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RC3000E (REV.A) User Manual

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Address: Building 2, No. 28 of the Shangdi 6th Street, Haidian District, Beijing 100085

Tel: +86-10-82883305

Fax: +86-10-82883056

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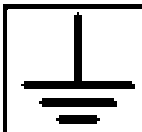
General Safety Instructions

The following instructions serve as a general guide for the safe installation and operation of telecommunications products. Additional instructions, if applicable, are included inside the manual.

Safety Symbols

This symbol may appear on the equipment or in the text. It indicates potential safety hazards regarding product operation or maintenance to operator or service personnel.

Danger of electric shock! Avoid any contact with the marked surface while the product is energized or connected to outdoor telecommunication lines.



Protective earth: the marked lug or terminal should be connected to the building protective earth bus.
Some products have terminals which are permanently protective earthing conductors.
Please be sure well conneted to earthing before equipment connected to supply.

Some products may be equipped with a laser diode. In such cases, a label with the laser class and other warnings as applicable will be attached near the optical transmitter. The laser warning symbol may be also attached.
Please observe the following precautions:
• Before turning on the chassis with optic module, make sure that the fiber optic cable is intact and is connected to the transmitter.
• Do not attempt to adjust the laser drive current.
• Do not use broken or unterminated fiber-optic cables/connectors or look straight at the laser beam.
• The use of optical devices with the equipment will increase eye hazard.
• Use of controls, adjustments or performing procedures other than those specified herein, may result in hazardous radiation exposure.
ATTENTION: The laser beam may be invisible!

Always observe standard safety precautions during installation, operation and maintenance of this product. Only qualified and authorized service personnel should carry out adjustment, maintenance or repairs to this product. No installation, adjustment, maintenance or repairs should be performed by either the operator or the user.

All extension slots are not hot-swappable

Some products have more than one power supply cord. Disconnect 2 power supply cords before servicing to avoid electric shock.

Before operating modules in the electricity conditions, please be noticed that optical modules shall be connected with optical fiber wires or shield with optical module cover for fear that laser light harms to operator's eyes.

It is suggested to apply optical module CLASS1 as laser.

Handling Energized Products

General Safety Practices

Do not touch or tamper with the power supply when the power cord is connected. Line voltages may be present inside certain products even when the power switch (if installed) is in the OFF position or a fuse is blown. For DC-powered products, although the voltages levels are usually not hazardous, energy hazards may still exist.

Before working on equipment connected to power lines or telecommunication lines, remove jewelry or any other metallic object that may come into contact with energized parts.

Unless otherwise specified, all products are intended to be grounded during normal use. Grounding is provided by connecting the mains plug to a wall socket with a protective earth terminal. If an earth lug is provided on the product, it should be connected to the protective earth at all times, by a wire with a diameter of 18 AWG or wider. Rack-mounted equipment should be mounted only in earthed racks and cabinets.

Always make the ground connection first and disconnect it last. Do not connect telecommunication cables to ungrounded equipment. Make sure that all other cables are disconnected before disconnecting the ground.

Connection of AC Mains

Make sure that the electrical installation complies with local codes.

Always connect the AC plug to a wall socket with a protective ground.

Always connect the power cord first to the equipment and then to the wall socket. If a power switch is provided in the equipment, set it to the OFF position. If the power cord cannot be readily disconnected in case of emergency, make sure that a readily accessible circuit breaker or emergency switch is installed in the building installation.

Connection of DC Mains

Unless otherwise specified in the manual, the DC input to the equipment is floating in reference to the ground. Any single pole can be externally grounded.

Due to the high current capability of DC mains systems, care should be taken when connecting the DC supply to avoid short-circuits and fire hazards.

DC units should be installed in a restricted access area, i.e. an area where access is authorized only to qualified service and maintenance personnel.

Make sure that the DC supply is electrically isolated from any AC source and that the installation complies with the local codes.

Before connecting the DC supply wires, ensure that power is removed from the DC circuit. Locate the circuit breaker of the panel board that services the equipment and switch it to the OFF position. When connecting the DC supply wires, first connect the ground wire to the corresponding terminal, then the positive pole and last the negative pole. Switch the circuit breaker back to the ON position.

A readily accessible disconnect device that is suitably rated and approved should be incorporated in the building installation.

Preventing Electrostatic Discharge Damage

Modules which can be plugged into chassis are sensitive to damage from static electricity. Conversely, static voltages as high as 35,000V can be generated just by handling plastic or foam packing material, or by sliding assemblies across plastic and carpets. Not exercising the proper electrostatic discharge (ESD) precautions can result in intermittent or complete component failures. To minimize the potential for ESD damage, observe the following guidelines:

• Always use an ESD-preventive antistatic wrist strap or ankle strap and ensure that it makes good skin contact.

• When removing or installing a component, make sure the equipment end of your antistatic strap leash is connected to the ESD connection sockets on the front of the chassis or to a bare metal surface on the chassis. Avoid contact between the component and your clothing. The wrist strap only protects the component from ESD voltages on the body; ESD voltages on your clothing can still cause component damage.

• Always place a card component-side-up on an antistatic surface, in an antistatic card rack, or in a static shielding bag. If you are returning the item to the factory, immediately place it in a static shielding bag.

• Handle Modules by the metal card carrier edges only; Avoid touching the board or any connector pins.

Chapter 1 Product Overview

1.1 Overview

RC3000E multi-service multiplexing device make full use of the 2M resource of carrier to provide subscribers with Ethernet, V.35, asynchronous serial interface, etc. data and various voice interfaces. It accomplishes data and voice, etc. multi-service cross over and multiplexing functions over one line. Meanwhile, providing PDH optical interface card and E1 interface card to satisfy various accessing environment and aggregation requirements.

RC3000E integrates the functions of digit/simulation accessing, multiplexing, crossing over, transmitting and protocol converting. Adopting modular intelligent BUS design, centrallized distributing the useful timeslots in several E1 channels. It is more cost-effective since making full use of the transmission line resources on hand, efficiently supporting now available services of client and guarantee the extension of service in future. Based on the in existence SDH or MSTP network, RC3000E provides with subscribers a better accessing solution with high performance and price ratio. It is also suitable to multi-service accessing of PSTN public network, public security organs, finance, electric power, railway, soldiery, etc. private network client and enterprise, district and community, office building, etc. common subscriber. It realizes the concept of three networks in one.

This product is centralized managed by Raisecom Nview NNM management platform, it is convinient to set and manage local and remote device, then supporting the management and maintenance of device running fast and effectively.

RC3000E is a 1U height, 360mm depth chassis, the whole chassis supports 3 downlink service slots and 1 uplink service slot. It is in support of 512 x 512 64k timeslots full cross over, in reduandant power supply mode.

1.2 Function feature

- Redundant power supply, five types: single AC, single DC, double AC, double DC, AC/DC;
- One uplink card slot, three user card slots, user cards support sub-cards of the old RC3000 series;
- Main board supports full signaling cross over of 512 x 512 64k timeslots;
- In support of E1 port 1+1 protection;
- Two clock modes for E1 transmitting clock: master clock, E1 recover clock;
- In support of E1 loopback detection;
- In support of inbuilt BER test, only one path of the 8 E1 lines can enable at one time, the 8 E1 lines can be set independently;
- SA data transparent transmission, SA4 or SA5 channel or independent timeslot 64K network management;
- In support of SNMP interface, CONSOLE commands interface, device online upgrade;
- Alarm output function, 2 digit values, can be configured by software.

1.3 Naming rules

RC3000E PCM cross multiplexing device

Model: RC3000E-XX

XX: power supply type

- RC3000E-AC/D: double AC power supply device;
- RC3000E-DC/D: double DC power supply device;
- RC3000E-AC/S: single AC power supply;
- RC3000E-DC/S: single DC power supply;
- RC3000E-AC_DC: AC/DC hybrid power supply.

