



# ORION TELECOM NETWORKS INC.

## VCL-SafeComm™ 16 E1 Links (48 E1 Ports) (1+1 Automatic Protection Switch)

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### Product Brochure & Data Sheet

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## Product Description:

The VCL-SafeComm™, 16 E1 Links (48 E1 Ports), 1+1 Automatic Protection Switching Equipment may be used to protect upto 16 E1 Links (48 E1 Ports), and provide an alternate communication route to each E1 Link between any two E1 points. In the event of the failure of the primary (Main) E1 communication route, the VCL-SafeComm, 16 E1



**VCL-SafeComm, 16 E1 Links (48 E1 Ports)  
1+1 Automatic Protection Switching (APS)**

links (1+1 Automatic Protection Switching Equipment) automatically switches the E1 traffic to a secondary (standby) E1 route. The VCL-SafeComm, 16 E1, 1+1 Automatic Protection Switching equipment is available in a 2U high chassis which may be mounted in any DIN standard, 19-Inch rack.

## Application:

This product allows the user to design 1+1 (protected) redundant E1 routes on similar (fiber-fiber), or complementing (fiber-radio) transmission mediums. Please see Figure # 1 for a graphical illustration for this application.

This product may also be used to design 1+1 redundant (protected) E1 rings on PDH networks, which otherwise would not be possible with PDH technology. Please see Figure # 3 for a graphical illustration for this application.

The criterion for switching between the primary (main) and the secondary (protected/standby) routes is user programmable. Criterion for switching between the primary (main) and the secondary (protected/standby) routes may be Loss-Of-Signal on E1 links, or AIS (All-Ones AIS alarm) condition. The criterion for switching time and recovery time between the primary (main) and the secondary (protected/standby) routes is user programmable (10ms to 3000ms).

E1 recovery switching time from Standby Link to Main Link is also user programmable from 10ms to 9999ms . Data transported on the E1 Links is transparent and protocol independent.

## Features & Highlights:

- High density protection switching equipment (upto 16 E1 Links i.e. 48 E1 Ports)
- To provide an independent point-to-point, protected E1 Link between two “E1 USER PORTS” on similar (example fiber-fiber), or dis-similar (fiber-radio) mediums
- To provide 1+1 E1 redundancy support to higher order multiplexers e.g. E2,E3
- System configuration and management interface through "CLI" text based commands and GUI (Graphical User Interface)
- Transport A-bis Interface on redundant E1 links
- Provide 1+1 Protection / Alternate Routing Path between BSC and BTS
- May be used in a point-to-point configuration to provide 1+1 Protected / Alternate Routing Path between any two locations (as shown in Figure # 1)
- May be used in a point-to-multipoint configuration to provide 1+1 Protected / Alternate Routing Path between one location and multiple locations (as shown in Figure # 2)
- May be used to design 1+1 resilient / alternate routing (protected) E1 rings over PDH networks, which otherwise would not be normally possible with PDH technology (as shown in Figure # 3).

## Features & Highlights:

- These ensure that mission critical voice, data, control and management traffic are properly supported and maintained even during E1 backhaul facility outages. When the primary (working) link fails, the E1 traffic is automatically switched to the standby (secondary) link to ensure maximum uptime.
- Through the comprehensive remote configuration and alarm management capabilities of the VCL-SafeComm, 16 E1, 1+1 Automatic Protection Switching Equipment the product may be used to improve network reliability and control
- Traffic Protection
- Alternate Facility Advantages
- Service Differentiation Agreements
- Increased Network Reliability Resilience
- Media and Path Diversity
- Remote Management
- Alarm logging and monitoring.
- Dual -48V DC Power Inputs. Allows the User to power the equipment from redundant (two) -48V DC power sources.

## Benefits:

### Customer Relations

- Competitive
- Service Level
- Back-haul Network
- Technology Migration
- User Programmable 1+1 Protection criterion:
  - a) Loss of Signal
  - b) AIS (All Ones Alarm)
  - c) Dry Relay Contact (External Trigger version)
- User programmable switching time from Main link to Standby link
- User programmable Recovery Parameters:
  - a) Recovery stay on Standby Port
  - b) Programmable recovery time from Standby to Main link when the Main link restored.

