
# F5-4518/8518 Copper/Optical Ethernet to 4/8E1 Converter User Manual

(Version 1.3)

Beijing Fibridge Co., Ltd.

# Content

# 1. Overview

This series of products are orientated in the broadband access system for its high-quality, high-stability and low price. F5-4518/8518 is the most newly promoted product that can map 100Base-FX and 10/100Base-T Ethernet data into 4/8 E1 channels. This protocol converter provides bandwidth up to 7.936Mbps (for 4E1, for 8E1 is 15.872Mbps) for Ethernet connection. And it also provides completed indicators to show the status and alarm messages of the E1 channels and optical ports. It is widely used in LAN connection, IP transmission and video broadcasting. The production has the features of setting E1 channels CRC error threshold and monitoring the E1 channel working status. If the CRC error rate in any E1 channel exceeds the threshold, the system will shut down this channel automatically, and reassign the data flow to valid E1 channels. E1 ports are compatible with 75Ω unbalanced and 120Ω balanced transmission lines. The Ethernet module of all the devices has several assemblages, for example: 1 optical and 1 electric port; 4 electric ports etc. Furthermore, it can be managed by the software Fi-View-PC.

# 2. Features

## 2.1. Hardware

- 1~4 E1 channels carry 100Base-FX and 10/100Base-T Ethernet data
- Comply with ITU-T G.703, G.823 for E1 ports and IEEE802.3u for Ethernet ports
- One optical port and three electric ports. Optical port supports 100 Base-FX mode. Electric ports support 10/100Base-T mode
- Ethernet ports is in flow control and back pressure mode; support huge packet, up to 1916 bytes (inclusive); carrier sense based backpressure is selected
- 16Mbits high-speed SDRAM inside used to cache
- Rearrange Ethernet packages in E1 channels to ensure data transfer efficiency and stability
- Allow the delay time between any two channels up to 16ms
- For each E1 channel, the payload capability is up to 1.984Mbps
- Auto-detect the valid E1 channels and auto-balance the data flow among the valid E1 channels
- Provide CRC error threshold setting for each E1 channel.

If the CRC error rate of any E1 channel exceeds the threshold, the system will shut down this channel, and reassign the data flow to the valid E1 channels automatically

- Even if all the receive lines of E1 channels is shut down, the local alarm and management information can still be transferred in the transmission line. While the converter works with optical equipment, this functionality affords a convenient and efficient way to locate the fault.
- 75Ω and 120Ω line impedance are optional for E1 channels.
- Full LED on front panel provides comprehensive indication of device working status
- Indicators can be selected to indicate local or remote status
- 220VAC and -48VDC power supply for standalone and chassis are optional
- Managed/ unmanaged optional
- Provide SNMP, WEB and Console management for the standalone. Viewing and configuring local and remote device easily.

## 2.2. Software

- Support SNMP management

- Show details of system information, including device name, location information, IP address, start-up time, software and hardware version
- View & configure the working status of each port, including link status, link speed, duplex mode, self-negotiate status
- Configure the code error limitation、LOS、 LOF、 AIS and overtime alarm information
- Configure system setting mode, CPU or hardware configure
- Choose to show local alarm or remote alarm
- Show the detailed information of power supply, including AC/DC type, output power and running status
- Support SNMP management. Set Trap Destination, Community Name, and authority
- Provide MIB file, make it easy to be integrated into the third-party SNMP management software
- Reset device to factory default, with network configuration resetting or not selectable
- Support firmware updating, with the update tool program and new version firmware file download from our website.
- Adopt the centralized management style and the tree-view catalogue, which can manage many sets of device at the same time in a single window.