1.4 Interface card types description

Downlink sub-card list of RC3000E:

Type	Name	Channel number description
RC3000-SUB-DS	FXS audio subscriber interface card.	8 channels, hardware setting can not be adjusted
RC3000-SUB-DO	FXO audio trunking interface card	8 channels, hardware setting can not be adjusted
RC3000-SUB-DM2	E&M wire-2 audio trunking interface card	8 channels, hardware setting can not be adjusted
RC3000-SUB-DM4	E&M wire-4 audio trunking interface card	4 channels, hardware setting can not be adjusted
RC3000-SUB-DV35	V35 data interface card	1 path, channel occupied timeslots can be set
RC3000-SUB-DV24	V24 data interface card	4 paths, each path 64-128K adjustable
RC3000-SUB-D232	RS232 serial data interface card	8 channels, hardware setting can not be adjusted
RC3000-SUB-D422	RS422 serial data interface card	8 channels, hardware setting can not be adjusted
RC3000-SUB-DMT	Magneto telephone interface card	8 channels, hardware setting can not be adjusted
RC3000-SUB-D485	RS485 serial data interface card	8 channels, hardware setting can not be adjusted
RC3000-SUB-DETH(REV.B)	100BaseT Ethernet data interface card	1 path, channel occupied timeslots can be set
RC3000-SUB-DETHX2	Double Ethernet data interface card	2 paths, channel occupied timeslots can be set
RC3000-SUB-DC64K	Co-directional 64K data interface card	4 channels, hardware setting can not be adjusted
RC3000-SUB-10FXS	FXS audio subscriber interface card.	10 channels, voice gain adjustable
RC3000-SUB-10FSO	FXO audio subscriber interface card	10 channels, voice gain adjustable
RC3000-SUB-8E&M	8 E&M interface sub-card	8 channels, E&M 2/4-wire can be configured by software

Uplink sub-card list of RC3000E:

Type	Name	Channel number description

RC3000E-UP-8E1	Uplink E1 interface card	8 E1 channels, 75Ω unbalanced interface
RC3000E-UP-8E1-BL	Uplink E1 interface card	8 E1 channels,120Ω balanced interface
RC3000E-UP-4E1	Uplink E1 interface card	4 E1 channels,75Ω unbalanced interface
RC3000E-UP-4E1-BL	Uplink E1 interface card	4 E1 channels,120Ω balanced interface
RC3000E-UP-OPT-FE2E1	Optical 8E1 Ethernet interface card	Optical interface uplinking, (6+2)E1 and 100M Ethernet

Chapter 2 Technical Specifications

2.1 Line side interface paramters

2.1.1 E1 interface specifications

- Rated bit rate: 2048Kbps±50ppm
- Code type: HDB3
- Impedance: 75Ω (unbalanced interface), 120Ω (balanced interface)
- Electric feature: compliant to ITU-T G.703 recommendation
- E1 connector type: DB37 M connector
- E1 cable type:
  - SYV 75-2-2 coaxial thin cable, transmitting over 200m at most for unbalanced signal;
  - 0.6mm (22AWG) twisted pair for balanced signal.

2.1.2 Ethernet interface specifications

- Compliant: IEEE802.3x, IEEE802.3u, IEEE802.1q, MSAN-126
- Connector type: RJ45
- Interface speed: 10/100M auto-negotiation
- Duplex mode: full-duplex/half-duplex, auto-negotiation
- Frame size: 1536
- Flow control: support
- Auto-MDI/MDIX

2.2 Client side interface card parameters

2.2.1 FXS interface specifications

- Code: law-A
- Bit rate: 64Kbps
- Audio interface impedance: off-hook loop impedance 600 +200//0.1
- On-hook impedance: 2MΩ
- Effective transmission bandwidth: 300Hz ~ 3400Hz
- Gain frequence feature:
  receive (A/D) gain range is -3~+13dB, default is 0dB, step value is 0.1dB
  send (D/A) gain range is -13~+3dB, default is -3.5dB, step value is 0.1dB
- Frequence distortion: 300Hz~3000Hz ＜0.5dB
  3000Hz~3400Hz ＜3.0dB
- Total distortion (1020 Hz): 0 ~ -30dBmO ＜33 dB
  -30 ~ -40dBmO ＜（33~22）dB
  -40 ~ -45dBmO ＜22 dB
- Gain changes according to the inputing electrical level:
  +3 dBmO ~ -40dBm0 Δ＜0.5dB
  -40dBmO ~ -50dBm0 Δ＜1.0dB
  -50dBmO ~ -55dBm0 Δ＜3.0dB
- Degree of unbalance about earth:
  300Hz ~ 600Hz ＞40dB
  600Hz ~ 2400Hz ＞46dB
  2400Hz ~ 3400Hz ＞41dB

- Idle channel noise: ＞ -67dBm0
- Return loss: 300~600 Hz ＞12 dB
  600~3400 Hz ＞15 dB
- Feedback voltage (on-hook): typical -48V
- Feedback current: typical 20mA
- Ring voltage: typical 60V/30Hz trapezoidal wave

2.3 Power supply

- AC power supply
  - Working voltage: 220 (V)
  - Tolerance: 100~240 (V)
  - Frequency: 50 (Hz)
- DC power supply
  - Working voltage: -48 (V)
  - Tolerance: -36~-72 (V)
- Power consumption: 40W at maximum

2.4 Working condition

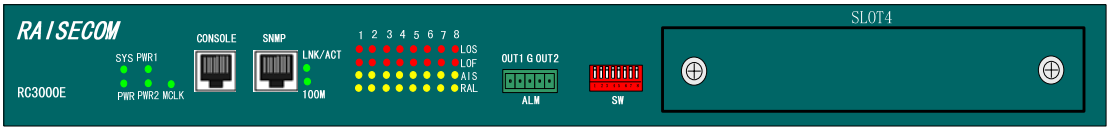
- Working temperature: 0~50 (℃)
- Relative humidity: ≤90% (25℃, without condensation)

2.5 Outlook dimensions

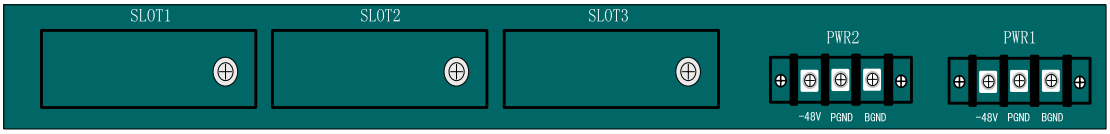
- Outlook: 1U height standalone device
- Dimensions: 440mm x 44.5mm x 360mm
- Net weight: 4Kg

Chapter 3 Device Appearance and Description

3.1 Device Front Panel



3.2 Device Rear Panel



3.3 Indicator definitions

Alarm	Definition
LOS	Loss Of Signal
AIS	Alarm Indicate Signal
LOF	Loss Of Frame Sync (MultiFrame Sync)
RAL	Remote Alarm Indicate, ON indicates remote device alarms
PWR1	Power supply 1 indicator, green indicates normal power supply
PWR2	Power supply 2 indicator, green indicates normal power supply
PWR	Chassis power supply indicator, green indicates normal
SYS	System running indicator, flickering indicates normal
LNK/ACT	SNMP interface LINK and ACT status
100M	SNMP interface speed status
MCLK	Device working clock indicator, green ON in master clock

3.4 Interface description

There is a 5-bit alarm outputting terminal connector on the front panel.

Alarm output port	Description
OUT 1-2	Alarm output terminal, alarm status is configurable. It is open by default, alarm output when it is closed.
G	Device inside connects to ground

Chapter 4 Function Description of Sub-cards

4.1 RC3000E-UP-8E1 card

RC3000E-UP-8E1 is an uplink interface sub-card with 8 E1 in RC3000E, it realizes 8 paths of E1 access and can be set in two modes through DIP switch: RC3000E-UP-8E1 and RC3000E-UP-8E1-BL.

The 8 E1 interfaces of RC3000E-UP-8E1 are unbalanced; and RC3000E-UP-8E1-BL 8 E1 interfaces are balanced.

4.1.1 Function features

- 8E1 uplink interface card of RC3000E
- Path protection
- 8E1 interface balanced or unbalanced mode can be set by DIP switch
- 8 E1 interfaces adopt DB37F female connector

4.1.2 Naming rule

Naming rule of RC3000E-UP-8E1(-BL) card:

RC3000E: multi-service cross multiplexing device

UP: uplink interface sub-card

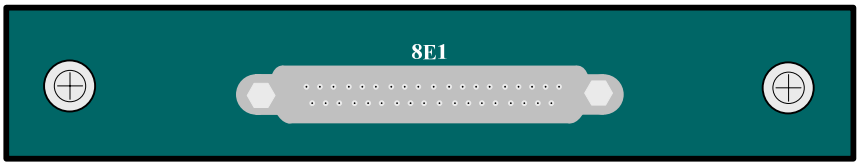
8E1: 8 paths of E1 uplink unbalanced interface sub-card, DB37F connector on device panel to connect BNC interface by cable.

