



**F4-51 10/100Mbps Ethernet over E1
Protocol Converter User Manual**

(Version 1.0)

Beijing Fibridge Co., Ltd.

Contents

| | |
|--|-----------|
| 1. Overview | 3 |
| 2. Features | 3 |
| 3. Application..... | 4 |
| 3.1. Peer-to-Peer application with standalone | 4 |
| 3.2. Star-Topology with chassis and standalone | 5 |
| 4. Specification | 5 |
| 4.1. E1 port..... | 5 |
| 4.2. Ethernet port..... | 6 |
| 4.3. Power | 6 |
| 4.4. Environment | 6 |
| 4.5. Dimensions & Weight | 7 |
| 5. Panel Instruction | 7 |
| 5.1. Front Panel..... | 8 |
| 5.2. Back Panel | 10 |
| 5.3. LED Description | 10 |
| 5.4. Ports' Description | 13 |
| 5.5. Switches' Description | 13 |
| 6. Installation & Operation | 15 |
| 6.1. Installation Steps | 15 |
| 6.1.1. Preparation | 15 |
| 6.1.2. Connection..... | 16 |

| | | |
|-----------|-------------------------------|-----------|
| 6.1.3. | Power ON | 17 |
| 6.2. | Something Notice | 18 |
| 6.3. | Faults & Solutions | 18 |
| 6.3.1. | E1 LOS ON | 18 |
| 6.3.2. | E1 LOF ON | 18 |
| 7. | Order Information..... | 19 |

1. Overview

F5-4511 Series F4-51 Converter is a high performance, remote, self-learning Module Card Ethernet bridge. Its compact size and low cost make it ideal for cost-sensitive bridging applications or as a LAN extender over bit stream type infrastructures. Its E1 data interface also provides an economical digital access solution for E1 and Fractional E1 network Services, which can work at data rates of 64Kbps to 2048Kbps. User data is placed into the E1 frame, using only the required number of timeslots. Timeslot assignment is accomplished according to the Data Port speed and manual setting of DIP switches. The main E1 link may be clocked from the recovered receive clock or from an internal oscillator. For easy to check the fault of network line, the device provides loop selection, both local loop and remote loop.

2. Features

Hardware Function:

- High performance bridge for 10/100MBase-T Ethernet extension
- Fully compatible with IEEE 802.3 and Ethernet Standards
- E1 channel: Full and Fabrication optional, 75/120ohm optional

- Ethernet Port:: 10Mbps, Full/Half Duplex Mode compatible
- 10/100MBase-T LAN Interface on RJ-45 connector and MDI/MDI-X compatible
- 15000 frames per second filtering and forwarding rate
- 1000 MAC address LAN table, and automatic LAN table learning and aging.
- Standalone and 16 slots chassis optional
- Power of Chassis: 2 Slots for slide in power supplier module, AC or DC power supplier module, Redundant Power supported

