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RC3000E (P100R001)
Product Description
(Rel_02)

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Notice

Preface

Objectives

This document provides introduction, device appearance, technical specifications, card functions, networking and applications, and network management of the RC3000E. It helps you quickly learn features and applications of the RC3000E.

Versions

The following table lists the product versions related to this document.

Product name	Product version
RC3000E	P100R001

Conventions

Symbol conventions

The symbols that may be found in this document are defined as follows.

Symbol	Description
	Indicates a hazard with a medium or low level of risk which, if not avoided, could result in minor or moderate injury.
	Indicates a potentially hazardous situation that, if not avoided, could cause equipment damage, data loss, and performance degradation, or unexpected results.
	Provides additional information to emphasize or supplement important points of the main text.
	Indicates a tip that may help you solve a problem or save time.

General conventions

Convention	Description
Times New Roman	Normal paragraphs are in Times New Roman.
Arial	Paragraphs in Warning, Caution, Notes, and Tip are in Arial.
Boldface	Buttons and navigation path are in **Boldface**.
Italic	Book titles are in *italics*.
`Lucida Console`	Terminal display is in `Lucida Console`.
Book Antiqua	Heading 1, Heading 2, Heading 3, and Block are in Book Antiqua.

Change history

Updates between document versions are cumulative. Therefore, the latest document version contains all updates made to previous versions.

Issue 02 (2016-03-01)

Second commercial release

- Added the RC3000-SUB-DMT (B), RC3000-SUB-10FXS/FXO (B.10) (with hardware version of B.3 or later), RC3000E-UP-OPT-FE2E1 (B) (with hardware version of B.1 or later), and RC3000-SUB-RS24.
- Deleted the EOL card RC3000-SUB-DETH (B).
- Added description that the maximum length of the cable used for the RS232 interface was 15 m based on RS232 standard.
- Modified the MTU of the Ethernet interface on the downlink card DETH×2 to 1518 bytes.
- Added wiring tables in the appendix.
- Updated contact information.

Issue 01 (2012-05-15)

Initial commercial release

Contents

Figures

Tables

1 Overview

This chapter includes the following sections:

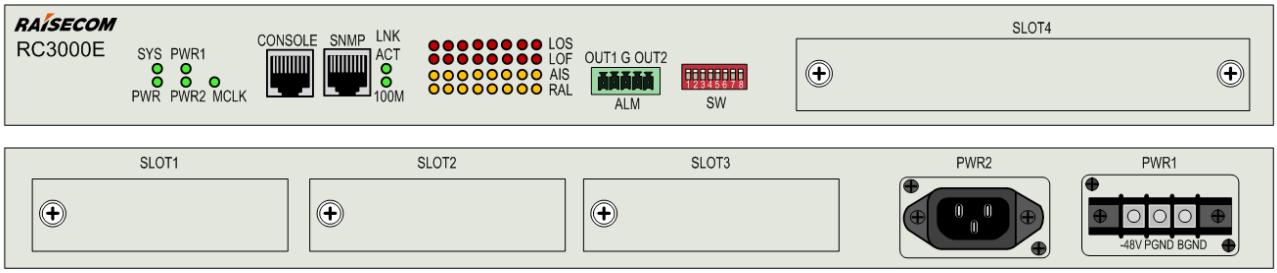
- Introduction
- Features
- Naming conventions
- Card types

1.1 Introduction

The RC3000E, developed by Raisecom, is a compact multi-service multiplexing device. It can make full use of the 2 Mbit/s resource of the Internet Service Provider (ISP) to provide data interfaces, such as the Ethernet interface, V.35 interface, and asynchronous serial interface, and various voice interfaces, thus implementing cross-connection multiplexing of data, voice, etc. on the same line. Moreover, the RC3000E provides the uplink E1 interface card and PDH optical card to meet requirements of various access scenarios and aggregation modes.

Figure 1-1 shows the appearance of the RC3000E.

Figure 1-1 Appearance



The RC3000E integrates the functions of digit/analogy access, multiplexing, cross connection, transmission, and protocol conversion. Adopting the modular intelligent BUS design, it can collectively allocate useful timeslots in several E1 channels. The RC3000E improves the cost effectiveness since it makes full use of the transmission line resources on hand to support users' current services effectively and ensure the expansion of future services. Based on the existing SDH or MSTP network architecture, it provides cost-effective access schemes, which can be extensively applied to the PSTN public network, leased network for public security

organs, finance organizations, electric power entities, railway departments, and army, and general user multi-service access for enterprises, districts and communities, office buildings, etc.

The RC3000E can be centralized managed by Raisecom NView NNM platform, which facilitates management and configurations of the local and remote ends. Thus, you can effectively and quickly manage and maintain the RC3000E.

1.2 Features

The RC3000E provides the following features:

- Support dual power and five power modes: single Alternating Current (AC), single Direct Current (DC), dual AC, dual DC, and hybrid AC/DC.
- Provide 1 uplink card slot, 3 user card slots, and multiple kinds of uplink cards and user cards.
- Support full cross connection of 512×512 64k timeslots carrying signaling.
- Support 1+1 protection on the E1 interface.
- The E1 transmitting clock supports master clock mode and E1 recovery clock mode.
- Support E1 loopback detection.
- Support built-in BERT. You can configure 8 way of E1 independently and can only enable 1 way of E1.
- Support SA data transparent transmission. You can choose SA4 channel, SA5 channel, or independent timeslot as the E1 NMS channel.
- Support the SNMP interface, Console Command Line Interface (CLI), and device updating online.
- Support the alarm output and 2 on/off values. You can configure it through the software.

1.3 Naming conventions

Name: RC3000E

Model: RC3000E-XX

XX refers to the power type of the product.

- RC3000E-AC/D: dual AC power
- RC3000E-DC/D: dual DC power
- RC3000E-AC/S: single AC power
- RC3000E-DC/S: single DC power
- RC3000E-AC_DC: hybrid AC/DC power

1.4 Card types

Uplink subcards

Table 1-1 lists the types of the uplink subcard.

Table 1-1 Types of the uplink subcard

Model	Name	Description
RC3000E-UP-8E1	Unlink E1 interface card	• 8 E1 channels • 75 Ω unbalanced interface
RC3000E-UP-8E1-BL	Unlink E1 interface card	• 8 E1 channels • 120 Ω balanced interface
RC3000E-UP-4E1	Unlink E1 interface card	• 4 E1 channels • 75 Ω unbalanced interface
RC3000E-UP-4E1-BL	Unlink E1 interface card	• 4 E1 channels • 120 Ω balanced interface
RC3000E-UP-OPT-FE2E1	Unlink PDH optical interface card	• Optical interface uplink • (6+2) E1 and 100 Mbit/s Ethernet multiplexing

Interface cards

Table 1-2 lists the types of the interface card.

Table 1-2 Types of the interface card

Model	Name	Description
RC3000-SUB-DV35	V35 data interface card	• Provide 1 channel. • The number of occupied timeslots can be configured.
RC3000-SUB-DV24	V24 data interface card	• Provide 4 channels. • The rate for each channel services can be adjusted (64–128 kbit/s).
RC3000-SUB-D232	RS232 serial interface card	• Provide 8 channels. • Hardware configurations cannot be adjusted.
RC3000-SUB-D485	RS485 serial interface card	• Provide 8 channels. • Hardware configurations cannot be adjusted.
RC3000-SUB-DETH×2	Two-way Ethernet data interface card	• Provide 2 channels. • The number of occupied timeslots can be configured.
RC3000-SUB-DC64K	Codirectional 64K data interface card	• Provide 4 channels. • Hardware configurations cannot be adjusted.
RC3000-SUB-10FXS	FXS audio user interface card	• Provide 10 channels. • Voice gains can be adjusted.
RC3000-SUB-10FSO	FXO audio user interface card	• Provide 10 channels. • Voice gains can be adjusted.

Model	Name	Description
RC3000-SUB-8E&M	8-way E&M interface subcard	• Support 8 channels. • E&M 2/4 wire can be configured.

2 Hardware description

This chapter includes the following sections:

- Appearance
- LEDs
- Interfaces
- DIP switch
- Slots

2.1 Appearance

Figure 2-1 and Figure 2-2 shows the appearance of the RC3000E.

Figure 2-1 Front appearance

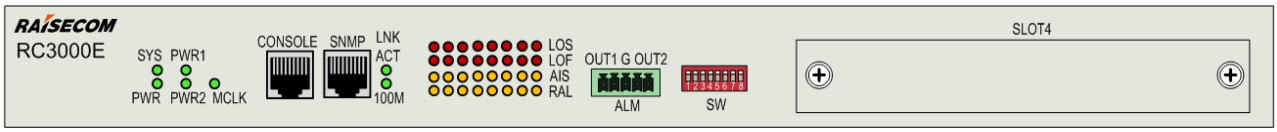
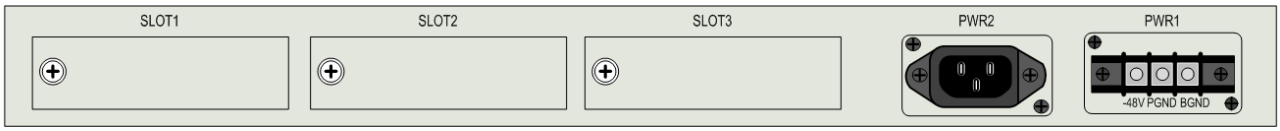


Figure 2-2 Rear appearance



2.2 LEDs

Table 2-1 lists LEDs on the RC3000E.

Table 2-1 LEDs

LED	Description
SYS	• Blinking green: the CPU is working properly. • Off: the CPU is working improperly.
PWR/PWR1/PWR2	• Green: the power is working properly. • Off: the power is working improperly.
MCLK	• Green: the clock of the RC3000E works in master mode. • Off: the clock of the RC3000E works in slave mode.
LNK/ACT	• Green: the link is connected properly. • Blinking green: the interface is transmitting or receiving data. • Off: the link connection fails.
100M	• Green: the rate of the SNMP interface is 100 Mbit/s. • Off: the rate of the SNMP is 10 Mbit/s.
LOS	• Red: the E1 interface is losing signals. • Off: the E1 interface is transmitting or receiving signals normally.
LOF	• Red: some E1 frame is being lost. • Off: no E1 frame is lost.
AIS	• Yellow: the RC3000E is receiving the all- 1 signal. • Off: the RC3000E is not receiving the all-1 signal.
RAL	• Yellow: the alarm is generated on the peer. • Off: no alarm is generated on the peer.

2.3 Interfaces

Table 2-2 lists the interfaces on the RC3000E.

Table 2-2 Interfaces

Interface	Description
Console interface	The Console interface is connected to the PC through the configuration cable and is used for local debugging.
SNMP interface	The SNMP interface is connected to the NView NNM system through the Ethernet cable and is used for remote network management.
ALM alarm output terminal	It is a 5-bit alarm output terminal connector and the alarm status can be configured. By default, it is disconnected and alarm is reported when it is connected. The inside is connected to the CGND.
PWR1/PWR2 interface	You can choose either of them as needed. • AC: the operating voltage is 220 V. The tolerance range is 100–240 V. The frequency is 50 Hz. • DC: the operating voltage is -48V and the tolerance range is -36 to -72 V.

2.4 DIP switch

Table 2-3 lists the DIP switch of the RC3000E.

Table 2-3 DIP switch

No.	Description
1	• ON: the clock of the RC3000E works in master mode. • OFF: the clock of the RC3000E works in slave mode. By default, the switch is OFF.
2–8	Reserved

2.5 Slots

Table 2-4 lists the slots on the RC3000E.

Table 2-4 Slots

Slot	Description
1–3	The slots are inserted with the user interface cards and are used to connect the user-side devices.
4	The slot is inserted with the uplink subcard and is used to connect the transmission network or devices at the transmission network side.

3 Technical specifications

This chapter includes the following sections:

- Overall specifications
- Interface specifications

3.1 Overall specifications

3.1.1 Power supply conditions

Table 3-1 lists the power supply conditions.

Table 3-1 Power supply conditions

Parameter	Description
AC power	• Rated voltage: 220 VAC • Voltage range: 100–240 VAC • Frequency: 50 Hz
DC power	• Rated voltage: -48 VDC • Voltage range: -36 to -72 VDC
Power consumption	≤ 40 W

3.1.2 Operating conditions

Table 3-2 lists the operating conditions.

Table 3-2 Operating conditions

Parameter	Description
Operating temperature	0–50 ℃
Relative humidity	≤ 90% (25 ℃, non-condensing)

3.1.3 Overall parameters

Table 3-3 lists overall parameters of the RC3000E.

Table 3-3 Overall parameters

Parameter	Description
Physical structure	1U device
Dimensions (mm)	440 mm (width) × 360 mm (depth) × 44.5 mm (height)
Net weight (kg)	4 kg

3.2 Interface specifications

3.2.1 Interface specifications of uplink interface card

E1 interface

Table 3-4 lists specifications of the E1 interface.

Table 3-4 Specifications of the E1 interface

Parameter	Description
Nominal bitrate	2048 kbit/s ± 50 ppm
Coding type	HDB3
Interface impedance	• 75 Ω (unbalanced interface) • 120 Ω (balanced interface)
Electrical feature	Comply with the ITU-T G.703 standard.
Frame structure	Comply with the ITU-T G.704 standard.
Jitter	Comply with the ITU-T G.823 standard.
E1 connector type	• Balanced: RJ45 connector • Unbalanced: CC3 female connector
E1 cable type	• For unbalanced signals, we recommend you to use the SYV 75-2-2 coaxial cable with the maximum transmission length of 200 m. • For balanced signals, we recommend using the 0.6 mm (22 AWG) twisted-pair cable.

Optical interface

Table 3-5 lists specifications of the optical interface.

Table 3-5 Specifications of the optical interface

Parameter	Description
Nominal bitrate	150 Mbit/s
Coding type	Specified scrambling
Fiber connector	SFP

Ethernet interface

Table 3-6 lists specifications of the Ethernet interface.

Table 3-6 Specifications of the Ethernet interface

Parameter	Description
Interface type	• Unshielded Twisted Pair (UTP) cable RJ-45 interface • Use the Category 5 Ethernet cable, the maximum transmission length of which is 100 m.
Interface rate	10/100 Mbit/s auto-negotiation
Duplex mode	Full duplex/half duplex auto-negotiation
MTU	1916 bytes
Flow control	• Support IEEE 802.3x flow control in full duplex mode. • Support back pressure flow control in half duplex mode.
Transparent transmission	• Support IEEE 802.1d Spanning Tree transparent transmission • Support IEEE 802.1q VLAN packet transparent transmission
Auto-MDI/MDIX	Supported

3.2.2 Interface specifications of downlink interface card

FXS audio user interface

Table 3-7 lists specifications of the FXS audio user interface.

Table 3-7 Specifications of the FXS audio user interface

Parameter	Description
Feeding voltage	• -48 VDC • -24 VDC
Loopback current	18–24 mA, with the nominal value of 20 mA
Ringing voltage	65±10 VAC, 25 Hz
Ring-trip time	200ms

Parameter	Description
2-wire input impedance	200+680 Ω
2-wire to 4-wire gain	0 ±0.5 dB
2-wire to 4-wire frequency feature	0 ±0.2 dB
4-wire to 2-wire gain	-3.5 ±0.5 dB
4-wire to 2-wire frequency feature	0 ±0.2 dB
Return loss	30–40 dB
Balance degree	60–70 dB
Common-Mode Rejection Ratio (CMRR)	60–70 dB
Power Supply Rejection Ratio (PSRR)	• Vcc: 30 dB • Vbat: 30 dB
Idle Channel Noise (ICN)	< -67 dBm0p

FXO audio relay interface

Table 3-8 lists specifications of the FXO audio relay interface.

Table 3-8 Specifications of the FXO audio relay interface

Parameter	Description
Ring detection voltage	≥ 35 V
Ring detection frequency	17–63 Hz
Ring non-detection voltage	≤ 15 V
2-wire loopback impedance	• Off-hook status: 200+680 Ω • On-hook status: 2 MΩ
2-wire to 4-wire gain	On-hook status: -0.60 dB
2-wire to 4-wire frequency feature	On-hook status: 0 ±0.2 dB
4-wire to 2-wire gain	Off-hook status: 3.5 ±0.5 dB
4-wire to 2-wire frequency feature	Off-hook status: 0 ±0.2 dB
Return loss	30–40 dB
Balance degree	60–70 dB
CMRR	60–70 dB
PSRR	30 dB
Idle Channel Noise (ICN)	< -67 dBm0p

E&M 2-wire audio relay interface

Table 3-9 lists specifications E&M 2-wire audio relay interface.

