



**RC701/RC702-FE series
Ethernet over SDH devices**

User Manual

Raisecom Technology Co., Ltd

1. Cautions



Warning: Only trained and qualified personnel should be allowed to install, replace or service this equipment.



RC702 is integrated equipment. Move carefully and do not disassemble or mend it without the guidance of Raisecom technical engineer with the anti-static procedures.



The equipment must be grounded. Do not disassemble the equipment by yourself. It may cause unrecoverable damage. Raisecom will not be responsible for the damage by this.

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2. Overview

2.1. Introduction

RC702-FE is an Ethernet over SDH device developed by Raisecom Technology Co., Ltd, it provides a 155M SDH interface (optical or electronic) and a 100M Ethernet interface (electronic), and encapsulates Ethernet data packets to SDH/SONET payload, so remote Ethernets can be connected through SDH transmission network at a high speed.

This device is available in all the operating networks such as: China Telecom, China Unicom, China Mobile, China Netcom and China Broadcast & Television, meanwhile it accords with X.85/X.86 of ITU-T, YD/T 1179-2002 of Ministry of Information Industry and related standards of SDH/SONET. RC702-FE provides network management and it is very convenient to manage.

2.2. Main features

Provide a 100M Ethernet electronic interface and an extended slot in which a 155M SDH optical or electronic interface module can be put.

- In SDH/SONET optical interface mode, the longest transmission distance is 120km.
- RC702-FE provides Console interface and SNMP network management interface.
- RC702-FE provides SNMP network management function, and accords with the standard specifications of SDH/SONET network management.
- Provide local and remote alarm indicators so it can be installed and maintained conveniently.
- RC702 does not specify the size of Ethernet frame, and the transmission for Ethernet protocols is transparent.
- Inside power supply, both 220V AC and -48V DC are available, so it supports two power supplies redundancy.
- Device power : $\leq 15W$

2.3. Part number explanation:

Model	Explanation
RC701-FE	Transmitting 100M Ethernet data on SDH network without network management.

RC702-FE	Transmitting 100M Ethernet data on SDH network with network management.
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3. Parameters

3.1. Optical interface module

Module type	Connector	line coding	wavelength nm	TX power dB	Rx sensitivity dB	Estimated transmission distance Km	Optical loss dB/Km
SC-OP /M	SC/ Multi-mode	NRZ	1310	-18 ~ -14	<-29	0 ~ 2	3
SC-OP /S1	SC/ Single-mode	NRZ	1310	-15 ~ -8	<-34	0 ~ 25	0.5
SC-OP /S2	SC/ Single-mode	NRZ	1310	-5 ~ 0	<-34	10 ~ 60	0.5
SC-OP /S3	SC/ Single-mode	NRZ	1550/DFB	-5 ~ 0	<-36	15 ~ 120	0.25

3.2. Electric interface module

Module type: SC-EP/CC3
 Port type: 75Ω Coaxial cable port
 Line coding: CMI
 Peak-to-peak value: Comply with ITU-T G.703

3.3. Power supply

Model	Explanation
RC700-PWR-AC	220V AC
RC700-PWR-DC	-48V DC

3.4. Dimensions

This device adopts the international standard 19 inches chassis, delicate appearance and convenience installation.

RC701/702-FE: 440mm (W) *43.6mm* (H) *200mm (D)

3.5. Basic components

- Extended card interface: 155.52Mbps SDH/SONET optical or electronic interface
- Ethernet interface: 100Mbps electronic interface
- Power supply modules: 220V AC or -48V DC
- Management interface: CONSOLE interface, Ethernet interface and SNMP network management interface (only for RC702-FE).

3.6. Extended card interface properties

- SDH optical interface: 155.52Mbps, line coding : NRZ, more information of available optical interface type is in the table of *Explanation of extended card*
- Type of optical interface: SC port
- SDH electronic interface: line coding CMI, signal peak-to-peak value 0.9 ~ 1.1V, and accords with ITU-T G.703
- Electronic interface type: 75Ω coaxial cable port
- Support the ITU-T G series suggestions.