# 3. Applications

## Peer-to-peer application with standalone

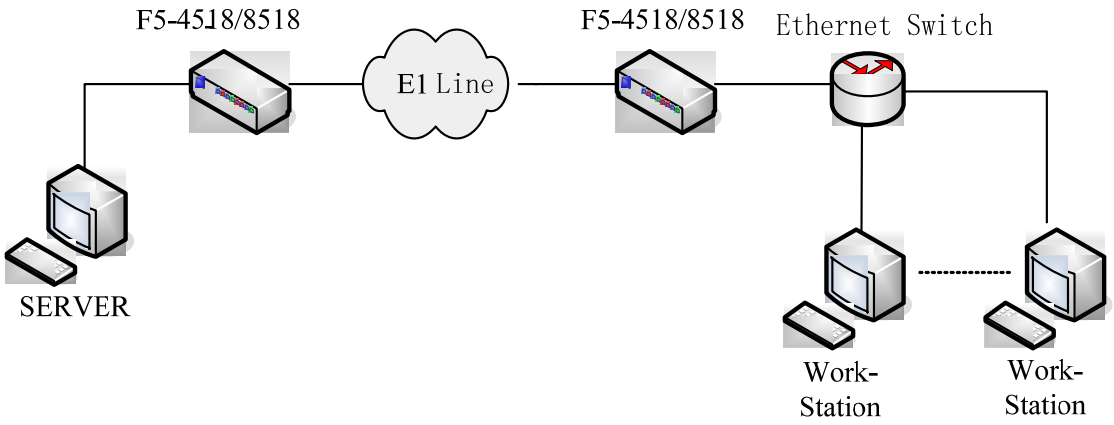


**Figure1: Application topology**

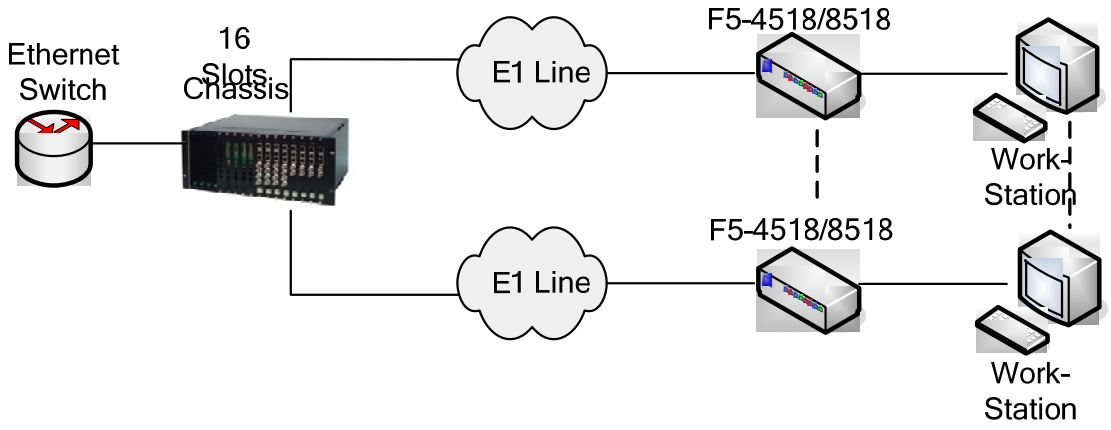


**Figure2: Application topology**

In these applications, two F5-4518/8518 converters carry Ethernet data to connect hosts with LAN. LAN transmit channel is Ethernet, WAN channel is fiber.

# 4. Specification

## 4.1. E1 Interface

- Data rate: 2.048Mbps
- Code type: HDB3
- Compliant with ITU-T G.703, G.823
- Line impedance: 75Ω for unbalanced or 120Ω for balanced
- Connector: BNC for unbalanced or RJ45 for balanced
- Jitter: Compliant with ITU-T G.823
- Transparent E1 mode
- Channel number: F5-4518: 4; F5-8518: 8

**Table1: Definition of RJ45 connector pins for 120Ω E1 ports**

| PIN | 1 | 2 | 4 | 5 | 3，6 | Others |
|---|---|---|---|---|---|---|
| Description | RX+ | RX- | TX- | TX+ | GND | Reserved |

## 4.2. Ethernet Optical Interface

- Adopt standard 1*9 pin optical transceiver module
- Wavelength: 850nm, 1310nm on multi-mode, 1310nm, 1550nm on single-mode
- Single mode/Multimode Optional
- Up to 120km transmission distance on single-mode, up to 5Km transmission distance on multi-mode

- SC/PC, ST/PC and FC/PC optional
- Port number: 1 RX, 1 TX
- Optical Power Budget List:

**Table 2: Optical Power Budget**

| Wave length (nm) | Connector | Emit Power (dBm) | Sensitivity (dBm) | Saturation (dBm) | Max Dist. (Km) | Loss (dBm/Km) |
|---|---|---|---|---|---|---|
| MM850 | SC/ST | -14 ~ -18.5 | -31~ -34 | -14 | 2 | 3 |
| MM1310 | SC/ST | -14 ~ -18.5 | -31~ -34 | -14 | 5 | 2 |
| SM1310 | SC/ST/ FC | -6 ~ -15 | Better than -34 | -3 | 40 | 0.4 |
| SM1310 | SC/ST/ FC | 3 ~ -3 | Better than -36 | -3 | 80 | 0.4 |
| 1550 DFB | SC/ST/ FC | 3 ~ -3 | Better than -36 | -3 | 120 | 0.25 |

