

# AceCom Networks

## **DS3/T3 over Ethernet**

### **DS3/T3 over IP**

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## Product Brochure & Data Sheet

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## Product Overview

AceCom 'VCL-DS3oP', DS3 (T3) over IP / Ethernet equipment provides transmission of one, point-to-point, DS3 (T3) link over an IP / Ethernet, MEF or MPLS network.

The 'VCL-DS3oP', DS3 (T3) over IP / Ethernet equipment is powered by a powerful PowerPC 400 MHz Processor which provides a highly reliable clock recovery mechanism for low jitter and wander control, even under variable network conditions.



The 'VCL-DS3oP', DS3 (T3) over IP / Ethernet equipment provides 2 x GigE electrical ports along with 2 x Gigabit optical ports which allow the users to implement 1+1 Ethernet link redundancy (Port Trunking), Ethernet Route Redundancy (Spanning Tree Protocol) and QoS by implementing Differentiated Services (Diffserv) and packet priority classification protocols for network optimization.

## Purpose of TDM over Packet technology

Telecom companies and enterprise users can save network and equipment cost and generate additional revenue by offering different types of services over a single packet-switched infrastructure by the use of T1oP equipment. The T1oP equipment is also suitable for connecting to Ethernet / packet wireless equipment to achieve fast deployment of T1 services over wireless Ethernet networks. One particular application is to build T1 links with low cost Wireless LAN bridges, replacing expensive TDM / T1 microwave radios.

The 8 x T1 over Ethernet (VCL-T1oP) multiplexer may be used to provide legacy TDM services over Gigabit Ethernet optical fiber, or wireless Ethernet/IP networks.

## How the TDM over Packet (DS3 over Ethernet) equipment works

The DS3 channel received from the customer side equipment on the DS3 interface of the DS3 over Ethernet equipment is converted by its DS3oP engine to Ethernet data packets (of a fixed size) and transported over the Ethernet network with UDP / IP, MEF or MPLS headers. At the receiving end the DS3 over Ethernet DS3oP equipment reconstructs the original data streams by removing the IP, MEF or MPLS headers and converts the Ethernet data packets back to DS3 frames using highly reliable and accurate clock recovery mechanism. The 'VCL-DS3oP', DS3 over IP / Ethernet equipment uses standard SAToP, DS3 to packet and packet to DS3 conversion mechanism making it suitable for use over all types of Ethernet / IP or MPLS infrastructure.

## Hardware Highlights

- › 19-Inch rack mountable
- › 1U form factor (44mm high)
- › 1+1 Redundant Power Supplies, AC and DC, or AC plus DC
- › Redundant power supply inputs
- › Extended Temperature Range: (-200° C to +600° C)
- › Range (-40 F to +1400 F) Fahrenheit
- › EMI/EMC Complaint
- › Real time battery backed clock with life in excess of 10 years

## DS3 Clock recovery and synchronization techniques:

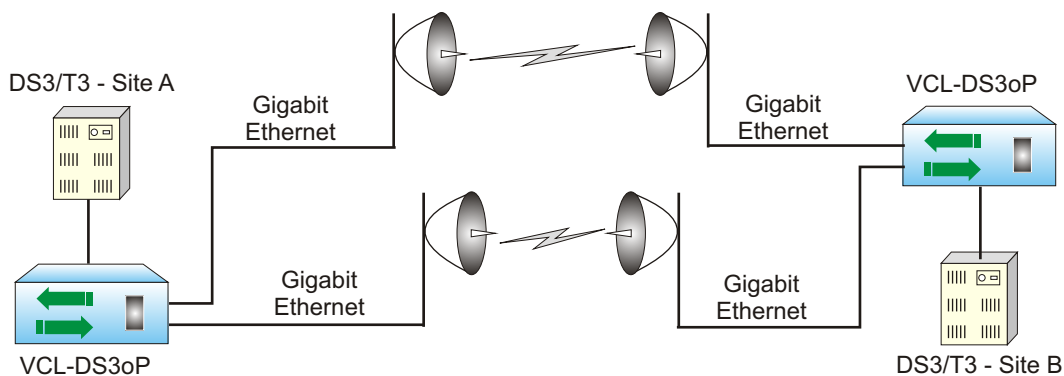
- Adaptive Clock Recovery (ACLK)
- Recovered Clock (RCLK) / Loop-Timed Clock
- Asymmetrical (One-Clock and Two-Clock) Clock
- Synchronization to an External Clock (ECLK)
- Synchronization to an Internal Clock
- Automatic clock priority selection with fall back
- Plesiochronous Clocking.