8E1-BL: 8 paths of E1 uplink balanced interface sub-card, DB37F connector on defice panel to connect RJ45 interface by cable.

4.1.3 Structure and dimensions

Dimensions: 25mm (H)×155mm (W)×100.5mm (D)

Front panel figure:



4.1.4 DIP switch setting

SW1: choose balanced or unbalanced mode for E1 1~4:

	Bit 1: E1 1	Bit 2: E1 2	Bit 3: E1 3	Bit 4: E1 4
ON	75Ω (unbalanced)	75 Ω (unbalanced)	75 Ω (unbalanced)	75 Ω (unbalanced)
OFF	120 Ω (balanced)	120 Ω (balanced)	120 Ω (balanced)	120 Ω (balanced)

SW3: Choose impedance match for E1 1~4 balanced or unbalanced mode

	Bit 1: E1 1	Bit 2: E1 2	Bit 3: E1 3	Bit 4: E1 4
ON	75 Ω (unbalanced)	75 Ω (unbalanced)	75 Ω (unbalanced)	75 Ω (unbalanced)
OFF	120 Ω (balanced)	120 Ω (balanced)	120 Ω (balanced)	120 Ω (balanced)

SW2: Choose E1 5~8 balanced or unbalanced mode

	Bit 1: E1 5	Bit 2: E1 6	Bit 3: E1 7	Bit 4: E1 8
ON	75 Ω (unbalanced)	75 Ω (unbalanced)	75 Ω (unbalanced)	75 Ω (unbalanced)
OFF	120 Ω (balanced)	120 Ω (balanced)	120 Ω (balanced)	120 Ω (balanced)

SW4: Choose impedance match for E1 5~8 balanced or unbalanced mode

	Bit 1: E1 5	Bit 2: E1 6	Bit 3: E1 7	Bit 4: E1 8
ON	75 Ω (unbalanced)	75 Ω (unbalanced)	75 Ω (unbalanced)	75 Ω (unbalanced)
OFF	120 Ω (balanced)	120 Ω (balanced)	120 Ω (balanced)	120 Ω (balanced)

SW5: Choose sub-card type

	Bit 1: reserved	Bit 2: Type[2]	Bit 3: Type[1]	Bit 4: Type[0]
ON	reserved	0	0	0
OFF	reserved	1	1	1

Type[2:4] = “100”; indicates RC3000E-UP-8E1-BL

Type[2:4] = “011”; indicates RC3000E-UP-8E1

4.2 RC3000E-UP-4E1 card

RC3000E-UP-4E1 is a 4 paths of unbalanced E1 uplink interface sub-card in RC3000E, it is used in RC3000E chassis to realize 4 paths of E1 accessing.

4.2.1 Function features

- 4 paths of unbalanced E1 uplink interface card of RC3000E
- Providing 4 paths of E1 interface
- E1 interfaces adopt CC3 connector
- E1 interfaces conduction through function if power down; path 1 conduction through path 2 and path 3 conduction through path 4

4.2.2 Naming rule

Naming rule of RC3000E-UP-4E1 card:

RC3000E: multi-service cross multiplexing device

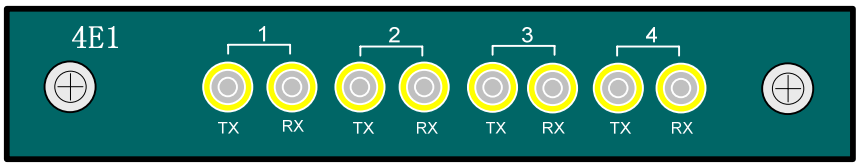
UP: uplink interface sub-card

4E1: 4 paths of E1 uplink unbalanced interface sub-card, CC3 connector on device panel

4.2.3 Structure and dimensions

Dimensions: 25mm (H)×155mm (W)×100.5mm (D)

Front panel figure:



4.3 RC3000E-UP-4E1-BL card

RC3000E-UP-4E1-BL is a 4 paths of balanced E1 uplink interface sub-card in RC3000E, it is used in RC3000E chassis to realize 4 paths of E1 accessing.

4.3.1 Function features

- 4 paths of balanced E1 uplink interface card of RC3000E
- Providing 4 paths of E1 interface
- E1 interfaces adopt RJ45 connector, each RJ45 outputs 1 path of E1
- E1 interfaces conduction through function if power down; path 1 conduction through path 2 and path 3 conduction through path 4

4.3.2 Naming rule

Naming rule of RC3000E-UP-4E1-BL card:

RC3000E: multi-service cross multiplexing device

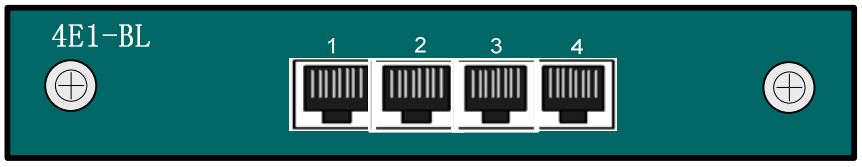
UP: uplink interface sub-card

4E1-BL: 4 paths of E1 uplink balanced interface sub-card, RJ45 connector on device panel

4.3.3 Structure and dimensions

Dimensions: 25mm (H)×155mm (W)×100.5mm (D)

Front panel figure:



4.3.4 Power-down conduction through function of 4 E1 card

The power-down conduction through function of RC3000E-UP-4E1(-BL) card: when the sub-card works in power-on mode, all of the 4 E1 paths signal access to main board for 64kbit/s cross multiplexing; when the sub-card works in power-down mode, all of the 4 E1 paths signal work in conduction through mode, that is E1 1 conduction through E1 2, E1 3 conduction through E1 4. receiving signal of E1 1 was output from transmitting end of E1 2, receiving signal of E1 2 was output from transmitting end of E1 1, receiving signal of E1 3 was output from transmitting end of E1 4, receiving signal of E1 4 was output from transmitting signal of E1 3.

When RC3000E-UP-4E1(-BL) restores from power down, the conduction through pairs between two E1 paths disappear and the RC3000E-UP-4E1(-BL) card works in power-on mode.

4.3.5 E1 protection switch

All uplink cards in RC3000E are in support of E1 protection switch. Different uplink cards support different protection pair number. At present, uplink card supports at most 4 E1 protection pairs, E1-1 and E1-2 form a pair, and so does E1-3 and E1-4, E1-5 and E1-6, E1-7 and E1-8.

Switch over condition:

- In E1 transparent mode, the two E1 paths make protection switch condition is: LOS, AIS.
- In E1 framed mode, the two E1 paths make protection switch condition can set as: LOS, LOF, AIS.

Switch over time:

- In LOS, LOF, AIS condition, switch time is <1ms;
- In CRC4 enable mode, E-3 can be configured to take part in switch condition; in E-3 condition, the switch time is <2s.

Switch over mode:

- Auto-switch: return mode, non-return mode
- Manual switch: don't switch when both paths are normal or neigher path is normal, just switch over when the current working paths is abnormal
- Force switch: switch over with regardless to the object normal or not.

Lock up protection is working in work path at any time until cancel lock up protection.

Besides, it is able to set switch protection:

Unidirection (one-end) return switch mode and unidirection non-return switch mode. By default it is unidirection non-return switch mode.

One-end: switching at one end and don't notify peer device.

Return mode: the switched path can switch back by automation after it restore; the software can configure the return time for return mode switching.

4.4 RC3000E-UP-OPT-FE2E1 card

RC3000E-UP-OPT-FE2E1 is optical Ethernet 8E1 uplinking sub-card of RC3000E Multi-service multiplexing device, which is plugged at slot-4 of RC3000E chassis. This sub-card can realizes multiplexing local 100M Ethernet service, 8 paths of E1 service and network management data to optical interface and transmitting to remote end. And in the opposite directioin, demultiplexing remote 100M Ethernet service, 8 paths of E1 service received by optical interface at local side. All of the 8 paths of E1 data can be sent to mainboard for cross-connection, or just send 6 of the 8 paths to mainboard, the other paths can be applied with other E1 interface device via the E1 interface on the front panel. The sub-card only receives management from mainboard, network management supports sub-device up to level-2.