## Salient Features:

- VCL-SafeComm 1+1 Protection Switch does not "add" a point-of-failure to the E1 network.
- Even in the event that the power to the VCL-SafeComm 1+1 Protection Switch (or the equipment itself) fails, the E1 link connectivity shall be "always" maintained." The E1 link integrity is ALWAYS maintained (the switch reverts the connection to the primary E1 link), even if the power to the equipment is disconnected and removed. This ensures that the E1 link connectivity is never lost.
- VCL-SafeComm 1+1 Protection Switch provides two power inputs and this allows the user to connect the switch to two separate independent -48V DC power sources to minimize the chances of any power failure occurring due to power outage.

## Mode of Operation:

There are three modes in which the VCL-SafeComm E1, 1+1 Automatic Protection Switch can be configured to operate in:

1. AUTOMATIC SWITCHING MODE
2. EXTERNAL TRIGGER SWITCHING MODE
3. MANUAL SWITCHING MODE.

### **AUTOMATIC SWITCHING MODE:**

The VCL-SafeComm can be configured to operate in an AUTOMATIC SWITCHING MODE. In the automatic mode, the switch shall automatically switch and re-route the E1 circuits from the MAIN route to the STANDBY route if there is an AIS or a LOS (LOSS OF SIGNAL) alarm, on the MAIN E1 link route.

Similarly, in the automatic mode the switch shall automatically switch back and re-route the E1 circuits from the STANDBY route to the MAIN route, upon the restoration of the service on the MAIN E1 link route.

All switching parameters and link restoration parameters are user programmable.

### **EXTERNAL TRIGGER SWITCHING MODE:**

Sometimes the user wants to switch the E1 circuits between the MAIN route and the STANDBY route when some external event occurs.

In the EXTERNAL TRIGGER MODE, the user can switch between the MAIN E1 route and the STANDBY E1 route when an external trigger (such as an closed/opened physical contact) is applied to the switch.

This unique feature is used by certain radios equipment suppliers, where they apply an external trigger to switch and re-route the E1 circuits between their main E1 radios and standby E1 radios.

### **MANUAL SWITCHING MODE:**

In Manual Switching Mode, the user shall use manual Telnet commands to switch the E1 circuits between the MAIN route and the STANDBY route, manually, using Telnet commands.

In this mode the AUTOMATIC MODE and the EXTERNAL TRIGGER MODE are both disabled and the manual commands over ride all other modes.

## Applications:

Providing 1+1 alternate paths between any two E1 Transmission mediums (active+standby). E.g.:

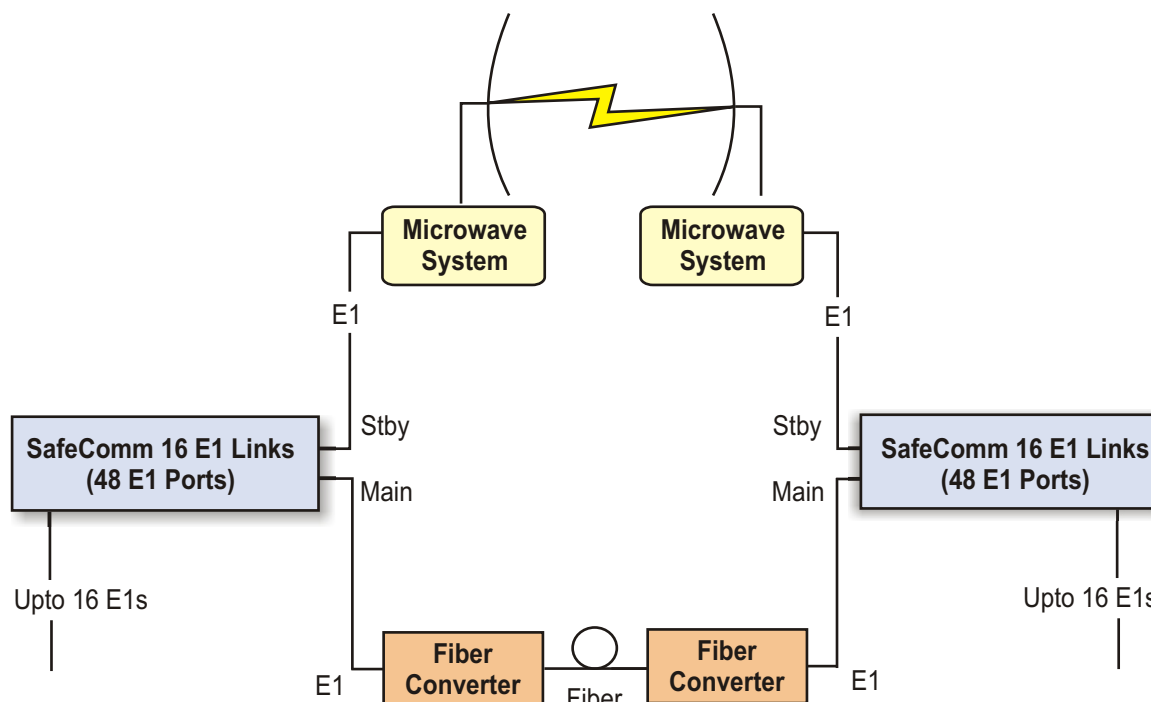
- Fiber/Fiber
- Radio/Fiber
- Radio/HDSL
- Fiber/HDSL etc.