## 4.3. Ethernet Electric Interface

- Speed: auto-negotiation
- Compatible with IEEE802.3u
- Connectors: RJ-45
- Duplex mode: auto-negotiation

- MDI/MDI-X auto crossover
- Design specially for supporting VLAN package
- Transfer distance: ≤100 meters
- Port number: 3

## 4.4. Power

- Power Input:

  AC Power: 198V~242VAC, 50/60Hz

  DC Power: -48VDC
- Power Consumption: <15W

## 4.5. Environment

- **Operating**

  Temperature: 0~+50℃

  Humidity: 0~90% (non-condensing)
- **Storage**

  Temperature: -25~+70℃

  Humidity: 0~95% (non-condensing)

## 4.6. Dimension & Weight

- **Dimension**

  435 Width ×36 Height ×233 Depth (mm)
- **Weight**

  3Kg (approx.)

# 5. Operation Instruction

## 5.1. Panel sketch map

### Front panel of module

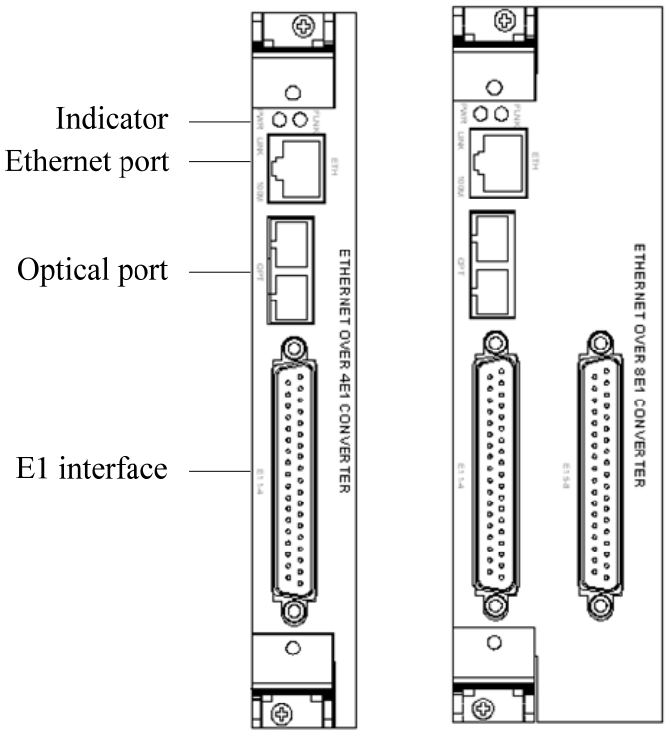


**Figure 3: Front panel of module**

### Front panel of Standalone

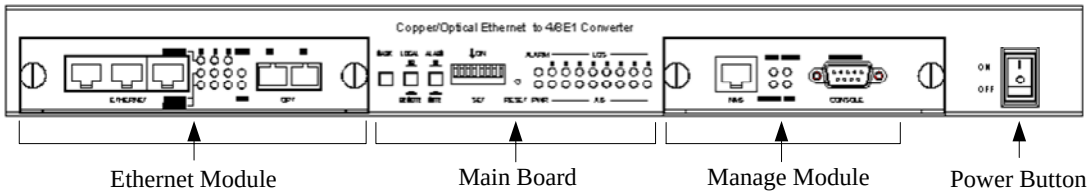