Table 3-9 Specifications of the E&M 2-wire audio relay interface

Parameter	Description
AD gain	0 dB
DA gain	-3.5 dB
AD frequency feature (300-3400 Hz)	0±0.2 dB
DA frequency feature (300-3400 Hz)	0±0.2 dB
Output loopback impedance	600 Ω
Input loopback impedance	600 Ω
Balance degree	60–70 dB
Return loss	20 dB
Maximum common-mode withstand voltage	300 V
CCRR	30 dB
Idle Channel Noise (ICN)	< -67 dBm0p

E&M 4-wire audio relay interface

Table 3-10 lists specifications of the E&M 4-wire audio relay interface.

Table 3-10 Specifications of the E&M 4-wire audio relay interface

Parameter	Description
AD gain	+14 dB
DA gain	+4 dB
AD frequency feature (300-3400 Hz)	0±0.2 dB
DA frequency feature (300-3400 Hz)	0±0.2 dB
Output loopback impedance	600 Ω
Input loopback impedance	600 Ω
Balance degree	60 dB
Maximum common-mode withstand voltage	300 V
CCRR	> 60 dB
PSRR	30 dB
Idle Channel Noise (ICN)	< -67 dBm0p

V35 data interface

Table 3-11 lists specifications of the V35 data interface.

Table 3-11 Specifications of the V35 data interface

Parameter	Description
Physical features	Comply with the V.35 interface standard.
Interface type	HDB26 negative connector
Working mode	DCE
Interface rate	N ×64 kbit/s (N: 1–31)

V24 data interface

Table 3-12 lists specifications of the V24 data interface.

Table 3-12 Specifications of the V24 data interface

Parameter	Description
Physical features	Comply with the V.24 interface standard.
Interface type	RJ45 connector
Working mode	DCE
Interface rate	N ×64 kbit/s (N: 1–2)

Ethernet interface

Table 3-13 lists specifications of the Ethernet interface.

Table 3-13 Specifications of the Ethernet interface

Parameter	Description
Interface type	• Unshielded Twisted Pair (UTP) cable RJ-45 interface • Use the Cat 5 Ethernet cable, the maximum transmission length of which is 100 m.
Interface rate	10/100 Mbit/s auto-negotiation
Duplex mode	Full duplex/half duplex auto-negotiation
MTU	1518 bytes
Flow control	• Support IEEE 802.3x flow control in full duplex mode. • Support back pressure flow control in half duplex mode.

Parameter	Description
Transparent transmission	• Support IEEE 802.1d Spanning Tree transparent transmission. • Support IEEE 802.1q VLAN packet transparent transmission
Auto-MDI/MDIX	Supported

RS232 serial interface

Table 3-14 lists specifications of the RS232 serial interface.

Table 3-14 Specifications of the RS232 serial interface

Parameter	Description
Physical features	Comply with the interface standard in RS232 communication protocol.
Interface type	RJ45 connector
Interface rate	≤ 19.2 kbit/s

The maximum length of the cable used for the RS232 interface was 15 m based on RS232 standard.

RS485 serial interface

Table 3-15 lists specifications of the RS485 serial interface.

Table 3-15 Specifications of the RS485 serial interface

Parameter	Description
Physical features	Comply with the interface standard in RS485 communication protocol.
Interface type	RJ45 connector
Interface rate	≤ 19.2 kbit/s

Codirectional 64K data interface

Table 3-16 lists specifications of the Codirectional 64K data interface.

Table 3-16 Specifications of the Codirectional 64K data interface

Parameter	Description
Physical features	Comply with the ITU-T G.703 and G.823 standards.
Interface type	RJ45 connector
Interface impedance	120 Ω (balanced)
Symbol rate	256 kbit/s
Frame structure	Unframed
Line coding	Codirectional coding
Working mode	DCE
Transmission distance	Use the Cat 5 UTP cable. The maximum transmission distance is 300 m.

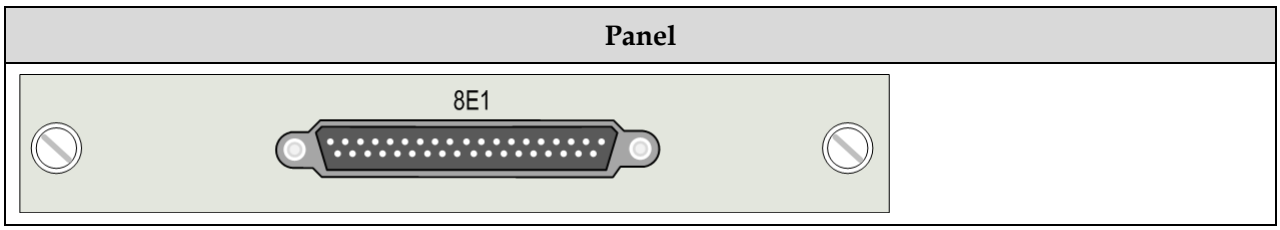
4 Cards

This chapter includes the following sections:

- RC3000E-UP-8E1
- RC3000E-UP-4E1
- RC3000E-UP-4E1-BL
- RC3000E-UP-OPT-FE2E1 (B)
- RC3000-SUB-10FXS/10FXO
- RC3000-SUB-8E&M
- RC3000-SUB-DETH×2
- RC3000-SUB-DV35
- RC3000-SUB-DV24
- RC3000-SUB-D232
- RC3000-SUB-D485
- RC3000-SUB-DMT (B)
- RC3000-SUB-DC64K
- RC3000-SUB-RS24

4.1 RC3000E-UP-8E1

4.1.1 Appearance and functions



Panel
Function
The RC3000E-UP-8E1 is an 8-way uplink interface card on the RC3000E. It can transmit 8 ways of E1 services. • Support channel protection. • Support configuring the 8-way E1 interface on the card to balanced or unbalanced mode through a DIP switch. • The E1 interface adopts the DB37F male interface connector.

All uplink cards of the RC3000E support E1 protection switching. The number of supported protection pairs is different according to different uplink cards.
At present, the uplink card supports up to 4 E1 protection pairs:
- E1-1 and E1-2
- E1-3 and E1-4
- E1-5 and E1-6
- E1-7 and E1-8

Switching conditions:
- In E1 transparent mode, LOS or AIS is generated.
- In E1 framed mode, LOS, LOF, or AIS is generated.

Switching time:
- When LOS, LOF, or AIS is generated, switching time <1ms.
- When CRC4 is enabled, you can configure E-3 as a switching condition. In this case, the switching time <2s.

Switching modes:
- Automatical switch (AS): it can be further divided into revertive and non-revertive modes.
- Manual Switch (MS): traffic will be manually switched to the protection line when the working line fails. MS will not be executed when both the working line and protection line work normally or fail.
- Forced Switch (FS): traffic will be forcibly switched to the specified line on matter the switched line works normally or not.
- Lockout protection: traffic is transmitted on the working line until the lockout protection is cleared.

In addition, you can configure the unidirectional revertive mode and unidirectional non-revertive mode. By default, it is in unidirectional non-revertive mode.
- Unidirectional switching: switching is executed without notifying the peer device.
- Revertive mode: the switched line can revert to the active mode automatically when it recovers. You can configure the reversion time through the software.

4.1.2 Slots

The RC3000E-UP-8E1 can be inserted into slot 4.

4.1.3 DIP switch

SW1: choose No. 1–4 ways of E1 to work in balanced or unbalanced mode.

–	1: No.1 way E1	2: No.2 way E1	3: No.3 way E1	4: No.4 way E1
ON	Unbalanced (75 Ω)	Unbalanced (75 Ω)	Unbalanced(75 Ω)	Unbalanced (75 Ω)
OFF	Balanced (120 Ω)	Balanced (120 Ω)	Balanced (120 Ω)	Balanced (120 Ω)

SW3: choose the matched impedance when No. 1–4 ways of E1 work in balanced or unbalanced mode.

–	1: No.1 way E1	2: No.2 way E1	3: No.3 way E1	4: No.4 way E1
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 No. 5–8 ways of E1 to work in balanced or unbalanced mode.

–	1: No.5 way E1	2: No.6 way E1	3: No.7 way E1	4: No.8 way E1
ON	Unbalanced (75 Ω)	Unbalanced (75 Ω)	Unbalanced (75 Ω)	Unbalanced (75 Ω)
OFF	Balanced (120 Ω)	Balanced (120 Ω)	Balanced (120 Ω)	Balanced (120 Ω)

SW4: choose the matched impedance when No. 5–8 ways of E1 work in balanced or unbalanced mode.

–	1: No.5 way E1	2: No.6 way E1	3: No.7 way E1	4: No.8 way E1
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 the type of the subcard

–	1: Reserved	2: Type [2]	3: Type [1]	4: Type [0]
ON	Reserved	0	0	0
OFF	Reserved	1	1	1

Note

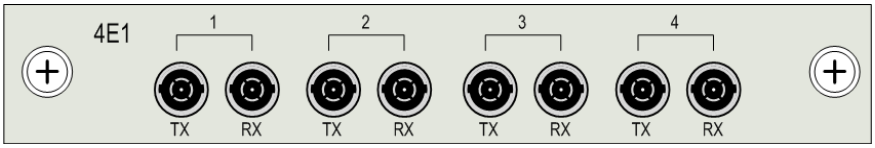
- Type [2: 4] = 100: the RC3000E-UP-8E1-BL
- Type [2: 4] = 011: the RC3000E-UP-8E1

4.1.4 Technical specifications

Dimensions: 155 mm (Width) × 100.5 mm (Depth) × 25 mm (Height)

4.2 RC3000E-UP-4E1

4.2.1 Appearance and functions

Panel

Function
The RC3000E-UP-4E1 is an uplink interface card on the RC3000E. It can transmit 4 ways of unbalanced E1 services. • Support channel protection. • The E1 interface supports bypass. When the power is down, the No.1 way is directly connected to the No.2 way and the No.3 way is directly connected to the No.4 way. • The E1 interface adopts the CC3 connector.

Note

The RC3000E-UP-4E1(-BL) supports bypass.

- When the subcard works in power-on mode, 4-way E1 signals are transmitted to the main control card for 64K cross-connection multiplexing.
- When the subcard works in power-down mode and 4-way E1 signals work in BYE-PASS mode, the No.1 way E1 is directly connected to the No.2 way E1 and the No.3 way E1 is directly connected to the No.4 way E1. To be more specific, the received signal on the No.1 way E1 will be transmitted from the TX of the No.2 way E1. The received signal on the No.2 way E1 will be transmitted from the TX of the No.1 way E1. The received signal on the No.3 way E1 will be transmitted from the TX of the No.4 way E1. The received signal on the No.4 way E1 will be transmitted from the TX of the No.3 way E1.
- When the RC3000E-UP-4E1(-BL) is powered on, BYE-PASS between 2 ways of E1 will be disabled. In this case, the RC3000E-UP-4E1(-BL) works in power-on mode.

4.2.2 Slots

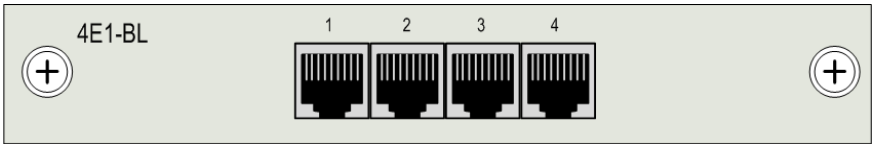
The RC3000E-UP-4E1 can be inserted into slot 4.

4.2.3 Technical specifications

Dimensions: 155 mm (Width) × 100.5 mm (Depth) × 25 mm (Height)

4.3 RC3000E-UP-4E1-BL

4.3.1 Appearance and functions

Panel

Function
The RC3000E-UP-4E1-BL is an uplink interface card for 4-way balanced E1 on the RC3000E. It can transmit 4 ways of E1 services. • Support channel protection. • The E1 interface supports bypass. When the power is down, the No.1 way is directly connected to the No.2 way and the No.3 way is directly connected to the No.4 way. • The E1 interface adopts the RJ45 connector. Each RJ45 interface can transmit 1-way E1.

4.3.2 Slots

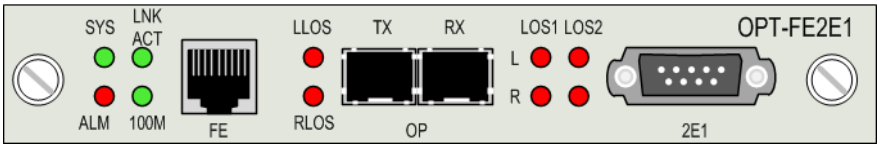
The RC3000E-UP-4E1-BL can be inserted into slot 4.

4.3.3 Technical specifications

Dimensions: 155 mm (Width) × 100.5 mm (Depth) × 25 mm (Height)

4.4 RC3000E-UP-OPT-FE2E1 (B)

4.4.1 Appearance and functions

Panel


Function
The RC3000E-UP-OPT-FE2E1 is an uplink subcard for Ethernet and 8E1 multiplexing on the RC3000E. It can multiplex the local 100 Mbit/s Ethernet services, 8-way E1 services, and network management data to the optical interface for transmission to the remote end. • Multiplex the remote 100 Mbit/s Ethernet services and 8-way E1 data to the local through the optical interface. • Transmit all 8-way E1 data to the main control card for cross connection. Alternatively, 6-way E1 data can be transmitted to the main control card for cross connection and the other 2-way E1 data can network with other devices which have E1 interfaces through the E1 interface on the panel. • The subcard can be managed by the main control card only. The NView NNM system supports two-level sub-devices. • 2-way E1 data can be transmitted through the DB9F interface on the panel. 2-way E1 data can not only be transmitted to the main control card for 64K cross connection but also transparently transmitted. • The E1 interface supports unbalanced or balanced mode. • The Ethernet supports auto-negotiation, self-cross connection (it is enabled only when the auto-negotiation is enabled), flow control (full duplex mode and half duplex mode). The MTU is 1916 bytes. • The Ethernet supports bidirectional (RX and TX) rate limiting and the step is 64 kbit/s. • Adopt the SFP optical interface as the uplink interface so that it supports Raisecom USPF-03 optical modules. • The optical interface supports ALS. • Support reporting remote Dying-gasp alarm. • Support cooperating with the RC3000-15-P240×2L-OPT used in the CO. • Support being used with another RC3000E-UP-OPT-FE2E1 (B) point to point. • Support cooperating with the RCMS29XX series multi-service fibermux.

Note

- The RC3000E-UP-OPT-FE2E1 (B) cannot be interconnected with the RC3000E-UP-OPT-FE2E1 (A).
- The RC3000E-UP-OPT-FE2E1 (B) cannot be interconnected with the RC3000 (C) or RCMS28XX series.

4.4.2 Slots

The RC3000E-UP-OPT-FE1E1 can be inserted into slot 4.

4.4.3 Interfaces

Figure 4-1 shows the appearance of the DB9F interface.

Figure 4-1 DB9F interface

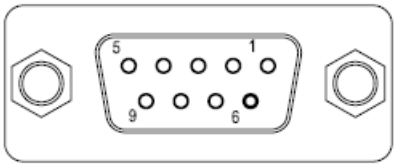


Table 4-1 lists the definition of PIN on the DB9 female socket.

Table 4-1 Definitions of PIN on the DB9 female socket

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	–	–

Note

- When the interface impedance is 120 Ω, use the CBL-E1-DB9M/2RJ45-2.5m cable to connect the RC3000E to the RJ45 head.
- When the interface impedance is 75 Ω, use the CBL-E1-DB9M/4BNCF-2.5m cable to connect the RC3000E to the BNC female interface.
- When the interface impedance is 75 Ω, "+" in the table refers to the core of the coaxial cable. "-" refers to the metallic shield (GND) of the cable.

4.4.4 LEDs

Table 4-2 lists the LEDs on the RC3000E-UP-OPT-FE2E1.

Table 4-2 LEDs on the RC3000E-UP-OPT-FE2E1

No.	Description	Status	Description
1	SYS	Green	System working LED • Blinking green: the system is working properly. • Green: the system is working improperly. • Off: the system is working improperly.
2	ALM	Red	General alarm LED • Red: some alarm is generated. • Off: no alarm is generated.
3	LLOS	Red	Local line Loss Of Signal (LOS) alarm LED • Red: some signal on the local line is lost. • Off: no signal on the local line is lost.
4	RLOS	Red	Remote line LOS alarm LED • Red: some signal on the remote line is lost. • Off: no signal on the remote line is lost.