3. Application

3.1. Peer-to-Peer application with standalone

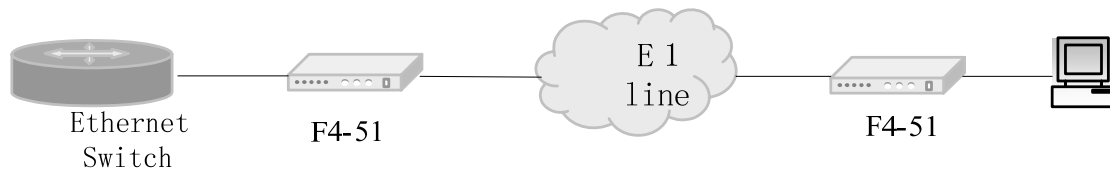


Figure1: Peer-to-peer topology

3.2. Star-Topology with chassis and standalone

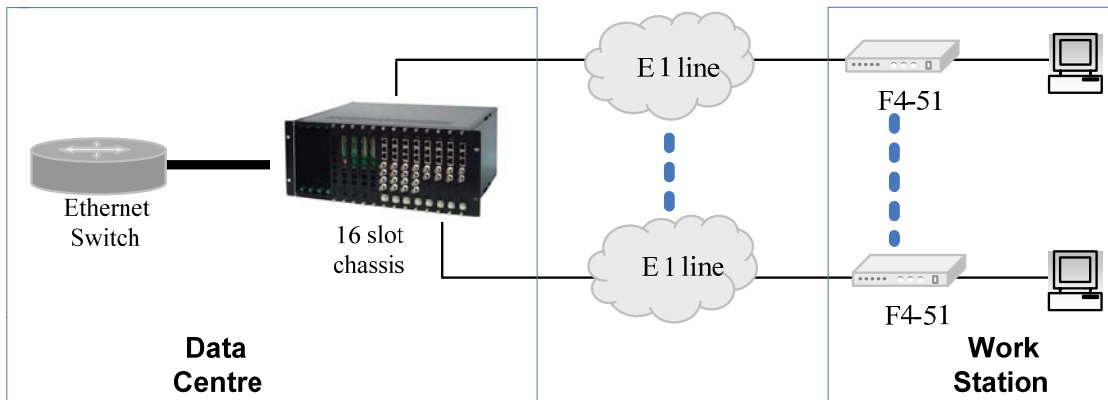


Figure2: Star topology

Note: No matter which topology you use, the F4-51 protocol converter should be used in-pairs. LAN transmit channel is Ethernet, WAN channel is E1; this two transmit channels can't be exchanged.

4. Specification

4.1. E1 port

- Data rate: $N \times 64\text{Kbps}$, $N=1\sim 31$
- Code type: HDB3
- Compliant with G.703, G.704, G.706, G.732
- 75Ω/ 120Ω Optional, auto-negotiation
- BNC (75Ω) / RJ45(120Ω)
- Filter: Compliant with ITU-T G.823
- Framed / Unframed optional

Table1: RJ45 connector (120Ω E1)

| | | | | | | |
|----------|-----|-----|-----|-----|-----|----------|
| Pin | 1 | 2 | 4 | 5 | 3,6 | else |
| Function | RX+ | RX- | TX- | TX+ | GND | reserved |

4.2. Ethernet port

- Standard: IEEE802.3, 802.3u
- 10/100Mbps, Half/Full Duplex
- RJ45 Connector
- MDI/MDI-X compatible
- Number of Ports: 1
- Commendatory transmit distance is less than 100m

4.3. Power

- Power Input:
AC Power: 198V~242VAC, 50/60Hz;
DC Power: -48VDC
- Power Consumption:
<3W for each standalone or module

4.4. Environment

- **Operating**
Temperature: 0~+50°C
Relative Humidity: 0~90% (non-condensing)
- **Storage**
Temperature: -25~+70°C
Relative Humidity: 0~95% (non-condensing)

4.5. Dimensions & Weight

- **Dimensions:**

- Standalone**

- 252mm Width × 36mm Height × 135.5mm Depth (mm)

- Module**

- 25.3mm Width × 146mm Height × 219.5mm Depth (mm)

- Chassis**

- 19' Width × 4UHeight × 340mm Depth (mm)

- **Shipping Weight:**

- Standalone:** 1.1Kg (approx.)

- Module:** 0.4Kg (approx.)