3.7. Properties of Ethernet interface

- Interface: electronics port, 100Mbps, full-duplex
- Interface type: RJ-45
- Support IEEE802.3 standards

3.8. Properties of CONSOLE interface (RC702-FE only)

- Interface type: RJ-45
- Comply with RS232
- Rate 9600bps

3.9. Properties of SNMP network management interface

(RC702-FE only)

- Interface type: RJ-45
- Support IEEE802.3 standards
- 10/100M auto negotiation

3.10. Power supply conditions

- Voltage: -48V DC, range of tolerance -36V ~ -72V
- 220V AC, range of tolerance 180V ~ 260V
- Device power: less than 15W

3.11. Ambience

Temperature: 0 ~ +45

Humidity: ≤90% (35)

4. How to use

4.1. Front view and explanation

4.1.1. Front view and explanation of RC701-FE

Electronic extended card is in figure 4-1, and optical extended card is in figure 4-2

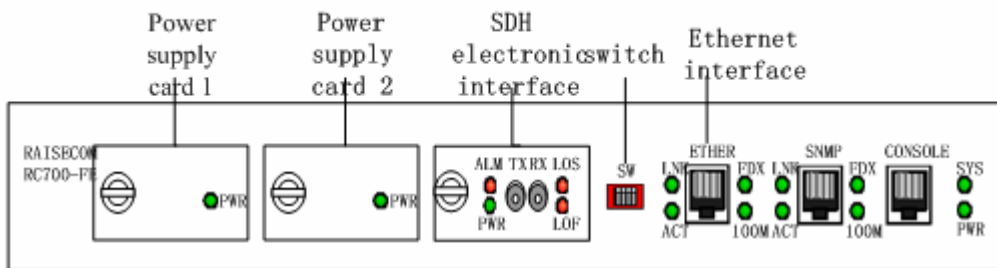


Figure 4-1 RC701-FE front view of SDH electronic interface

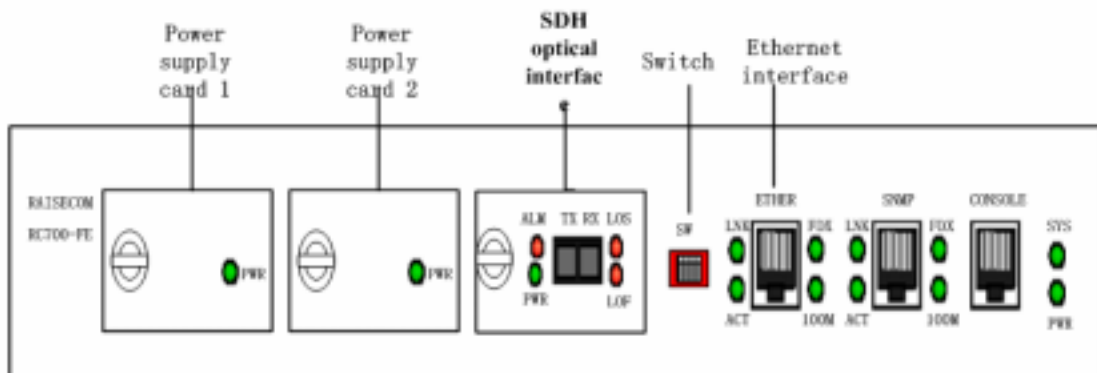


Figure 4-2 RC701-FE front view of SDH optical interface

4.1.2. Front view and explanation of RC702 - FE

Electronic extended card is in figure 4-3, and optical extended card is in figure 4-4