## Application Diagram

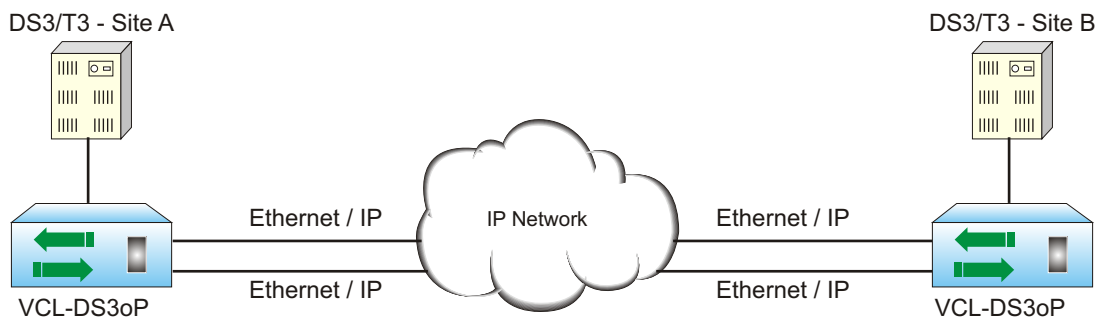
### LANs, WANs, MANs, IP Satellite and Wireless Ethernet



### DS3 Link Redundancy - Using Port Trunking / Bonding



### DS3 Link Redundancy - Using Spanning Tree Protocol



## Key Features - Ethernet / IP Network Interface

- Each terminal supports one DS3 interface.
- Suitable for point-to-point applications.
- Internal, External, Adaptive, Recovered clock and Asymmetrical (One-Clock and Two-Clock) options for DS3 synchronization. Automatic clock priority selection with fall back.
- Absolute and Differential times tamps.
- Jitter and Wander conforms to G.823 / G.824 and G.8261 and TDM specifications.
- Supports DS3 Framed and Unframed formats.
- Supports SAToP transport mechanism.
- Supports network latency / packet delay variation / jitter buffer of up to 45ms.
- Supports IP, MPLS and MEF8 (Metro Ethernet) tagging.
- 75 Ohms BNC interface.
- DS3 Loopback facility for testing and diagnostics.
- Key Features - Ethernet / IP Network Interface.
- Switching Capacity upto 6 Gbps, non-blocking.
- 4 GigE Ports.
- Optical SFP based (1000BaseSX/LX) and Electrical (10/100/1000Base-T) Ethernet Port options.
- 2 x 10/100/1000BaseT Copper Ports.
- 2 x 1000BaseSX/LX Optical Fiber Ports.
- Point-to-point applications Port Control Ingress Rate Limiting.
- 1+1 Hitless Ethernet Link Redundancy - Port Trunking.
- 1+1 Ethernet Route Redundancy - Spanning Tree Protocol.
- IGMP Snooping.
- Supports QoS, 802.1p based packet priority.
- Tagged/Un-Tagged/Un-Modified 802.1Q Mode.
- Q-in-Q Tagging.
- User configurable MTU (DS3oP payload) packet size. May be configured from 1 to 1800 Bytes.
- Switch supports jumbo frame sizes of up to 9000 Bytes.
- Port based and Tag based VLANs.
- Single / Double 802.1 VLAN tagging (Q in Q VLAN Tagging) user configurable.
- Supports QoS on 802.1p based packet priority.
- Supports Packet priority assignment (IP Diffserv / DSCP).
- UDP-specific "Special" Ethernet type.
- In band VCCV ARP.
- Broadcast DA.