**Example:** The user may deploy the VCL-SafeComm, 16 E1, 1+1 Automatic Protection Switching Equipment to provide an alternate communication route between an optical fiber link and a radio link between any two points. In the event of the failure of the primary (optical fiber) link the E1 is automatically switched to the alternate route over the E1 radio, thus ensuring maximum uptime on all such 1+1 protected E1 Links.

Once the primary (optical fiber) E1 Link on the optical fiber is restored, the VCL-SafeComm, 16 E1, 1+1 Automatic Protection Switching Equipment automatically restores the communication to the primary (optical fiber) E1 Link. The switching time and restoration criterion is user programmable.

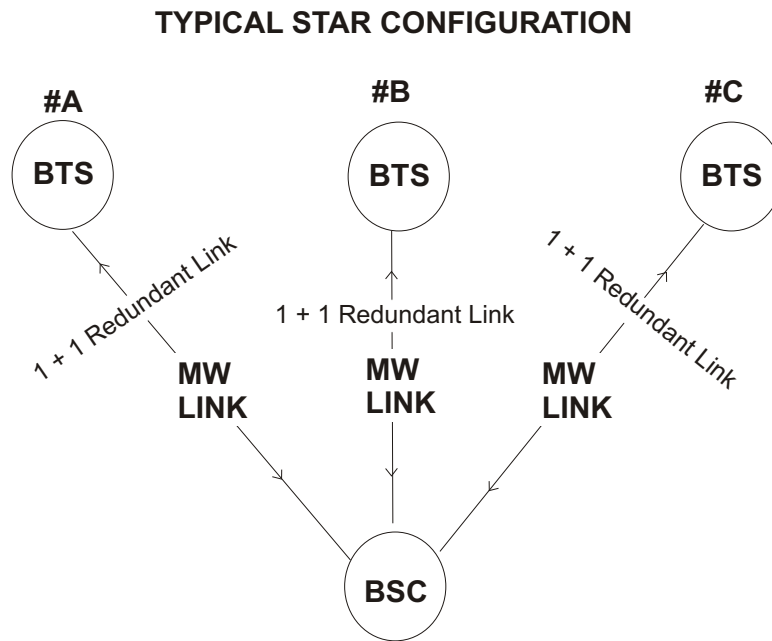
## Application Diagram:

