MODEL7302

FE1 Optic Fiber Modem

User Manual

3onedata Co.,Ltd

Tel: +86-755-26702688 Fax: +86-755-26703485

www.3onedata.com

Contents

1. Introduction 3
2. Product Features 3
3. Specifications 3
4. Description on Installation and Panels 4
4.1 Unpacking: 4
4.2 Front/Rear panels of the stand alone device: 4
4.3 Front/Rear panels of Rack-mountable casing: 6
5. MODEL7302 Application 7
5.1 E1 configuration 7
5.2 Connection the Twisted Pair(120 ohm) to the G.703 Network 7
5.3 Settings of Switch and Jumper 8
5.3.1 Clock setting 8
5.3.2 Settings of loop back test and pseudo-random code test 8
5.3.3 Framing/non-framing and time slot settings 9
6. Common Problems 10

1. Introduction

MODEL7302 FE1 Fiber Modem is a high-performance E1 fiber optic modem developed by using a dedicated integrated circuit. It is to modulate a framing or non-framing E1 data signal directly into single- or multi-mode optic fiber for a transmission via optic cable line. At another end of the optic cable, optical signal is demodulated into a framing or non-framing E1 data signal. E1 interface may be directly connected with the E1 interfaces of image and data terminals or the WAN ports of MUX, exchanger and router for a dedicated network setup or a LAN connection.

2. Product Features

- Conforms to all relevant ITU series standards(ITU-T G.703 G.704 G.823)
- Transmit one E1 channel
- Framing or non-framing mode in option
- E1 time slot in arbitrary option
- Balanced 120Ω/non-balanced 75Ω interfaces automatic
- Support the loop back of local analog/digital interface
- Support remote loop back function (valid on under framing mode)
- Support pseudo-random code test function, providing convenience for the test of optic fiber line status
- 120km trunking -free transmission distance for single-mode optic fiber
- Capable to be communicated with V.35 fiber modem
- Available with complete line detection and alarm indications
- Available with independent structure and 19-inch frame-mounted structure (frame-mounted structure can be inserted with 16 modules);
- AC 220V and DC –48V inputs may be selected for fiber optic modems of both structures;
- For frame-mounted fiber optic modems, dual power supply heat backup is provided to ensure a Receiving level：0~-43db

3. Specifications

Optic interface:

- Line mode type: CMI
- Line mode rate: 2.048Mbps
- Operating wavelength:850nm,1310nm or 1550nm
- Optic fiber connector: SC/PC
- Applicable optic fiber: multi-mode, single-mode
- Transmission distance:
  Single-mode: up to 120km Multi-mode: up to 2km

E1 interface:

- Standard: ITU-T G.703 G.704
- Frame structure: framing CCS(PCM31)/ CAS(PCM30)
- Rate:N×64Kbps (N=1~31)or 2.048Mbps

- Impedance:75Ω,physical interface BNC ;120Ω,physical interface RJ45
- Code:HDB3
- Receiving level:0~-43db

Indicator lamps:

To indicate the operating status of power supply, loopback and random code test, code missing alarm, out-of-frame alarm etc.

Structure:

Independent:140mm(depth) x 210mm(width) x 42mm(height)

Frame-mounted:19in 4.5U standard casing

Power supply:

Independent: 85V～264V AC input,5V/2A output

-36V～-72V DC input,5V/2A output

Frame-mounted: 150V～260V AC input,5V/16A,12V/1A output

-38V～ -58V DC input,5V/16A ,12V/1A output

Power consumption： 3W

Operating temperature:0 °C～50 °C

Storage temperature: -20 °C～80 °C

Humidity: 5%～90% (free of condensate)

4. Description on Installation and Panels

4.1 Unpacking:

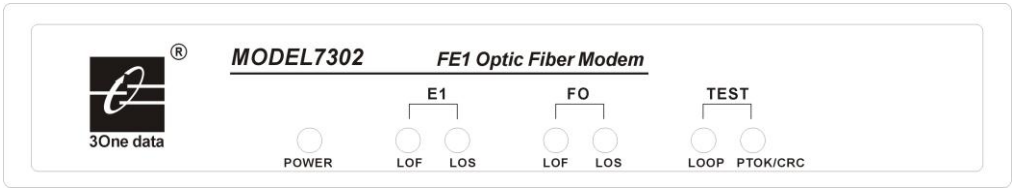
After the equipment is unpacked, a check shall be done for the completeness. If any part is found missing, please immediately contact our representative offices or agents. Complete packing shall include the following items (for an independent product):

- One set of MODEL7302 FE1 Fiber Modem
- One FE1 Fiber Modem Operation Manual
- One power line(FE1 Fiber Modem/AC)
- A couple of BNC connectors

Please also contact our representative offices or agents for any transportation damage found with this product.