5. Panel Instruction

5.1. Front Panel

Standalone

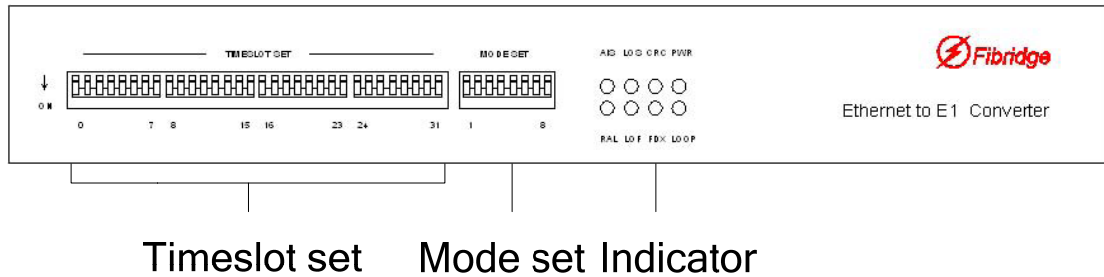
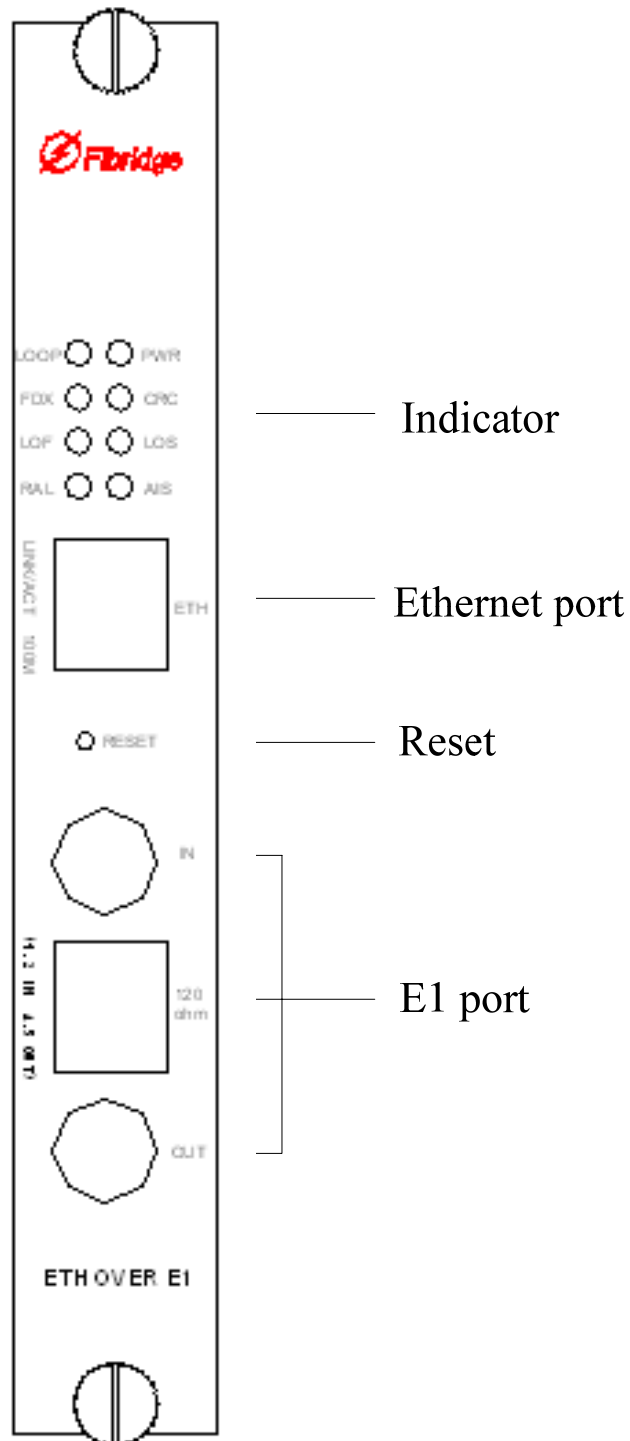


Figure3: Standalone front panel

Note: Timeslot set switch has 32 pin in all, corresponding to 32 E1 timeslot. The detail is in Table 5.

Module

Figure 4: Module front panel

5.2. Back Panel

Standalone

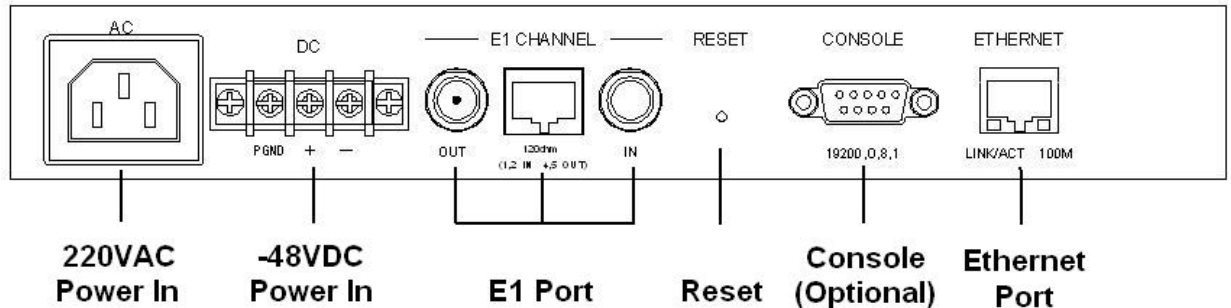


Figure 5: Standalone back panel

Note: Console is optional. It can be fixed according to your need.

5.3. LED Description

- **Standalone:**

Table 2: Standalone front panel LED

| ID | Color | Status | Description |
|------|-------|---------------|-------------------------------------|
| PWR | G | ON | Power supply OK |
| | | OFF | Power supply failed |
| LOOP | G | ON | Local loop |
| | | OFF | No loop |
| FDX | G | ON | Ethernet work at full duplex status |
| | | OFF/ Blink | Ethernet work at half duplex status |
| CRC | R | ON | E1 frame CRC error |
| | | OFF | E1 frame no CRC error |

| | | | |
|-----|---|--------------|-------------------------------|
| LOS | R | ON | Local E1 link signal loss |
| | | OFF | E1 link signal OK |
| LOF | R | ON/ Blink | Local E1 synchronization loss |
| | | OFF | E1 link signal OK |
| AIS | R | ON | Local E1 link has AIS alarm |
| | | OFF | E1 link signal OK |
| RAL | R | ON | Remote E1 has LOS or LOF |
| | | OFF | Remote E1 link OK |

Note: R: red; G: green; Y: yellow.