No.	Description	Status	Description
5	L LOS1	Red	Local No.1 way E1 signal LOS alarm LED on the 2E1 interface • Red: some local No.1 way E1 signal lost. • Off: no local No.1 way E1 signal lost. **Note** The LED is disabled in mode 3.
6	L LOS2	Red	Local No.2 way E1 signal LOS alarm LED on the 2E1 interface • Red: some local No.2 way E1 signal lost. • Off: no local No.2 way E1 signal lost. **Note** The LED is disabled in mode 3.
7	R LOS1	Red	Remote No.1 way E1 signal LOS alarm LED on the 2E1 interface • Red: some remote No.1 way E1 signal lost. • Off: no remote No.1 way E1 signal lost. **Note** The LED is disabled in mode 1 and mode 3.
8	R LOS2	Red	Remote No.2 way E1 signal LOS alarm LED on the 2E1 interface • Red: some remote No.2 way E1 signal lost. • Off: no remote No.2 way E1 signal lost. **Note** The LED is disabled in mode 1 and mode 3.
9	LNK ACT	Green	Link status LED • Green: the link connection is normal. • Blinking green: data is transmitting or receiving on the interface.
10	100M	Green	Ethernet interface rate LED • Green: the interface rate is 100 Mbit/s. • Off: the interface rate is 10 Mbit/s.

4.4.5 Jumper

Jumper	Status	Function	Description
J7	Short circuit	ISP	In ISP mode, you can update the MCU program through the serial interface on the card and the system is in wait-to-update status.
	Open circuit	NARMAL	Working mode
J8	Short circuit	Unbalanced	The 2E1 interface of the subcard works in unbalanced mode.
	Open circuit	Balanced	The 2E1 interface of the subcard works in balanced mode.
J10	Short circuit	Unbalanced match	The No.1 way E1 works in unbalanced mode and matches with the impedance at the RX side.
	Open circuit	Balanced match	The No.1 way E1 works in balanced mode and is matched with the impedance at the RX side.
J11	Short circuit	Unbalanced match	The No.2 way E1 works in unbalanced mode and is matched with the impedance at the RX side
	Open circuit	Balanced match	The No.2 way E1 works in balanced mode and is matched with the impedance at the RX side
J12	Short circuit	Unbalanced match	The No.1 way E1 works in unbalanced mode and the TX side is grounded.
	Open circuit	Balanced match	The No.1 way E1 works in balanced mode.
J13	Short circuit	Unbalanced match	The No.2 way E1 works in the unbalanced mod and the TX side is grounded.
	Open circuit	Balanced match	The No.2 way E1 works in balanced mode.

Before delivery, J7 is in open-circuit status and can work properly. J8 are in short-circuit status.

4.4.6 DIP switch

SW1: choose the balanced or unbalanced mode of the No.1 way E1 or No.2 way E1.

DIP bit	Status	Function	Description
SW1-1	ON	Unbalanced match	The No.1 way E1 works in unbalanced mode and matches with the impedance at the RX side.

DIP bit	Status	Function	Description
	OFF	Balanced match	The No.1 way E1 works in balanced mode and is matched with the impedance at the RX side.
SW1-2	ON	Unbalanced match	The No.2 way E1 works in unbalanced mode and is matched with the impedance at the RX side
	OFF	Balanced match	The No.2 way E1 works in balanced mode and is matched with the impedance at the RX side
SW1-3	ON	Unbalanced match	The No.1 way E1 works in unbalanced mode and the TX side is grounded.
	OFF	Balanced match	The No.1 way E1 works in balanced mode.
SW1-4	ON	Unbalanced match	The No.2 way E1 works in unbalanced mode and the TX side is grounded.
	OFF	Balanced match	The No.2 way E1 works in balanced mode.

Note

Before delivery, all bits of SW1 are ON.

4.4.7 Cables

Interface	Cable
DB9F	When the interface impedance is 120 Ω, use the CBL-E1-DB9M/2RJ45-2.5m cable to connect the RC3000E to the RJ45 head.
	When the interface impedance is 75 Ω, use the CBL-E1-DB9M/4BNCF-2.5m cable to connect the RC3000E to the BNC female interface.

4.4.8 Technical specifications

Dimensions: 155 mm (Width) × 100.5 mm (Depth) × 25 mm (Height)

4.5 RC3000-SUB-10FXS/10FXO

4.5.1 Appearance and functions

Panel


Panel
Function
The 10FXS/10FXO is an auto interface card on the RC3000E. • It is embedded with feeding and ringing modules, and can be connected to a telephone or a Stored Program Control (SPC) switch through the exterior line interface. • Provide 10 channels, the number of which depends on the hardware and cannot be changed. • Support polarity inversion. • Support high-impedance recording.

- The RC3000E-SUB-10FXS/10FXO of B.10 or later (with the PCB version of B.3 or later) supports high-impedance recording, namely, the FXO-R voice module and recording.
- In slot configuration mode, use the **show version** command to view the PCB version.
- The voice module of the FXS, FXO, and FXO-R can be customized instead of being switched through software.

4.5.2 Slots

The RC3000-SUB-10FXS/10FXO can be inserted into slots 1–3.

4.5.3 Interfaces

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

Note

In actual application, you can define that voice signal A is connected to the Tip line while voice signal B is connected to the Ring line

4.5.4 LEDs

Table 4-3 lists the LEDs on the RC3000E-SUB-10FXS/10FXO.

Table 4-3 LEDs on the RC3000E-SUB-10FXS/10FXO

No.	Description	Status	Description
1	FXS	Green	• Green: the card works in FXS mode. • Off: the card works in FXO or FXO-R mode or fails.
2	FXO	Green	• Green: the card works in FXO or FXO-R mode. • Off: the card works in FXS mode or fails.

4.5.5 Technical specifications

Dimensions: 70 mm (Width) × 167.5 mm (Depth) × 20 mm (Height)

Maximum power consumption:

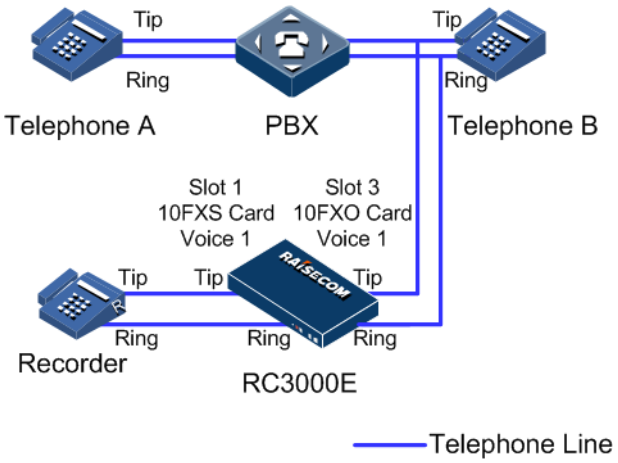
- RC3000-SUB-10FXS: < 10 W
- RC3000-SUB-10FXO < 2.5 W
- RC3000-SUB-10FXO-R < 2.5 W

4.5.6 Application

The RC3000E-SUB-10FXS/10FXO of B.10 or later (with the PCB version of B.3 or later) supports high-impedance recording, with the networking and function shown in Figure 4-2.

- The FXO-R interface on the RC3000E-SUB-10FXO is connected to the telephone line of the recorded telephone in physically parallel mode. It extracts voice services when the recorded telephone is being answered.
- Timeslots of the FXO-R interface on the RC3000E-SUB-10FXO are cross-connected to those of the FXS interface on the RC3000E-SUB-10FXS. The FXO-R interface extracts voice services of the recorded telephone when the FXS interface is connected to the recorded telephone or the monitor telephone.
- The Recorder records voice or rings according to the ring current sent by the FXS module. It starts recording as long as Telephone B receives or originates a call and has established a conversation (when to record depends on configurations of the Recorder).

Figure 4-2 Networking with FXO-R recording

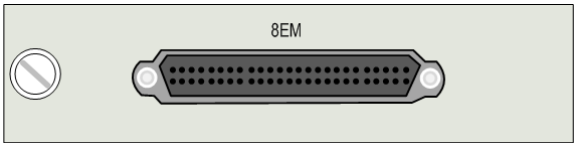


Note

- As shown in Table 4-2, Tx and Rx are connected to one of the twisted pair respectively.
- Use the **crossconnect source 1/1/1 sink 3/1/1 twoway** command to configure bidirectional cross connection between TS1 of No.1 E1 of the RC3000E-SUB-10FXS in slot 1 (No.1 way voice services of the RC3000E-SUB-10FXS) and TS1 of No.1 E1 of the RC3000E-SUB-10FXO in slot 3 (voice 1 of the RC3000E-SUB-10FXO).
- No.1 to No.10 voice services of the RC3000-SUB-10FXS/10FXO occupy TS1–TS10 of No.1 E1 of the slot.
- Specify the quantity of RXO-R interfaces when ordering the RC3000-SUB-10FXS/10FXO.
- In slot configuration mode, use the **show version** command to view the PCB version.

4.6 RC3000-SUB-8E&M

4.6.1 Appearance and functions

Panel

Function
The RC3000-SUB-8E&M is the E&M audio interface card on the RC3000E. • A single card provides 8 ways of E&M interface. • The E&M interface supports 2/4 wire and gain configurations. The type is Type 5. • A/D gain adjustment is in the range of -3 to +19 dB. D/A gain adjustment is in the range of -13 to +7 dB. You can adjust the gain through the software and the step is 0.1 dB.

4.6.2 Slots

The RC3000-SUB-8E&M can be inserted into slots 1–3.

4.6.3 Interfaces

The interface adopts the SCIC female connector. Figure 4-3 shows the PIN numbers on the interface. For the used cable, see section 7.2.5 CBL-VOICE-SCSI50M(40)/NC.

Figure 4-3 PIN numbers on the interface

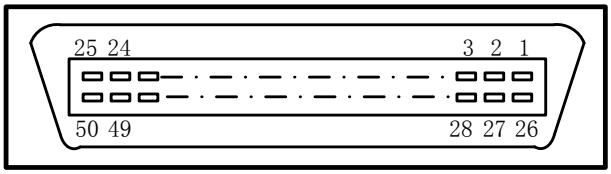


Table 4-4 lists the relationship between the SCIC PIN number and the E&M channel.

Table 4-4 Relationship between the SCIC PIN number and the E&M channel

SCIC PIN	E&M channel	Description	Cable color
1	1	• 4-wire: receive audio A. • 2-wire: idle	White background with blue loop
2		• 4-wire: receive audio B. • 2-wire: idle	Blue background with white loop
26		• 4-wire: send audio A. • 2-wire: receive/send audio A.	White background with orange loop
27		• 4-wire: send audio B. • 2-wire: receive/send audio B.	Orange background with white loop
3		Signaling M wire	White background with green loop
4		Signaling E wire	Green background with white loop
28	2	• 4-wire: receive audio A. • 2-wire: idle	White background with brown loop
29		• 4-wire: receive audio B. • 2-wire: idle	Brown background with white loop
5		• 4-wire: send audio A. • 2-wire: receive/send audio A.	White background with grey loop
6		• 4-wire: send audio B. • 2-wire: receive/send audio B.	Grey background with white loop
30		Signaling M wire	Red background with blue loop

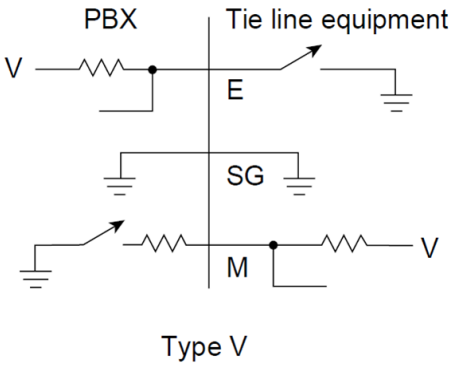
SCIC PIN	E&M channel	Description	Cable color
31		Signaling E wire	Blue background with red loop
7	3	• 4-wire: receive audio A. • 2-wire: idle	Red background with orange loop
8		• 4-wire: receive audio B. • 2-wire: idle	Orange background with red loop
32		• 4-wire: send audio A. • 2-wire: receive/send audio A.	Red background with green loop
33		• 4-wire: send audio B. • 2-wire: receive/send audio B.	Green background with red loop
9		Signaling M wire	Red background with brown loop
10		Signaling E wire	Brown background with red loop
34	4	• 4-wire: receive audio A. • 2-wire: idle	Red background with grey loop
35		• 4-wire: receive audio B. • 2-wire: idle	Grey background with red loop
11		• 4-wire: send audio A. • 2-wire: receive/send audio A.	Black background with blue loop
12		• 4-wire: send audio B. • 2-wire: receive/send audio B.	Blue background with black loop
36		Signaling M wire	Black background with orange loop
37		Signaling E wire	Orange background with black loop
13	5	• 4-wire: receive audio A. • 2-wire: idle	Black background with green loop
14		• 4-wire: receive audio B. • 2-wire: idle	Green background with black loop
38		• 4-wire: send audio A. • 2-wire: receive/send audio A.	Black background with brown loop
39		• 4-wire: send audio B. • 2-wire: receive/send audio B.	Brown background with black loop
15		Signaling M wire	Black background with grey loop
16		Signaling E wire	Grey background with black loop

SCIC PIN	E&M channel	Description	Cable color
40	6	• 4-wire: receive audio A. • 2-wire: idle	Yellow background with blue loop
41		• 4-wire: receive audio B. • 2-wire: idle	Blue background with yellow loop
17		• 4-wire: send audio A. • 2-wire: receive/send audio A.	Yellow background with orange loop
18		• 4-wire: send audio B. • 2-wire: receive/send audio B.	Orange background with yellow loop
42		Signaling M wire	Yellow background with green loop
43		Signaling E wire	Green background with yellow loop
19	7	• 4-wire: receive audio • 2-wire: idle	Yellow background with brown loop
20		• 4-wire: receive audio B. • 2-wire: idle	Brown background with yellow loop
44		• 4-wire: send audio A. • 2-wire: receive/send audio A.	Yellow background with grey loop
45		• 4-wire: send audio B. • 2-wire: receive/send audio B.	Grey background with yellow loop
21		Signaling M wire	Purple background with blue loop
22		Signaling E wire	Blue background with purple loop
46	8	• 4-wire: receive audio A. • 2-wire: idle	Purple background with orange loop
47		• 4-wire: receive audio B. • 2-wire: idle	Orange background with purple loop
23		• 4-wire: send audio A. • 2-wire: receive/send audio A.	Purple background with green loop
24		• 4-wire: send audio B. • 2-wire: receive/send audio B.	Green background with purple loop
48		Signaling M wire	Purple background with brown loop
49		Signaling E wire	Brown background with purple loop
25	Idle	–	Purple background with grey loop

SCIC PIN	E&M channel	Description	Cable color
50		–	Grey background with purple loop

The RC3000E, as a Tie line device, uses the E&M signalling type of Type V, as shown in Figure 4-4.

Figure 4-4 E&M signaling type

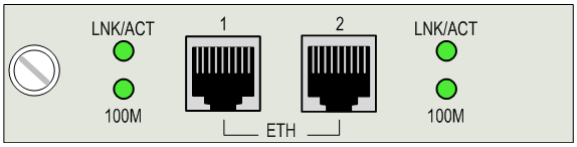


4.6.4 Technical specifications

Dimensions: 70 mm (Width) × 167.5 mm (Depth) × 20 mm (Height)

4.7 RC3000-SUB-DETH×2

4.7.1 Appearance and functions

Panel

Function
The RC3000-SUB-DTH×2 is the subcard for transmitting Ethernet services on the RC3000E. • Provide 2 100Based-T Ethernet electrical interfaces. • Two Ethernet channel are independent from each other and you can configure or check either of them individually. • The number of channels occupied by the interface can be configured. The number of channels ranges from 0 to 31, that is, the bandwidth of the interface is N × 64 kbit/s (N: 0–31). • The MTU of the Ethernet interface is 1518 bytes.

4.7.2 Slots

The RC3000-SUB-DETH×2 can be inserted into slots 1–3.

4.7.3 Interfaces

Table 4-5 lists the definitions of the interface.