**Figure 4: Front panel of standalone**

### Details:

### Ethernet Module

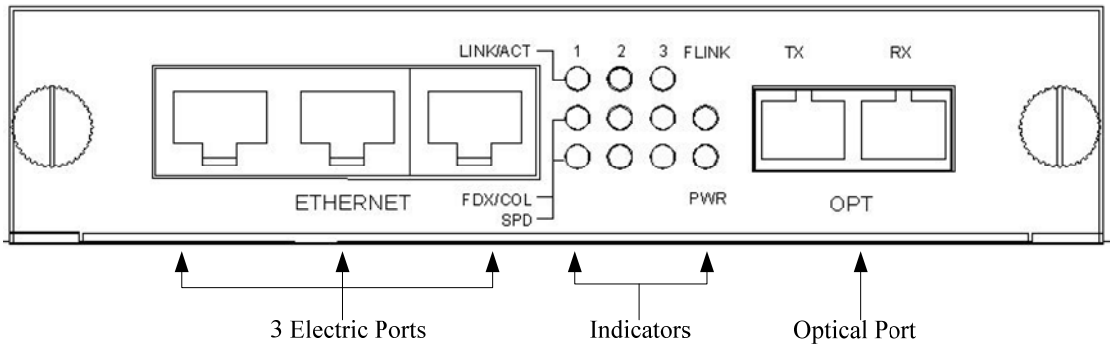


**Figure 5: Ethernet Board**

## Main Board

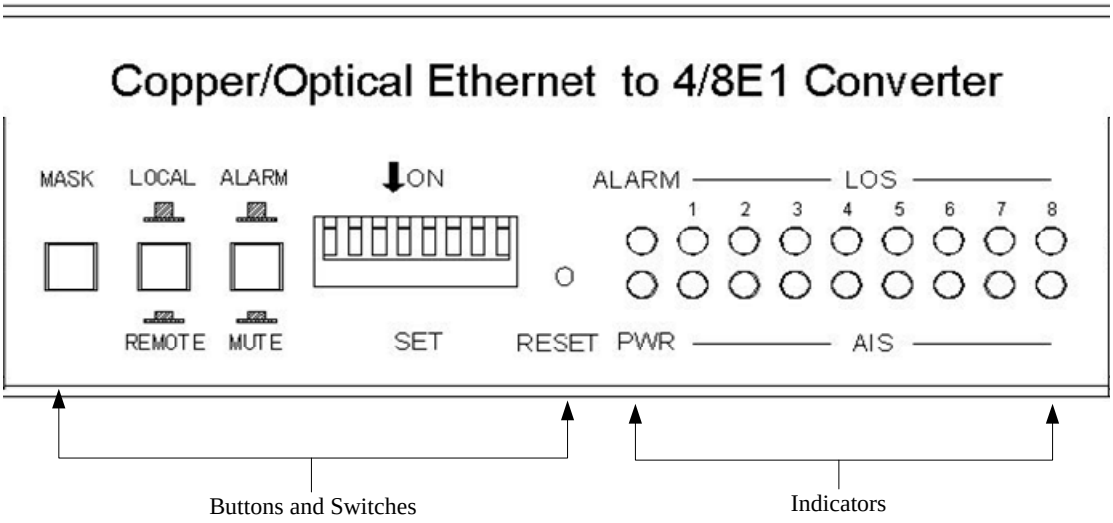


**Figure 6: Main Board**

## Manage Module

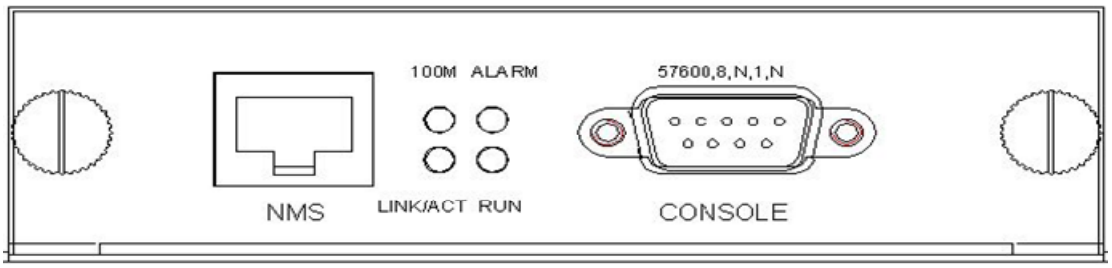


**Figure 7: Manage Board**

## Back panel

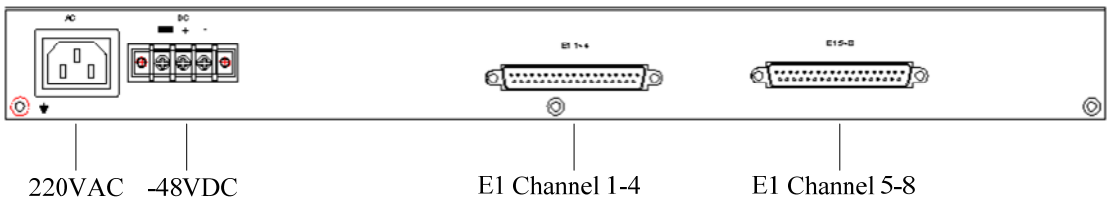


**Figure 8: Back panel**

## 5.2. LED Description

### Table 3: Module Card Indicators Description

| LED | Color | Function | Stat. | Description |
|---|---|---|---|---|
| PWR | Green | Power | ON | Power supply is OK |
| | | | OFF | Power off or failed |
| FLINK | Green | Optical port link status | ON | Optical port linked |
| | | | OFF | Optical port not link |
| | | | Blink | Optical port is transferring data |