4.4.1 Function features

- 6＋2 paths of E1 and 100M linear Ethernet multiplexing upto 150M optic
- Single optical interface product
- The panel outputs 2 paths of E1 data, interface type is DB9F. the 2 E1 can make 64K cross-connection in mainboard or direct transparent transmitted at optical interface
- E1 interface provides unbalanced and balanced modes
- Ethernet supports auto-negotiation, auto-MDI/MDIX (auto-MDI/MDIX effective when auto-negotiation enable), full-duplex flow control and half-duplex back pressure, MTU is 1916 bytes
- Receiving rate limit setting and sending rate limit setting, step at 64kbit/s
- ALS function
- Remote power off detection and report

4.4.2 Naming rule

Naming rule of RC3000E-UP-OPT-FE2E1 card:

RC3000E: multi-service cross multiplexing device

UP: uplink interface sub-card

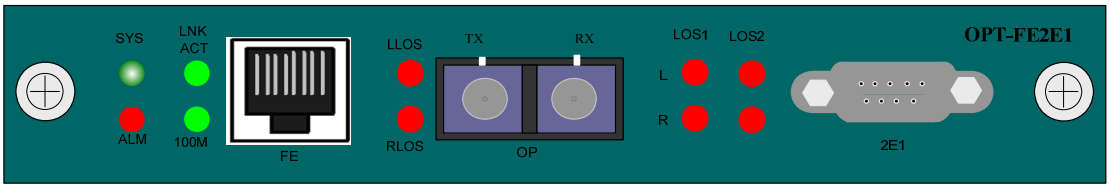
OPT: optical module

FE2E1: the card provides 1 path of 100M Ethernet and 2 E1 interfaces

4.4.3 Structure and dimensions

Dimensions: 25mm (H)×155mm (W)×100.5mm (D)

Front panel figure:

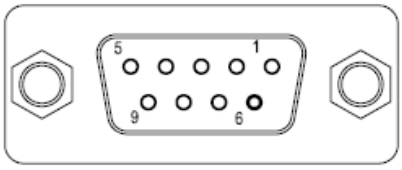


4.4.4 Indicator description

No.	Name	Color	Description
1	SYS	green	System status indicator. Flickering: system works in order; ON/OFF: system abnormal.
2	ALM	red	Device alarm. ON: any type of alarm occurs in the device.
3	LLOS	red	Local line loss of signal
4	RLOS	red	Remote line loss of signal
5	L LOS1	red	LOS alarm of local E1-1 path in the 2E1 interfaces. Red ON: LOS; OFF: no LOS. **NOTE : This indicator is ineffective in mode 3 working status.**
6	L LOS2	red	LOS alarm of local E1-2 path in the 2E1 interfaces. Red ON: LOS; OFF: no LOS. **NOTE : This indicator is ineffective in mode 3 working status.**
7	R LOS1	red	LOS alarm of remote E1-1 path in the 2E1 interfaces. Red ON: LOS; OFF: no LOS. **NOTE : This indicator is ineffective in mode 1 and mode 3 working status.**
8	R LOS2	red	LOS alarm of remote E1-2 path in the 2E1 interfaces. Red ON: LOS; OFF: no LOS. **NOTE : This indicator is ineffective in mode 1 and mode 3 working status.**
9	LNK/ACT	green	ON: port link up; Flickering: port ActiVE
10	100M	green	ON: port works at 100M; OFF: port works at 10M

4.4.5 2E1 interface definition

4.4.5.1 DB9F interface



4.4.5.2 Definition of DB9F interface

For 120Ω, connecting to cable CBL-E1-DB9M/2RJ45-2.5m, transfer to RJ45 connector;

For 75Ω, connecting to cable CBL-E1-DB9M/4BNCF-2.5m, transfer to BNC female connector.

The following table is pin definition of DB9 femal connector, when it is 75Ω, "+" denotes core of coaxial-cable, "-" denotes screen layer (ground) of coaxial-cable.

Pin	Definition	Description
1	IN1+	1 (RX1)
6	IN1-	
2	OUT1+	2 (TX1)
7	OUT1-	
3	IN2+	3 (RX2)
8	IN2-	
4	OUT2+	4 (TX2)
9	OUT2-	
5		

4.4.6 Optical interface specification

Model	Interface type	Wavelength (nm)	Tx power (dBm)	Rx sensitivity (dBm)	Optical extinction	Min. overload (dBm)	Distance (Km)
RC3000E-UP-OPT-FE2E1-S1	SC	1310	-15 ~ -8	<-34	>8.2	>-8	0~25
RC3000E-UP-OPT-FE2E1-S2	SC	1310	-5 ~ 0	<-34	>8.2	>-8	10~60
RC3000E-UP-OPT-FE2E1 -S3	SC	1310	-5 ~ 0	<-36	>10	>-10	15~120
RC3000E-UP-OPT-FE2E1 -SS13	SC	1310	-12 ~ -3	<-30	>8.2	>-8	0~25
RC3000E-UP-OPT-FE2E1–SS15	SC	1550	-12 ~ -3	<-30	>8.2	>-8	0~25
RC3000E-UP-OPT-FE2E1–SS23	SC	1310	-5 ~ 0	<-32	>8.2	>-8	10~50
RC3000E-UP-OPT-FE2E1–SS25	SC	1550	-5 ~ 0	<-32	>8.2	>-8	10~50

NOTE: The distrance listed in the table means the max. transmission distance in typeical optical cable condition. The actual transmission distance is depended on network condition.

4.4.7 Jumper setting

4.4.7.1 Short connection terminal

Position of J7, J8, J10, J11, J12, J13 on PCB.

4.4.7.2 Jumper definition and description

J7	Function	Description
Short circuit	ISP	User can enter ISP mode through serial interface upgrade MCU program on the card, the system is in status of waiting to upgrade in this mode.
Open circuit	NARMAL	Working mode

J8	Function	Description
Short circuit	Unbalanced	2E1 interface of sub-card works in unbalanced mode.
Open circuit	Balanced	2E1 interface of sub-card works in balanced mode.

J10	Function	Description
Short circuit	Unbalanced match	E1-2 works in unbalanced mode, receiving side impedance match.
Open circuit	Balanced match	E1-2 works in balanced mode, receiving side impedance match.

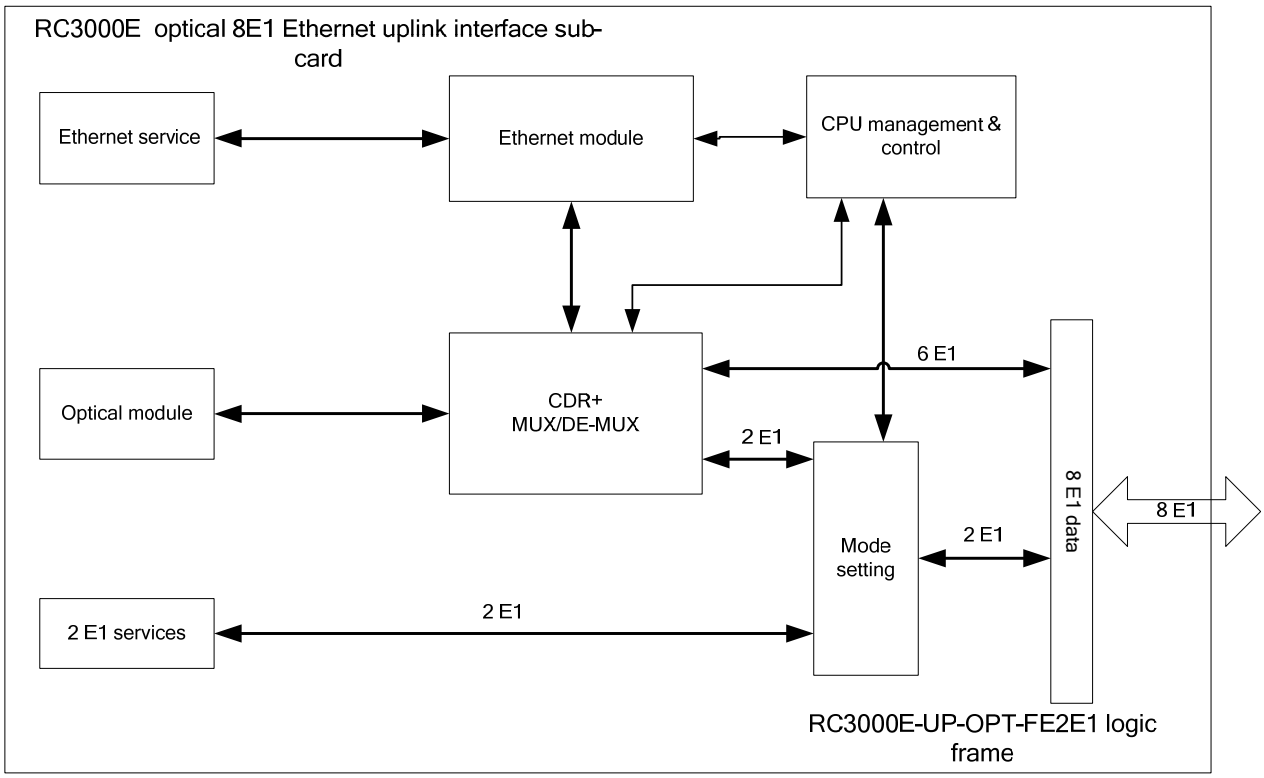
J11	Function	Description
Short circuit	Unbalanced match	E1-2 works in unbalanced mode, receiving side impedance match.
Open circuit	Balanced match	E1-2 works in balanced mode, receiving side impedance match.

