

IT-7304-PC

V.35 Optic Fiber Modem

User Manual

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1. Introduction

IT-7304-PC is a high-performance V.35 optic fiber modem developed by using a dedicated integrated circuit. It is to modulate an $N \times 64K$ V.35 data signal directly over 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 V.35 data signal. V.35 interface may be directly connected with the V.35 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

- Rate $N \times 64K$ bit/s ($N=1 \sim 32$)
- Support the loopback of local analog/digital interface
- Support remote loopback function
- Support pseudo-random code test function
- 120km trunking -free transmission distance for single-mode optic fiber
- Capable to be communicated with FE1 Fiber Modem
- Available with complete line detection and alarm indications
- Available with independent structure and 19-inch Rack-mountable structure
Rack-mountable structure can be inserted with 16 modules
- AC 220V and DC -48V inputs may be selected for fiber optic modems of both structure
- For Rack-mountable fiber optic modems, dual power supply heat backup is provided to ensure a high operating reliability

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

V.35 interface:

- Data rate: $N \times 64K$ bps ($N=1 \sim 32$)
- Available with CTS/RTS (Hardware) flow control function
- Type of connector: M34 connector
- Operating mode: DCE

Indicator lamps: To indicate the operating status of power supply, data receiving/sending, loopback and random code test, code missing alarm, out-of-frame alarm etc.

Structure:

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

Rack-mountable: 19in 4.5U standard casing

Power supply:

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

-36V~-72V DC input, 5V/2A output

Rack-mountable: 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:

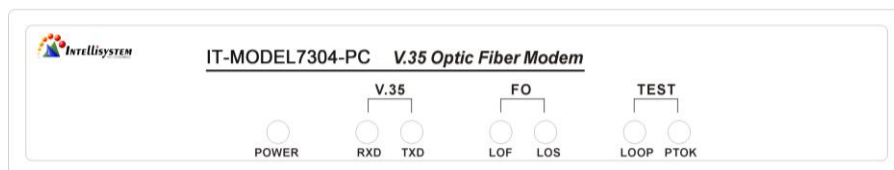
After the equipment is unpacked, a check shall be done for the completeness. If any part is found missing, please immediately contact our representative offices or agents. Complete packing shall include the following items (for an independent product):

- One set of V.35 Fiber Modem IT-7304-PC
- One V.35 Fiber Modem Operation Manual
- One power line(V.35 Fiber Modem/AC)

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 IT-7304-PC

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

RXD: Data receiving indicator lamp at V.35 interface. Flash indicates that there is data output from V3.5 interface. The quicker it flashes, the higher rate of data output from V3.5interface.

TXD: Data sending indicator lamp at V.35 interface. Flash indicates that there is data input to V3.5 interface. The quicker it flashes, the higher rate of data input to V3.5interface

LOF: E1 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

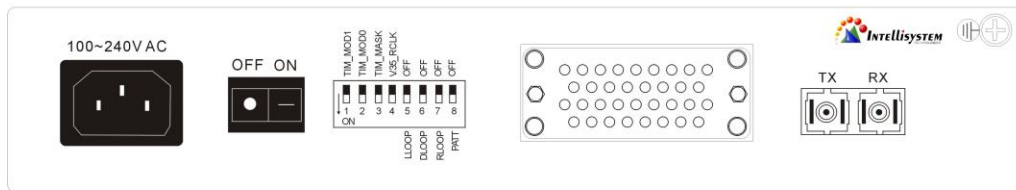
opposite device. Alarm status of opposite device can be detected only at framing mode.

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

LOOP: Indicator lamp of loopback test status. When local 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: 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 IT-7304-PC/AC

220V AC: AC power jack.

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

V.35: V.35 interface, with a M34 cored jack.

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.

S5.1=OFF, S5.2=OFF: network clock at V.35 interface (Received Recovered).

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=OFF: invalid

S5.1 = ON, S5.2=ON: using local crystal OSC 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: for V.35 receiving clock phase selection

S5.4=OFF, using positive phase

S5.4=ON, using negative phase

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

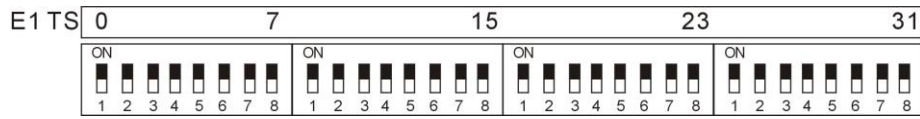
S5.6: Local digital loopback (V.35 interface loopback), ON valid.