## System Access, Control and Management Options

- Telnet.
- CLI Control Interface (HyperTerminal or VT100).
- SNMP V2 Traps (MIB File provided).
- Windows based GUI (Graphical User Interface) for easy configuration, management and access. Ability to monitor multiple units from a single NMS.
- Password Protection.

### System Management, Monitoring and Alarm Interfaces.

- NMS (Network Management System) to monitor multiple units from single Central Location.
- External Alarm - Dry contact relay alarms are also available at rear of the system to connect the system to an external alarm.
- Supports system temperature monitoring with High Temperature and Low Temperature alarms and SNMP Traps.
- Supports SNMP V2 Monitoring and Traps.
- UDP-specific “Special” Ethernet type.
- Self-test for checking system errors upon system bootup.
- Event Logging.
- Clock Performance Alarms.
- Network Performance Alarms.
- Network Performance Monitoring and Diagnostics.
- Online / remote upgrade of firmware.

### OAM: Operation and Management Ports

- RS232 Serial Port.
- USB COM Port.
- 10/100/1000BaseT Ethernet Management for In-band remote access.

### Technical Specifications

#### DS3oP Specifications

Max number of logical Link	One point-to-point logical link
Max DS3 payload MTU Size	User configurable from 1 to 1800 Bytes
Supported Transport Mechanisms	IETF-PWE3 and SAToP
Supported PSN (Packet Switched Networks) type	UDP, IP, MPLS and MEF
QoS	802.1q, 802.1p packet priority

#### DS3 Interface

Number of Ports	One
Framing Formats	Framed, Unframed (User selectable)
Framing	B3ZS and G.832 framing modes (user selectable)
Line Coding	Meets ANSI T1.404 M13 or C-bit parity
Line Impedance	75 Ohms

## Technical Specifications

### Gigabit Ethernet Switch Interface

Number of Ports	4 Ports - 2 Gigabit optical ports and 2 GigE (electrical) ports. Complies with IEEE802.3, 802.1Q and 802.1P
Electrical	10/100/1000 Auto-negotiation / MDI-X (Auto-sensing), Full-Half Duplex, Rj45 Electrical Connector
Optical	1000Base-FX (Gigabit Ethernet), SFP
Protection	ESD protection
Maximum Frame Size	9000 Bytes (Jumbo Frames)
Switching Capacity	Upto 6 Gbps, Non-blocking

### Gigabit Ethernet Optical Interface Specifications

Optical Interface Type	SFP
Compliance	- Compliant with 1000Base-LX - MSA Compliant , RoHS, EMI, ESD, DDM
Safety	Class 1 Laser Safety / IEC-60825 Compliant
Bit Rate	1.25 Gbps
Wavelength	1310 / 1550 nm
Distance	550m to 80Kms, as per order
Optical Connector	LC

### Power Consumption

Power Consumption	< 30 Watts
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### Power Supply Options

- Dual Redundant (AC + DC)
- 1+1 AC power (100 to 240V AC, 50/60 Hz)
- 1+1 DC (-48V) power (40 to 72V DC)
- 1+1 DC (-24V) power (18 to 40V DC)
- AC or DC

### Command Language

- Windows based GUI (Graphical User Interface).
- Command Line Interface (English text commands)

### Management and Control Interfaces

- COM Port (RS232 Serial Port)
- USB Port
- 10/100/1000BaseT Ethernet Port (each multiplexer may be assigned an IP address and connected to a LAN / IP network for remote access and management through the 10/100/1000BaseT Ethernet Port for in-band configuration, management and access).
- Telnet
- SNMP V2 Monitoring
- Windows based GUI.

