PW-FE1-4ETH

Interface E1-Ethernet Converter

User Manual

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Content

1. Product description

PW-FE1-4ETH Interface Converter is an Ethernet bridge of high performance, which accomplishes the converting between the 100M Ethernet port and the E1 port. As an extended device of the Ethernet, PW-1E1-4ETH bridge realizes interconnection of four Ethernet by using 1pc E1 channel provided by existing networks with low cost.

100BASE-TX (RJ45) interfaces are provided at the end of Ethernet LAN to accomplish various functions including double Ethernet interface broad band shared, MAC address self-learning, address filtering, address table maintenance and flow control. The device has 4 ETH port, it can work like an intelligent L2 switch. It can be reduce Net node, dispense with device as HUB, consequently reduce the malfunction node.

Our PW-FE1-4ETH has the GUI NMS, it can manage the converter like an intelligent L2 switch. It can set the TAG VLAN on these 4 ETH port, can set the special tag like Q-in-Q, can configurable data rate from 32K~100M on each ETH port, can do some QoS setting.

E1 interfaces conforming to ITU-T G.703 and G.704 proposals are provided at the end of WAN, supporting RJ45 and BNC connection modes. The E1 ports support both framing and un-framing architecture. The user can select an operating mode for the E1 interface according to the connected E1 environment. This provides flexibility of network application. In the framing mode, the E1 interface provides a rate of N*64Kbps (N=1to31). In Un-Framing Mode,E1 channel provides a rate of 2.048Mbps and accomplishes transparent transmission.

If the FE1-4ETH bridge is used in the framing mode, the transmission clock can be either provided internally, i.e. using the main clocking timing mode (INT), or extracted from the E1 channel, i.e. using slave clock timing mode.

The FE1-4ETH bridge provides plenty of self-test functions, supporting local loop. It also provides pseudo random code test function to test error codes in the circuit.

It is proposed to use the products of this series in pairs.

A typical application is shown in figure 1.

Figure1 typical application of AN-FE-4ETH bridge

2. Main features

- In accordance with the provisions of IEEE 802.3, 802.3u Ethernet ITU-T G.703, G.704 and G.823 protocols.
- E1 interface framing/un-framing optional; balanced 120ohm unbalanced 75ohm optional.
- The E1 interface uses PCM31 mode, supporting CRC check.
- E1 interface main/ slave clock optional in the framing mode.
- In E1 framing mode, number of time slots is optional from 1 to 31.
- Supporting 2.048Mbps transparent transmission in the E1 un-framing mode.
- The two 100BASE-TX Ethernet interfaces support 100M half/ full duplex modes.
- MAC addresses self-learning and addresses filtering functions, reducing the transmission load of the E1 circuit.
- Built-in 64Mbits SDRAM Ethernet data buffer memory, improving the capability of Ethernet side anti-outburst, assuring high throughput of data transmission.
- E1 circuit local loop tests.
- Pseudo random sequence test, facilitating the test of E1 circuit.
- Perfect circuit test and alarm indication.
- Optional AC 220V or DC –48V input for bridge of both architectures

3. Technical specifications

Protocol: G.703, G.704, G.736, G.823, I.431

IEEE802.3u 100BASE_TX

Circuit Interface (E1): Impedance: 75Ω, physical interface: BNC

Impedance: 120Ω, physical interface: RJ45

Interface rate :Framing: N*64Kbps,N==0~31; UN-framing: 2.048Mbps

Coding: HDB3, Jitter tolerance in accordance with G.823

Output Jitter < 0.05UI

Data interface (100BASE_TX): Impedance: 100Ω, interface: RJ45

Interface rate: 100Mbps

Coding: Manchester

Cable: 75Ω coaxial-cable, UTP5 twisted pair.

Transmission range:

Data interface: 100m, Circuit interface: BNC: 600m; RJ45: 300m

Indicator: indicating power, connection states of data and circuit interfaces, operation state, test state and trouble alarm.