### Table 4: Main Board Indicators Description

| LED | Color | Status | Description |
|---|---|---|---|
| PWR | Green | ON | Power supply is OK |
| | | OFF | Power off or failed |
| ALARM | Red | ON | Manage module has alarm |
| | | OFF | Manage module has no alarm |
| LOS1-8 | Red | ON | Local or remote E1 channel loss signal, or frame loss asynchronous |
| | | OFF | No LOS or LOF alarm |
| AIS1-8 | Red | ON | Local or remote E1 channel has AIS alarm |
| | | OFF | No AIS alarm |

## Table 5: Ethernet Card Indicators Description

| LED | Color | Status | Description |
|---|---|---|---|
| PWR | Green | ON | Power supply is OK |
| | | OFF | Power off or failed |
| Flink | Green | ON | Optical port link OK |
| | | Blink | Optical port is transferring data |
| | | OFF | Optical port not link |
| Link/ ACT 1-3 | Green | ON | Electric port link OK |
| | | Blink | Electric port is transferring data |
| | | OFF | Electric port not link |
| FDX/ COL 1-3 | Yellow | ON | Full duplex mode |
| | | Blink | In half duplex mode, it indicates a collision has occurred |
| | | OFF | Half duplex mode |
| SPD 1-3 | Yellow | ON | 100M speed |
| | | OFF | 10M speed |

## Table 6: Manage Card Indicators Description

| LED | Color | Status | Description |
|---|---|---|---|
| 100M | Yellow | ON | SNMP Ethernet is 100M |
| | | OFF | SNMP Ethernet is 10M |
| LINK/ ACT | Green | ON | SNMP Ethernet port link OK |
| | | BLINK | SNMP Ethernet port is transferring data |
| | | OFF | SNMP Ethernet port not link |
| Alarm | Red | ON | Equipment temperature over level |
| | | OFF | Equipment temperature normal |
| RUN | Green | BLINK | SNMP CPU works normally |

| | | | |
|---|---|---|---|
| | | OFF | SNMP CPU not work |

## 5.3. Button Description

**Table 7: Button description (In the main board)**

| Name | Status | Description |
|---|---|---|
| Reset | Down | Reset equipment |
| | Up | Equipment works normally |
| MASK | Down | Mask all the alarm indicators |
| | Up | Not use this function |
| Local/ Remote | Down | Main board LED (LOS, AIS) indicate remote status |
| | Up | Main board LED (LOS, AIS) indicate local status |
| Mute | Down | Make the speaker mute |
| | Up | The speaker will ring when alarm occurs |
| Power | ON | Power ON |
| | OFF | Power OFF |

**Default set: Power off, others up.**

## 5.4. DIP Switch Description

**Table 8: Switch description (In the main board)**

| Name | Bit | Stat. | Description |
|---|---|---|---|
| SET | DIP1 DIP2 | OFF OFF | Local device Is controlled by hardware |
| | | OFF ON | Local device is controlled by local management |
| | | Else | Description in **Table 9** |

| | | | |
|---|---|---|---|
| | DIP3 | ON | Enable E1 channels loop back.<br>If button LOCAL/REMOTE is UP, local loopback is enabled;<br>If button LOCAL/REMOTE is DOWN, remote loopback is enabled. |
| | | OFF | Disable E1 channels loop back.<br>If button LOCAL/REMOTE is UP, local loopback is disabled;<br>If button LOCAL/REMOTE is DOWN, remote loopback is disabled. |
| | DIP4<br>DIP5 | OFF<br>OFF | No CRC error threshold |
| | | ON<br>OFF | CRC error threshold is $1\times10^{-4}$ |
| | | OFF<br>ON | CRC error threshold is $1\times10^{-5}$ |
| | | ON<br>ON | CRC error threshold is $1\times10^{-6}$ |
| | DIP6-DIP8 | Reserved | |

**Default set: All ON.**

## 5.5. Loop back SET

**Table 9: Loop back set**

| Name | Description |
|---|---|
| Local loop back | DIP1&DIP2&DIP3 of local device is"OFF, OFF, ON"; the "Local/ Remote" button of local device is "UP". |
| Remote loop back | DIP1&DIP2&DIP3 of local device is"OFF, OFF, ON",<br>DIP1&DIP2 of remote device is"ON, ON", the "Local/ Remote" button of local device is "DOWN". |

