

User Manual

IT-7301-PC



Statement

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Notes

In reading this manual, please pay attention to the following symbols,



: Information necessary to explain.



: Special attention.

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1. Product Overview

IT-7301-PC is a high-performance E1 fiber optic modem developed by using a dedicated integrated circuit. It is to modulate a 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 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
- E1 time slot in arbitrary option
- Balanced 120Ω/non-balanced 75Ω interfaces automatic
- Support the loop back of local analog/digital interface
- 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. Technical Indexes

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
- Rate: $N \times 64\text{Kbps}$ ($N=1\sim 31$) 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: $0^{\circ}\text{C}\sim 50^{\circ}\text{C}$

Storage temperature: $-20^{\circ}\text{C}\sim 80^{\circ}\text{C}$

Humidity: 5%~90% (free of condensate)

4. Description on Installation and Panel

4.1 Unpacking

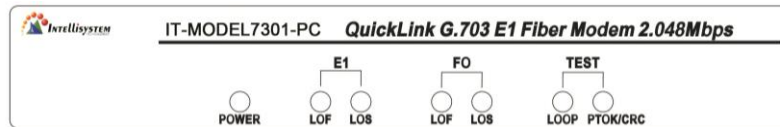
After the equipment is unpacked, a check shall be done for the completeness. If any part is found missing, please immediately contact our representative offices or agents. Complete packing shall include the following items (for an independent product):

- One set of IT-7301-PC E1 Fiber Modem
- One IT-7301-PC Operation Manual
- One power line (E1 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 an independent casing

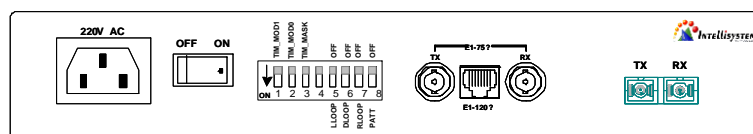
- IT-7301-PC front panel:



Front panels of IT-7301-PC

- 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.

- IT-7301-PC/AC rear panel:



IT-7301-PC/AC Rear Panel Schematic

- 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.

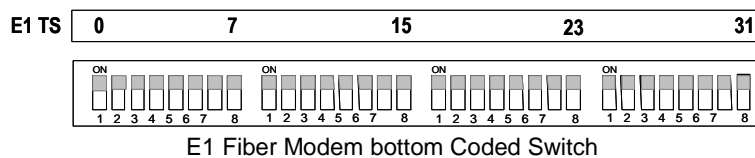
S5.5: Local loopback setting (optic interface in direct loopback), ON valid.

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

S5.7: Remote digital loopback (remote optic interface loopback), ON valid. Non-framing mode is invalid.

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

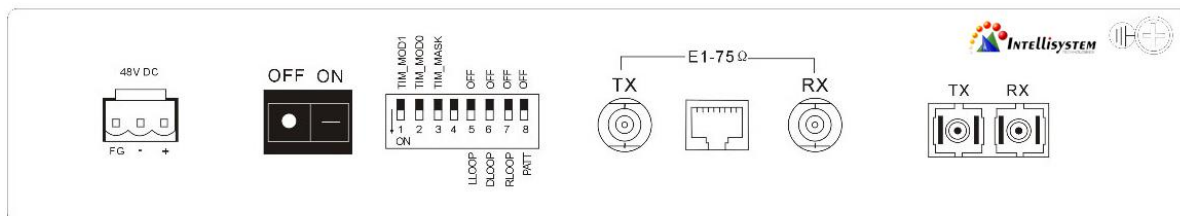
- IT-7301-PC bottom coded switch:



Default: non-frame mode, time slot 0 is ON.



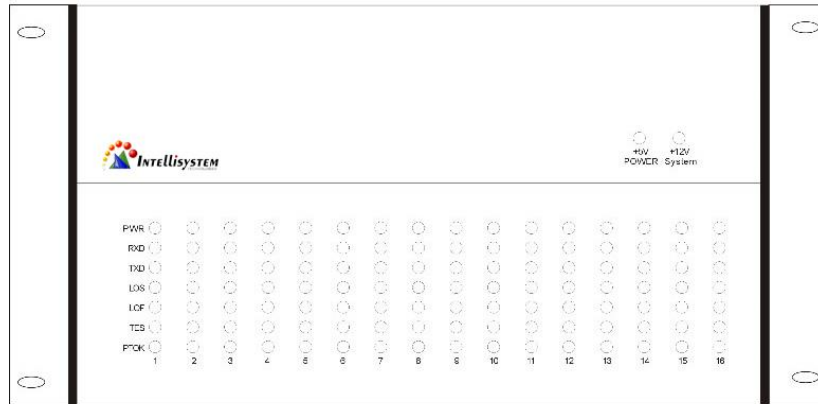
- IT-7301-PC/DC rear panel:



IT-7301-PC/DC Rear Panel Schematic

4.3 Front and rear panels of Rack mountable casing

- RACK front panel:



RACK Front Panel

+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;