Dimensions (LxWxD): 210 x 40 x 140mm

Power Supply : 85V ~ 264 Volt AC input , 5Volt/1Amp Output

-36V ~ -72 Volt DC Input, 5Volt/1Amp Output

Power dissipation: 3Watt

Operation Temperature : 0^0C ~ 50^0C

Storage Temperature : -20^0C ~ 80^0C

Humidity :5% ~ 90% (no Condensation)

4. Installation and panel description

4.1. Unpacking

Check the accessories and spare parts when opens the package.

- FE1-4ETH Bridge
- Operation manual
- A supply cord (only for AC type)
- Two type of connector/plugs : BNC or RJ45

In case of missing or any damage during transportation, immediately contact our offices or agencies.

4.2 Front and rear panel of the device

4.2.1. The front panel of the FE1-4ETH bridge

The front panel of the FE1-4ETH Bridge is shown as below

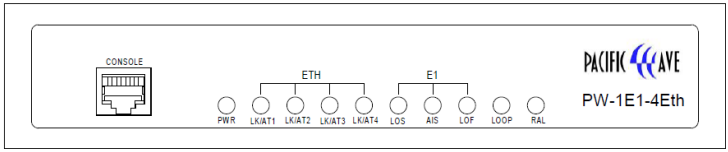


Figure 2 front panel of FE1-4ETH Bridge

Explanations for the two rows of indicators at the left are as follows:

POWER: Power. Always lights after starting up.

LK/AT1:Flickers if ETH1 is connected and transmitting data.

LK/AT2:Flickers if ETH2 is connected and transmitting data.

LK/AT3: Flickers if ETH3 is connected and transmitting data

LK/AT4: Flickers if ETH4 is connected and transmitting data

LOF: Alarm indicator lamp for input signal out-of-frame in E1 line. Constantly lightening indicates the alarm with local device; flash indicates the alarm with opposite device. Alarm status of opposite device can be detected only at framing mode.

LOS: E1 link interruption alarm. Always lights after starting up till synchronization is established. It also lights in case of E1 link interruption or signal loss in communication.

AIS: Always lights after receiving a alarm indication signal.

LOOP: Always lights in testing if transmitting local loop, flickers if remote E1 interface loop instructions or pseudo-random sequence test instructions.

RAL : Always light when E1 line of remote site cut down

4.2.2. The rear panel of the FE1-4ETH bridge

The AC input rear panel of FE1-4ETH Bridge is shown in figure 3.

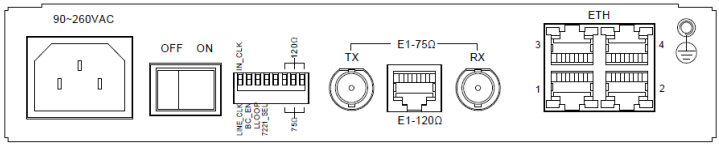


Figure 3 AC input rear panel of FE1-4ETH Bridge

220V AC: AC socket with two cores

OF ON: Power Switch for Electrical Power

8 Bits coded Switch: System configure, more description in 4.2.3

E1-75Ω: BNC Tx/Rx socket for 75ohm impedance E1 interface

E1-120Ω: RJ45 socket for 120Ω impedance E1 interface

ETH: RJ45 socket for 100Mbps Ethernet interface

The DC input rear panel of FE1-4ETH Bridge is shown in figure 4.

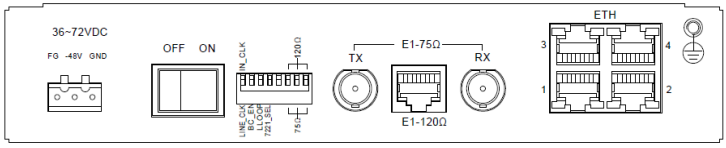
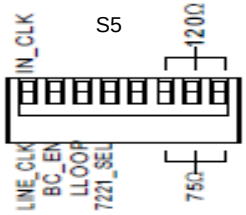


Figure 4 DC input rear panel of FE1-4ETH bridge

48VDC : DC-48Volt Power Supply Connector

The others are the same as in figure 3.