Figure (application) # 1



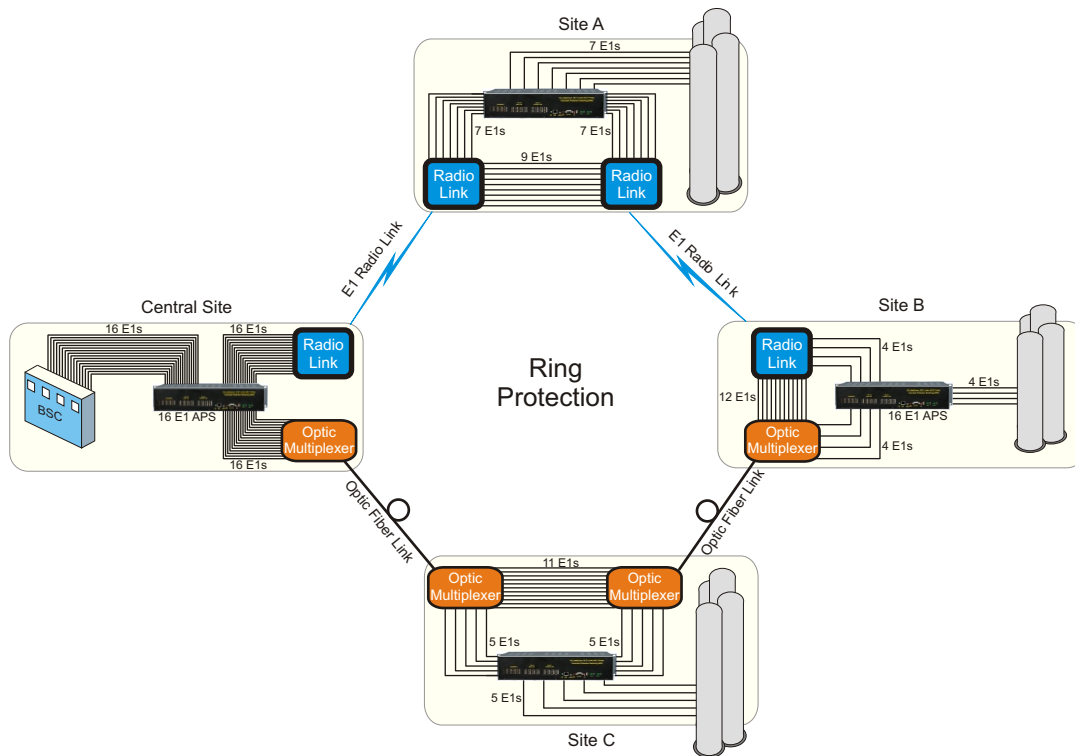
**Point-to-Point Application:** May be used in a point-to-point configuration to provide 1+1 Protected /Alternate Routing Path between any two points, using diverse (or similar) E1 transmission mediums.

Figure (application) # 2



**Point-to-Multipoint Application:** To provide 1+1 Redundant E1 Link(s) between a single (BSC) location and multiple (BTS) locations using diverse (or similar) E1 transmission mediums.

Figure (application) # 3

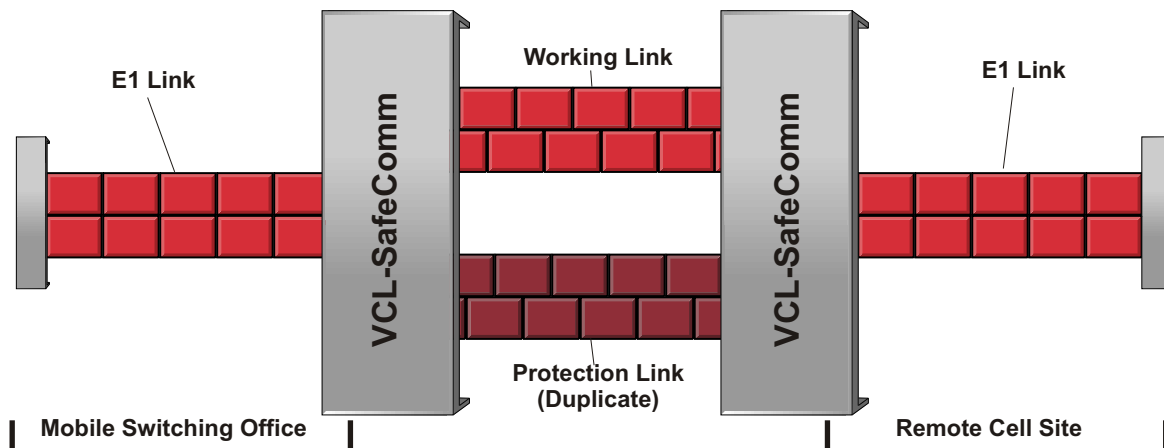


**Application to provide resilient (protected) E1 rings over PDH networks:**  
 The VCL-SafeComm may also be used in 1+1 redundant (protected) E1 rings on PDH networks using diverse (or similar) E1 transmission mediums.

### How It Works - VCL-SafeComm™ (With Path Protection Switching)

During normal operation, VCL-SafeComm sends duplicate traffic across both the working and dedicated protection E1 facilities while continuously maintaining the performance of both links to determine which link shall be utilized.