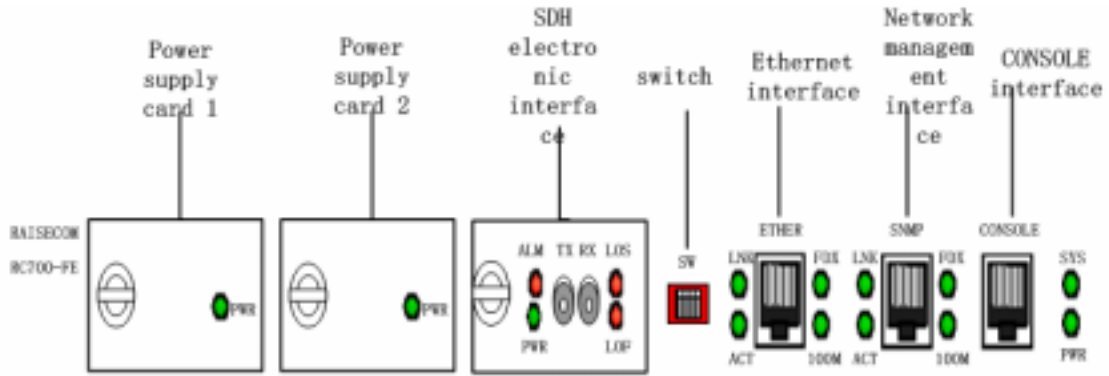


Figure 4-3 RC702-FE front view of SDH electronic interface

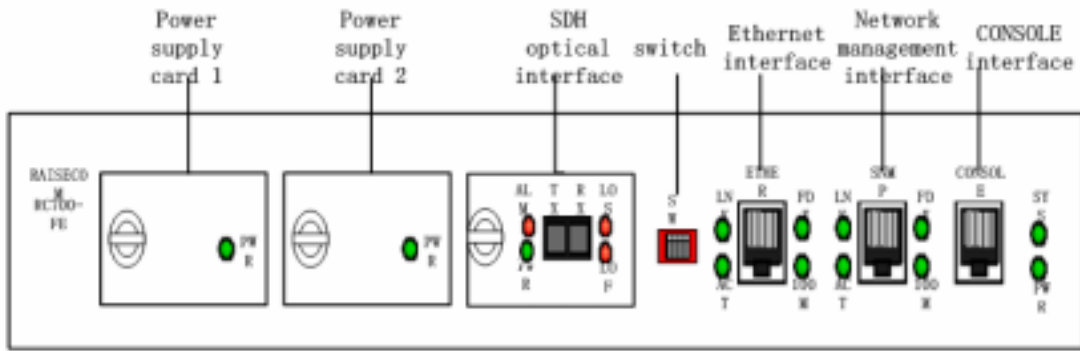


Figure 4-4 RC702-FE front view of SDH optical interface

4.2. Explanation of front view indicators

Type	Description
Extended card interface (SDH optical or electronic interface)	
PWR	Power supply indicator light, system is powered on when light is on and not powered on when off.
ALM	Alarm indicator light, indicates alarms of device
LOF	Alarm of receiving frame not synchronously when light is on
LOS	Alarm of receive-signal loss when light is on
<p>Switch, and default status is OFF.</p> <p>(numbers sequence is from left to right)</p>	
First number	OFF: Ethernet interface is in auto negotiation status; ON: Ethernet interface is in 100M full-duplex status
Second	RESERVED(must be OFF)

number	
Third number	RESERVED(must be OFF)
Fourth number	RESERVED(must be OFF)
Ethernet interface	
ACT	Indicator of receiving and transmitting status, data is been transmitting when light is on and no data transmitting when off.
LNK	Indicator of Ethernet connection status, connect successfully when light is on and unsuccessfully when off.
100M	Indicator of Ethernet interface rate, rate of Ethernet interface is 100M when light is on and 10M when light is off. (note 1)
FDX	Indicator of full-duplex, Ethernet interface is in full-duplex mode when light is on and in half-duplex mode when light is flicking. (note1)
SNMP network management interface	
ACT	Indicator of receiving and transmitting status, data is been transmitting when light is on and no data transmitting when off.
LNK	Indicator of network management interface connection status, connect successfully when light is on and unsuccessfully when off.
100M	Indicator of Ethernet network management interface rate, rate of Ethernet network management interface is 100M when light is on and 10M when light is off.
FDX	Indicator of full-duplex, Ethernet network management interface is in full-duplex mode when light is on and in half-duplex mode when light is flicking
PWR	Power supply indicator light, system is powered on when light is on and not powered on when off.
SYS	System indicator, flicking means CPU works regularly.
Power supply card 1/ Power supply card 2	
PWR	Power supply indicator light, power on when light is on and not power on when off

Note 1: This device only supports 100M full-duplex mode, and it will not work normally if Ethernet interface can not negotiate to 100M full-duplex mode.

4.3. Rear view and explanation

When use AC power supply, there is 220V standard three-phase plug, as figure 2-5:



Figure 4-5 RC701/702-FE rear view of AC power supply

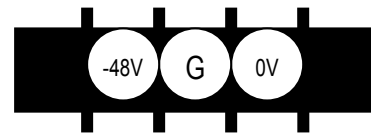
When use DC power supply, there is -48V power supply plug.



Figure 4-6 RC701/702-FE rear view of DC power supply

Note: there three connections of DC power supply: -48V, ground, 0V, and they connect to

-48 power supply cable, protection ground and 0V power supply cable. Remember that protection ground connection is very important for safe use of the device.



6. Installation

6.1. Preparation

First check the type and amount of the device with packing list, and the appearance. There must be drying process if the device is affected with damp.