4.2.3 System test and configuration



We can find 8pcs DIP Switch (From Left to Right : 1st to 8th Swich) with below detail description :

S5.1, 1st Switch-Main/Slave Clock setting (valid only in Framing mode).
ON for Main clock (INT-CLK) and OFF for slave clock (LINE-CLK).

S5.2, 2nd Switch- BC_EN to set Bandwidth Coupling,
ON to follow bandwidth setting (time slot) of remote converter.
OFF to use bandwidth setting (time slot) of local converter

S5.3, 3rd Switch-LLOOP Local Loopback Setting (For Testing Purpose)
ON for E1 interface in direct Loop back mode.
OFF for E1 Interface not in direct Loop back mode..

S5.4, 4th Switch- 7221_SEL to Set Version of Remote Corverter
ON for working with the old Firmware Version Device.
OFF for working with same Firmware Version of Device

S5.5, 5th Switch – NULL (Not in Used)

S5.6 to S5.8, 6th to 8th Switch - To select between 75Ω or 120Ω
When S5.6~S5.8 is set 75Ω, The E1 circuit uses BNC Coaxial cable
When S5.6~S5.8 is set 120Ω, The E1 circuit uses RJ45 sockets and 120Ω balanced twisted-pair.

5. Applications of FE1-4ETH Bridge

5.1 Definition of balanced twisted-pair wire sequence

5.1.1 100BASE-TX interface wire sequence

The RJ45 Unshielded twisted-pair for FE1-4ETH interface can use DCE or DTE standard stipulations, it support AUTO MDI/MDX function.

5.1.2 E1 interface wire sequence

1 & 2 are transmitting lines, 4 & 5 are receiving lines, as shown below:

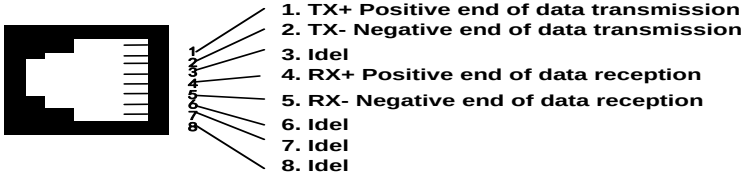
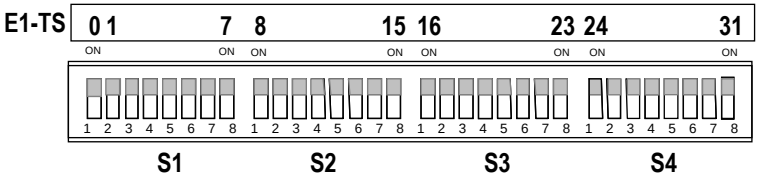


Figure 5 RJ45 balanced twisted-pair wire sequence for E1 interface

5.2 Setting of DIP switch and jumper

5.2.1 Setting of E1 interface impedance

Below are switch which allow user to set number of Time Slots according to the expected rate : as shown by Figure 6 :



SWITCH	Status	Function	Description
SW 0 (S1.1)	ON	Unframed 2048KBps	Full E1 used (31Time Slot)
	OFF	Framed in Xx64K	User can set X-Time Slot to use
SW 16 (S3.1) (Valid If SW0 is off)	ON	CCS (PCM31)	Max 31 Timeslot
	OFF	CAS (PCM30)	Max 30Timeslot

- 1st switch-SW0 (S1.1) is used to set E1 framing/non-framing.
  "ON" refers to non-framing mode (2.048Mbps), despite of whatever positions are set at other switches (S2,S3,S4).
- 2nd to 32nd Switch (S1.2~S1.8, S2.1~S2.8, S3.1~S3.8, S4.1~S4.8)
  SW1—SW31are respectively used to set 1st–31st time slots (this only function if S1.1 is off).
  Set at "ON", the corresponding time slot is selected;
  Set at "OFF", the corresponding time slot is not selected.
  The rate of E1 interface dependent on Number of Selected time slots.