## 5.6. Port Description

**Table 10: Port Description**

| Name | Description |
|---|---|
| Ethernet | Three electric Ethernet ports, RJ45 connector |
| OPT | TX: fiber transmit port |
| | RX: fiber receive port |
| NMS | SNMP management Ethernet port |
| Console | Console management port, baud rate is 57600, even, 8 data bits, 1 stop bit. |
| E1 1~4 | 1~4 E1 ports, connected with DB37~8BNC(75Ω) adapter or DB37~4RJ45(120Ω) cable |
| E1 5~8 | 5~8 E1 ports, connected with DB37~8BNC(75Ω) adapter or DB37~4RJ45(120Ω) cable. Not use for F5-4518 |

# 6. Installation & Operation

## 6.1. Installation Steps

### 6.1.1. Preparation

- Open the package, check the device and accessories according to the “Package List”. If any was lost or damaged, please contact us immediately.
- Make 75Ω E1 cable. There are two BNC connectors (for 75Ω E1) and one RJ45 plug (for 120Ω E1) in the package. If you want to use 75Ω interface, take out the BNC

connectors, and weld them on the 75Ω E1 coaxial cable (Figure 9).

**Figure 9: 75Ω BNC**

- Make 120Ω E1 cable. If you use 120Ω interface, take out RJ45 plug, and fix it on twister-pair cable (Figure 8). **Table 1** is the detailed definition of 120Ω connector.

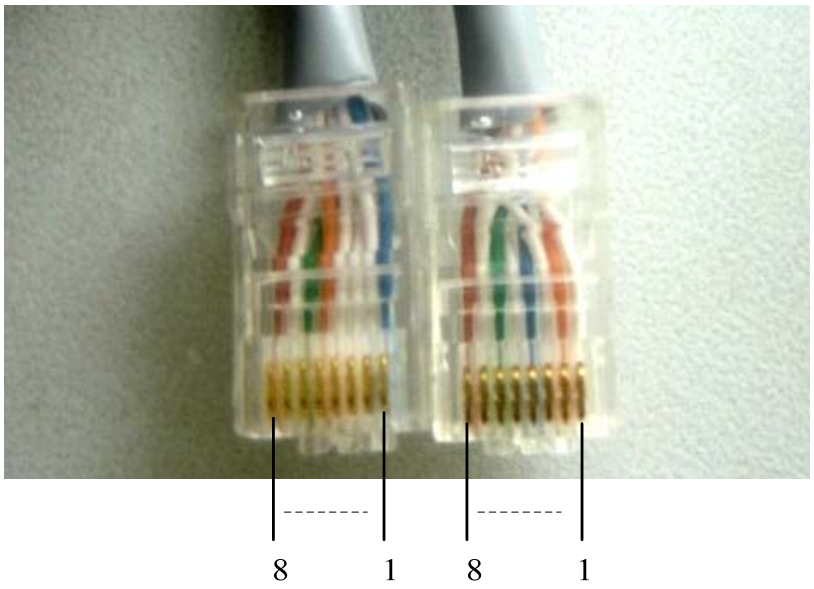


**Figure 10: 120Ω RJ45**

### 6.1.2. Connection

- Take out the equipment; place it on neat table or the other platform.
- Connect SNMP Ethernet port (if device has management function) and Ethernet electric ports with twisted-pair cable.
- Connect E1 1~4 and E1 5~8 (for 4E1 don't connect 5~8) ports with DB37~8BNC (75Ω) or DB37~4RJ45 (120Ω) adapters, then link with 75Ω coaxial cables or 120Ω twisted-pair cables to the adapter.

