AceCom Networks

VCL-Ethernet over E1 (FE1)
E1/10(100) Base-T Interface Converter

Data Sheet & User Manual

AceCom Networks Pte Ltd.
200 Jalan Sultan, #02-13 Textile Centre,
Singapore 199018
Phone: +65 6295 3233, **Fax:** +65 6295 3133
E-mail: sales@acecomnet.com
Web Site: http://www.acecomnet.com

Description

The VCL-Ethernet over E1-E1/10(100)Base-T Interface Converter provides the user with Ethernet over E1 conversion enabling the user to transport Ethernet data over an E1 link.

VCL-Ethernet over E1 (FE1)

The equipment be always installed and used in pairs, with one terminal being installed at either end of the network.

The VCL-Ethernet over E1-E1/10(100)Base-T Interface Converter is an Ethernet extension device utilizing TDM telecom infrastructure (the telecom network of E1s, or of PDH, SDH and E1/E3/SDH microwave etc. carrying E1s). It converts the Ethernet data into E1 frame format for transmission over the existing TDM (E1) links and then re-converts the E1 back into Ethernet data the far-end terminal, to BRIDGE two Ethernet LANs over the existing E1-based telecom network. The device can effectively utilize the redundant bandwidth of telecom operators' existing TDM network to transport Ethernet data with low investment.

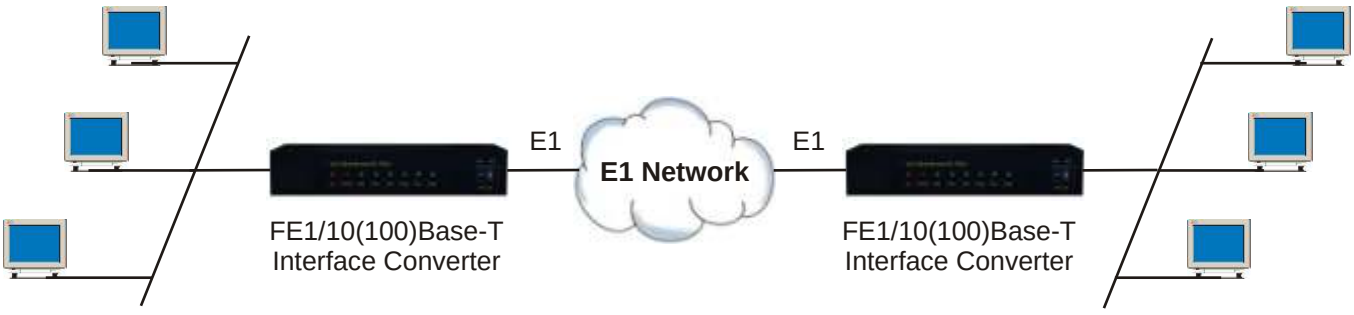
Application

The equipment may be used for the following purposes:

- Bridging Ethernet LANs over existing TDM (E1) telecom network.
- Extending Ethernet networks utilizing TDM (E1) landline based telecom infrastructure.
- Using telecom network of E1s/PDH/SDH microwave etc. carrying E1s to transport Ethernet data.

In all cases the equipment be always installed and used in pairs, with one terminal being installed at either end of the network.

Typical Application Diagram



Application Diagram of FE1/10(100)Base-T Interface Converter

Technical Features

- The maximum transmission rate of Ethernet data over E1 links is 2.048Mbit/s
- E1 supports three working modes of transparent transmission, framed (CCS/ PCM 31) and multiple framed (CAS/PCM30)
- Allows transparent transmission of super-long frames in 1528 bytes (without CRC) and supports Ethernet switches with VLAN function
- Automatic Ethernet negotiation function. Supports 10M/100M and working modes of both full-duplex and half-duplex
- Available with MAC address list filtration, learning, and updating functions
- Available with auto-resetting function. When network port stops receiving or sending data for about 8 seconds, the auto-resetting circuit will be able to start automatically, to reduce and maintain workload for the system
- Equipment supports two working modes of internal clock and network clock
- Supports RLOOP (E1 port external loop-back) function

E1 Interface Specifications

Line Rate	E1 (2.048 Mbps ± 50 bps)
Framing	Un-Framed /PCM 30 /PCM 31
Electrical	As per ITU-T G.703
Jitter	As per ITU-T G.823
Impedance	120 Ohm (RJ-45)
Impedance	75 Ohm (BNC)

Ethernet Port specifications

Interface Types	10/100BaseT
Standards Compliance	IEEE 802.3
Transmission Bit Rate	10/100BaseT transmission rate limited
Connectors	RJ-45 (10/100BaseT Electrical)

Clock

Internal and network clock.