4.2 Front/Rear panels of the stand alone device:

■ **Front panel：**



Front Panel of MODEL7302

POWER：Power supply indicator lamp. Constantly lightening after the machine is turned on.

E1 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.

E1 LOS：Alarm indicator lamp for code missing in E1 line. Constantly lightening indicates the alarm with local device.

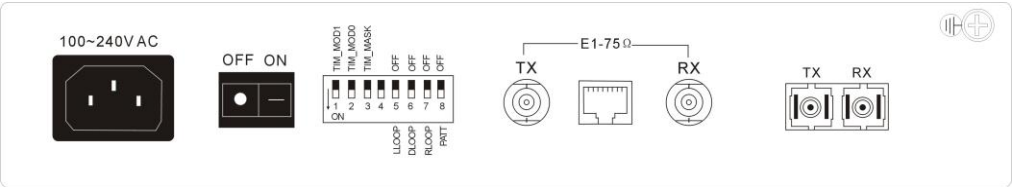
FO LOF：Alarm indicator lamp of input signal out-of-frame in optic line. Constantly lightening indicates the alarm with local device; flash indicates the alarm with opposite device. Alarm status of opposite device can be detected only at framing mode.

FO LOS：Alarm indicator lamp for code missing in optic line. Constantly lightening indicates the alarm with local device.

LOOP：Indicator lamp of loopback test status. When local device is at a loopback status, the lamp is constantly lightening; when opposite device is at a loopback status, the lamp flashes. When local device is not at a framing mode, it is unable to detect whether opposite device is at a loopback test status.

PTOK/CRC：Indicator lamp of Pseudo-random code test. When the device is at a loopback status, pseudo-random code test can be made. If this lamp is constantly lightening, it indicates that Pseudo-random code passes the test.

■ **Rear panel：**



Rear Panel of MODEL7302/AC

220V AC： AC power jack.

OFF ON： Power switch. When the ON button is pressed down, the power supply is turned on.

E1-75Ω TX/RX：Receiving/sending jack of 75ΩBNC interface in E1.

E1-120Ω： Jack of 120Ω RJ45 interface in E1.

TX RX : Receiving/sending jack of optical fiber, with TX as the sending terminal and RX as the receiving terminal.

There is a coded switch S5 on the panel, which is used as the system configuration switch to set such functions as clock, time slot, phase, loopback and Pseudo-random code test etc.

Wherein, S5.1 and S5.2 are clock settings.

S5.2＝OFF：network clock at E1 interface(Received Recovered) (S5.1 in whatever status)

S5.1 ＝ OFF，S5.2＝ON：network clock at the optic fiber interface (Received Recovered). Remote time slot setting can be tracked only at this status.

S5.1 ＝ ON，S5.2＝ON：using local crystal oscillation generating clock

S5.3: time slot setting

S5.3＝OFF，using remote time slot setting (valid only when S5.1 ＝ OFF，S5.2＝ON)

S5.3＝ON，using local time slot setting

S5.4: Reserved

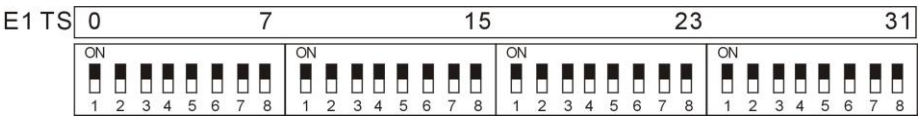
S5.5: Local loopback setting (optic interface in direct loopback), ON valid.

S5.6: Local digital loopback (E1 interface loopback), ON valid.