S5.7: Remote digital loopback (V.35 interface loopback), ON valid.

Valid at framing mode (0-time slot unused).

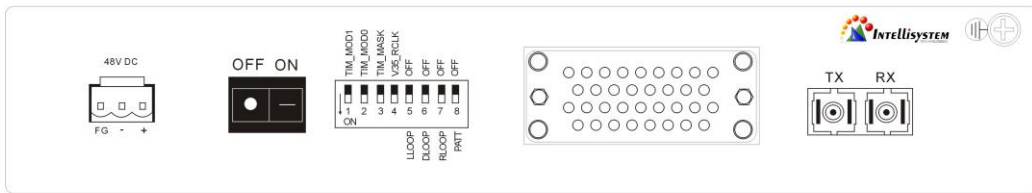
S5.8: Pseudo-random code test, ON valid, and valid at loopback status.

■ **IT-7304-PC 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.

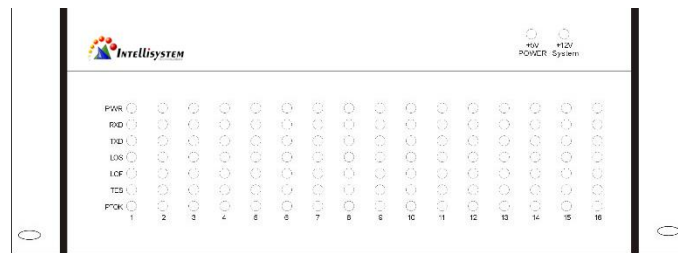


Rear Panel of IT-7304-PC/DC

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:

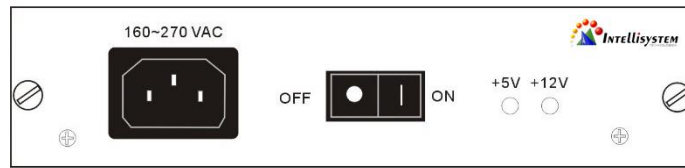
● **RACK front panel:**



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 at V.35
- TXD: lightening upon data sending from V.35
- LOS: lightening when the optic line gets lost
- LOF: lightening after a synchronization of data out-of-frame
- TEST: lightening during loopback test (equivalent to LOOP)
- PTOK: lightening after a successful pseudo-random code test

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



RACK/AC AC Redundancy Power Supply Panel

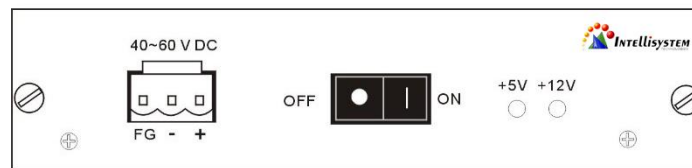
160~270 VAC: AC 220V input jack

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

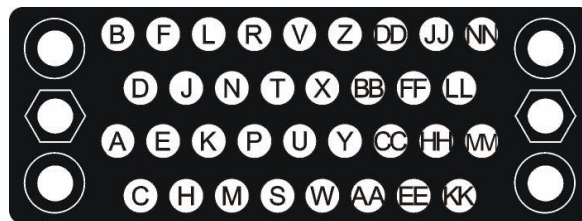
+5V: 5V main power supply indicator lamp

+12V: 12V fan power supply indicator lamp

5. IT-7304-PC Application

5.1 Definition of signal lines at V.35 interface

5.1.1 Distribution diagram of guiding feet on M34 cored jack



Distribution diagram of guiding feet on M34 cored jack

5.1.2 Definition of signal lines at V.35 interface

As shown :(Operating mode: DCE)

Definition of Signal Lines at V.35 Interface

V.35 Feet	Signal	Function	Direction
A	CGND	Frame ground	——
B	GND	signal ground	——
C	RTS	request to send	input
D	CTS	consent to send	output
E	DSR	data set ready	output
F	DCD	data carrier detection	output
H	DTR	data terminal ready	input
P	TXD A	transmitting data line A	input
S	TXD B	transmitting data line B	input
R	RXD A	receiving data line A	output
T	RXD B	receiving data line B	output
U	EXTCLK A	exterior clock line A	input
W	EXTCLK B	exterior clock line B	input
V	RXCL A	receiving clock line A	output
X	RXCL B	receiving clock line B	output
Y	TXCL A	transmitting clock line A	output
AA	TXCL B	transmitting clock line B	output