**Environment**

Temperature for operation	(-200C ~ +600C) Celsius for operation (-40F ~ +1400 F) Fahrenheit
Storage	(-400C ~ +700C) Celsius (-400F ~ +1580 F) Fahrenheit
Humidity	5% to 95% (350C) Non-condensing

**Regulatory Compliance**

- Safety - IEC 60950 Safety - IEC 60950
- CE
- RoHS
- Complies to ANS/IEC standards
- Complies with Telecom Part 68, FCC Part 15 and CISPR 22 Class A
- EMC EN55022: 1998 + A1 and A2
- EMC EN55024,
- Operation ETS 300 019 Class 3.2
- Storage ETS 300 019 Class 1.2
- Transportation ETS 300 019 Class 2.3

**AC Power Supply Specifications**

Input AC Voltage	110 / 220 Volts AC
Range of input AC voltage	100 V to 240 V AC, 50Hz/60Hz.
AC Input Connector	IEC Connector

### 24V DC Power Supply Specifications

Power Supply	24V DC
Range of input	18V to 40V DC
Input voltage reversal protection	Provided
Under voltage protection	< 4.85V
Over voltage protection	> 5.15V
Efficiency at full load	> 90% @ 5V/8A (when input voltage 24V)
Ripple at full load	< 5mVrms
Spike at full load	< 50mV

### 48V DC Power Supply Specifications

Power supply	-48V DC
Range of input	-40V DC to -72V DC
Under voltage protection	< 4.85V
Over voltage protection	> 5.15V
Efficiency at full load	> 91% @ 5V/10A (when input voltage -48V)
Ripple at full load	< 5mVrms
Spike at full load	< 50mV

### Environment

Temperature	-20°C ~ +60°C for Operation
Humidity	5% to 95% (35°C) Non-condensing

### Regulatory Compliance

- Safety - IEC 60950 Safety - IEC 60950
- CE
- RoHS
- Complies to ANS/IEC standards
- Complies with Telecom Part 68, FCC Part 15 and CISPR 22 Class A
- EMC EN55022: 1998 + A1 and A2
- EMC EN55024,
- Operation ETS 300 019 Class 3.2
- Storage ETS 300 019 Class 1.2
- Transportation ETS 300 019 Class 2.3

### NMS (with Telnet) OAM port Specifications

Network Interface	RJ-45 Ethernet 10BaseT or 100BaseT-TX (auto sensing)
Compatibility	Ethernet Version 2.0IEEE802.3
Protocols supported	ARP, UDP/IP, TCP/IP, Telnet,SNMP
Management	SNMP, Serial login, Telnet login



**External Alarms**

- Dry Contact Relay - 2 Form C
- Rated upto 72V DC, 1 Amp.

**Chassis**

- 1U High (44mm)
- 19-inch rack-mounting shelf
- Also available in Desktop / Table Top Version.

**NMS (with Telnet) OAM port Specifications**

Network Interface	RJ-45 10/100/1000BaseT(auto sensing)
Compatibility	Ethernet Version 2.0, IEEE802.3
Protocols supported	ARP, UDP/IP, TCP/IP, Telnet, ICMP, SNMP
LEDs	10Base-T and 100Base-TX Activity, Full/half duplex
Management	SNMP, Serial login, Telnet login
EMI Compliance	-Radiated and conducted emissions complies with Class B limits of EN55022:1998 -Direct and Indirect ESD complies with En55024: 1999 -RF Electromagnetic Field Immunity complies with EN55024:1998 -Electrical Fast Transient/Burst Immunity complies with EN55024:1998 -Power Frequency Magnetic Field Immunity complies with EN55024:1998 -RF Common Mode Conducted Susceptibility complies with EN55024:1998

**Mechanical Specification**

Height	44 mm (1U)
Depth	260 mm
Width	480 mm (19 inch rack mountable)
Weight	5 Kgs.