Installation and Commissioning

1 Qualifying the network

- Please ensure that the error code rate each of the E1 circuits connecting to the equipment is lower than 10^{-7}.
- The transmission time delay difference between the various E1 circuits shall not exceed 8ms.
- The Ethernet wire type shall be, crossover when connecting with PC, and straight through when connecting to an Ethernet switch/HUB. The length of the ethernet cable shall not exceed 100m.

2 Grounding

- When the device is used with the AC~220V power supply, the 3-core socket must be grounded for protection.
- The other equipment (e.g. optical terminal) connected with the converter shall also be grounded to earth for protection.

3 Installation

Step 1 Power up the Ethernet over E1 equipment. Please ensure that Ethernet over E1 equipment is powered-up prior to connecting the ethernet and the E1 links.

Step 2 Connect E1 line on the premise that transmission device, interface converter and Ethernet converter have safely grounded.

BER test may be conducted on each E1 link using a BERT tester to ensure that the E1 errors are within the permitted limits / threshold.

Step 3 Please configure the ethernet mode of the Ethernet over E1 equipment at both sides as well as the ethernet interfaces of the devices that are connected to the Ethernet over E1 equipment. Connect the ethernet links.

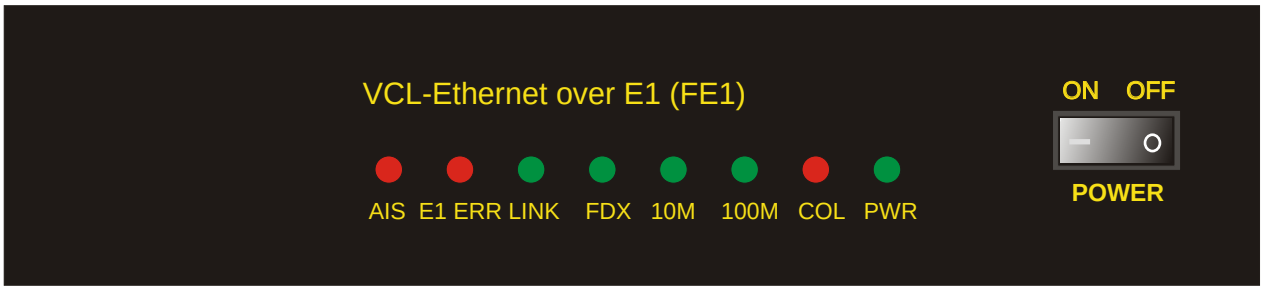
The equipment is used to bridge two LANs. Please ensure that the LANs on both sides of the link are operating in the same IP domain.

Step 4 Ping over the ethernet connection from one side to the other (near-end to the far-end) to verify that the Ethernet connection has been established between the two LANs.

After succeeding in "ping", the user may also check the integrity of each E1 link by connecting E1 link and then transporting ethernet data over that E1 link. In the event that the Ethernet over E1 equipment resets repeatedly or lots of frame errors are noticed, recheck the connection between E1 cable and interface converter, or E1 cable and transmission device.

Description of the Front Panel

Figure of the front panel of E1/10(100) Bast-T interface converter is as follows:



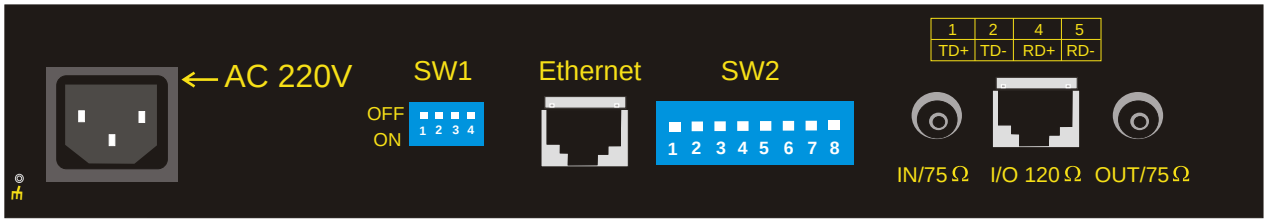
POWER LED: The GREEN LED indicator lights of power supply is lit under normal working condition when the power supply is connected.