  For example: if 3rd switch (S1.3) is "ON" and other switches is "OFF" indicates that 2nd Time slot is selected, at this setting E1 rate is 64K;
  If 7th(S1.7) & 10th(S2.2) switches is "ON" and other switches is "OFF" indicates that 6th& 9th Time slots are selected, E1 rate is 2*64K=128K.

- SW-16 (S3.1) is used to set E1 frame structure to be PCM30(CAS mode) or PCM31 (CSS mode)
  '0FF'—PCM30, 16th time slot not being used for transmission service;
  'ON'—PCM31, 16th time slot can be used for transmission service.

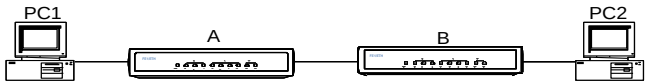
5.3 Configuration of Ethernet connecting devices

The equipment uses 100BASE-TX Ethernet interfaces and supports adaptive 100M half/full duplex mode. Ethernet devices connected to FE1-4ETH bridge (such as SWITCH, HUB, Ethernet adapter card (NIC), etc.) can be set to 100M full duplex, 100M half duplex, adaptive 100M half/full duplex and adaptive 10/100M.

5.4 Simple self-test methods for devices and E1 circuits

Test 1: test of back-to-back connection

Connect two FE1-4ETH bridge devices back to back, ping the other's IP address on the two computers to test the two devices.



Test 2: test of E1 circuit transmission error codes.

Connect the device in the real operational environment, check the E1 circuit with the loop and pseudo-random sequence test function provided by the device.

5.5 Typical applications

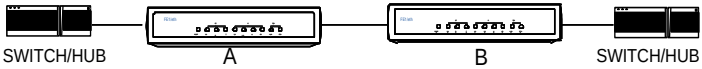
Mode 1: connect Ethernet with E1 networks.

SDH, PDH and DDN networks have already been widely adopted. With E1 channels provide by such networks, bridging connection and interconnection of two Ethernet networks at different locations can be easily realized by FE1-4ETH bridge.

Connecting two Ethernet networks with an E1 network.

Mode 2: Extend an Ethernet network with existing twisted pair or coaxial cable.

Connected with twisted pair or 75Ω coaxial cable, the E1 ports of FE1-4ETH Bridge support a transmission range of 300m or 600m. Two Ethernet networks at different locations can be bridged by two FE1-4ETH bridge with existing twisted pair or coaxial cable.



Extending Ethernet with existing twisted pair and coaxial cable

5.6 Common Questions and Answer.

(For independent interface converter, reference for frame bridge)

No.	Symptoms	Causes	Remedies
1	The power indicator does not light after starting up.	The power circuit has a failure.	1. The power is not connected. Check the contact of power Cord and its converters. 2. Failure at internal power module. Send back to factory for repair.
2	Indicator LNK does not light when the Ethernet network is connected.	Integrity test of link has not passed.	1. The type of the cable does not meet DTE/DCE modes of Ethernet ports from Device.. 2. The crystal head of the cable is not well molded. Check Quality of UTP cable. 3. The rate setting of converter or the network card is wrong. See 5.3. 4. The internal circuit of the equipment is damaged. Send back to factory for repair.

3	Indicator LOS always lights when the cable at the E1 port is connected.	The circuit signals are lost.	1. Check the coaxial cable or UTP5 twisted pair for open circuit and short circuit. Check whether the plugs are positioned well. 2. The factory default of the device is 75Ω BNC interface. If a 120Ω RJ45 interface is used, S5.6~S5.8 should be reconfigured. (See 4.2.3) 3. The internal circuit of the equipment is damaged. Send it to factory for repair.
4	Indicators are normal, but communication can not be done.	Different mode/ Setting between Local device and Remote Device	1. The setting of framing or un-framing are different. Make sure both devices has same code setting S1.1. 2. Setting of the time slots are different. Make sure both devices set same time slots via the dip switch S1.2~S1.8, S2.1~S2.8, S3.1~S3.8, S4.1~S4.8..