Figure (application) # 4



### Technical Specifications

#### E1 Interface:

Number of Interfaces	Total 48 E1 interfaces 16 for Main E1 Links 16 for Primary E1 Links 16 for Secondary E1 Links
Line Rate	E1 - 2.048 Mbps
Line Code	HDB3
Frame Structure	G.704
Bit Rate	2048 Kbps ± 50 ppm
Jitter Tolerance	As per ITU-T G.823
Output Jitter	< 0.05 UI (in the frequency range of 20 Hz to 100 KHz)
Pulse Mask	As per ITU (CCITT) Rec. G.703
Conformity (electrical)	G.703
Nominal Impedance	120 Ohms, balanced

### E1 Switching Criterion and Time:

E1 Switching Criterion	User Programmable 1+1 Protection Criterion a) Loss of Signal      b) AIS (All Ones Alarm)
Minimum E1 Switching Time from Main Link To Standby Link	10 milliseconds to 3000ms (User Programmable)
Minimum E1 (Recovery) Switching Time From Standby Link to Main Link	10 milliseconds to 9999ms (User Programmable)
Switching Mode	User can program the APS to stay on Standby Port a) Auto when the Main link is restored. b) Force ON Main    c) Force ON Standby

**Note:** With “**External Trigger**” option it allows the user to switch between the “Main Link” and the “Standby Link” using an external dry contact input which can be an “OPEN” circuit or a “CLOSED” circuit input.

The “**External Trigger**” is user programmable and the user can configure the equipment to switch between the “Main Link” and the “Standby Link” when the external trigger circuit “Closes” or “Opens”.

The “**External Trigger**” option can also disabled through user executable software commands and the system can be made to work in either “Auto” or “Manual” switching mode.

### Synchronization Clock:

Transparent between the two points of the E1 Links.

### Management and Control Interfaces:

- Serial Management Port (RS232) - COM Port
- 10/100 BaseT for Remote Management over a LAN
- 10/100 BaseT Telnet over a TCP/IP Network

### Specification and Regulation Compliance:

- Meets CE requirements
- Complies with FCC, Part 68 and Part 15 subpart A specifications
- Safety - UL 1459 Issue 2

### Command Language:

Command Line Interface (English text commands)

### Alarm Contact Closures:

1 Alarm Relay,  
Type - Form "C" relay

### Temperature:

Operating      0°C to 50°C  
 Humidity      5% to 95% non-condensing

### Dimensions and Weight:

Rack mounting	Standard 19-Inch. DIN Rack
Height	90.00 mm.
Depth	280.00 mm.
Width	480.00 mm.
Weight	4.20 kg.

### AC Power Supply Specifications:

Output voltage of AC Adapter	100 - 240 Volt AC
Range of input AC voltage	100V to 240V AC, 50Hz / 60Hz.
System input voltage	7.5V DC to 9.0V DC, DC input polarity protection
Maximum full load output current	2.5 A at 7.5V DC / 9.0V DC
Input voltage reversal protection	Provided in the Card
Efficiency at full load	> 90%

### DC Power Supply Specifications:

Input DC voltage - Dual Input	-48V DC (nominal)
Range of input voltage	-40V to -60V DC
System voltage	3.3V
Input voltage reversal protection	Provided in the Card
Short circuit protection	Provided
Power Consumption	≤ 10W

**Ordering Information:**

S. No.	Part No.	Product Description	Qty.
1.	VCL-1431-APS-16/48E1-DC	16 E1 Links APS - 48 E1 Ports Automatic Protection Switching  19-inch Rack Mount, operates on (-48V DC) DC powered version.	1
2.	VCL-1431-APS-16/48E1-AC	16 E1 Links APS - 48 E1 Ports Automatic Protection Switching  19-inch Rack Mount, operates on (7.5V DC) AC powered version.	1
3.	VCL-1431-APS-16/48E1-T-DC	16 E1 Links APS - 48 E1 Ports Automatic Protection Switching with External Trigger input  19-inch Rack Mount, operates on (-48V DC) DC powered version.	1
4.	VCL-1431-APS-16/48E1-T-AC	16 E1 Links APS - 48 E1 Ports Automatic Protection Switching with External Trigger input  19-inch Rack Mount, operates on (7.5V DC) AC powered version.	1

Technical specifications are subject to changes without notice.

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