Table 4-5 Definitions of the interface

RJ45	PIN	E1 No.	Timeslot
PORT 1	• 1 and 2: TX • 3 and 6: RX • 4, 5, 7, and 8: NC	1	0–31
PORT 2	• 1 and 2: TX • 3 and 6: RX • 4, 5, 7, and 8: NC	2	0–31

4.7.4 LEDs

Table 4-6 lists the LEDs on the RC3000-SUB-DETH×2.

Table 4-6 LEDs on the RC3000-SUB-DETH×2

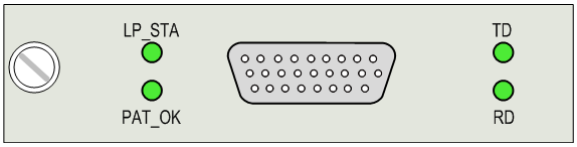
No.	Description	Status	Description
1	LNK/ACT	Green	• Green: the link is connected properly. • Off: the link is disconnected or fails. • Blinking green: data is sending or receiving.
2	100M	Green	• Green: work at 100 Mbit/s. • Off: work at 10 Mbit/s.

4.7.5 Technical specifications

Dimensions: 70 mm (Width) × 167.5 mm (Depth) × 20 mm (Height)

4.8 RC3000-SUB-DV35

4.8.1 Appearance and functions

Panel


Function
The RC3000-SUB-DV35 is the V.35 data interface card on the RC3000E. • Support configuring the number of channels. • Support phase adjustment. • Support loopback configuration and BERT.

The number of occupied channels by the V35 interface can be configured and the configuration rules are as below.

Rules for automatically allocating channels:

- In 8-channel mode, when the V35 card is inserted into slot 1 and channels 1–8 of the No.1 way E1 are not occupied, the system will automatically allocate 8 channels for the card to occupy channels 1–8 of the No.1 way E1; when the V35 card is inserted into slot 2 and channels 9–16 of the No.1 way E1 are not occupied, the system will automatically allocate 8 channels for the card to occupy channels 9–16 of the No.1 way E1; when the V35 card is inserted into slot 3 and channels 17–30 of the No.1 way E1 are not occupied, the system will automatically allocate 14 channels for the card to occupy channels 17–30 of the No.1 way E1 (channels 17–31 when it is the PCM31).
- In 10-channel mode, when the V35 card is inserted into slot 1 and channels 1–10 of the No.1 way E1 are not occupied, the system will automatically allocate 10 channels for the card to occupy channels 1–10 of the No.1 way E1; when the V35 card is inserted into slot 2 and channels 11–20 of the No.1 way E1 are not occupied, the system will automatically allocate 10 channels for the card to occupy channels 11–20 of the No.1 way E1; when the V35 card is inserted into slot 3 and channels 21–30 of the No.1 way E1 are not occupied, the system will automatically allocate 10 channels for the card to occupy channels 21–30 of the No.1 way E1 (channels 21–31 when it is the PCM31).

Rules for manually allocating channels:

- When manually allocating channels, you can configure different limitations according to different positions of the card. The RC3000E supports 4 ways of E1 and each E1 is a user group. In configuration, 1, 2, 3, and 4 are used to stand for the No.1, No.2, No.3, and No.4 E1. Moreover, the RC3000E provides 4 groups of bus and can transmit 4-group user services (2 Mbit/s). In configuration, 5, 6, 7, and 8 are used to stand for user groups 1, 2, 3, and 4.
- User group 1 serves as the main channel and the default channel. Other user groups are independent channels. Occupied independent channels are different according to slots. And there are different limitations towards different versions of the RC3000E products for the use of independent channels. For REV B.00 or before versions, slot 1 uses user group 2 as the independent channel; slot 2 uses user group 4 as the independent channel; slot 3 supports no independent channel. For REV B.00 or later versions, slot 1 uses user group 2 as the independent channel; slot 2 uses user group 3 as the independent channel; slot 3 uses user group 4 as the independent channel.
- Limitations for main channel configurations: when you use the main channel to transmit data, there are different limitations for the number configurations of the channel according to slots. The range for the card in slot 1 is 0–31. 0 refers to disabling transmission of this card and the channel No. starts from 1. When there is any other card in later slot occupies the main channel, channel collision alarm will be reported. The range for the card in slot 2 is 0–23. 0 refers to disabling transmission of this card and the channel No. starts from 9. When there is any

other card in later slot occupies the main channel, channel collision alarm will be reported. The range for the card in slot 3 is 0–15. 0 refers to disabling transmission of this card and the channel starts from 17.

- Limitations for independent channel configurations: When you use the independent channel to transmit data, the range is 0–31. There will not be any channel collision alarm and the channel No. starts from 1.

4.8.2 Slots

The RC3000-SUB-DV35 can be inserted into slots 1–3. For the used cable, see section 7.2.5 CBL-VOICE-SCSI50M(40)/NC.

4.8.3 Interfaces

Name	Input (I)/Output (O)	PIN
Chassis Ground (CGND)	–	1
Signal Ground (SGND)	–	7
Receive Data (A) (RD (A))	O	3
Receive Data (B) (RD (B))	O	21
Receive Timing (A) (RCK (A))	O	17
Receive Timing (B) (RCK (B))	O	25
Send Data (A) (TD (A))	I	2
Send Data (B) (TD (B))	I	11
Send Timing (A) (TCK (A))	O	15
Send Timing (B) (TCK (B))	O	23
Terminal Timing (A) (SCTE (A))	I	24
Terminal Timing (B) (SCTE (B))	I	16
Request to Send (RTS)	I	4
Clear to Send (CTS)	O	5
Data Set Ready (DSR)	O	6
Data Carrier Detect (DCD)	O	8
Data Terminal Ready (DTR)	I	20

4.8.4 LEDs

Table 4-7 lists the LEDs on the RC3000-SUB-DV35.

Table 4-7 LEDs on the RC3000-SUB-DV35

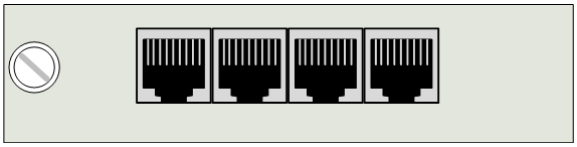
No.	Description	Status	Description
1	TD	Green	• Green: data is sending through the interface. • Off: no data is sending through the interface.
2	RD	Green	• Green: data is receiving through the interface. • Off: no data is receiving through the interface.
3	LP_STA	Green	• Green: local loopback occurs. • Off: no local loopback occurs.
4	PAT_OK	Green	• Green: BERT is normal. • Off: no BERT or BERT is abnormal.

4.8.5 Technical specifications

Dimensions: 70 mm (Width) × 167.5 mm (Depth) × 20 mm (Height)

4.9 RC3000-SUB-DV24

4.9.1 Appearance and functions

Panel

Function
The RC3000-SUB-DV24 is the standard V.24 interface card on the RC3000E. • The interface rate is 64 kbit/s or 128 kbit/s. • Provide 4 channels and occupy eight 64K channels. The number of occupied channels depends on the hardware and cannot be changed. • Provide 4 RJ45 interfaces, each of which is a channel interface.

4.9.2 Slots

The RC3000-SUB-DV24 can be inserted into slots 1–3.

4.9.3 Interfaces

Figure 4-5 shows the appearance of the RJ45 interface

Figure 4-5 Appearance of the RJ45 interface

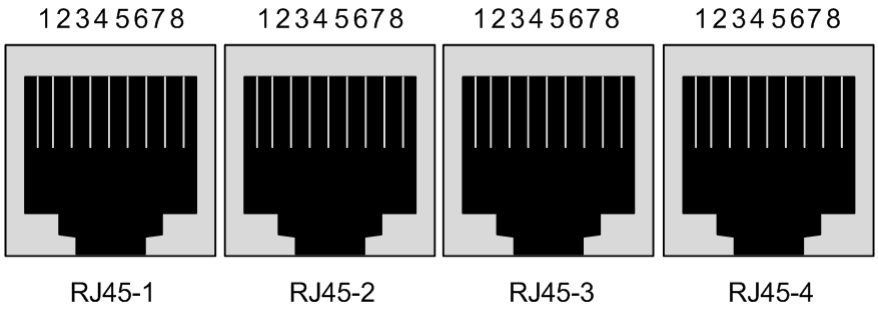


Table 4-8 lists the relationship between the channel and PIN

Table 4-8 Relationship between the channel and the PIN

Channel	1	2	3	4
PIN	RJ45-1 2 RDATA 3 TDATA 6 RCLK 7 TCLK 1, 4, 5, and 8 GND	RJ45-2 2 RDATA 3 TDATA 6 RCLK 7 TCLK 1, 4, 5, and 8 GND	RJ45-3 2 RDATA 3 TDATA 6 RCLK 7 TCLK 1, 4, 5, and 8 GND	RJ45-4 2 RDATA 3 TDATA 6 RCLK 7 TCLK 1, 4, 5, and 8 GND

Table 4-9 lists the definitions of the DB25 signal.

Table 4-9 Definitions of the DB25 signal

Function	Mnemonic	PIN	In–Out	Remarks
Frame Ground (FGND)	101/FGND	1	○——○	–
Signal Ground (SGND)	102/SGND	7	○——○	–
Transmit Data (TD)	103/TD	2	○——►	–
Receive Data (RD)	104/RD	3	◄——○	–
RTS	105/RTS	4	○——►	ON
CTS	106/CTS	5	◄——○	–
DTR	108/DTR	20	○——►	ON
Terminal TX Clock (TTC)	113/TTC	24	○——►	Idle
TX Clock (TC)	114/TC	15	◄——○	Idle
RX Clock (RC)	115/RC	17	◄——○	Idle

Table 4-10 lists the connection methods of the RJ45 interface and the RC3000-SUB-DV24.

Table 4-10 Connection methods of the RJ45 interface and the RC3000-SUB-DV24

DB25	3	2	1 and 7	6, 8, and 20	24	15 and 17	4 and 5
Signal name	RX data	TX data	SGND and PGND	Handshaking signals (internally connected)	TC	RC (internally connected)	Handshaking signals (internally connected)
RJ45	3	2	1 and 4	–	6	7	–

4.9.4 Timeslot rules

Table 4-11 lists the timeslot rules.

Table 4-11 Timeslot rules

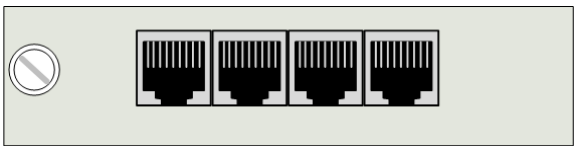
Channel No.	1	2	3	4
Occupied channel No. (64K)	1	3	5	7
Occupied channel No. (128K)	1 and 2	3 and 4	5 and 6	7 and 8

4.9.5 Technical specifications

Dimensions: 70 mm (Width) × 167.5 mm (Depth) × 20 mm (Height)

4.10 RC3000-SUB-D232

4.10.1 Appearance and functions

Panel

Function
The RC3000-SUB-D232 is the standard RS232 interface card on the RC3000E. • Provide 8 channels, the number of which depends on the hardware and cannot be changed. • Provide 4 RJ45 interfaces, each of which corresponds to 2 channel interfaces.

4.10.2 Slots

The RC3000-SUB-D232 can be inserted into slots 1–3.

4.10.3 Interfaces

Figure 4-6 shows the appearance of the RJ45 interface.

Figure 4-6 Appearance of the RJ45 interface

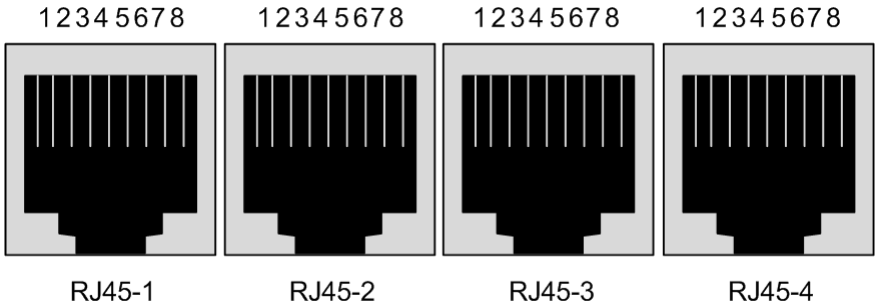


Table 4-12 lists the relationship between the channel and PIN.

Table 4-12 Relationship between the channel and PIN

Channel	1	2	3	4	5	6	7	8
RJ45	RJ45-1		RJ45-2		RJ45-3		RJ45-4	
PIN	• 2RX • 3TX • 1GND • 4GND	• 6RX • 7TX • 5GND • 8GND	• 2RX • 3TX • 1GND • 4GND	• 6RX • 7TX • 5GND • 8GND	• 2RX • 3TX • 1GND • 4GND	• 6RX • 7TX • 5GND • 8GND	• 2RX • 3TX • 1GND • 4GND	• 6RX • 7TX • 5GND • 8GND

Note

- 2RX is the data receiving end of the RS232 interface card. 3TX is the data transmitting end of the RS232 interface card. 1 and 4 GND is the grounding terminal of the RS232 interface card. When making the RS232 interface cable, you need to consider the connection methods of the ground. One of the two ground cables from the RS232 interface should be connected to the SGND and the other should be connected to the CGND of DB9 or DB15. When plugging the cable into the interface in power-on status, you need to plug the cable into the RJ45 interface of the RS232 interface card first and then plug the cable into the DB interface of other devices. In this case, the ground cable is connected first and the RS232 serial interface will not be damaged when Potential Difference (PD) exists between the two ends. Moreover, the RS232 interface of the RC3000E supports electrostatic protection to avoid damage on the serial interface of RS232 interface card.
- The maximum length of the cable used for the RS232 interface was 15 m based on RS232 standard.

DB9

Table 4-13 lists definitions of DB9.

Table 4-13 Definitions of DB9

No.	1	2	3	4	5	6	7	8	9
Name	DCD	RXD	TXD	DTR	SG	DSR	RTS	CTS	RI

DB25

Table 4-14 lists definitions of DB25.

Table 4-14 Definitions of DB25

No.	1	2	3	4	5	6	7	8	9-19	20	21	22	23-25
Name	Idle	TXD	RXD	RTS	CTS	DSR	SG	DCD	Idle	DTR	Idle	RI	Idle

Table 4-15 lists the relationship between DB9 and DB25.

Table 4-15 Relationship between DB9 and DB25

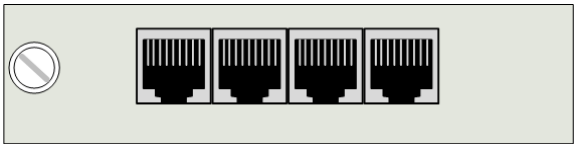
DB9	2	3	5	1, 4, and 6	7 and 8
DB25	3	2	7	6, 8, and 20	4 and 5
Signal name	TXD	RXD	GND	Internally connected	Internally connected

4.10.4 Technical specifications

Dimensions: 70 mm (Width) × 167.5 mm (Depth) × 20 mm (Height)

4.11 RC3000-SUB-D485

4.11.1 Appearance and functions

Panel

Function
The RC3000-SUB-D485 is the RS485 interface card on the RC3000E. • Provide 8 channels, the number of which depends on the hardware and cannot be changed. • Provide 4 RJ45 interfaces, each of which corresponds to 2 channel interfaces.

4.11.2 Slots

The RC3000-SUB-D485 can be inserted into slots 1–3.

4.11.3 Interfaces

Figure 4-7 shows the appearance of the RJ45 interface.

Figure 4-7 Appearance of the RJ45 interface

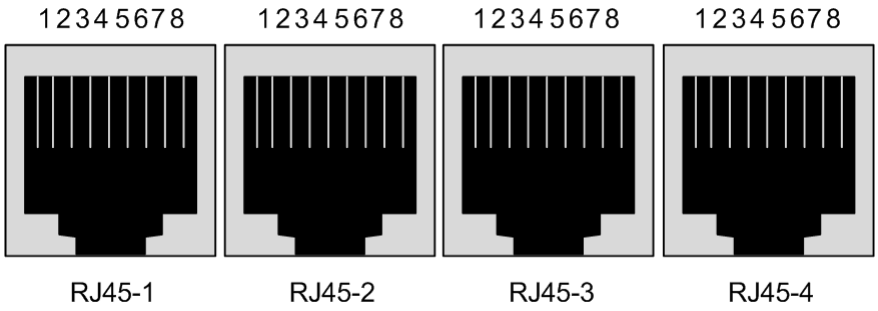


Table 4-16 lists the relationship between the channel and PIN.