Table 3: Standalone back panel LED

| ID | Color | Status | 状态说明 |
|--------------|-------|--------|-----------------------------------|
| LINK/ ACT | G | ON | Ethernet link OK |
| | | Blink | Ethernet receive or transmit data |
| | | OFF | Ethernet link failed |
| 100M | Y | ON | Ethernet rate is 100M |
| | | OFF | Ethernet rate is 10M |

- **Module:**

Table 4: Module LED

| ID | Color | Status | Description |
|--------------|-------|---------------|-------------------------------------|
| PWR | G | ON | Power supply OK |
| | | OFF | Power supply failed |
| LOOP | G | ON | Local loop |
| | | OFF | No loop |
| FDX | G | ON | Ethernet work at full duplex status |
| | | OFF/ Blink | Ethernet work at half duplex status |
| CRC | R | ON | E1 line has CRC error |
| | | OFF | No CRC error |
| LOS | R | ON | Local E1 link signal loss |
| | | OFF | E1 link signal OK |
| LOF | R | ON/ Blink | Local E1 synchronization loss |
| | | OFF | E1 link signal OK |
| AIS | R | ON | Local E1 link has AIS alarm |
| | | OFF | E1 link signal OK |
| RAL | R | ON | Remote E1 has LOS or LOF |
| | | OFF | Remote E1 link OK |
| LINK/ ACT | G | ON | Ethernet link OK |
| | | Blink | Ethernet receive or transmit data |

| | | | |
|------|---|-----|-----------------------|
| | | OFF | Ethernet link failed |
| 100M | Y | ON | Ethernet rate is 100M |
| | | OFF | Ethernet rate is 10M |

5.4. Ports' Description

Table 5: Port description

| Port | ID | Description |
|----------|--------------|--------------------------------------|
| E1 | 75Ω: IN, OUT | Unbalanced interface, BNC connector, |
| | 120Ω: 120ohm | Balanced interface, RJ45 connector |
| Ethernet | ETHERNET | RJ45 connector |

5.5. Switches' Description

Table 6: Timeslot set

| Pin | ON | OFF |
|------|-------------------|-----------------------|
| 0~31 | Use this timeslot | Not use this timeslot |

As factory default, pin "0" is ON, other timeslot pin is OFF. It's no framed E1 mode.

Note:

- Standalone has timeslot switch indicate at shell, the sign of module is "SW1~SW4".
- These timeslots can only be choose at E1 framed mode, from left to right is 0~31 timeslot.
- No framed E1 mode setting: Set timeslot pin"0" ON, then other timeslot pins will be useless. E1 bandwidth is

2.048M.

- Framed E1 mode setting: Set timeslot pin"0" OFF, please be assured that at least one timeslot pin besides pin"0" is ON. The bandwidth is $N \times 64\text{Kbps}$ ($N=1\sim 31$). At framed mode, the bandwidth of two equipments working in pair is the same.

Table 7: Mode set

| PIN | ON | OFF |
|-----------------|---|--------------------------------|
| 1 TIM_MODE | Recovered Clock | Internal Oscillator |
| 2 BUFF_SEL | Small Buffer | Large Buffer |
| 3 COUPLE | E1 Bandwidth couple. Local E1 bandwidth is the same with remote E1 bandwidth. | No bandwidth couple functions. |
| 4 LOOP_SEL | Local Loop | No Loop |
| 5 SDRAM_TEST | Test SDRAM | No Test |
| 6 DPX | Full Duplex Ethernet | Half Duplex Ethernet |
| 7 SPD | 100M Ethernet | 10M Ethernet |
| 8 AN_ENA | Ethernet Auto negotiation | Constraint Ethernet Mode |

Note:

- As factory default, these 8 pins are all "OFF".

- If you change the Ethernet status via the switches, please reset the F4-51 equipment then it can work at the new Ethernet status.
- Standalone has mode set switch sign at shell; the sign of module is “SW5”.