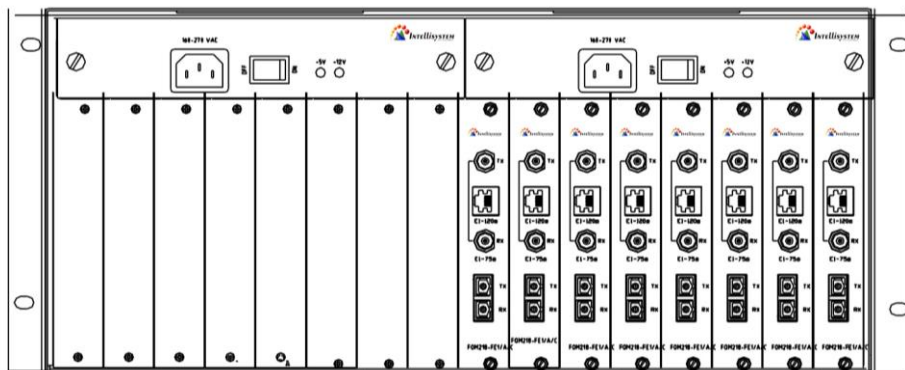
LOS: lightening when either optic line or E1 line gets lost ;

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

TEST: lightening during loopback test;

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

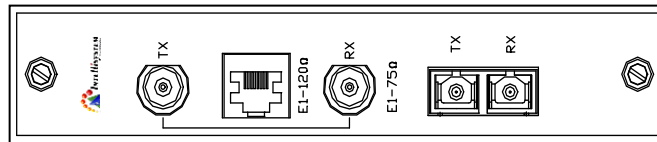
- RACK rear panel:



RACK Rear Panel

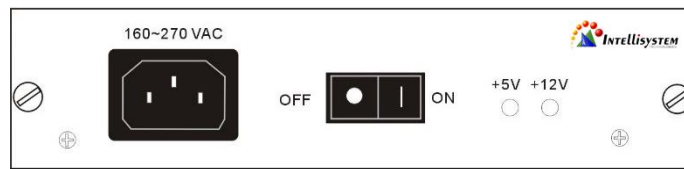
This panel is composed of three small panels, as described below:

➤ IT-7301-PC module panel:



IT-7301-PC Module Panel

➤ RACK AC redundancy power supply panel:



RACK AC Redundancy Power Supply Panel

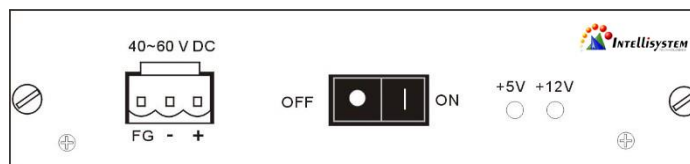
160~270 VAC: AC 220V input jack

ON OFF: power switch

+5V: 5V main power supply indicator lamp;

+12V: 12V fan power supply indicator lamp

➤ RACK DC redundancy power supply panel:



RACK 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

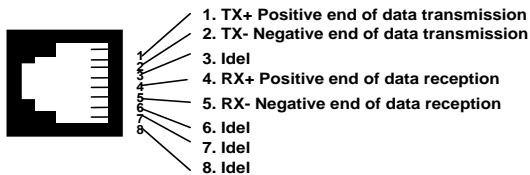
5. IT-7301-PC Application

5.1 E1 configuration

The device support two physical match impedance of the E1 interface, which can automatics 120ohm balanced twisted-pair and 75-ohm 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

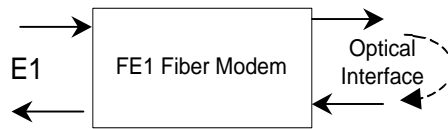
E1 interface timing (S5.1=ON/OFF, S5.2=OFF): the sending timing is E1 port timing, and the received data, after buffering, is synchronized with E1 port timing.

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.

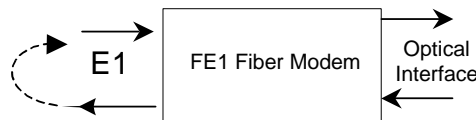
5.3.2 Settings of loop back test and pseudo-random code test

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.



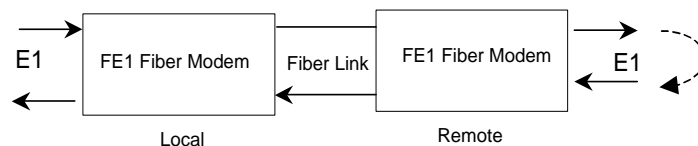
Local Loop back Schematic

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.



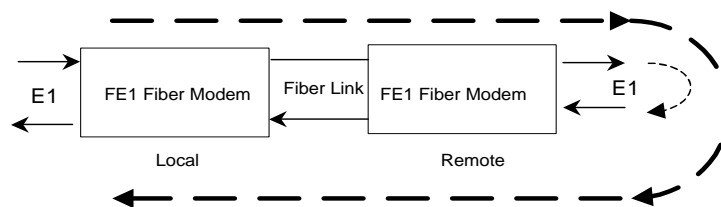
Local Digital Loop back

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 E1 Fiber Modem remote device; ② E1 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.

6.Common Problems

Common Failures and Solutions

No.	Failure	Cause	Solution
1	PWR power supply indicator lamp not lightening	<ol style="list-style-type: none"> 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 	<ol style="list-style-type: none"> 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	<ol style="list-style-type: none"> 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 	<ol style="list-style-type: none"> 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	<ol style="list-style-type: none"> 1. Optic fiber in wrong interconnection 2.Optic fiber not well inserted 3.Optic fiber broken 4.Internal circuit damaged 	<ol style="list-style-type: none"> 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	<ol style="list-style-type: none"> 1.Error code in the line of E1 interface 2.Internal circuit damaged 	<ol style="list-style-type: none"> 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	<ol style="list-style-type: none"> 1.Line of E1 interface not getting through 2.Internal circuit damaged 	<ol style="list-style-type: none"> 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.