S5.7: Remote digital loopback (remote optic interface loopback), ON valid. Valid at framing mode (0 time slot unused).

S5.8: Pseudo-random code test, ON valid, and valid at loopback status.

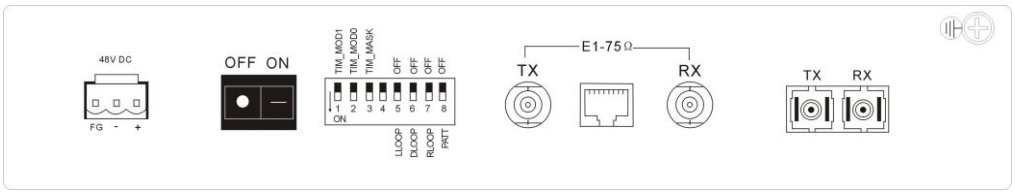
- **MODEL7302 bottom coded switch：**



Bottom Coded Switch

After time slot 0 is valid, other coded switches in whatever positions are all valid.

Select the number of time slots according to the expected rate. Normally for an independent type, a time slot setting of automatic tracking Central Site module is selected. Coded switches of plate-clip time slot correspond to S1, S2, S3 and S4.



Rear Panel of MODEL7302/DC

48V DC： DC -48V power supply connector

The others are the same as AC Rear Panel

4.3 Front/Rear panels of Rack-mountable casing:

- **RACK front panel：**



Front Panel of RACK

+5V: 5V main power supply indicator lamp

+12V: 12V fan power supply indicator lamp

Under the panel is a group of indicator lamps matrix:

PWR : power supply lamp;

RXD : lightening upon data receiving;

TXD : lightening upon data sending;

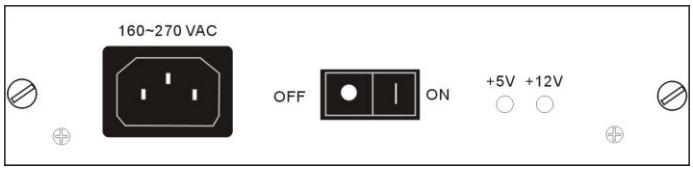
LOS : lightening when the optic line or E1line gets lost;

LOF : lightening after a synchronization of data out-of-frame;

TEST : lightening during loopback test；

PTOK: lightening after a successful pseudo-random code test;

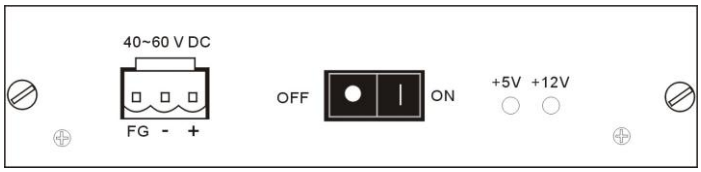
- **RACK/AC AC redundancy power supply panel：**



RACK/AC AC Redundancy Power Supply Panel

160~270 VAC：AC 220V input jack
ON OFF：power switch
+5V：5V main power supply indicator lamp；
+12V：12V fan power supply indicator lamp

- **RACK/DC DC redundancy power supply panel：**



RACK/DC DC Redundancy Power Supply Panel

40~60 VDC：DC-48V input connector (FG grounded, with"- +" terminals connected with 48V input)
ON OFF： power switch
+5V： 5V main power supply indicator lamp
+12V： 12V fan power supply indicator lamp

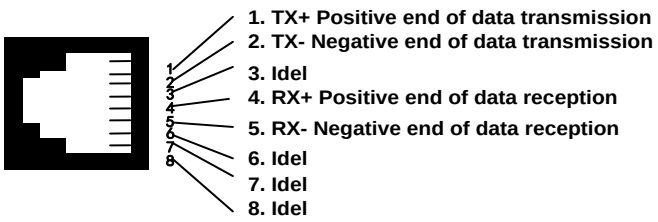
5. MODEL7302 Application

5.1 E1 configuration

The device support two physical match impedance of the E1 interface, which can automatics 120ohm balanced twisted-pair and 75ohm non-balanced coaxial cable interface. Users can select the appropriate interface to connection dispense with any operation.