Definition of Indicators on Front Panel

Switch	Description	
PWR	**ON**	System is powered
	OFF	System is not powere
COL	**ON**	Conflict indication on LAN port
	OFF	OK
100 M	**ON**	Ethernet port rate is 100M
	OFF	Ethernet port rate is not 100M
10 M	**ON**	Ethernet port rate is 10M
	OFF	Ethernet port rate is not 10M
FDX	**ON**	Ethernet port is running in full-duplex mode
	OFF	Ethernet port is running in half-duplex mode
LINK	**ON**	LAN port connection Normal
	OFF	No LAN connection on Ethernet port
E1 ERR	**ON**	**Solid** E1 Signal lost
		Flushing E1 out of step
	OFF	OK
AIS	**ON**	Alarm indication of opposite terminal during transparent transmission
	OFF	OK

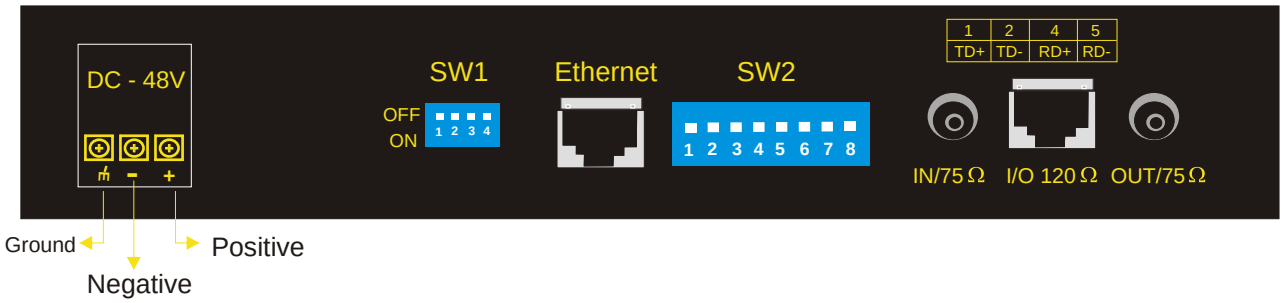
2 A. Back Panel: AC Input

The back panel of the 10(100) Base-T Ethernet over E1 equipment is as follows with AC Input.



B. Back Panel: -48V DC Input

The back panel of the 10(100)Base-T Ethernet over E1 equipment is as follows with DC Input.



DIP Switch (SW1) settings on the back panel are as follows:

Switch 1	Switch 2	Switch 3	Switch 4	Function
OFF	OFF	OFF	OFF	10 M/100 M Auto-negotiating Full/Half Duplex mode
OFF	OFF	ON	OFF	10 M Full/Half Duplex mode
OFF	OFF	OFF	ON	100 M Full/Half Duplex mode
ON	ON	ON	OFF	10 M Half Duplex mode
ON	OFF	ON	OFF	10 M Full Duplex mode
ON	ON	OFF	OFF	100 M Half Duplex mode
ON	OFF	OFF	OFF	100 M Full Duplex mode

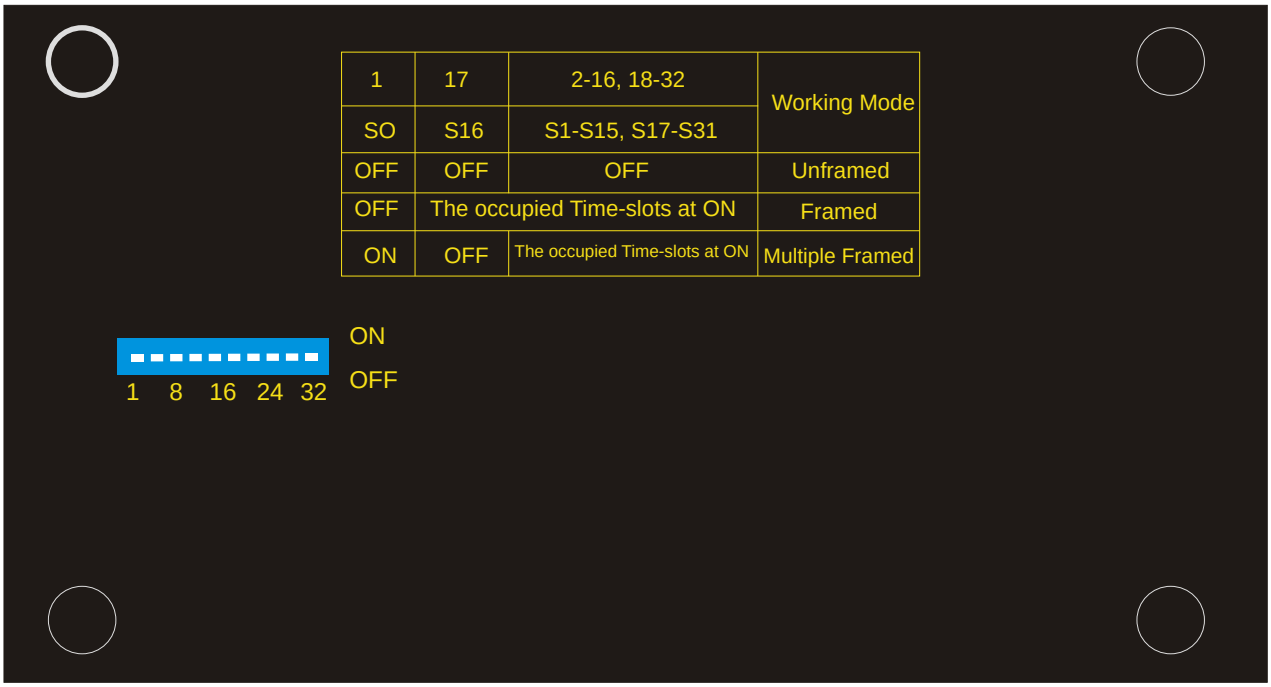
DIP switch (SW2) settings on the back panel are as follows:

Switch Number	ON	OFF
Switch 1	Internal Clock	Network Clock
Switch 2	E1 External Loop-back Forbidden	E1 External Loop-back Allowed
Switch 3	Auto-resetting function Forbidden	Auto-resetting function Allowed
Switch 4	Auto-resetting Delay by 16 seconds	Auto-resetting Delay by 8 seconds
Switch 5	Manual Resetting Closed	Manual Resetting Opened
Switch 6	E1 Line Impedance : 75 Ohms	E1 Line Impedance : 120 Ohms
Switch 7		
Switch 8		

IN 75 WRepresents the E1 unbalanced 75Winput.
OUT 75 WRepresents the E1 unbalanced 75WOutput.

3 Bottom Panel

The bottom panel of the 10(100)Base-T Ethernet over E1 equipment is as follows.



E1 Time Slot Setup: For E1 time slot setup, the DIP Switch settings on the bottom panel are as follows:

Working Mode	Switch Setting
Unframed	All switches are set to OFF
Framed (CCS)	S0 set to OFF, and the occupied time slots to ON
Multi-Framed (CAS)	All switches S0~S31 set to ON but S16 is set to OFF

Example 1: If you wish to use only first 5 time slots then you need to set the S0 time slots to OFF and switch S1 to S5 to ON and time slot S16 will be set to ON.

Example 2: If you wish to carry first 8 time slots on 512Kbps, then you need to set the S0 time slot OFF and switch S1 to S8 to ON (i.e. since each time slot consumes 64Kbps, so 8 time slots will consume 8 x 64Kbps = 512Kbps) and time slot S16 will be set to ON.

Example 3: If you wish to carry 20 time slots on 1.28Mbps (64Kbps x 20) then you need to set time slot S0 OFF and S1 to S21 time slots to ON. Please remember that the time slot S16 will be used as signaling time slot.

4. E1 RJ-45 to RJ-45 Crossover Pinout Details:

120W RJ45 pin-out		
PIN No.	**Definition of function**	**Signal Direction**
1	TX+ (transmitted data +)	E1 Data Output
2	TX- (transmitted data -)	E1 Data Output
3	NC	
4	RX+ (received data +)	E1 Data Input
5	RX- (received data -)	E1 Data Input
6	NC	
7	NC	
8	NC	

Ethernet RJ-45 Crossover Pinouts

Ethernet RJ-45 Crossover Pinouts		
PIN No.	**Definition of function**	**Signal Direction**
1	TX+ (transmitted data +)	Data Output
2	TX- (transmitted data -)	Data Output
3	RX+ (received data +)	Data Input
4	NC	
5	NC	
6	RX- (received data -)	Data Input
7	NC	
8	NC	

General:

1 Power Supply

AC Mains Input	220V 20% (AC Mains Input Model)
Optional	
DC Input	-48V
Power Consumption	5W

2 Service Conditions

Ambient temperature	0^0C ~ 50^0C
Relative humidity	90% (at 35^0C)

3 Dimensions 20cm x 15cm x 4.3cm

4 Weight 750g

Ordering Information

S. No.	Part No.	Product Description	Qty.
1.	VCL-Ethernet over E1(FE1)-DC	10/100 Base-T (Ethernet, 1 electrical) to 1E1/FE1 (120 Ohms, 75 Ohms) Interface Converter (with -48V DC power input)	1
2.	VCL-Ethernet over E1(FE1)-AC	10/100 Base-T (Ethernet, 1 electrical) to 1E1/FE1 (120 Ohms, 75 Ohms) Interface Converter (with 220V AC power input)	1

Note: Operation and maintenance of network equipment require professional knowledge and experience. We recommend the equipment to be managed only by qualified technicians. Should you require technical assistance please consult the provider, or contact our SUPPORT DESK at **support@valiantcom.com**

Notes:

Technical Specifications are subject to change without notice.
Windows is the registered Trademark of Microsoft Corporation, USA.
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AceCom Networks Pte Ltd.
200 Jalan Sultan, #02-13 Textile Centre,
Singapore 199018
Phone: +65 6295 3233, **Fax:** +65 6295 3133
E-mail: sales@acecomnet.com
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