Table 4-16 Relationship between the channel and PIN

Channel	1	2	3	4	5	6	7	8
PIN	• RJ45-1 • 1 A • 2 B • 3 NC • 4 NC	• RJ45-1 • 5 A • 6 B • 7 NC • 8 NC	• RJ45-2 • 1 A • 2 B • 3 NC • 4 NC	• RJ45-2 • 5 A • 6 B • 7 NC • 8 NC	• RJ45-3 • 1 A • 2 B • 3 NC • 4 NC	• RJ45-3 • 5 A • 6 B • 7 NC • 8 NC	• RJ45-4 • 1 A • 2 B • 3 NC • 4 NC	• RJ45-4 • 5 A • 6 B • 7 NC • 8 NC

Note

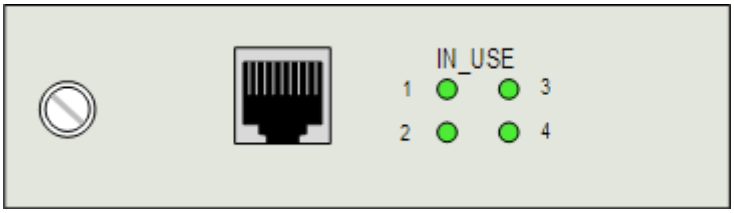
A is the positive end for receiving and sending data of the RS485 interface card. B is the negative end for receiving and sending data of the RS485 interface card. The RS485 interface card of the RC3000E supports electrostatic protection to avoid damage on the serial interface of RS485 interface card. Meanwhile, all interface cards support hot-plugging. In practice, you can insert the RS485 interface card into the corresponding slot after connecting cables to the interface properly, thus protecting the RS485 interface.

4.11.4 Technical specifications

Dimensions: 70 mm (Width) × 167.5 mm (Depth) × 20 mm (Height)

4.12 RC3000-SUB-DMT (B)

4.12.1 Appearance and functions

Panel

Function
The RC3000-SUB-DMT (B.00) is the magneto telephone interface card on the RC3000. It can transmit magneto telephone signals. • Support 1 RJ45 interface which supports 4 magneto telephone channels. • Its interface mandatorily occupies TS1–TS4 of PCM30 mode of E1 lines. • Support adjusting voice gains through software. The A/D gain ranges from -10 +16 dB and is 0 dB by default. The D/A gain ranges from -10 to +16 dB and is -3.5 dB by default. The step is 0.1 dB. • Its interface supports configuring bit a/b and occupies bit a by default. • Its interface supports configuring the signalling mode through software, such as positive/negative signalling, being positive signalling by default. • Support 2100 Hz signaling and configuring the signaling through software. This feature is enabled by default. • Support overcurrent protection of the voice interface and ringing current output. • Support online upgrade.

4.12.2 Slots

The RC3000-SUB-DMT (B.00) can be inserted into slots 1–3.

4.12.3 Interfaces

Figure 4-8 shows PIN definitions of the RJ45 interface on the RC3000-SUB-DMT (B.00).

Figure 4-8 PIN definitions of the RJ45 interface on the RC3000-SUB-DMT (B.00)

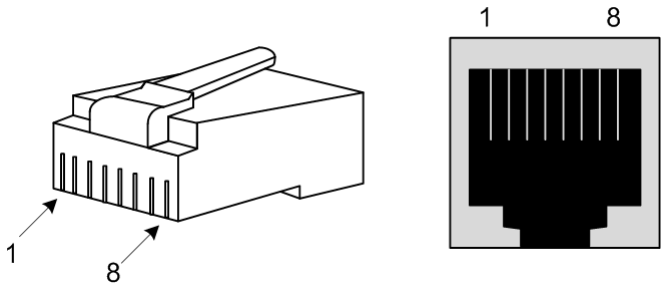


Table 4-17 lists the mapping between the channel and PIN.

Table 4-17 Mapping between the channel and PIN

RJ45	PIN	Channel
RJ45-1	1 T and 2 R	1
	3 T and 4 R	2
	5 T and 6 R	3
	7 T and 8 R	4

4.12.4 LEDs

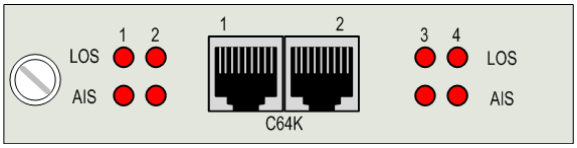
LED	Status	Description
IN_USE	Green	Voice channel in-use LED, indicating 2100 Hz signaling status in magneto mode (enabled with 2100 Hz signaling) or digital signaling status in common mode (disabled with 2100 Hz signaling) • Green: the voice channel is receiving or sending signaling. • Off: the voice channel is idle.

4.12.5 Technical specifications

Dimensions: 70 mm (Width) × 167.5 mm (Depth) × 20 mm (Height)

4.13 RC3000-SUB-DC64K

4.13.1 Appearance and functions

Panel

Function
The RC3000-SUB-DC64K is the 4-way codirectional 64K data card on the RC3000E. • Interface signal rate is 256 kbaud. • Each card has 4 channels and occupies four 64K channels (each channel occupies one 64K channel). The number of occupied channels depends on the hardware and cannot be changed. • Provide 2 RJ45 interfaces, each one of which provides 2 user access interfaces.

4.13.2 Slots

The RC3000-SUB-DC64K can be inserted into slots 1–3.

4.13.3 Interfaces

Figure 4-9 shows the appearance of the RJ45 interface.

Figure 4-9 Appearance of the RJ45 interface

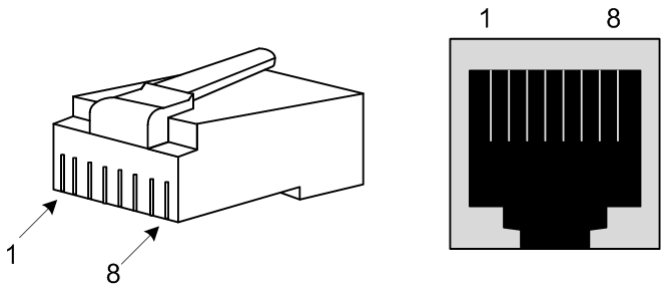


Table 4-18 lists the relationship between the PIN and the signal name.

Table 4-18 Relationship between the PIN and the signal name

PIN	64K signal name
1	TD1+
2	TD1-
3	RD2+
4	RD1+

PIN	64K signal name
5	RD1-
6	RD2-
7	TD2+
8	TD2-

4.13.4 LEDs

Table 4-19 lists the LEDs on the RC3000-SUB-DC64K.

Table 4-19 LEDs on the RC3000-SUB-DC64K

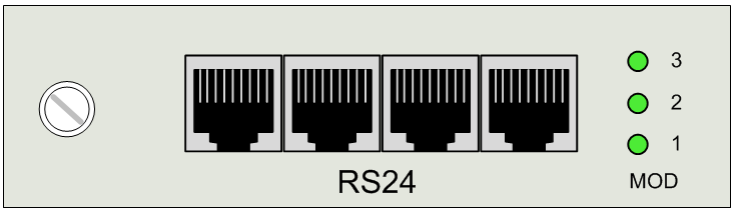
LEDs	Status	Description
LOS	Red	• Red: some signal is lost. • Off: no signal is lost.
AIS	Red	• Red: error code (all-1) occurs. • Off: no error code occurs.

4.13.5 Technical specifications

Dimensions: 70 mm (Width) × 167.5 mm (Depth) × 20 mm (Height)

4.14 RC3000-SUB-RS24

4.14.1 Appearance and functions

Panel


Function
The RC3000-SUB-RS24 is used to transmit V.24, RS232, RS422, and RS485 services. • Provide four RJ45 interfaces. • Support transmitting up to 4 ways of V.24 services, or 8 ways of RS232 services, or 4 ways of RS422 services, or 4 ways of RS485 services. • The subcard can work in software configuration status or hardware configuration status. • In software configuration status: – The subcard can be configured to RC3000-SUB-RS24 mode only. – Each RJ45 interface can be independently configured to either of RS232, V.24, RS422, and RS485 modes, which can transmit 2 ways of RS232 services, 1 way of V.24 services, 1 way of RS422 services, and 1 way of RS485 services respectively. – Support MCU online upgrade. • In hardware configuration status: – The subcard can be configured to RC3000-SUB-DV24, RC3000-SUB-D232, RC3000-SUB-D422, or RC3000-SUB-D485 mode. – In RC3000-SUB-DV24 mode, support transmitting 4 ways of V.24 services. – In RC3000-SUB-D232 mode, support transmitting 8 ways of RS232 services. – In RC3000-SUB-D422 mode, support transmitting 4 ways of RS422 services. – In RC3000-SUB-D485 mode, support transmitting 4 ways of RS485 services. – MCU online upgrade is not supported.

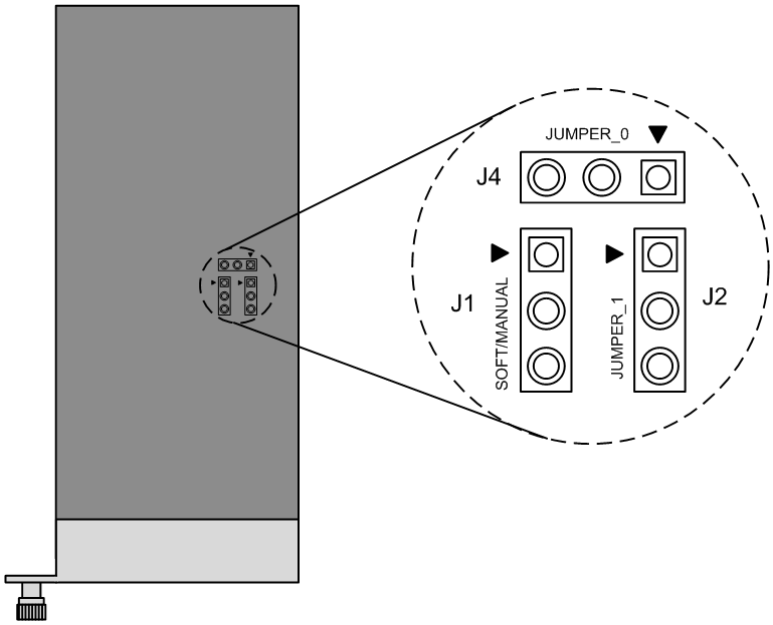
4.14.2 Slots

The RC3000-SUB-RS24 can be inserted into slots 1–3.

4.14.3 Jumper

Figure 4-10 shows positions of the J1, J2, and J4. The arrow points to PIN 1 of each jumper.

Figure 4-10 Positions of J1, J2, and J4



4.14.4 Working status

Use J1 to configure the subcard to work in software configuration status or hardware configuration status:

- Hardware configuration status: short circuit PIN 1 and PIN 2 of J1.
- Software configuration status: short circuit PIN 2 and PIN 3 of J1.

In hardware configuration status, software configurations lose effect; in software configuration status, jumper configurations lose effect.

Note

The maximum length of the cable used by the RS232 interface is 15 m according to RS232 standard.

Software configuration status

In software configuration status, the RC3000 identifies the subcard as the RC3000-SUB-RS24. You can configure the working mode of each RJ45 interface through the NView NNM system or CLI. Each RJ45 interface can be independently configured to work in RS232, V.24, RS422, or RS485 mode.

Hardware configuration status

In hardware configuration status, you can use J2 and J4 to configure the subcard to RC3000-SUB-DV24, RC3000-SUB-D232, RC3000-SUB-D422, or RC3000-SUB-D485 mode, as shown in Table 4-20. At this time, the four RJ45 interfaces are in the same working mode.

Table 4-20 Functions of J2 and J4

J2 status	J4 status	Description
1-2 short circuit	1-2 short circuit	RC3000-SUB-DV24 mode
2-3 short circuit	2-3 short circuit	RC3000-SUB-D232 mode
1-2 short circuit	2-3 short circuit	RC3000-SUB-D422 mode
2-3 short circuit	1-2 short circuit	RC3000-SUB-D485 mode

Note

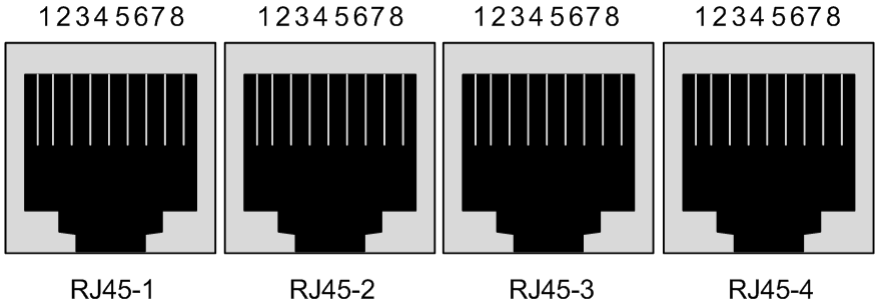
By default, the subcard works in hardware configuration status and is configured to RC3000-SUB-D232 mode.

4.14.5 Interfaces

There are four RJ45 interfaces on the RC3000-SUB-RS24.

Figure 4-11 shows PIN definitions of the RJ45 interface on the RC3000-SUB-RS24.

Figure 4-11 PIN definitions of the RJ45 interface on the RC3000-SUB-RS24



Note

The maximum length of the cable used by the RS232 interface is 15 m according to RS232 standard.

Software configuration status

In software configuration status, each RJ45 interface can be independently configured to work in RS232, V.24, RS422, or RS485 mode. PIN definitions of the four RJ45 interfaces in different modes are listed Table 4-21, 0, Table 4-23, and Table 4-24 respectively.

Table 4-21 PIN definitions of RJ45-1

Mode / PIN	V.24	RS232	RS422	RS485
1	GND	GND	GND	GND

Mode / PIN	V.24	RS232	RS422	RS485
2	V24_TX0	RS232_TX0	RS422_TX0+	NC
3	V24_TCLK0	RS232_TX1	RS422_TX0-	NC
4	NC	NC	NC	RS485_A0
5	NC	NC	NC	RS485_B0
6	V24_RX0	RS232_RX0	RS422_RX0+	NC
7	V24_RCLK0	RS232_RX1	RS422_RX0-	NC
8	GND	GND	GND	GND

Table 4-22 PIN definitions of RJ45-2

Mode / PIN	V.24	RS232	RS422	RS485
1	GND	GND	GND	GND
2	V24_TX1	RS232_TX2	RS422_TX1+	NC
3	V24_TCLK1	RS232_TX3	RS422_TX1-	NC
4	NC	NC	NC	RS485_A1
5	NC	NC	NC	RS485_B1
6	V24_RX1	RS232_RX2	RS422_RX1+	NC
7	V24_RCLK1	RS232_RX3	RS422_RX1-	NC
8	GND	GND	GND	GND

Table 4-23 PIN definitions of RJ45-3

Mode / PIN	V.24	RS232	RS422	RS485
1	GND	GND	GND	GND
2	V24_TX2	RS232_TX4	RS422_TX2+	NC
3	V24_TCLK2	RS232_TX5	RS422_TX2-	NC
4	NC	NC	NC	RS485_A2
5	NC	NC	NC	RS485_B2
6	V24_RX2	RS232_RX4	RS422_RX2+	NC

Mode / PIN	V.24	RS232	RS422	RS485
7	V24_RCLK2	RS232_RX5	RS422_RX2-	NC
8	GND	GND	GND	GND

Table 4-24 PIN definitions of RJ45-4

Mode / PIN	V.24	RS232	RS422	RS485
1	GND	GND	GND	GND
2	V24_TX3	RS232_TX6	RS422_TX3+	NC
3	V24_TCLK3	RS232_TX7	RS422_TX3-	NC
4	NC	NC	NC	RS485_A3
5	NC	NC	NC	RS485_B3
6	V24_RX3	RS232_RX6	RS422_RX3+	NC
7	V24_RCLK3	RS232_RX7	RS422_RX3-	NC
8	GND	GND	GND	GND

Note

NC in Table 4-21, Table 4-22, Table 4-23, and Table 4-24 refers to no connection.

Hardware configuration status

In hardware configuration status, you can configure the subcard to RC3000-SUB-DV24, RC3000-SUB-D232, RC3000-SUB-D422, or RC3000-SUB-D485 mode. PIN definitions of the RJ45 interface in four modes are listed in Table 4-25, Table 4-26, Table 4-27, and Table 4-28 respectively.

