



E1:Framed/unframed,75ohm/120ohm Compatible

F5-4511 Series Ethernet to E1 Converter

F4-51 User Manual

(Version: 2.0)

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1 Overview

F5-4511 Series F4-51 converter is a high performance, remote, self-learning 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

- High performance bridge for 10Base-T Ethernet extension
- Fully compatible with IEEE 802.3 and Ethernet Standards
- E1 channel: framed and unframed optional, 75/120ohm optional
- Ethernet Port: 10Mbps, Full/Half Duplex Mode compatible
- 10Base-T LAN Interface on RJ-45 connector and

MDI/MDI-X optional

- Allow transmitting and receiving VLAN data packet
- 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 Specification

3.1 E1 interface

- ◆ Data rate: $N \times 64\text{Kbps}$, $N=1\sim 32$
- ◆ Code type: HDB3
- ◆ Compliant with G.703, G.704
- ◆ Line impedance: $75\ \Omega$ (Unbalanced) / $120\ \Omega$ (Balanced)
- ◆ Connector: BNC($75\ \Omega$) / RJ45($120\ \Omega$)
- ◆ Jitter: Compliant with ITU-T G.742 and G.823
- ◆ Framed / unframed optional

Definition of RJ45 connector ($120\ \Omega$ E1 balanced):

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

3.2 Ethernet Interface

- ◆ Compatible with IEEE802.3
- ◆ Speed: 10Mbps

- ◆ Full/Half duplex auto negotiate
- ◆ Connectors: RJ-45 Connector
- ◆ Transfer distance: <150m

3.3 Size

- ◆ Standalone: 252 (W) × 136 (D) × 40 (H)mm
- ◆ Module: 220 (L) × 176(W) × 25.3(H) mm
- ◆ 16-slot chassis: 19 inch(W) × 340mm (D) × 4U (H)

3.4 Power

Power supply:

AC Power: 100V-240V, 0.4-0.2A, 50-60 Hz

DC Power: -48V, 0.4A

Power consumption <3W

3.5 Environment

Operation

Temperature: 0°C ~ 50°C;

Humidity: 90%(non-condensed)

Air pressure: 86kPa ~ 106 kPa.

Transport and store

Temperature: -20°C ~ 60°C;

Humidity: 95%(non-condensed)

Air pressure: 86kPa ~ 106 kPa

4 Appearance

4.1 Front panel of standalone

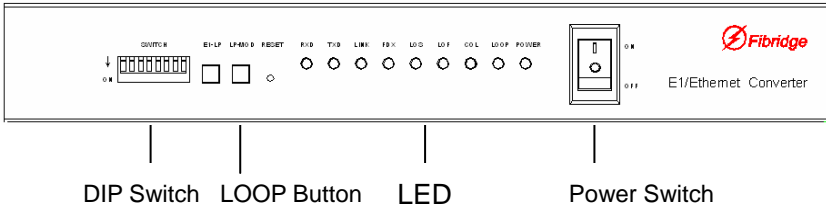


Figure1 Front Panel of Standalone

4.2 Back panel of standalone

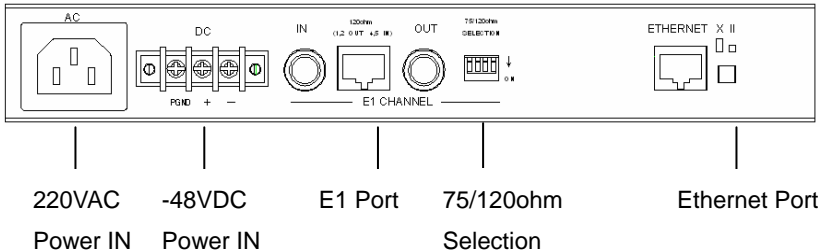


Figure2 Back Panel of Standalone

Note: 220VAC & -48VDC power input are alternative, in one device, there is only one kind of power input.