## Ordering Information

S. No.	Part #	Product Descriptions	Remarks
1	VCL-DS3oP-GE-2OE-XXXX	VCL-DS3oP DS3 over Ethernet Multiplexer (DS3oP / TDM over IP) 19-inch 1U High Rack Mount version Supports: <ul style="list-style-type: none"> <li>• 1 x DS3 [75 Ohms 2xBNC (F) (Unbalanced)]</li> <li>• 4 x Ethernet Ports (1000Mbps, Gigabit)                             <ul style="list-style-type: none"> <li>› 2 x Electrical Ethernet Ports [RJ45 (F)]</li> <li>› 2 x Optical Ethernet Ports [1.25Gbps SFP based / without SFPs]</li> </ul> </li> <li>• OAM [10/100/1000BaseT Ethernet - RJ45 (SNMP, Telnet) and Serial Port (USB and DB-9 COM Port)]</li> </ul> Supports: <ul style="list-style-type: none"> <li>• MPLS, MEF (Metro Ethernet)</li> <li>• PWE3 (pseudo-wire), SAToP</li> <li>• Point-to-point applications</li> <li>• Alternate Route Protection (for 1+1 Ethernet link redundancy on WAN side)</li> <li>• Clocking options: Adaptive / Loop-timed / External / Internal / Asymmetrical (One-Clock and Two Clock)</li> </ul>	CORE UNIT without PSUs.

### Power Supply Options

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 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]	

### Gigabit Ethernet SFP Options

1	VCL-EMOD 0206	1.25Gbps SFP Transceiver Duplex LC, 850nm, 550m, MMF	Maximum 2 SFPs per CORE UNIT.
2	VCL-EMOD 0205	1.25Gbps SFP Transceiver Duplex LC, 1310nm, 10Km, SMF	
3	VCL-EMOD 0231	1.25Gbps SFP Transceiver Duplex LC, 1310nm, 20Km, SMF	
4	VCL-EMOD 0255	1.25Gbps SFP Transceiver Duplex LC, 1310nm, 40Km, SMF	
5	VCL-EMOD 0155	1.25Gbps SFP Transceiver Duplex LC, 1550nm, 40Km, SMF	
6	VCL-EMOD 0256	1.25Gbps SFP Transceiver Duplex LC, 1550nm, 80Km, SMF	

### Cables and Accessories Options

1	VCL-HRNS 1247	75 Ohms Connectorized Cable [BNCM-BNCM, 3m]	As per Site Requirement.
2	VCL-HRNS 1229	Optical Patch Cord Connectorized Cable [2LC-2LC, 3m, SM]	
3	VCL-HRNS 1238	Optical Patch Cord Connectorized Cable [2LC-2LC, 10m, SM]	
4	VCL-HRNS 1242	Optical Patch Cord Connectorized Cable [LC-FC, 10m, SM]	
5	VCL-HRNS 1243	Optical Patch Cord Connectorized Cable [2LC-2FC, 10m, SM]	
6	VCL-HRNS 1239	Optical Patch Cord Connectorized Cable [LC-SC, 10m, SM]	
7	VCL-HRNS 1258	Optical Patch Cord Connectorized Cable [2LC-2SC, 10m, SM]	
8	VCL-ECON 1172	Connector (Attenuator LC-LC (10 db.))	
9	VCL-ECON 1173	Connector (Attenuator LC-LC (20 db.))	
10	VCL-ECON 1186	Connector (Attenuator FC-FC (10 db.))	
11	VCL-ECON 1187	Connector (Attenuator FC-FC (20 db.))	
12	VCL-ECON 1197	Connector (Attenuator SC-SC (10 db.))	
13	VCL-ECON 1198	Connector (Attenuator SC-SC (20 db.))	
14	UMIKitDS3oPDLX	System Core Cables, Installation Accessories, Documentation, System User Manual / Disk (Set)	

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

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Technical specifications are subject to changes without notice.  
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