5.2 Standard V.35 crossover cable connection diagram

	V.35 feet		V.35 feet	
CGND	A	—————	A	CGND
GND	B	—————	B	GND
RTS	C	—————	D	CTS
CTS	D	—————	C	RTS
DSR	E	—————	H	DTR
DTR	H	—————	E	DSR
TXDA	P	—————	R	RXDA
TXDB	S	—————	T	RXDB
RXDA	R	—————	P	TXDA
RXDB	T	—————	S	TXDB
EXCA	U	—————	V	RXCA
EXCB	W	—————	X	RXCB
RXCA	V	—————	U	EXCA
RXCB	X	—————	W	EXCB

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

V.35 interface timing (S5.1= OFF, S5.2=OFF): the sending timing is V.35 port timing, and the received data, after buffering, is synchronized with V.35 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 OSC, and the received data, after buffering, is synchronized with local timing.

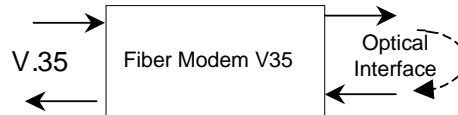
5.3.2 Phase selection

S5.4 is used for the receiving phase selection of V.35 interface.

5.3.3 Settings of loopback test and pseudo-random code test

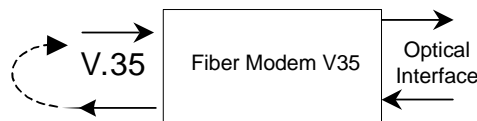
S5.5~S5.8 of coded switch S5 are used for setting the loopback test and pseudo-random code test.

S5.5 is local loopback control (LLOOP) and optic interface is directly looped back to V.35 interface. “OFF” indicates normal operation; “ON” indicates local loopback test. The default is “OFF”. It is used for testing whether local device is in normal operation.



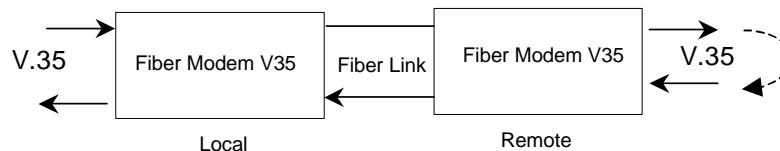
Local Loopback Schematic

S5.6: local digital loopback control (DLOOP). “OFF” indicates normal operation; “ON” indicates local digital loopback. The default is “OFF”. With a loopback from local V.35 interface to E1 optic interface, it is used for testing whether the remote device and E1 optic line are in normal operation.



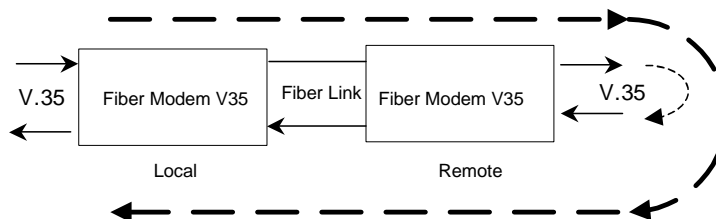
Local Digital Loopback

S5.7: “OFF” indicates normal operation; “ON” indicates command remote loopback. The default is “OFF”. As this command must be sent through E1 optic line to remote end for validness, it will become invalid at the following two cases: ① the remote end is not V.35 Fiber Modem device; ② V.35 Fiber Modem is working at a non-framing status, at this moment all time slots of E1 are used for transmitting the data from V.35 interface at a rate of 2048Kbps. Through a transmission of loopback command from local device to remote device, the command remote loopback is achieved.



Remote Loopback

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 V.35 optic line output terminal and tests whether V.35 optic line input signal is in compliance with this sequence standard, so as to judge whether the device and line transmission have an error code.

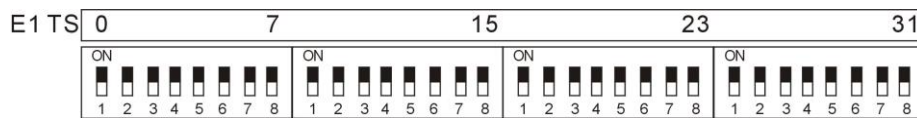


Pseudo-random Code Test

Remark: Pseudo-random sequence code test can be made only under a loopback status. At this moment, constantly lightening of LOOP and PTOK/CRC lamps shows local status, flash shows remote status; TXD and RXD lamps are used for showing the status of local TXD or RXD.

5.3.4 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.
- 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 V.35 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. TS0 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-works 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	<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	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	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	TXD lamp not lightening	V.35 interface not well connected or the router etc. not turned on.	<ol style="list-style-type: none"> 1. Check the connecting line and terminal device