Table 4-25 PIN definitions of RJ45 interface in RC3000-SUB-DV24 mode

Mode / PIN	V.24	RS232	RS422	RS485
1	GND	GND	GND	GND
2	V24_TX0	V24_TX1	V24_TX2	V24_TX3
3	V24_TCLK0	V24_TCLK1	V24_TCLK2	V24_TCLK3
4	NC	NC	NC	NC
5	NC	NC	NC	NC

Mode / PIN	V.24	RS232	RS422	RS485
6	V24_RX0	V24_RX1	V24_RX2	V24_RX3
7	V24_RCLK0	V24_RCLK1	V24_RCLK2	V24_RCLK3
8	GND	GND	GND	GND

Table 4-26 PIN definitions of RJ45 interface in RC3000-SUB-D232 mode

Mode / PIN	V.24	RS232	RS422	RS485
1	GND	GND	GND	GND
2	RS232_TX0	RS232_TX2	RS232_TX4	RS232_TX6
3	RS232_TX1	RS232_TX3	RS232_TX5	RS232_TX7
4	NC	NC	NC	NC
5	NC	NC	NC	NC
6	RS232_RX0	RS232_RX2	RS232_RX4	RS232_RX6
7	RS232_RX1	RS232_RX3	RS232_RX5	RS232_RX7
8	GND	GND	GND	GND

Table 4-27 PIN definitions of RJ45 interface in RC3000-SUB-D422 mode

Mode / PIN	V.24	RS232	RS422	RS485
1	GND	GND	GND	GND
2	RS422_TX0+	RS422_TX1+	RS422_TX2+	RS422_TX3+
3	RS422_TX0-	RS422_TX1-	RS422_TX2-	RS422_TX3-
4	NC	NC	NC	NC
5	NC	NC	NC	NC
6	RS422_RX0+	RS422_RX1+	RS422_RX2+	RS422_RX3+
7	RS422_RX0-	RS422_RX1-	RS422_RX2-	RS422_RX3-
8	GND	GND	GND	GND

Table 4-28 PIN definitions of RJ45 interface in RC3000-SUB-D485 mode

Mode / PIN	V.24	RS232	RS422	RS485
1	GND	GND	GND	GND
2	NC	NC	NC	NC
3	NC	NC	NC	NC
4	RS485_A0	RS485_A1	RS485_A2	RS485_A3
5	RS485_B0	RS485_B1	RS485_B2	RS485_B3
6	NC	NC	NC	NC
7	NC	NC	NC	NC
8	GND	GND	GND	GND

Note

NC in Table 4-25, Table 4-26, Table 4-27, and Table 4-28 refers to no connection.

4.14.6 LEDs

There are three LEDs on the RC3000-SUB-RS24.

Table 4-29 lists LEDs on the RC3000-SUB-RS24.

Table 4-29 LEDs on the RC3000-SUB-RS24

LED	Status	Description
1	Green	Subcard working status LED • Green: the subcard works in hardware configuration status. • Off: the subcard works in software configuration status.
2	Green	LED 2 and LED 3 are used together. • When the subcard works in hardware configuration status, they indicate the type of the current subcard. • When the subcard works in software configuration status, they indicate the working mode of the first RJ45 interface.
3	Green	

Table 4-30 describes indications of LED 2 and LED 3.

Table 4-30 Indications of LED 2 and LED 3

LED 2	LED 3	Description	
		Hardware configuration status	Software configuration status
Green	Green	The subcard works in RC3000-SUB-DV24 mode.	RJ45-1 interface is in V.24 mode.
Off	Off	The subcard works in RC3000-SUB-D232 mode.	RJ45-1 interface is in RS232 mode.
Off	Green	The subcard works in RC3000-SUB-D422 mode.	RJ45-1 interface is in RS422 mode.
Green	Off	The subcard works in RC3000-SUB-D485 mode.	RJ45-1 interface is in RS485 mode.

4.14.7 Timeslot rules

Software configuration mode

In software configuration mode, timeslot rules of the four RJ45 interfaces on the RC3000-SUB-RS24 are listed in Table 4-31. In different working modes, each interface can transmit 1 way or 2 ways of 64 kbit/s services.

Table 4-31 Timeslot rules in software configuration mode

RJ45 interface / Working mode	RJ45-1		RJ45-2		RJ45-3		RJ45-4	
V.24 mode (64 kbit/s)	1		3		5		7	
V.24 mode (128 kbit/s)	1	2	3	4	5	6	7	8
RS232 mode	1	2	3	4	5	6	7	8
RS422 mode	1		3		5		7	
RS485 mode	1		3		5		7	

Hardware configuration mode

In hardware configuration mode, timeslot rules of the four RJ45 interfaces on the RC3000-SUB-RS24 are listed in Table 4-32. In different working modes, each interface can transmit 1 way or 2 ways of 64 kbit/s services.

Table 4-32 Timeslot rules in hardware configuration mode

RJ45 interface / Working mode	RJ45-1		RJ45-2		RJ45-3		RJ45-4	
V.24 mode (64 kbit/s)	1		3		5		7	
V.24 mode (128 kbit/s)	1	2	3	4	5	6	7	8
RS232 mode	1	2	3	4	5	6	7	8
RS422 mode	1		2		3		4	
RS485 mode	1		2		3		4	

4.14.8 Technical specifications

Table 4-33 lists technical specifications of the RC3000-SUB-RS24.

Table 4-33 Technical specifications of the RC3000-SUB-RS24.

Parameter	Description
Dimensions (mm)	70 (Width) × 167.5 (Depth) × 20 (Height)
Weight (kg)	0.14
Power consumption (W)	< 5.5

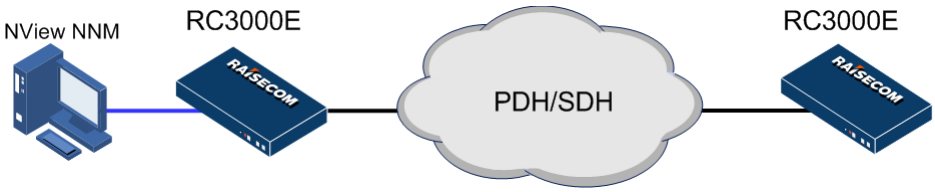
5 Networking and applications

This chapter includes the following sections:

- Typical applications of device
- Application modes of RC3000E-UP-OPT-FE2E1

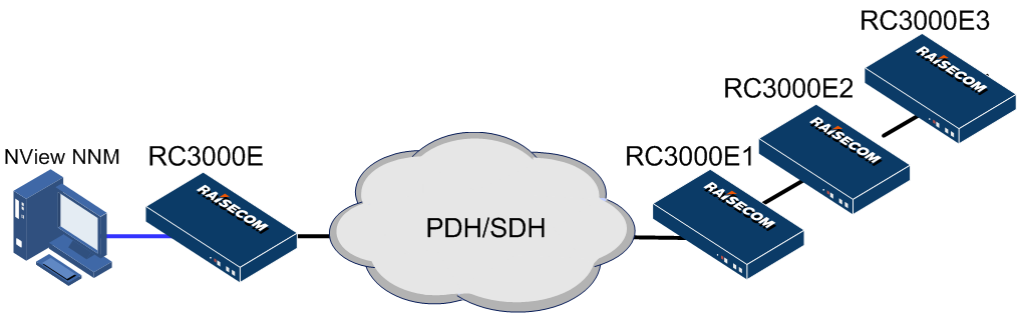
5.1 Typical applications of device

Figure 5-1 Typical applications of the RC3000E (1)



As shown in Figure 5-1, it is a typical point-to-point networking application of the RC3000E. Both the two RC3000E devices can transmit voice and data services to realize point-to-point transmission. The NView NNM system can manage the RC3000E devices comprehensively.

Figure 5-2 Typical applications of the RC3000E (2)

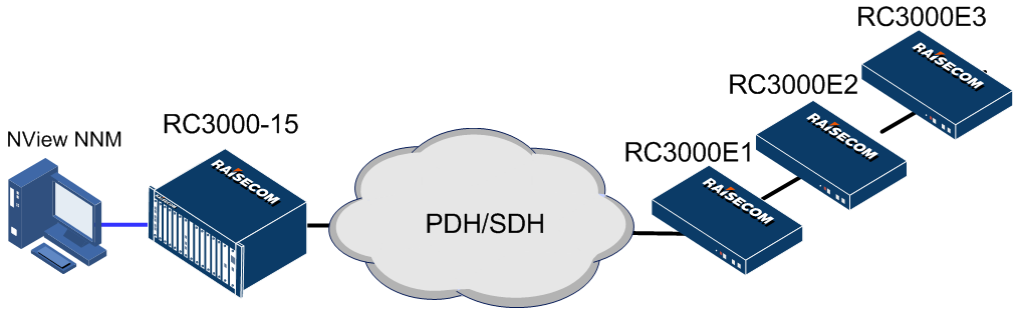


As shown in Figure 5-2, it is a typical chain cascading networking application of the RC3000E. RC3000E 1, RC3000E 2, and RC3000E 3 can transmit voice and data services. The NView NNM system can manage the RC3000E devices comprehensively.

Note

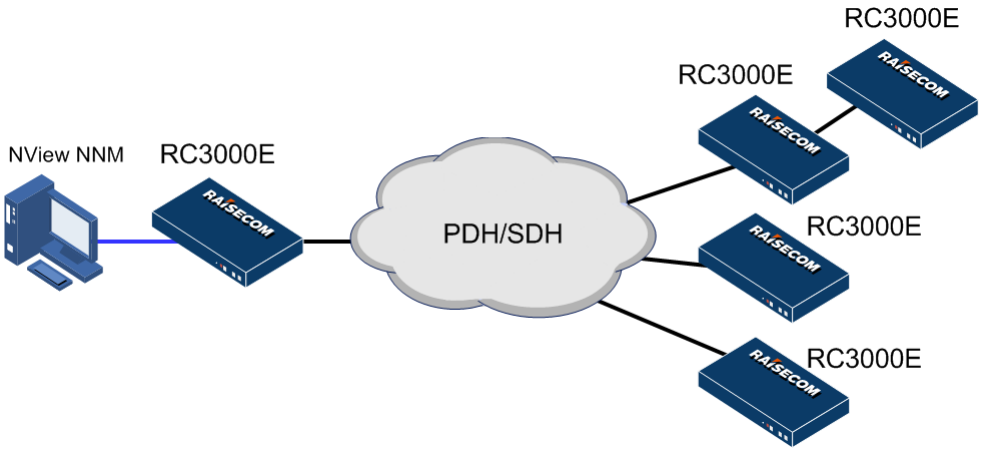
When the RC3000E works as a CO device, it does not save configurations of the remote device. To save configurations, use the **sync-config** command and then the **write** command on the remote device.

Figure 5-3 Typical applications of the RC3000E (3)



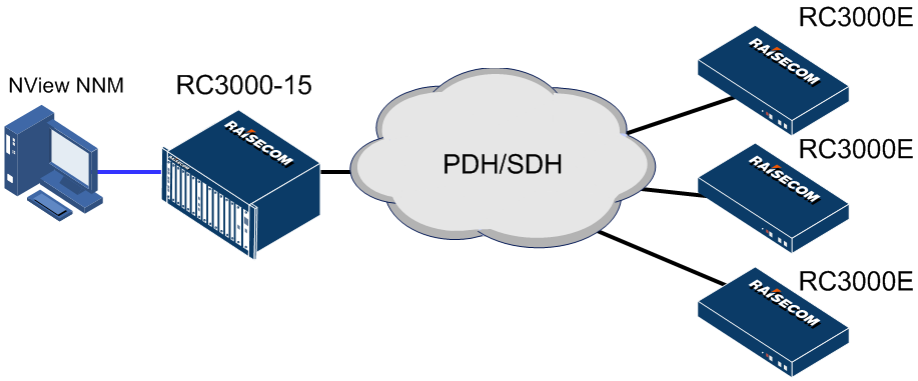
As shown in Figure 5-3, in the remote end, the RC3000E devices are cascaded in chain and each RC3000E device can transmit voice and data services; in the local end, the RC3000-15 can aggregate services in large capacity. Meanwhile, the NView NNM system can manage the RC3000-15 and RC3000E devices comprehensively.

Figure 5-4 Typical applications of the RC3000E (4)



As shown in Figure 5-4, it is a point-to-multipoint networking application of the RC3000E. In the remote end, these RC3000E devices can transmit voice and data services. In the local end, the RC3000E is used to aggregate services and the NView NNM system can manage the RC3000E devices comprehensively.

Figure 5-5 Typical applications of the RC3000E (5)



As shown in Figure 5-5, it is a point-to multipoint networking application of the RC3000E and RC3000-15. In the remote end, these RC3000E devices can transmit voice and data services. In the local end, the RC3000-15 can aggregate services in large capacity and the NView NNM system can manage the RC3000E devices and the RC3000-15 comprehensively.

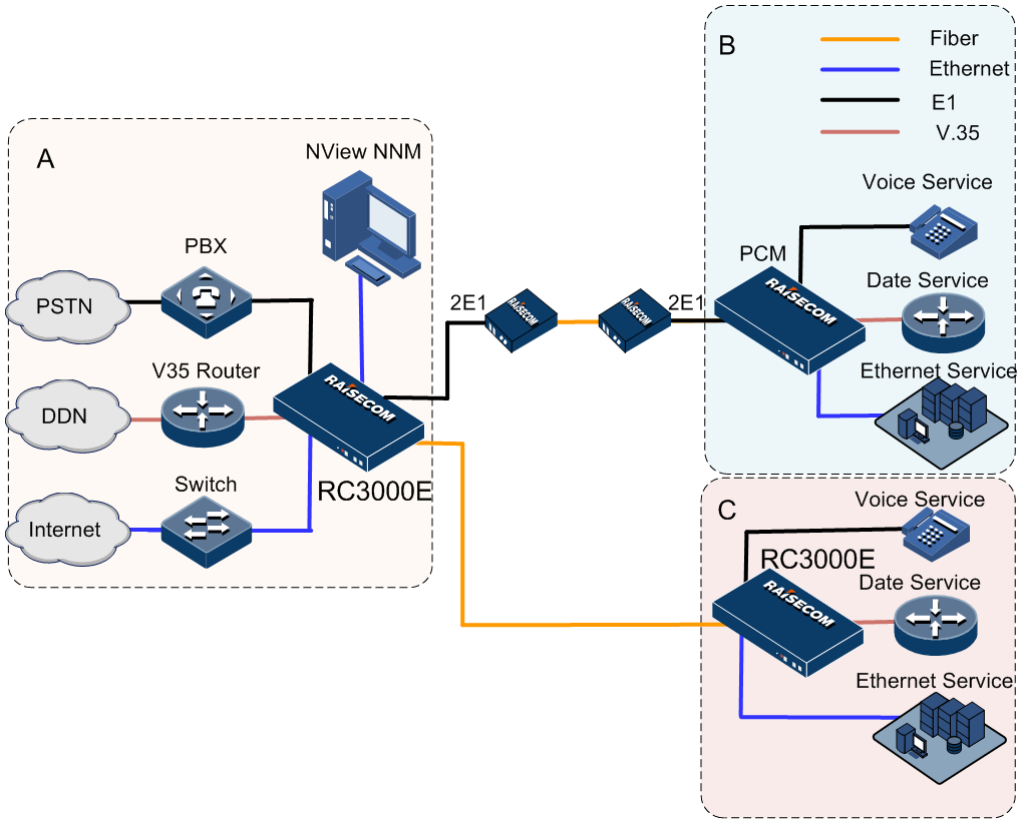
5.2 Application modes of RC3000E-UP-OPT-FE2E1

5.2.1 Mode 1

Cross the first 6 of 8 ways of E1 demultiplexed from the optical transmission and 2 ways of E1 on the subcard interface.

- Station A uses the RC3000E; station B uses the PCM device through the E1 interface; station C uses the RC3000E for service data interaction and the RC3000E-UP-OPT-FE2E1 serves as the uplink card of the RC3000E.
- The PCM in station B accesses the transmission network through the E1 interface and interconnects the 2E1of the RC3000E in station A. Station B can interact up to 2 ways of E1 services with station A.
- The RC3000E in station C connects the RC3000E in station A through the fiber. Station C can interact up to 6 ways of E1 services with in station A.