4.3 Front Panel of Module

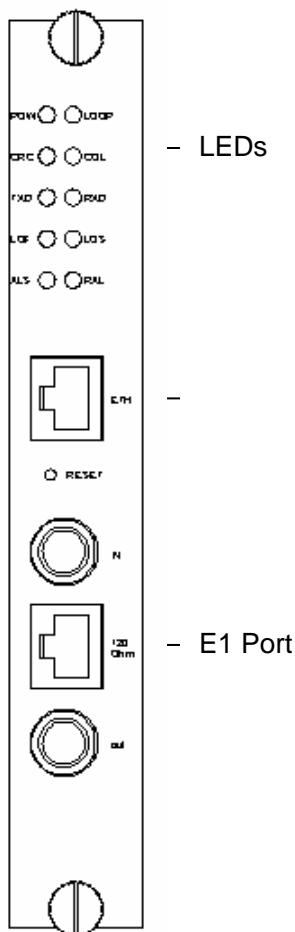


Figure3 Front Panel of Module

4.4 LED Description

Table 1 LED Description

Indicator	Color	Status	Description
RXD	Yellow	Blink	Receiving data
TXD	Yellow	Blink	Transmitting data
LINK	Green	ON	Ethernet port link OK
FDX	Green	ON	Ethernet is working at Full Duplex mode
LOS	Red	ON	E1 link signal loss
LOF	Red	ON	E1 synchronization loss
COL	Red	ON	Ethernet line collision
LOOP	Green	ON	Indicate Local Loop Status
POWER	Green	ON	Power supply OK

4.5 DIP Switch Description

Refer to the following tables for the functions of the DIP switches located along the both of the front and back side of the F4-51. F4-51 provides a total of 5 DIP switches for timeslot selection(see table 2 for detail). But please **NOTE** when you select unframed mode (set pin 7 of SWITCH1 ON), the timeslot setting does no function.

Fractional E1 uses only a fraction of the total available timeslots. For example, if you wish to translate only 192K from a 2048K E1 line, you only need to set two pins, pin1 and pin2

of SWITCH1, OFF and set three pins, pin3-5 of SWITCH1, ON.

Table 2 Function Description of Switch/SW5

BIT		ITEM	Status	
Switch	SW5		ON	OFF
1	8	BW0	BW0-BW4 are used as Binary Code and can provide 32 different kinds of Bandwidth. BW4 is the MSB, BW0 is the LSB. When is ON , it means 0, when is OFF, it means 1. See Table 6 to get more details. These settings will be ignored when Bit7 “Full/Fabr” is set OFF.	
2	7	BW1		
3	6	BW2		
4	5	BW3		
5	4	BW4		
6	3	NA	Not Available	Not Available
7	2	E1-FULL	Framed(Fractional) mode	Unframed(Full) mode
8	1	TIM-MOD	Recovered Clock	Internal Oscillator

Note: “Switch” is for standalone, and “SW5” is for module.

Table 3 75/120ohm selection or SW6 Setting

BIT	For 75 ohm Selection	For 120 ohm
1	OFF	ON
2	ON	OFF
3	ON: TRIP is connected to ground OFF: TRIP is opened	OFF
4	ON: RRIP is connected to ground OFF: RRIP is opened	OFF
Default: Bit 1-4: OFF ON ON ON		

Note: “75/120ohm Selection” is for standalone, and “SW6” is for F4-51 module Card.



Table 4 E1_LP Button or JP4 Jumper Descriptions

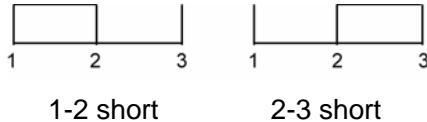
E1_LP	JP4	Description
Up	2-3 short	None loop, work as normal
Down	1-2 short	Loop mode, usually used to check the fault of the network line. To configure either Local loop or Remote loop, please see table 5.

Table 5 LP_MODE Button or JP5 Descriptions

LP_Mode	JP5	Description
Up	1-2 short	Remote Loop, only available on Fractional (framed) Mode
Down	2-3 short	Local Loop

Explanation:

- 1) **UP** is corresponding to  , **Down** is corresponding to 
- 2) **Short** is corresponding to



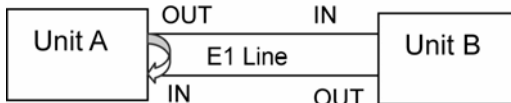
NOTE: 1. Before you select remote loop or local loop, you should set E1_LP down first;

2. Local Loop Back is available both in framed mode and in unframed mode;

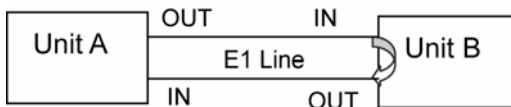
3. Remote Loop Back is only available in framed mode. In other words, if you want to use remote loop, you should set the bit7 of "SWITCH"(on the front panel of the device) ON. (see table 2 of the technical datasheet);

4. If Unit A(F4-51) is at internal clock, Unit B(F4-51) is at recovered clock, and there is no other based clock in the whole network line, you can't set Unit B(F4-51) on remote loop.