J12	Function	Description
Short circuit	Unbalanced mode	E1-1 works in unbalanced mode, transmitting side connects grounding.
Open circuit	Balanced mode	E1-1 works in balanced mode.

J12	Function	Description
Short circuit	Unbalanced mode	E1-1 works in unbalanced mode, transmitting side connects grounding.
Open circuit	Balanced mode	E1-1 works in balanced mode.

NOTE: J7 is open circuit status when leaving factory, but the device can work in order. J8, J10~J13 is short circuit status.

4.4.8 Principle frame



- CPU unite can manage and control the function units on the card and communicate with mainboard.
- At uplinking direction of sub-card, PDH optical signal was recovered to clock and data by CDR and then demultiplexing, transmit Ethernet data to Ethernet module. And then choos E1 signal transmitting direction according to the sub-card working mode.
- At downlinking direction of sub-card, multiplexing and coding Ethernet data and E1 data according to working mode of sub-card, and then transmitting by optical module.
- The Ethernet module realizes access and transmission of Ethernet data, and exchange data between MUX/DEMUX module.

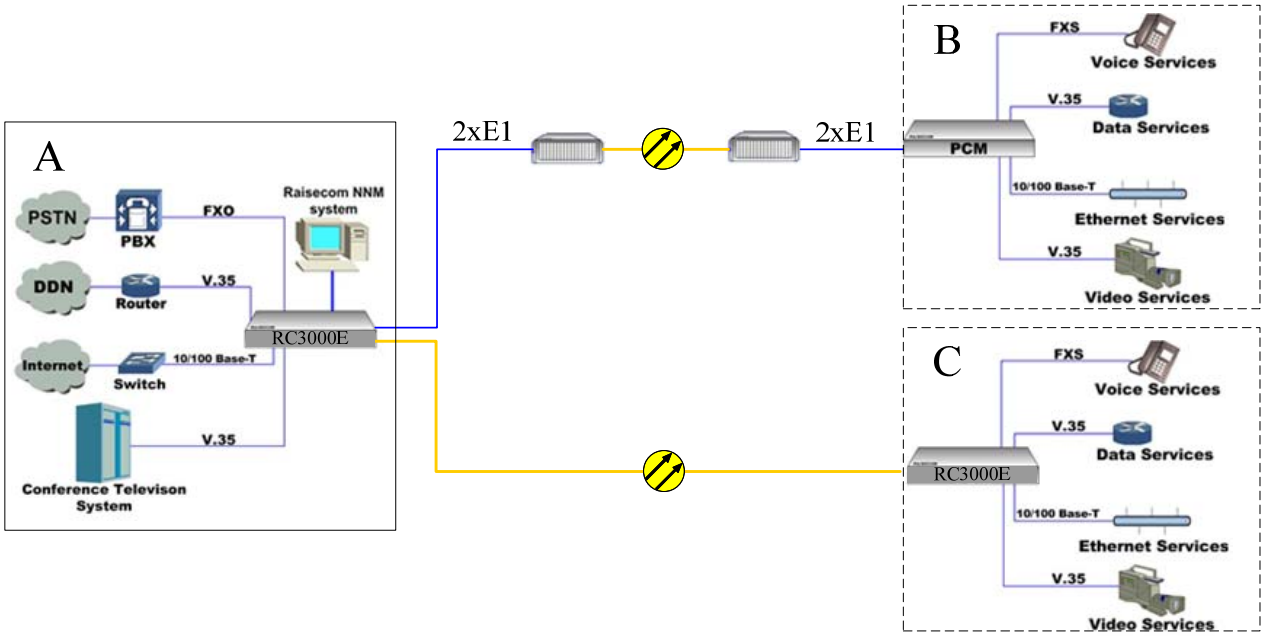
4.4.9 Typical application

As optical FE2E1 uplinking interface card of RC3000E, this card is applied in RC3000E chassis.

Set working mode by software, it supports 3 modes in all, by default, it is mode 1.

4.4.9.1 Mode 1

Cross-connect the first 6E1 paths demultiplexed from optical transmission and the 2E1 of sub-card panel.



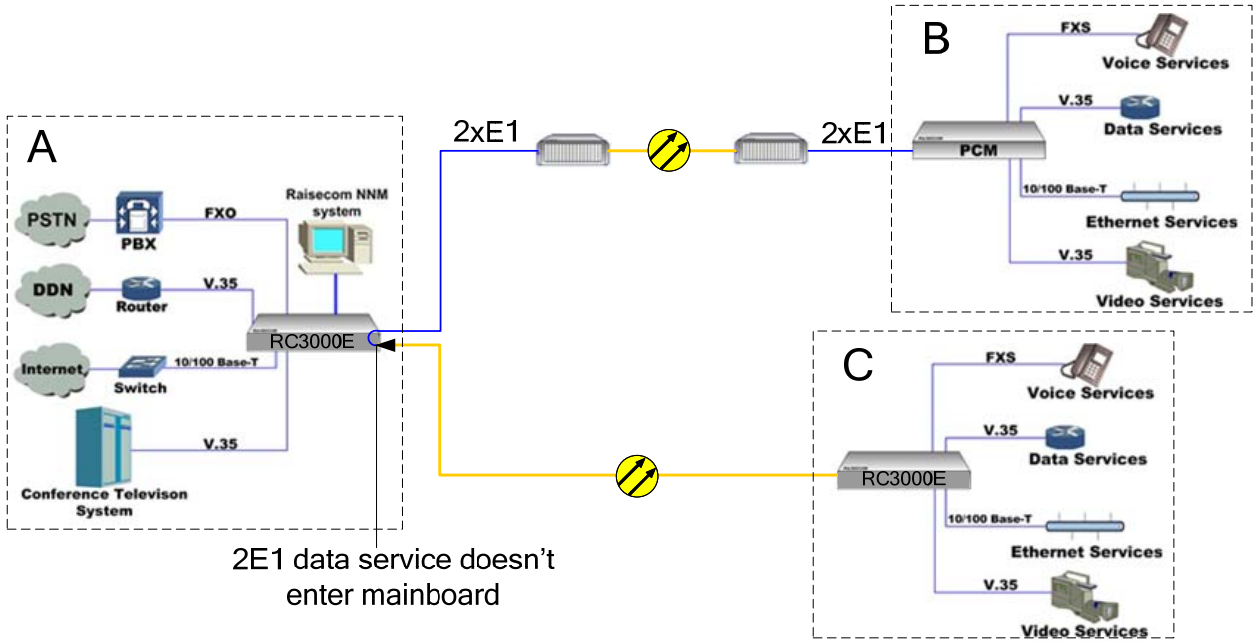
Station A applies RC3000E, station B applies PCM device with E1 interface, station C applies RC3000E to make service data exchangement, RC3000E-UP-OPT-FE2E1 is applies as uplinking card of RC3000E.

The PCM device at station B accesses into transmission network through E1, connecting to 2E1 of RC3000E at station A. Station B can exchange at most 2E1 capacity service with station A.

RC3000E at station C connects to RC3000E at station A by optical fiber. Station C can exchange at most 6E1 capacity service with station A.

4.4.9.2 Mode 2

Cross-connect the first 6E1 paths demultiplexed from optical transmission. The other 2E1 outputs from 2E1 interfaces on sub-card panel.