Figure 5-6 Networking scheme in mode 1

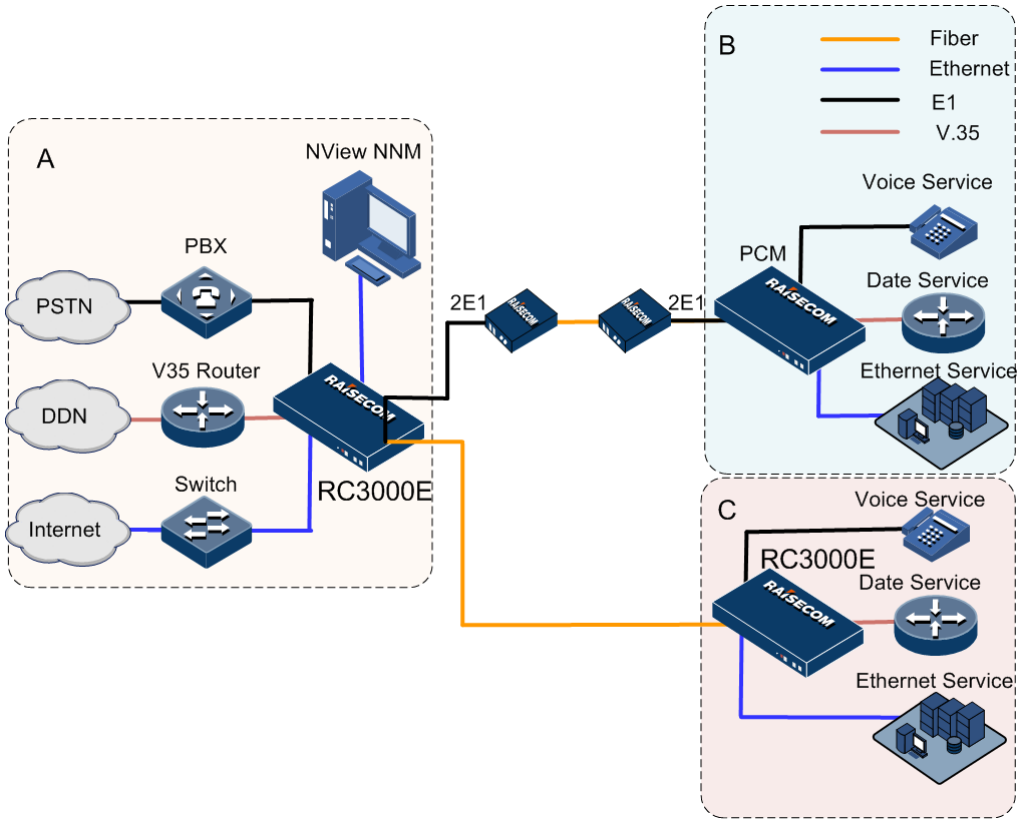


5.2.2 Mode 2

Cross the first 6 of 8 ways of E1 demultiplexed from the optical transmission while the rest 2 ways of E1 are transmitted from the 2E1 interface on the subcard.

- The RC3000E in station A connects to the RC3000E in station C for service interaction.
- The PCM in station B accesses the transmission network through the E1 interface and interconnects the RC3000E in station A to enter the optical channel through it for service interaction with the RC3000E in station C. The RC3000E-UP-OPT-FE2E1 serves as the uplink card of the RC3000E. Station B can interact up to 2 ways of E1 services at the 64 kbit/s with station C.
- The RC3000E in station C interconnects the RC3000E in station A through the fiber. Station C can interact up to 6 ways of E1 services at the 64 kbit/s with station A.

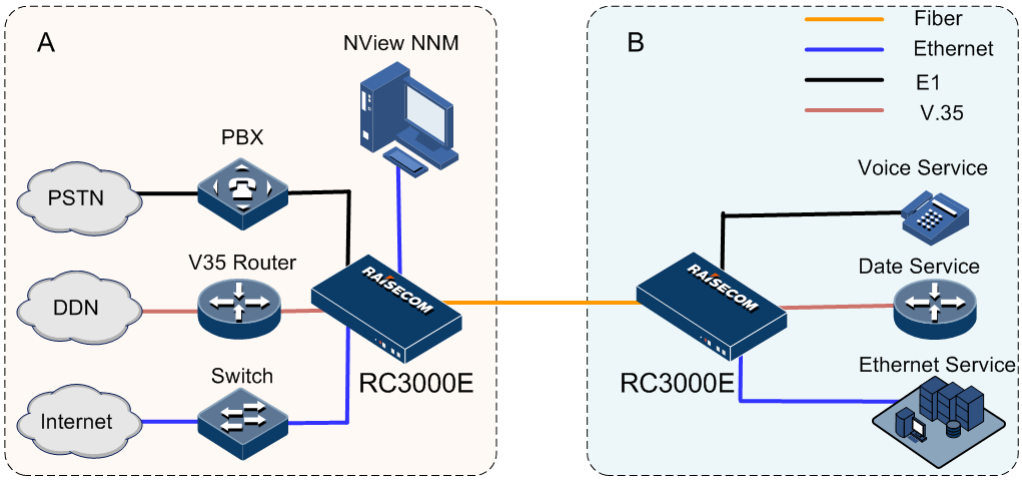
Figure 5-7 Networking scheme in mode 2



5.2.3 Mode 3

Cross 8 ways of E1 demultiplexed from the optical transmission while the 2 ways of E1 on the subcard interface are idle.

Figure 5-8 Networking scheme in mode 3



The RC3000E in station A connects the RC3000E in station B through fiber and the RC3000E-UP-OPT-FE2E1 serves as the uplink card of the RC3000E. Station A can interact 8 ways of E1 services at the 64 kbit/s with station B.

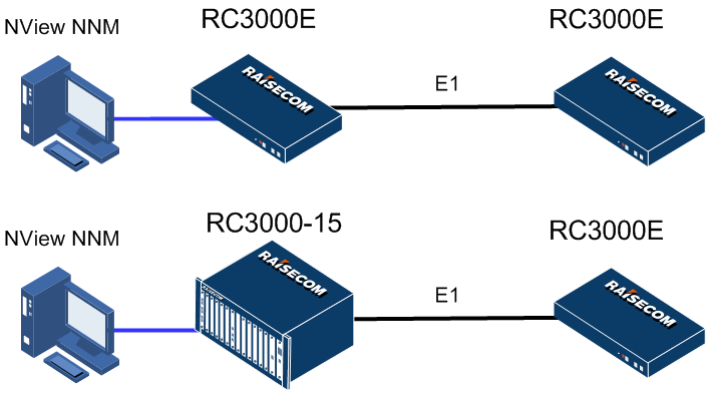
6 Network management

This chapter includes the following sections:

- Network management through E1 channel
- Network management through optical channel
- Network management through E1 channel+optical channel

6.1 Network management through E1 channel

Figure 6-1 Network management through the E1 channel

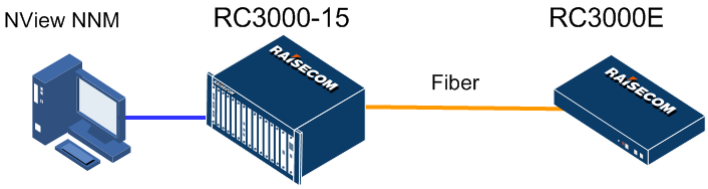


When the Central Office (CO), the RC3000E (or the RC3000-15), networks with the remote RC3000E through the E1 channel, the NView NNM system can manage the network through the E1 channel (Sa bit or independent timeslot).

The RC3000E can be a management/managed device.

6.2 Network management through optical channel

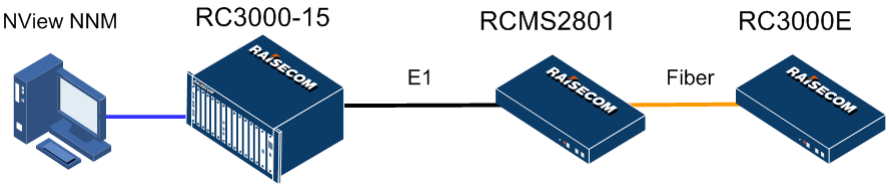
Figure 6-2 Network management through the optical channel



The RC3000-15 can manage the RC3000E through the optical channel or E1 channel. In this case, the optical channel is selected as the network management channel generally.

6.3 Network management through E1 channel+optical channel

Figure 6-3 Network management through E1 channel+optical channel



The RC3000-15 connects the RCMS2801-240FE through the E1 channel (the E1 channel can be the E1 link in SDH network). The RCMS2801-240FE connects the RC3000E through the optical interface.

The RC3000-15 manages the RC3000E through the E1 channel and the RC3000E manages the RCMS2801-240FE through the optical overhead channel, thus implementing the integrated network management.

7 Appendix

The appendix lists wiring and FAQs, including the following sections:

- FAQs
- Wiring
- Terms
- Acronyms and abbreviations

7.1 FAQs

7.1.1 Any alarm is reported on the uplink interface of the RC3000E

When LOF, LOS, or AIS alarm is reported on the E1 interface, check the device from the following three aspects:

- Check whether the cable connected to the E1 interface or optical interface is connected correctly or not, or disconnected due to faults.
- Check whether the peer device connected to the E1 interface works normally or not.
- Check whether the power and grounding line of the two ends are connected normally or not.

If the problem is not solved after checking, contact Raisecom technical support engineers.

7.1.2 Voice is not continuous or data transmission fails when no alarm is reported

This problem is usually caused by the multiframe asynchronization. You can detect whether there is multiframe asynchronization alarm on the E1 interface of the RC3000E or not. If yes, you can check the following aspects:

- Check whether the synchronization clock is consistent or not. In general, there is only one master clock on the network.
- Check the entries of the E1 alarm.

If the problem is not solved after checking, contact Raisecom technical support engineers.

7.1.3 LOF or RAL alarm is reported among alarms on the E1 interface

This problem is usually caused by the inconsistency of the clock. In applications, the devices should be synchronized with the same clock (one master clock and multiple slave clocks) on the network. When the devices are synchronized with a clock which is not existed or the clock trace each other, alarms will be generated. You can check the clock configurations of the RC3000E and other devices on the whole network.

If the problem is not solved after checking, contact Raisecom technical support engineers.

7.1.4 Forget the password after modifying it

Contact Raisecom technical support engineers.

7.2 Wiring

When you order the device, we recommend ordering corresponding cables together. When you need to make cables by yourself due to cable faults, follow this section.

7.2.1 CBL-E1-DB37F/16BNCF

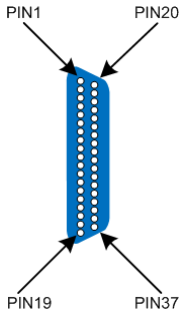
Figure	PIN	Signal	Definition	Chanel
DB37F 	3	OUT1-	TX1	Channel 1
	4	OUT1+		
	21	IN1+	RX1	
	22	IN1-		
	5	OUT2-	TX2	Channel 2
	6	OUT2+		
	23	IN2+	RX2	
	24	IN2-		
	7	OUT3-	TX3	Channel 3
	8	OUT3+		
	25	IN3+	RX3	
	26	IN3-		
	9	OUT4-	TX4	Channel 4
	10	OUT4+		
	27	IN4+	RX4	
	28	IN4-		

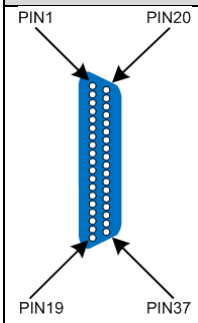
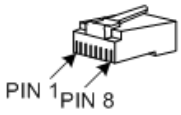
Figure	PIN	Signal	Definition	Chanel
	11	OUT5-	TX5	Channel 5
	12	OUT5+		
	29	IN5+	RX5	
	30	IN5-		
	13	OUT6-	TX6	Channel 6
	14	OUT6+		
	31	IN6+	RX6	
	32	IN6-		
	15	OUT7-	TX7	Channel 7
	16	OUT7+		
	33	IN7+	RX7	
	34	IN7-		
	17	OUT8-	TX8	Channel 8
	18	OUT8+		
	35	IN8+	RX8	
	36	IN8-		

Note

- It is connected to the core of coaxial cables if marked plus (+); namely, the PIN is welded with the core of the coaxial cable.
- It is connected to the shielding layer of coaxial cables if marked hyphen (-); namely, the PIN is welded with the shielding layer of the coaxial cable.
- The wiring is also applicable to the CBL-E1-DB37F/16BNCM.

7.2.2 CBL-E1-DB37F/8RJ45

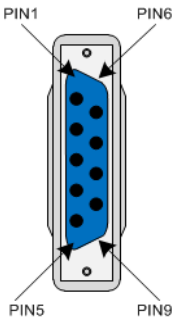
Figure	DB37F PIN	RJ45 PIN	Signal	Definition	Channel
DB37F	3	5	OUT1-	TX1	Channel 1
	4	4	OUT1+		
	21	2	IN1+	RX1	
	22	1	IN1-		
	5	5	OUT2-	TX2	Channel 2
	6	4	OUT2+		

Figure	DB37F PIN	RJ45 PIN	Signal	Definition	Channel
 RJ45 	23	2	IN2+	RX2	
	24	1	IN2-		
	7	5	OUT3-	TX3	Channel 3
	8	4	OUT3+		
	25	2	IN3+	RX3	
	26	1	IN3-		
	9	5	OUT4-	TX4	Channel 4
	10	4	OUT4+		
	27	2	IN4+	RX4	
	28	1	IN4-		
	11	5	OUT5-	TX5	Channel 5
	12	4	OUT5+		
	29	2	IN5+	RX5	
	30	1	IN5-		
	13	5	OUT6-	TX6	Channel 6
	14	4	OUT6+		
	31	2	IN6+	RX6	
	32	1	IN6-		
	15	5	OUT7-	TX7	Channel 7
	16	4	OUT7+		
	33	2	IN7+	RX7	
	34	1	IN7-		
	17	5	OUT8-	TX8	Channel 8
	18	4	OUT8+		
	35	2	IN8+	RX8	
	36	1	IN8-		

Note

RJ45 PIN 5 and PIN 4 are in twisted pair mode. RJ45 PIN 2 and PIN 1 are in twisted pair mode.

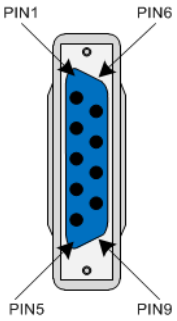
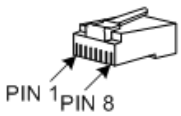
7.2.3 CBL-E1-DB9M/4BNCF

Figure	PIN	Signal	Definition	Channel
DB9M 	1	IN1+	RX1	Channel 1
	6	IN1-		
	2	OUT1+	TX1	
	7	OUT1-		
	3	IN2+	RX2	Channel 2
	8	IN2-		
	4	OUT2+	TX2	
	9	OUT2-		

Note

- It is connected to the core of coaxial cables if marked plus (+); namely, the PIN is welded with the core of the coaxial cable.
- It is connected to the shielding layer of coaxial cables if marked hyphen (-); namely, the PIN is welded with the shielding layer of the coaxial cable.
- The wiring is also applicable to the CBL-E1-DB9M/4BNCM.

7.2.4 CBL-E1-DB9M/2RJ45

Figure	DB9M PIN	RJ45 PIN	Signal	Definition	Channel
DB9M  RJ45 	7	5	OUT1-	TX1	Channel 1
	2	4	OUT1+		
	1	2	IN1+	RX1	
	6	1	IN1-		
	9	5	OUT2-	TX2	Channel 2
	4	4	OUT2+		
	3	2	IN2+	RX2	
	8	1	IN2-		

Note

RJ45 PIN 5 and PIN 4 are in twisted pair mode. RJ45 PIN 2 and PIN 1 are in twisted pair mode.