5.2 Connection the Twisted Pair(120 ohm) to the G.703 Network

As shown, 1 and 2 are sending lines, 4 and 5 are receiving lines.



Line Sequence of Balanced Twisted-Pair at E1 Interface RJ45

Attention: In E1 twisted-pair standard, 1 and 2 are defined as sending lines, 4 and 5 as receiving lines.

5.3 Settings of Switch and Jumper

Independent device has totally 5 setting switches, with S5 located on the rear panel and S1~S4 under the bottom cover. The user can easily make settings without the need to open the cover.

5.3.1 Clock setting

E1 interface timing (S5.1=ON/OFF, S5.2=OFF): the sending timing is E1 port timing, and the received data, after buffering, is synchronized with E1 port timing.

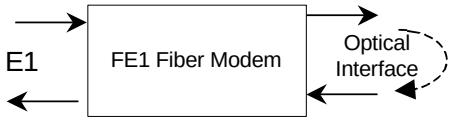
Optic interface receiving timing (optic interface originated from the clock, S5.1=OFF，S5.2=ON):

the sending timing is optic interface receiving timing, and the received data, after buffering, is synchronized with optic interface receiving timing. Under this timing mode, local time slot setting can automatically track the opposite time slot setting.

Local main timing (S5.1=ON, S5.2=ON): the sending timing is of local crystal oscillation, and the received data, after buffering, is synchronized with local timing.

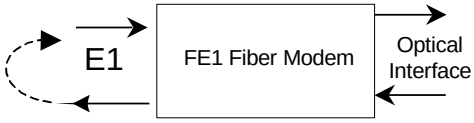
5.3.2 Settings of loop back test and pseudo-random code test

S5.5～S5.8 of coded switch S5 are used for setting the loop back test and pseudo-random code test. S5.5 is local loop back control（LLOOP）and optic interface is directly looped back to E1 interface. “OFF” indicates normal operation; “ON” indicates local loop back test. The default is “OFF”. It is used for testing whether local device is in normal operation.



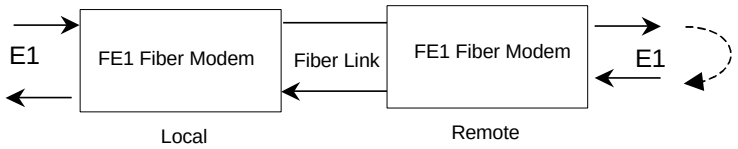
Local Loop back Schematic

S5.6: local digital loop back control (DLOOP). “OFF” indicates normal operation; “ON” indicates local digital loop back. The default is “OFF”. With a loop back from local E1 interface to optic interface, it is used for testing whether the remote device and optic line are in normal operation.



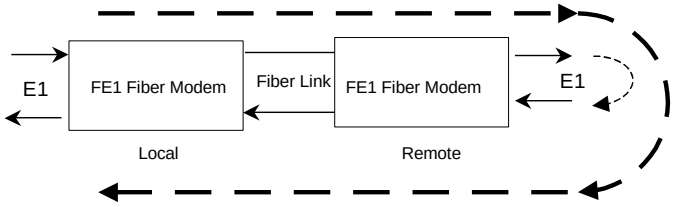
Local Digital Loop back

S5.7: “OFF” indicates normal operation；“ON” indicates command remote loop back. The default is “OFF”. As this command must be sent through E1 line to remote end for validness, it will become invalid at the following two cases: ① the remote end is not FE1 Fiber Modem remote device; ② FE1 Fiber Modem is working at a non-framing status, at this moment all time slots of E1 are used for data transmission at a rate of 2048Kbps. Through a sending of loop back command from local device to remote device, the command remote loop back is achieved.



Remote Loop back

S5.8: Pseudo-random code test control (PATT). "OFF" indicates normal operation; "ON" indicates pseudo-random sequence test. The default is "OFF". It generates a pseudo-random sequence code to be transmitted to E1 output terminal and tests whether E1 input signal is in compliance with this sequence standard, so as to judge whether the device and line transmission have an error code.