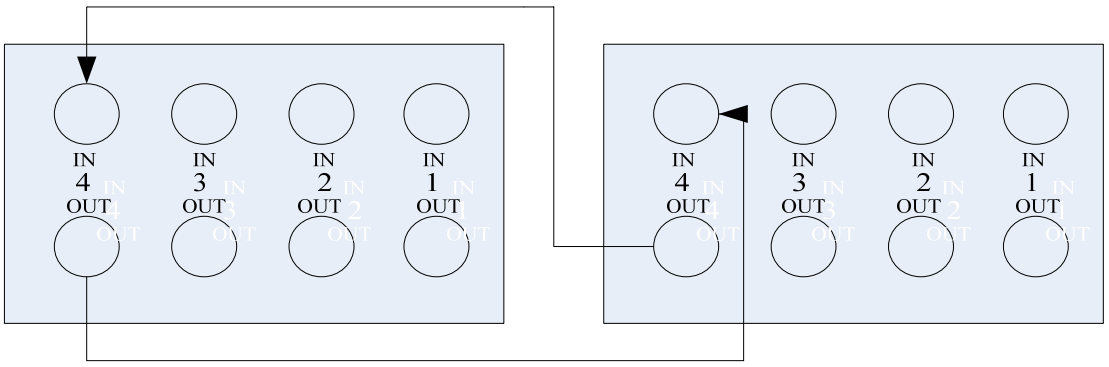


**Figure 11: 75Ω connection**

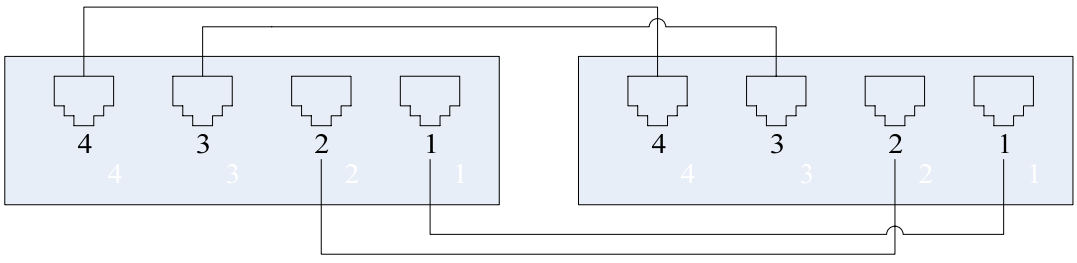


**Figure12: 120Ω connection**

- Connect optical ports with fiber.

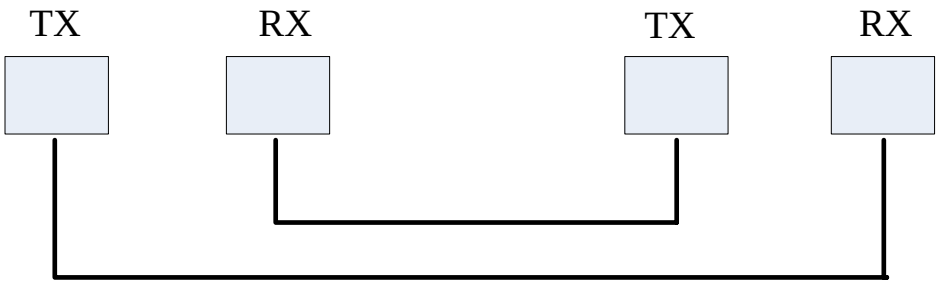


**Figure 13: Fiber connection**

- Set buttons and dip switches. Device can work in the default mode. If you have special requirement, please set buttons or switches according to the description.
- Connect power supply cable to the equipment.

### 6.1.3. Power ON and the Indicators status

- If the equipment works normally, the status of indicators will be as follow:

**For main board:** “PWR” ON.

**For Ethernet module:** “PWR” ON; if Optical port is connected, “Flink” blinks; if electric ports are connected, “Link/ACT” blinks, “FDX/COL” and “SPD” ON or OFF according to the Ethernet state.

**For Manage module:** “RUN” blinks; if NMS Ethernet port is connected, “Link/ACT” blinks, “100M” ON or OFF according to the Ethernet state.

