] |                          |
| 9      | VCL-ECON 1172 | Connector (Attenuator LC-LC (10 db.))                     |                          |
| 10     | VCL-ECON 1173 | Connector (Attenuator LC-LC (20 db.))                     |                          |
| 11     | VCL-ECON 1186 | Connector (Attenuator FC-FC (10 db.))                     |                          |
| 12     | VCL-ECON 1187 | Connector (Attenuator FC-FC (20 db.))                     |                          |
| 13     | VCL-ECON 1197 | Connector (Attenuator SC-SC (10 db.))                     |                          |
| 14     | VCL-ECON 1198 | Connector (Attenuator SC-SC (20 db.))                     |                          |

Technical specifications are subject to changes without notice.

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20100, N 51st Ave, Suite B240,  
Glendale AZ 85308  
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4000 Ponce de Leon Blvd. Suite 470,  
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Phone: 1-305-777-0419,  
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