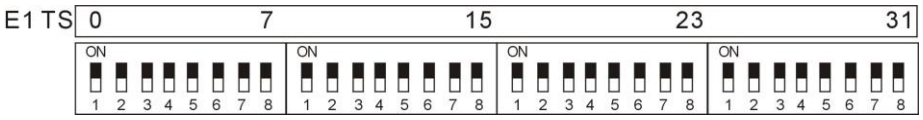


Pseudo-random Code Test

Remark: Pseudo-random sequence code test can be made only under a loop back status. At this moment, constantly lightening of LOOP and PTOK/CRC lamps shows local status, and flash shows remote status.

5.3.3 Framing/non-framing and time slot settings

Totally 32 coded switches S1, S2, S3 and S4 are used for E1 time slot setting.



E1 Time Slot Setting

- 1st switch (S1.1) is used for controlling E1 framing/non-framing. "ON" refers to non-framing mode (2.048Mbps).
- 31 switches, from 2nd—32nd(S1.2~S1.8, S2, S3, S4), are respectively used for controlling the selection of 1st –31st time slots. Set at "ON", the corresponding time slot is selected; set at "OFF", the corresponding time slot is not selected. The rate of E1 interface is completely dependent on the number of the selected time slots. For example: the setting of 3rd switch to "ON" and all other switches to "OFF" indicates that 2nd time slot is selected, at this moment the rate is 64K; the setting of 7th and 8th switches to "ON" and all other switches to "OFF" indicates that 6th and 7th time slots are selected, with a rate of 2×64K=128K. TSO setting is used for specifying E1 frame to be transparent or framing: "0"--framing, "1"--non-framing. But the bit has to be specified in combination with other time slots. TS16 setting is used for controlling E1 frame structure to be PCM30（CAS）or PCM31（CCS）: '0'—PCM30, at this moment 16th time slot must not be used for transmission service; '1'—PCM31, 16th time slot can be used for transmission service. Besides, TS1—TS31 are respectively used for controlling the selection of 1st—31st time slots: '1'—the corresponding time slot is selected; '0'—the corresponding time slot is not selected.
- Typical application： Non-framing mode: 1st switch is set to "ON", and all other switches

to “OFF” (other switches are located in such a way that the setting of non-framing is unaffected) Framing mode: 1st switch is set to “OFF”, and all other switches are set according to the time slot positions to be used by E1 channel and the rate of V.35 port. (If it is set to tracking remote time slot, the time slot switch will become invalid)

Attention: Ex-work S1,S2,S3 and S4 are all set to “OFF”

Attention: The setting of tracking remote time slot: S5.2 to “ON”; S5.1 and S5.3 to “OFF”

6. Common Problems

Common Failures and Solutions

No.	Failure	Cause	Solution
1	PWR power supply indicator lamp not lightening	1.Power supply not properly connected 2.Protector tube damaged 3. -48V DC input tie-line in reverse connection 4.Internal power supply circuit with failure	1.Check power switch and jack 2.Replace protector tube 3.Correct -48V power supply line connection 4.Returned to the manufacturer for repair.
2	Optic interface LOF out-of-frame alarm lamp lightening	1.Optic interface not clean 2.Optic fiber not well inserted 3.Wrong clock setting 4.Time slots of the devices at two ends not conformance 5.Internal circuit damaged	1. Clean the connector of optic interface 2. Insert the SC connector in place 3. Refer to the description on rear panel 4. Returned to the manufacturer for repair.
3	Optic LOS data loss alarm lamp lightening	1. Optic fiber in wrong interconnection 2.Optic fiber not well inserted 3.Optic fiber broken 4.Internal circuit damaged	1. Correct the connection 2. Insert the SC connector in place 3. Check optic cable 4. Returned to the manufacturer for repair.
4	Lightening of LOF out-of-frame alarm lamp at E1 interface	1.Error code in the line of E1 interface 2.Internal circuit damaged	1.Check if UTP wire couple is twisted or the connecting cable is not good contact 2.Returned to the manufacturer for repair.
5	Lightening of LOS data loss alarm lamp at E1 interface	1.Line of E1 interface not getting through 2.Internal circuit damaged	1. Check the linear sequence of UTP cable or check if crystal head is in good connection; Check if coaxial cable is broken 2.Returned to the manufacturer for repair.