### 6.1.4. Loop back Topology

Local loop back topology

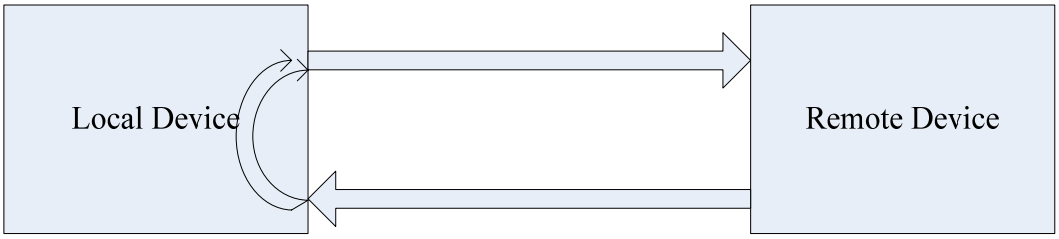


**Figure 14: Local loop back**

Remote loop back topology

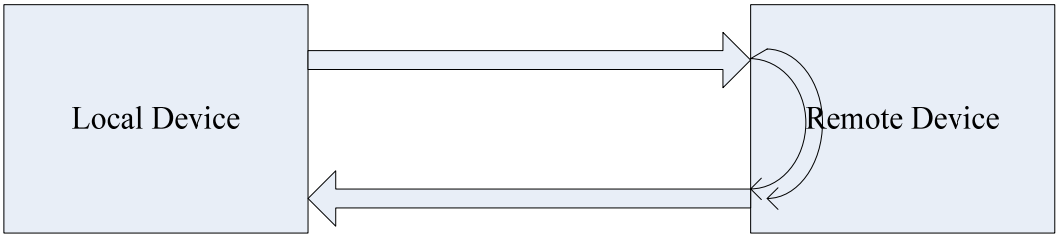


**Figure 15: Remote loop back**

**Note:** If test loop back function of a single device, the “E1 Tester” is needed to connect with the device.

## 6.2. Notice

- E1 ports should be linked in pairs and one-to-one, e.g., IN1 of local end device should be connected with OUT1 of remote end device, vice versa. Otherwise, they can not receive data.
- Make sure the type of power supply is in accordance with your requirement.
- It is very important that equipments are connected to earth rightly and firmly. Check the distributing of the power

supply and the connection to the earth.

## 6.3. Faults & Solutions

### 6.3.1. Power LED OFF

Please check whether the power button is “ON”.

### 6.3.2. LOS LED ON

Please check whether the relevant E1 channels IN and OUT are already linked, or whether it has bit errors in the channels.

### 6.3.3. No alarm, but can’t transfer data

Please check whether E1 channels are linked in pairs and one-to-one.

# 7. Order Information

| P/N | Description |
|---|---|
| **F5-451833-S042CA/D** | 1 optical port and 3 electric ports Ethernet to 4 E1 converter, standalone, 220VAC/-48VDC power supply. Optical port: single mode, 40Km, SC/PC |
| **F5-4518-S042C A/D** | 1 optical port Ethernet to 4 E1 converter, standalone, 220VAC/-48VDC power supply. Optical port: single mode, 40Km, SC/PC |
| **F5-451813-S042CM** | 1 optical port and 1 electric port Ethernet to 4 E1 converter, module. Optical port: single mode, 40Km, SC/PC |

| | |
|---|---|
| **F5-4533A/D** | 3 electric ports Ethernet to 4 E1 converter, standalone, 220VAC/-48VDC power supply |
| **F5-4543A/D** | 4 electric ports Ethernet to 4 E1 converter, standalone, 220VAC/-48VDC power supply |
| **F5-851813-S042CA/D** | 1 optical port and 1 electric port Ethernet to 8 E1 converter, standalone, 220VAC/-48VDC power supply. Optical port: single mode, 40Km, SC/PC |
| **F5-851833-S042CA/D** | 1 optical port and 3 electric ports Ethernet to 8 E1 converter, standalone, 220VAC/-48VDC power supply. Optical port: single mode, 40Km, SC/PC |
| **F5-8518-S042C A/D** | 1 optical port Ethernet to 8 E1 converter, standalone, 220VAC/-48VDC power supply. Optical port: single mode, 40Km, SC/PC |
| **F5-851813-S042CM** | 1 optical port and 1 electric port Ethernet to 8 E1 converter, module. Optical port: single mode, 40Km, SC/PC |
| **F5-8533A/D** | 3 electric ports Ethernet to 8 E1 converter, standalone, 220VAC/-48VDC power supply |
| **F5-8543A/D** | 4 electric ports Ethernet to 8 E1 converter, standalone, 220VAC/-48VDC power supply |
| **Manage Module** | **For SNMP management and can worked with all of the series listed above** |

**Notice:**

1. **The P/Ns shown in above table are for 75ohm E1 channels only. Append suffix "-H" for each to**

**represent 120ohm E1 channels.**

2. **All of the devices listed above with optical port working in single mode can work in multi mode also, and the "P/N" will be changed. For example, "F5-451813-S042CA/D" is single mode optical, and "F5-451813-M2CA/D" is multi mode optical.**
3. **All of the devices listed above support SNMP management, and the manage module is optional.**

** We Reserve the right to vary descriptions and specifications without notice due to Fibridge's policy of continuous product improvement**

**Beijing Fibridge CO., LTD.**

Address: A402, Power Creative Building, NO.1 Shangdi East RD., Haidian District, Beijing

Tel: +86-10-58858988

Fax: +86-10-58858520

Email: info@fibridge.com

Website: http://www.fibridge.com