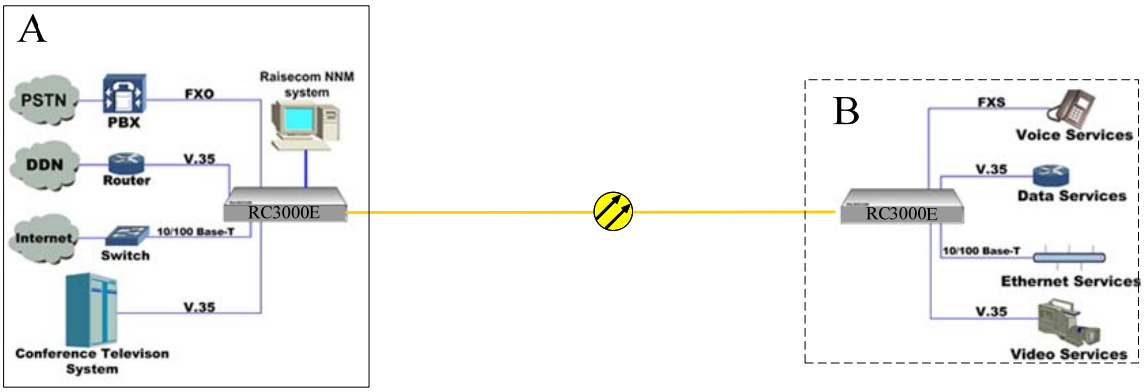
RC3000E at station A exchange service with RC3000E at station C, PCM device at station B accesses into transmission network by E1 and exchange with RC3000E at station A, then enter optical channel through RC3000E at station A and exchange service with RC3000E at station C. RC3000E-UP-OPT-FE2E1 is applied as uplinking card of RC3000E.

Station B can at most exchange 64kbit/s services capacity at 2E1.

RC3000E at station C connects to RC3000E at station A by optical fiber. Station C can exchange at most 64kbit/s services capacity at 6E1 with station A.

4.4.9.3 Mode 3

Cross-connect the 8E1 paths demultiplexed from optical transmission. The 2E1 interfaces on sub-card interface is nonuse.



RC3000E at station C connects to RC3000E at station A by optical fiber. RC3000E-UP-OPT-FE2E1 is applied as uplinking card of RC3000E. Station C can exchange at most 64kbit/s services capacity at 8E1 with station A.

4.4.10 Network management feature

As uplink card of RC3000E, it is in support of RC3000E network management.

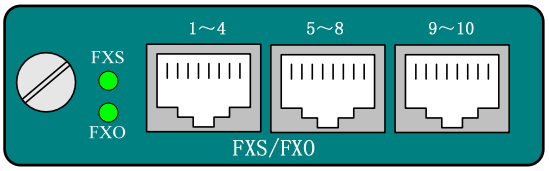
Configurable ID range of media converter that is connected to RC3000E-UP-OPT-FE2E1 card is 1~200.

4.5 RC3000E-SUB-10FXS card

4.5.1 Function features

10FXS audio interface card has feedback and ring module, it can connect to external telephone or external wire of PBX. There are 10 paths, and the paths number is decided by hardware, can not be changed, supporting polarity reversal.

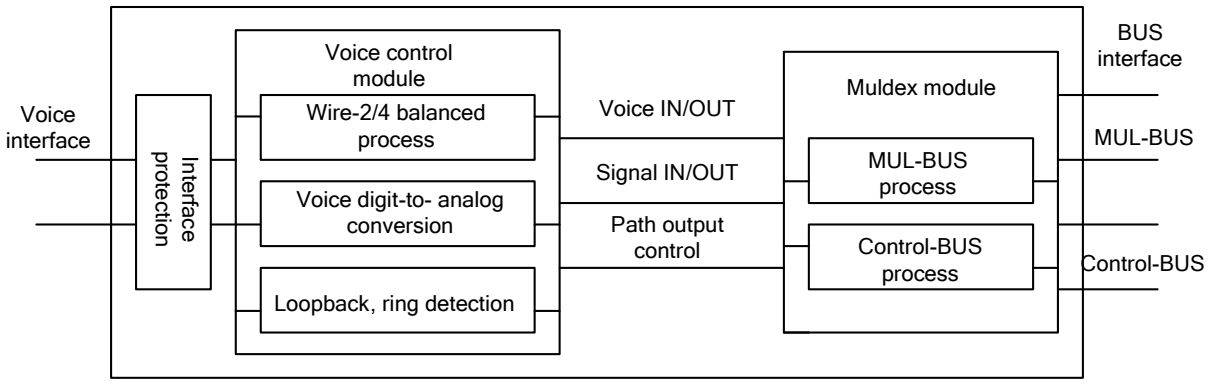
4.5.2 Structure and dimensions



4.5.3 Interface description

RJ45	Pin	Channel	Signal
PORT 1	1~2	Channel 1	CHANN1A / CHANN1B
	3~4	Channel 2	CHANN2A / CHANN2B
	5~6	Channel 3	CHANN3A / CHANN3B
	7~8	Channel 4	CHANN4A / CHANN4B
PORT 2	1~2	Channel 5	CHANN5A / CHANN5B
	3~4	Channel 6	CHANN6A / CHANN6B
	5~6	Channel 7	CHANN7A / CHANN7B
	7~8	Channel 8	CHANN8A / CHANN8B
PORT 3	1~2	Channel 9	CHANN9A / CHANN9B
	3~4	Channel 10	CHANN10A / CHANN10B
	5~6	Reserved	
	7~8	Reserved	

4.5.4 Logical principle

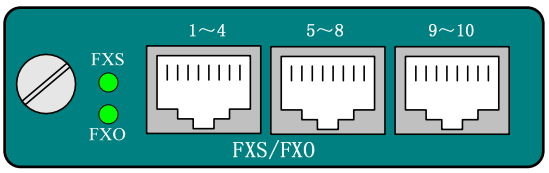


4.6 RC3000-SUB-10FXO card

4.6.1 Function features

10FXO audio relay interface card is an interface module to relay voice path in PBX. There are 10 paths, and the paths number is decided by hardware, can not be changed, supporting polarity reversal.

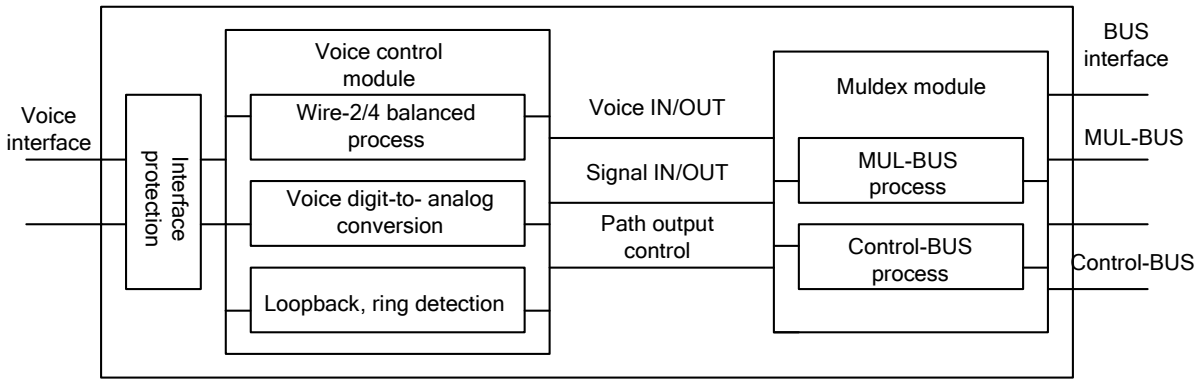
4.6.2 Structure and dimensions



4.6.3 Interface description

RJ45	Pin	Channel	Signal
PORT 1	1~2	Channel 1	CHANN1A / CHANN1B
	3~4	Channel 2	CHANN2A / CHANN2B
	5~6	Channel 3	CHANN3A / CHANN3B
	7~8	Channel 4	CHANN4A / CHANN4B
PORT 2	1~2	Channel 5	CHANN5A / CHANN5B
	3~4	Channel 6	CHANN6A / CHANN6B
	5~6	Channel 7	CHANN7A / CHANN7B
	7~8	Channel 8	CHANN8A / CHANN8B
PORT 3	1~2	Channel 9	CHANN9A / CHANN9B
	3~4	Channel 10	CHANN10A / CHANN10B
	5~6	Reserved	
	7~8	Reserved	

4.6.4 Logical principle



4.7 RC3000-SUB-8E&M card

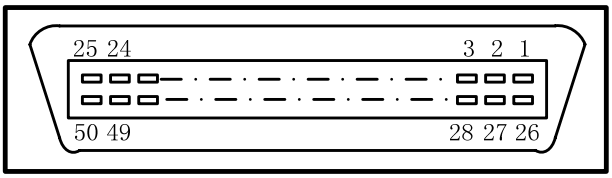
4.7.1 Function features

This card provides 8 E&M interfaces. E&M interface supports wire-2/4 and gain value setting, Type5. A/D gain range is -3~+19dB. D/A gain range is -13~+7dB. User can adjust gain value by software, step value is 0.1dB.