6. Installation & Operation

6.1. Installation Steps

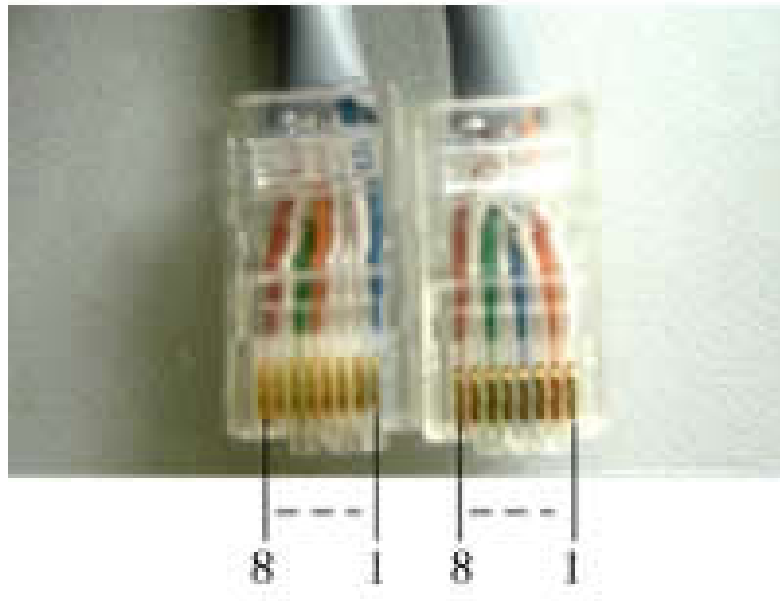
6.1.1. Preparation

- Electric iron, which is used to weld the BNC connectors to E1 cable.
- E1 analyzer, which is used to test the E1 transmission line
- 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 6).



Figure6: 75Ω BNC

- Make 120Ω E1 cable. If you use 120Ω interface, take out RJ45 plug, and fix it on twister-pair cable (Figure 7). Table 1 is the detailed definition of 120Ω connector.

**Figure 7: 120Ω RJ45****6.1.2. Connection**

- Check the device and accessories according to Packing List when open the package. If anything missing or damaged, please contact us immediately.
- Take out the equipment; place it on neat table or the other platform.
- Set dip switches according to your demand. Please don't set both the two equipment working in pairs at master

timing mode. The commendatory timing mode is one working at master clock, the other is recovered clock.

- Connect the 10/100Base-T cable and E1 cables (Figure8) to the interfaces. The 75Ω E1 line and the 120ΩE1 line can't be connected at one time.

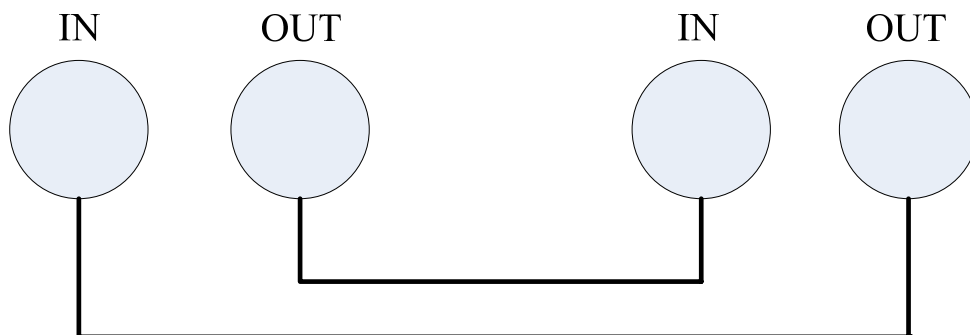


Figure8: 75Ω E1 connection

- Connect power supply cable to the equipment. For the modules, fix them in the chassis, and connect power supply cable to the chassis.

6.1.3. Power ON

- If the equipment works normally, all the LED indicators are off, except for “PWR”. When you connect Ethernet line, the indicator “LINK/ACT” is on or blinks. “FDX” and “SPD” will ON or OFF according to the Ethernet state and the switches setting mode.

6.2. Something Notice

- Make sure the type of power supply is in accordance with the equipment request.
- 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.
- Please don't set two F4-51 working in-pair both at "Internal Oscillator" time-mode. In general, one is "Recovered clock", the other is "Internal Oscillator". If you assured that there is line clock in the E1 line, you can set F4-51 "Tim-mod" both at "Recovered clock".

6.3. Faults & Solutions

6.3.1. E1 LOS ON

Check if the E1 "IN" and "OUT" are connected by contraries.

6.3.2. E1 LOF ON

Check if the two F4-51 equipments working in-pair are all work at "framed mode" or "unframed mode". If in framed-mode, be sure that E1 timeslot of the two F4-51 is in the same; Or there is code error in the E1 line.

7. Order Information

| P/N | Description |
|---------------|--|
| F4-51A | 10/100M Ethernet to E1converter, standalone, 220VAC power supply |
| F4-51D | 10/100M Ethernet to E1converter, standalone, -48VDC power supply |
| F4-51M | 10/100M Ethernet to E1converter, Module card |
| FC-416 | 16 slot chassis, supply two powers |

** 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>