5. Unit A's local loop back:



Unit A's remote loop back:



4.6 Bandwidth Selection

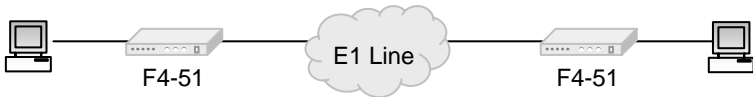
Table 6 Bandwidth Selections

No.	BW4	BW3	BW2	BW1	BW0	Bandwidth
1	ON	ON	ON	ON	ON	N.A.
2	ON	ON	ON	ON	OFF	64Kbps
3	ON	ON	ON	OFF	ON	128Kbps
4	ON	ON	ON	OFF	OFF	192Kbps
5	ON	ON	OFF	ON	ON	256Kbps
6	ON	ON	OFF	ON	OFF	320Kbps
7	ON	ON	OFF	OFF	ON	384Kbps
8	ON	ON	OFF	OFF	OFF	448Kbps
9	ON	OFF	ON	ON	ON	512Kbps
10	ON	OFF	ON	ON	OFF	576Kbps
11	ON	OFF	ON	OFF	ON	640Kbps
12	ON	OFF	ON	OFF	OFF	704Kbps
13	ON	OFF	OFF	ON	ON	768Kbps
14	ON	OFF	OFF	ON	OFF	832Kbps
15	ON	OFF	OFF	OFF	ON	896Kbps
16	ON	OFF	OFF	OFF	OFF	960Kbps
17	OFF	ON	ON	ON	ON	1024Kbps
18	OFF	ON	ON	ON	OFF	1088Kbps
19	OFF	ON	ON	OFF	ON	1152Kbps
20	OFF	ON	ON	OFF	OFF	1216Kbps
21	OFF	ON	OFF	ON	ON	1280Kbps
22	OFF	ON	OFF	ON	OFF	1344Kbps
23	OFF	ON	OFF	OFF	ON	1408Kbps
24	OFF	ON	OFF	OFF	OFF	1472Kbps

25	OFF	OFF	ON	ON	ON	1536Kbps
26	OFF	OFF	ON	ON	OFF	1600Kbps
27	OFF	OFF	ON	OFF	ON	1664Kbps
28	OFF	OFF	ON	OFF	OFF	1728Kbps
29	OFF	OFF	OFF	ON	ON	1792Kbps
30	OFF	OFF	OFF	ON	OFF	1856Kbps
31	OFF	OFF	OFF	OFF	ON	1920Kbps
32	OFF	OFF	OFF	OFF	OFF	1984Kbps

5 Typical Application

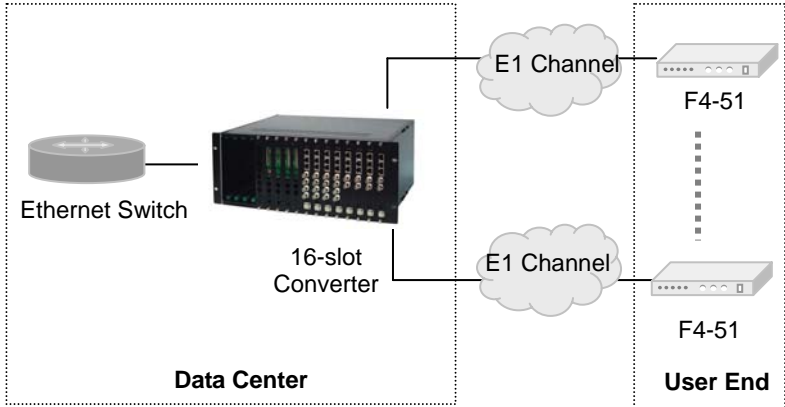
5.1 Point to Point



In the above application, it is recommended that user select one F4-51 device's timing signal as unique timing source, and all the other equipment follow this timing source.

F4-51 should be used in pairs.

5.2 Star Topology



6 Order Information

6.1 Model:

F5-4511, Ethernet to 1-8 E1 Protocol Converter Series

6.2 P/N:

F4-51A 10Base-T to E1 Converter, Standalone Device,
220VAC Power input

F4-51D 10Base-T to E1 Converter, Standalone Device,
-48VDC Power input

F4-51M 10Base-T to E1 Converter, Module Card

FC-416 16 Slots Chassis, Supply two Powers