4.7.2 Structure and dimensions

4.7.3 Interface description

It adopts SCIC female connector, pin number shows as below:



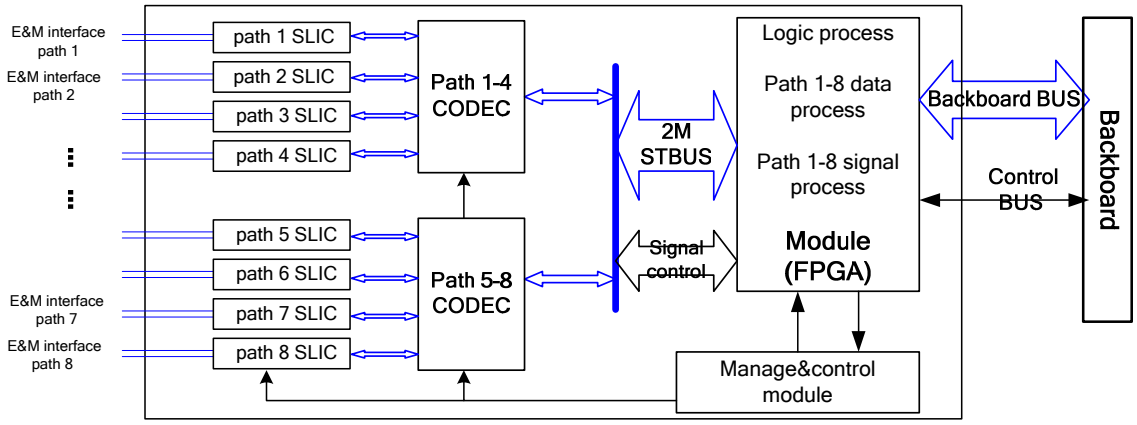
Definition as below:

SCIC Pin	EM Channel	EM signal description
1	Channel 1	Audio receive A for wire-4; idle for wire-2
2		Audio receive B for wire-4; idle for wire-2
26		Audio send A for wire-4; audio receive/send A for wire-2

27		Audio send B for wire-4; audio receive/send B for wire-2
3		M signal wire
4		E signal wire
28	Channel 2	Audio receive A for wire-4; idle for wire-2
29		Audio receive B for wire-4; idle for wire-2
5		Audio send A for wire-4; audio receive/send A for wire-2
6		Audio send B for wire-4; audio receive/send B for wire-2
30		M signal wire
31		E signal wire
7	Channel 3	Audio receive A for wire-4; idle for wire-2
8		Audio receive B for wire-4; idle for wire-2
32		Audio send A for wire-4; audio receive/send A for wire-2
33		Audio send B for wire-4; audio receive/send B for wire-2
9		M signal wire
10		E signal wire
34	Channel 4	Audio receive A for wire-4; idle for wire-2
35		Audio receive B for wire-4; idle for wire-2
11		Audio send A for wire-4; audio receive/send A for wire-2
12		Audio send B for wire-4; audio receive/send B for wire-2
36		M signal wire
37		E signal wire
13	Channel 5	Audio receive A for wire-4; idle for wire-2
14		Audio receive B for wire-4; idle for wire-2
38		Audio send A for wire-4; audio receive/send A for wire-2
39		Audio send B for wire-4; audio receive/send B for wire-2
15		M signal wire
16		E signal wire
40	Channel 6	Audio receive A for wire-4; idle for wire-2
41		Audio receive B for wire-4; idle for wire-2
17		Audio send A for wire-4; audio receive/send A for wire-2
18		Audio send B for wire-4; audio receive/send B for wire-2
42		M signal wire
43		E signal wire
19	Channel 7	Audio receive A for wire-4; idle for wire-2
20		Audio receive B for wire-4; idle for wire-2
44		Audio send A for wire-4; audio receive/send A for wire-2
45		Audio send B for wire-4; audio receive/send B for wire-2
21		M signal wire

22		E signal wire
46	Channel 8	Audio receive A for wire-4; idle for wire-2
47		Audio receive B for wire-4; idle for wire-2
23		Audio send A for wire-4; audio receive/send A for wire-2
24		Audio send B for wire-4; audio receive/send B for wire-2
48		M signal wire
49		E signal wire
25	Idle	
50		

4.7.4 Logical principle



Logic figure of RC3000 E&M sub-card

4.8 Other supported sub-cards

Downlink sub-card type	Name	Channel description
RC3000-SUB-DS	FXS audio user interface card	8 channels, set by hardware, can not change.
RC3000-SUB-DO	FXO audio relay interface card	8 channels, set by hardware, can not change.
RC3000-SUB-DM2	E&M wire-2 audio relay interface card	8 channels, set by hardware, can not change.
RC3000-SUB-DM4	E&M wire-4 audio relay interface card	4 channels, set by hardware, can not change.
RC3000-SUB-DV35	V35 data interface card	1 channel, timeslots number is configurable
RC3000-SUB-DV24	V24 data interface card	4 channels, each channel 64-128K configurable
RC3000-SUB-D232	RS232 serial data interface card	8 channels, set by hardware, can not change.
RC3000-SUB-D422	RS422 serial data interface card	8 channels, set by hardware,

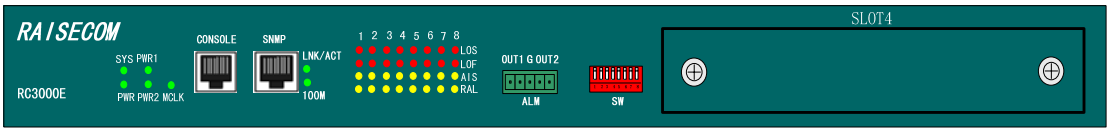
		can not change.
RC3000-SUB-DMT	Magnetic phone interface card	8 channels, set by hardware, can not change.
RC3000-SUB-D485	RS485 serial data interface card	8 channels, set by hardware, can not change.
RC3000-SUB-DETH(REV.B)	100BaseT Ethernet data interface card	1 channel, timeslots number is configurable
RC3000-SUB-DETHX2	Dual-Ethernet data interface card	2 channels, timeslots number is configurable
RC3000-SUB-DC64K	Co-directional 64K data interface card	4 channels, set by hardware, can not change.

The RC3000 sub-cards list in the above table is also supported by RC3000E only for some special version differents, please refer to ordering information or our technical supporting engineers.

Chapter 5 Device Settings

5.1 DIP switch

5.1.1 DIP switch position



5.1.2 Description

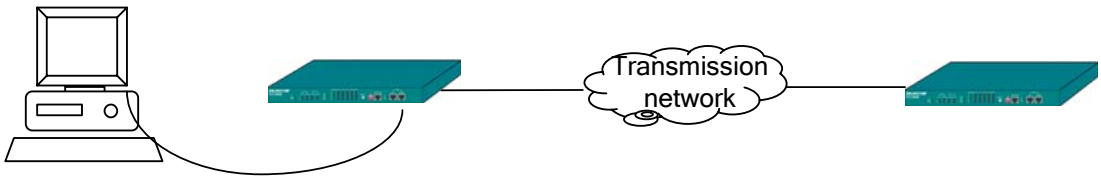
SW	1	2-8
ON	Master clock	Reserved
OFF	Slave clock	Reserved

5.1.3 Default setting

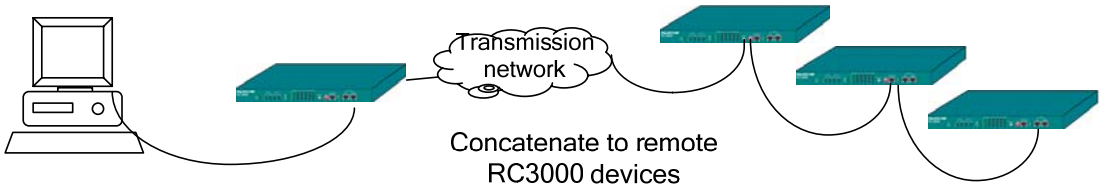
Device default status:

- Management status: managed
- Clock mode: slave
- IP:192.168.4.28
- Cross: none

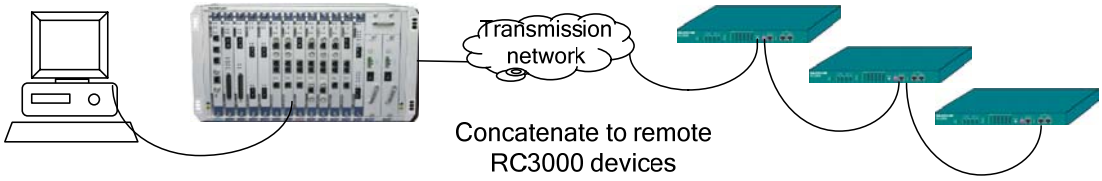
Chapter 6 Typical Application and Connection



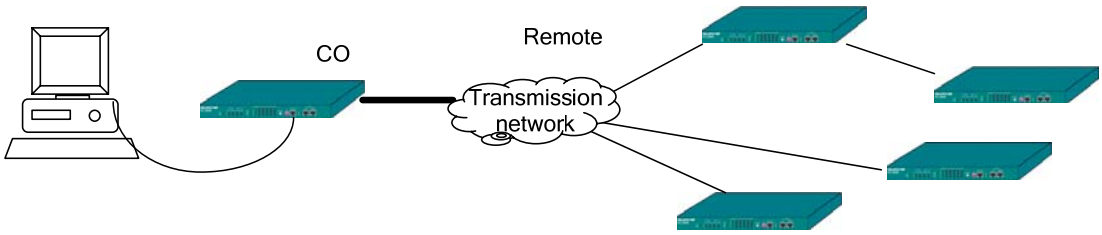
Application 1 Point-to-point application



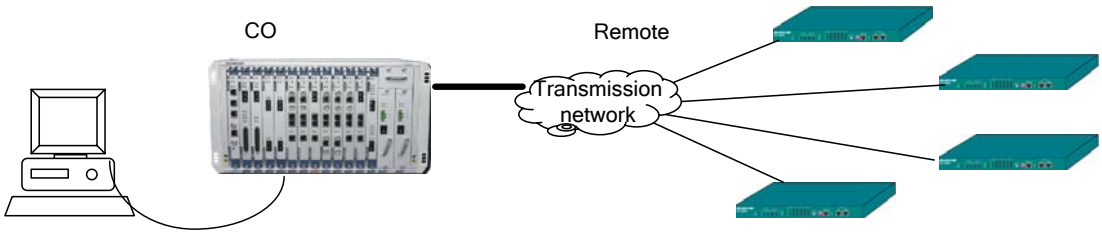
Application 2 RC3000E at central office concatenates with other remote devices



Application 3 RC3000-15 at central office concatenates with other remote devices



Application 4 RC3000E at central office to aggregate multiple services from remote devices

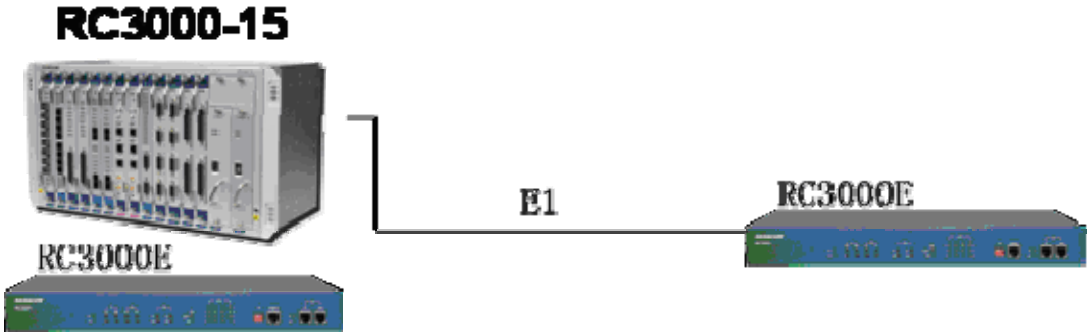


Application 5 RC3000-15 at central office to aggregate multiple services from remote devices

Chapter 7 Network Management Features

7.1 Network management connection

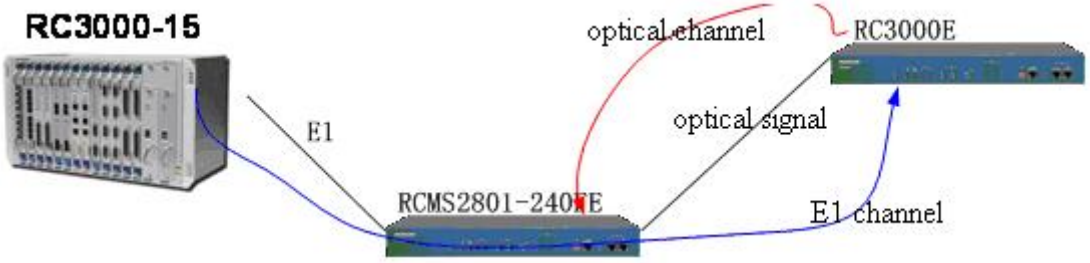
- Connected by E1 direct:



When central RC3000-15 (or RC3000E) to connect remote RC3000E by E1 and build network, user can direct use E1 network management channel (Sa bit or independent timeslot) for network management.

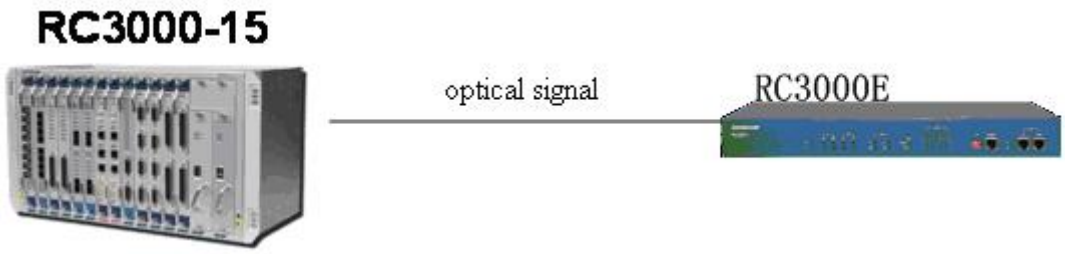
RC3000E can be the promoting end or managed end in network management.

- Central RC3000-15 connects to Ethernet multiplexer and then connected to RC3000E by optic fibers.



In the above topology, central RC3000-15 is connected to Ethernet multiplexer RCMS2801-240FE by E1 cable (E1 can be the E1 connection in SDH network), through optical interface, RCMS2801-240FE is connected to remote RC3000E. in this network topology, the central RC3000-15 manages remote RC3000E through E1 network management channel, RC3000E manages RCMS2801-240FE through overhead channel and then fulfill end-to-end management.

- RC3000-15 Ethernet multiplexer sub-card under-connects optical interface uplink card of RC3000E



RC3000-15 manages remote RC3000E by optical associated channel or E1 associated channel. At this time, the optical channel can be chosen as network management channel.

7.2 Network management function

RC3000E has SNMP interface for network management, E1 and optical associated network management channels. It can manage or be managed by other devices. Please refer to RC3000E configuration for network mangement configuration.

7.3 Network management configuration

As an network element in the network management system, the device needs one and the only IP. Please refer to configuration guide for IP configuration.

Appendix A FAQ

- There is alarm at uplink interface

The device E1 has LOF, LOS or AIS, try below methods to check:

a. E1 connecion cables or optical connection cables are connected proper, there is no open circuit or other error.

b. The peer device connected on this E1 is working normal.

c. Check the power supply grounding wire of both ends devices.

- The voice is off and on or data communication error but there is no alarm on device.

This fault usually is caused by out of multi-frame, check if there is out of multi-frame alarm at RC3000E E1 interface; if there is such alarm, check as below:

a. Wether synchronous clock is right, one master clock in one network;

b. Check the items of E1 alarm.

- At E1 interface alarm, sometimes appears LOF or RAL alarm.

This fault usually is caused by clock inconsistent. In factual applicatioin, RC3000E in network should synchronous to one clock (one master and multiple salve). If the device synchronous to an inexisting clock or traces each other, this alarm comes out. Please check the RC3000E or other device clock setting in the whole network.

- Forget device password after modifying original password.

Contact with device providor for technical support.

瑞斯康达科技发展股份有限公司
RAISECOM TECHNOLOGY CO.,LTD.

Address: Building 2, No. 28 of the Shangdi 6th Street, Haidian District, Beijing Postcode: 100085 Tel: +86-10-82883305 Fax: +86-10-82883056 Email: export@raisecom.com
http://www.raisecom.com