To make sure the device will work normally, please follow the steps:

- Read this guide carefully
- Prepare optical fiber or 75Ω coaxial cable
- Fix and install access device.
- Connect fiber or cable.
- Configure EOS device (RC702-FE only, more information is available in configuration guide.
- Work normally.

6.2. Installation

6.2.1. Prepare cables

The required cables are in table 6-1:

Table 6-1 interface cable specifications of RC701/702-FE EOS

Interface	Specification
100Mbps Ethernet interface and SNMP network management interface	UTP of 100Base-T, the longest distance is 100m,
CONSOLE cable	Available in appendix
155Mbps SDH optical interface	Single mode or multi mode optical fiber of SC depends on users.
155Mbps SDH electronic interface	75Ω coaxial cable, for short distance connection. Use SYV-75-2-2 communication cable.
Power supply interface	AC mode, 220V/10A power supply cable DC mode, -48V/10A power supply cable

6.2.2. Install extension card

Extension cards of same type devices can be exchanged, for example: extend cards of two RC701-EF can be changed. You must use jumper to exchange extended cards of different type devices.

Crossover cable differences of extension cards between RC701-FE and RC702-FE, table 6-2 and 6-3

Table 6-2 Jumper settings of electronic extended card of RC701/702-FE

Type \ jumper	RC701-FE	RC702-FE
JP1	Connect with a short	N/A
JP2	N/A	Connect with a short
JP3	N/A	Connect pin 2 and 3 with a short

Table 6-3 Jumper settings of optical extension card of RC701/702-FE

type \ jumper	RC701-FE	RC702-FE
JP1	Connect with a short	N/A
JP2	Connect pin 1 and 2 with a short	Connect pin 2 and 3 with a short
JP3	N/A	Connect pin 2 and 3 with a short

Note: this is the default settings.

6.2.3. Connect 100M Ethernet interface

One end of Ethernet cable connects to router or switch, and the other end connects to Ethernet interface of EOS device. Usually, Ethernet interface is in 100M full-duplex mode.

6.2.4. Connect 155M SDH interface

- Connect one end of SDH optical fiber to the SDH interface on EOS device.
- Connect the other end of SDH optical fiber to STM-1 interface of SDH device.
- Under normal condition, indicator lights of LOS and LOF are off.

6.2.5. Connect CONSOLE interface (RC702-FE only)

- Connect the RJ45 connector of CONSOLE cable to CONSOLE interface

on front panel of EOS device.

- Connect the DB9 connector to PC serial interface.
- Run Hyper terminal program, and configure the baud rate as 9600.
- Configure RC702-FE, more information is available in configuration guide.

6.2.6. Connect network management interface (RC702-FE only)

Connect SNMP network management interface to related network.

6.2.7. Power on

When connect power supply cable, first connect the cable to POWER plug on rear panel of EOS device, and than connect to power supply.

If you use the -48 DC power supply, first connect protection ground, then -48V connection to low electron cable and finally 0V to high electron. Make sure of firm installation and no short-cut, turn on power supply.

If you use 220V AC power supply, the cable described in appendix is available.

After being powered on, the power supply indicator lights of power supply card, device and extended card work normally.

7. Q&A

If you have problems during the installation or application, please try to solve them through the following suggestions. And if it does not work, please contact the sellers to get technical supports.

- PWR light of power supply card off
Check the power supply cable first, if power supplied normally there must be error of power supply card.
- There is LOS or LOF alarm of SDH optical interface or electronic interface.
That is to say, there is receiving signal loss or frames receiving not synchronously of SDH optical or electronic interface. First, check whether the fiber or cable is connected correctly; secondly, self-loop the fiber (perhaps optical loss is needed) or cable, if there are still alarms, then there is something wrong with device.
- Indicator light of Ethernet interface or SNMP network management interface is off.
First, check whether the cable works normal or not; then, check whether the devices connect to Ethernet interface or SNMP network management interface works normal or not. It is recommended that use rollover cables to connect switch or hub and use crossover cables to connect router or NIC.
- Line is disconnecting.
Check whether Ethernet interface is in 100M full-duplex, and it must be in that mode, otherwise it will not work.

8. Appendix How to make CONSOLE cable

8.1. Appendix 1 cable of CONSOLE interface

Signaling and Pinouts of CONSOLE of RJ45 plug:

Pin number of RJ45	Signal	Correspond PC serial port pin number
1	NC	-
2	DSR#	6
3	RxD	3
4	GND	5
5	GND	5
6	TxD	2
7	DTR#	4
8	NC	-

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