7.2.5 CBL-VOICE-SCSI50M(40)/NC

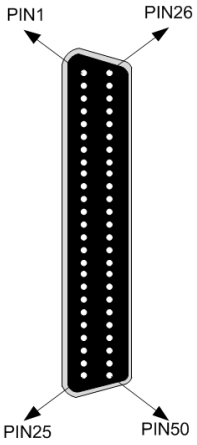
Figure	PIN	Cable color	E&M Channel	Description
SCSI50M 	1	White background with blue loop	Channel 1	• Audio RX A in 4-wire mode • Idle in 2-wire mode
	2	Blue background with white loop		• Audio RX B in 4-wire mode • Idle in 2-wire mode
	26	White background with orange loop		• Audio TX A in 4-wire mode • Audio TX/RX A in 2-wire mode
	27	Orange background with white loop		• Audio TX B in 4-wire mode • Audio TX/RX B in 2-wire mode
	3	White background with green loop		M signaling cable
	4	Green background with white loop		E signaling cable
	28	White background with brown loop	Channel 2	• Audio RX A in 4-wire mode • Idle in 2-wire mode
	29	Brown background with white loop		• Audio RX B in 4-wire mode • Idle in 2-wire mode
	5	White background with grey loop		• Audio TX A in 4-wire mode • Audio TX/RX A in 2-wire mode
	6	Grey background with white loop		• Audio TX B in 4-wire mode • Audio TX/RX B in 2-wire mode
	30	Red background with blue loop		M signaling cable
	31	Blue background with red loop		E signaling cable
	7	Red background with orange loop	Channel 3	• Audio RX A in 4-wire mode • Idle in 2-wire mode
	8	Orange background with red loop		• Audio RX B in 4-wire mode • Idle in 2-wire mode
	32	Red background with green loop		• Audio TX A in 4-wire mode • Audio TX/RX A in 2-wire mode
	33	Green background with red loop		• Audio TX B in 4-wire mode • Audio TX/RX B in 2-wire mode

Figure	PIN	Cable color	E&M Channel	Description
	9	Red background with brown loop		M signaling cable
	10	Brown background with red loop		E signaling cable
	34	Red background with grey loop	Channel 4	• Audio RX A in 4-wire mode • Idle in 2-wire mode
	35	Grey background with red loop		• Audio RX B in 4-wire mode • Idle in 2-wire mode
	11	Black background with blue loop		• Audio TX A in 4-wire mode • Audio TX/RX A in 2-wire mode
	12	Blue background with black loop		• Audio TX B in 4-wire mode • Audio TX/RX B in 2-wire mode
	36	Black background with orange loop		M signaling cable
	37	Orange background with black loop		E signaling cable
	13	Black background with green loop	Channel 5	• Audio RX A in 4-wire mode • Idle in 2-wire mode
	14	Green background with black loop		• Audio RX B in 4-wire mode • Idle in 2-wire mode
	38	Black background with brown loop		• Audio TX A in 4-wire mode • Audio TX/RX A in 2-wire mode
	39	Brown background with black loop		• Audio TX B in 4-wire mode • Audio TX/RX B in 2-wire mode
	15	Black background with grey loop		M signaling cable
	16	Grey background with black loop		E signaling cable
	40	Yellow background with blue loop	Channel 6	• Audio RX A in 4-wire mode • Idle in 2-wire mode
	41	Blue background with yellow loop		• Audio RX B in 4-wire mode • Idle in 2-wire mode
	17	Yellow background with orange loop		• Audio TX A in 4-wire mode • Audio TX/RX A in 2-wire mode
	18	Orange background with yellow loop		• Audio TX B in 4-wire mode • Audio TX/RX B in 2-wire mode
	42	Yellow background with green loop		M signaling cable

Figure	PIN	Cable color	E&M Channel	Description
	43	Green background with yellow loop		E signaling cable
	19	Yellow background with brown loop	Channel 7	• Audio RX A in 4-wire mode • Idle in 2-wire mode
	20	Brown background with yellow loop		• Audio RX B in 4-wire mode • Idle in 2-wire mode
	44	Yellow background with grey loop		• Audio TX A in 4-wire mode • Audio TX/RX A in 2-wire mode
	45	Grey background with yellow loop		• Audio TX B in 4-wire mode • Audio TX/RX B in 2-wire mode
	21	Purple background with blue loop		M signaling cable
	22	Blue background with purple loop		E signaling cable
	46	Purple background with orange loop	Channel 8	• Audio RX A in 4-wire mode • Idle in 2-wire mode
	47	Orange background with purple loop		• Audio RX B in 4-wire mode • Idle in 2-wire mode
	23	Purple background with green loop		• Audio TX A in 4-wire mode • Audio TX/RX A in 2-wire mode
	24	Green background with purple loop		• Audio TX B in 4-wire mode • Audio TX/RX B in 2-wire mode
	48	Purple background with brown loop		M signaling cable
	49	Brown background with purple loop		E signaling cable
	25	Purple background with grey loop	–	Idle
	50	Grey background with purple loop	–	Idle

Note

The cable supports up to 8 E&M channels.

7.2.6 CBL-EM-HDB26M/NC

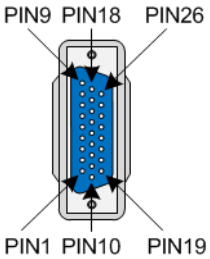
Figure	PIN	Cable color	E&M Channel	Description
HDB26M 	7	White background with blue loop	Channel 1	• Audio RX A in 4-wire mode • Idle in 2-wire mode
	17	Blue background with white loop		• Audio RX B in 4-wire mode • Idle in 2-wire mode
	8	White background with orange loop		• Audio TX A in 4-wire mode • Audio TX/RX A in 2-wire mode
	18	Orange background with white loop		• Audio TX B in 4-wire mode • Audio TX/RX B in 2-wire mode
	25	White background with green loop		M signaling cable
	26	Green background with white loop		E signaling cable
	5	White background with brown loop	Channel 2	• Audio RX A in 4-wire mode • Idle in 2-wire mode
	15	Brown background with white loop		• Audio RX B in 4-wire mode • Idle in 2-wire mode
	6	White background with grey loop		• Audio TX A in 4-wire mode • Audio TX/RX A in 2-wire mode
	16	Grey background with white loop		• Audio TX B in 4-wire mode • Audio TX/RX B in 2-wire mode
	23	Red background with blue loop		M signaling cable
	24	Blue background with red loop		E signaling cable
	3	Red background with orange loop	Channel 3	• Audio RX A in 4-wire mode • Idle in 2-wire mode
	13	Orange background with red loop		• Audio RX B in 4-wire mode • Idle in 2-wire mode
	4	Red background with green loop		• Audio TX A in 4-wire mode • Audio TX/RX A in 2-wire mode
	14	Green background with red loop		• Audio TX B in 4-wire mode • Audio TX/RX B in 2-wire mode
	21	Red background with brown loop		M signaling cable
	22	Brown background with red loop		E signaling cable

Figure	PIN	Cable color	E&M Channel	Description
	1	Red background with grey loop	Channel 4	• Audio RX A in 4-wire mode • Idle in 2-wire mode
	11	Grey background with red loop		• Audio RX B in 4-wire mode • Idle in 2-wire mode
	2	Black background with blue loop		• Audio TX A in 4-wire mode • Audio TX/RX A in 2-wire mode
	12	Blue background with black loop		• Audio TX B in 4-wire mode • Audio TX/RX B in 2-wire mode
	19	Black background with orange loop		M signaling cable
	20	Orange background with black loop		E signaling cable
	9	Black background with green loop	-	Idle
	10	Green background with black loop	-	Idle

7.2.7 CBL-V35-HDB26M/2M34F

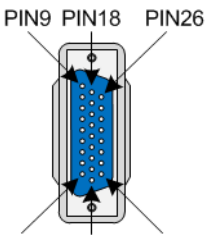
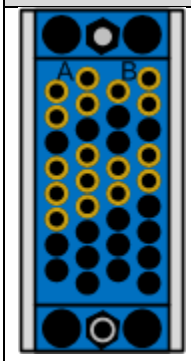
Figure	HDB26 PIN	M34 PIN (Channel 1)	Definition (Channel 1)	M34 PIN (Channel 2)	Definition (Channel 2)
HDB26M  M34F	1	A	PGND	–	–
	2	P	TD (A)	–	–
	3	R	RD (A)	–	–
	4	–	–	–	–
	5	–	–	R	RD (A)
	6	–	–	T	RD (B)
	7	B	GND	–	–
	8	–	–	V	RCP (A)
	9	–	–	X	RCP (B)
	10	–	–	P	TD (A)
	11	S	TD (B)	–	–
	12	–	–	U	SCTE (A)
	13	–	–	W	SCTE (B)

Figure	HDB26 PIN	M34 PIN (Channel 1)	Definition (Channel 1)	M34 PIN (Channel 2)	Definition (Channel 2)
	14	–	–	Y	TCP (A)
	15	Y	TCP (A)	–	–
	16	W	SCTE (B)	–	–
	17	V	RCP (A)	–	–
	18	–	–	A	PGND
	19	–	–	S	TD (B)
	20	–	–	–	–
	21	T	RD (B)	–	–
	22	–	–	AA	TCP (B)
	23	AA	TCP (B)	–	–
	24	U	SCTE (A)	–	–
	25	X	RCP (B)	–	–
	26	–	–	B	GND

Note

- The M34 PIN complies with ISO 2593 standard.
- The cable belongs to the V.35 service cable which does not support hot swapping.
- The wiring is also applicable to the CBL-V35-HDB26M/2M34M.

7.2.8 CBL-V35-HDB26M/M34F

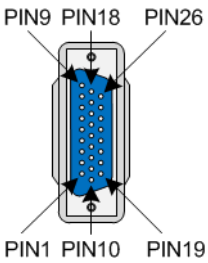
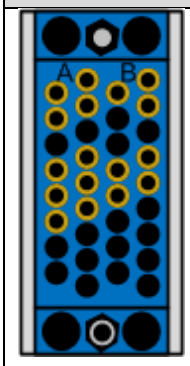
Figure	HDB26 PIN	M34 PIN	Definition
HDB26M  M34F	1	A	PGND
	2	P	TD (A)
	3	R	RD (A)
	4	C	RTS
	5	D	CTS
	6	E	DSR
	7	B	GND
	8	F	DCD
	9	–	–
	10	–	–

Figure	HDB26 PIN	M34 PIN	Definition
	11	S	TD (B)
	12	–	–
	13	–	–
	14	–	–
	15	Y	TCP (A)
	16	W	SCTE (B)
	17	V	RCP (A)
	18	–	–
	19	–	–
	20	H	DTR
	21	T	RD (B)
	22	–	–
	23	AA	TCP (B)
	24	U	SCTE (A)
	25	X	RCP (B)
	26	–	–

Note

- The M34 PIN complies with ISO 2593 standard.
- The cable belongs to the V.35 service cable which does not support hot swapping.
- The wiring is also applicable to the CBL-V35-HDB26M/M34M.

7.2.9 CBL-V24-HDB26M/4DB25F

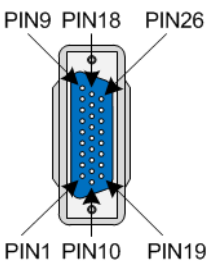
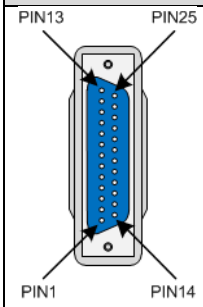
Figure	HDB26M PIN	DB25F PIN	Definition	Channel
HDB26M  DB25F	Connected to the shell	1	–	Channel 1
	7	3	TX1	
	17	2	RX1	
	8	15, 17 (two pins are short connected)	TC1	
	18	24	RC1	
	25, 26	7 (two pins share PIN 7)	GND1	

Figure	HDB26M PIN	DB25F PIN	Definition	Channel
	Connected to the shell	1	–	Channel 2
	5	3	TX2	
	15	2	RX2	
	6	15, 17 (two pins are short connected)	TC2	
	16	24	RC2	
	23, 24	7 (two pins share PIN 7)	GND2	
	Connected to the shell	1	–	Channel 3
	3	3	TX3	
	13	2	RX3	
	4	15, 17 (two pins are short connected)	TC3	
	14	24	RC3	
	21, 22	7 (two pins share PIN 7)	GND3	
	Connected to the shell	1	–	Channel 4
	1	3	TX4	
	11	2	RX4	
	2	15, 17 (two pins are short connected)	TC4	
	12	24	RC4	
	19, 20	7 (two pins share PIN 7)	GND4	

Note

The wiring is also applicable to the CBL-V24-HDB26M/4DB25M.

7.3 Terms

1+1 protection	A 1+1 protection architecture has one normal traffic signal, one working transport entity, one protection transport entity, and a permanent bridge. At the source end, the normal traffic signal is permanently bridged to both the working and the protection transport entities. At the sink end, the normal traffic signal is selected from the better of the two transport entities. Due to the permanent bridging, the 1+1 protection architecture does not allow an unprotected extra traffic signal to be provided.
A	
Alarm masking	The device does not record alarms complying with the masking rules nor report the alarms to the NMS.
Automatic Laser Shutdown (ALS)	The technology that is used for automatically shutting down the laser to avoid the maintenance and operation risks when the fiber is pulled out or the output power is over great.
Auto-negotiation	The interface automatically chooses the rate and duplex mode according to the result of negotiation. The auto-negotiation process is: the interface adapts its rate and duplex mode to the highest performance according to the peer interface, that is, both ends of the link adopt the highest rate and duplex mode they both support after auto-negotiation.
B	
Bracket	Small parts at both sides of the chassis, used to install the chassis into the cabinet
C	
Cyclic Redundancy Check (CRC)	The sender calculates a checksum according to the transmitted data before transmission. Then the checksum is transmitted with the data. The receiver adopts the same algorithm to calculate the checksum of the transmitted data. If the checksum of both the sender and receiver is identical, the transmission is accurate.
E	
Error code	Bits of the received and sent signals are inconsistent with each other.
Ethernet	It is founded by Xerox Corporation and defined by DEC, Intel, and Xerox. Ethernet is the most widely used LAN. Its rates include 10 Mbit/s, 100 Mbit/s, and 1000 Mbit/s. Ethernet adopts CSMA/CD mechanism and complies with IEEE 802.3 standard.
ETSI 600 cabinet	Cabinet with width of 600 mm, depth of 600 mm, compliant with the ETSI standard

F

Frame	It is a data transmission unit, composed of several parts, each of which has different functions.
Full duplex	In a communication link, both parties can receive and send data concurrently.

G

Ground cable	The cable to connect the device to ground, usually a yellow/green coaxial cable. Connecting the ground cable properly is an important guarantee to lightning protection, anti-electric shock, and anti-interference.

H

Half duplex	In a communication link, both parties can receive or send data at a time.

I

Institute of Electrical and Electronics Engineers (IEEE)	A professional society serving electrical engineers through its publications, conferences, and standards development activities. The body responsible for the Ethernet 802.3 and wireless LAN 802.11 specifications.
ITU-T	International Telecommunication Union Telecommunication Standardization Sector

L

Label	Symbols for cable, chassis, and warnings
Loopback	It is the process that a signal is sent out and then sent back to the sender. It is used to detect and analyze potential faults in a ring network.

M

Multi-mode fiber	In this fiber, multi-mode optical signals are transmitted.
Multiplexing	Multiplexing is a method by which multiple analog message signals or digital data streams are combined into one signal over a shared medium. Generally, it is used to adapt multiple lower-order path layer signals into a higher-order path or the multiple higher-order path layer signals into a multiplex section.

Multiplex Section Protection (MSP)	MSP is based on multiplex sections. Whether to perform switching depends on the quality of multiplex section signals. Switching is initiated by the APS protocol carried by the Multiplex Section Overhead (MSOH). If a multiplex section fails, service signals of the whole STM-N are switched to the backup channel.

R

RS232	It is an Asynchronous Transfer Mode (ATM), which does not contain hand-shaking signals. It can carry on point-to-point communication with RS232 and RS422 of other stations and the transmission is transparent.
RS422	It is used to define the balanced circuit specification of electrical parameters. The interface can change to RS232 through the jumper. Others are identical with RS232.

S

Single-mode fiber	In this fiber, single-mode optical signals are transmitted.
Slot	Time is divided into periodical frames. Each frame is divided into several timeslots. Each timeslot is a communication channel assigned to a user.
Subnetwork Connection Protection (SNCP)	Transport entity protection for the case where the transport entity is a subnetwork connection. The serial compound link connection within the subnetwork connection is protected by adding bridges and selectors in the connection functions at the edges of the protected domain and an additional serial compound link connection between these connection functions.

T

Timeslot	Time is divided into periodical frames. Each frame is divided into multiple timeslots. Each timeslot is a communication channel which can be assigned to a user.
Timeslot cross connection	With synchronous multiplexing mode and flexible mapping structure, the SDH network can multiplex low-rate PDH tributary signals (such as, 2 Mbit/s) into SDH frames (STM-N). In this way, low-rate signals of different systems can be transmitted on the SDH network.

7.4 Acronyms and abbreviations

A

A/D	Analog/Digital
ACL	Access Control List
ALS	Automatic Laser Shutdown
AWG	American wire gauge

B

BITS	Building Integrated Timing Supply System
BPDU	Bridge Protocol Data Unit

D

D/A	Digital/Analog
DCE	Data Connection Equipment
DTE	Data Terminal Equipment

E

EMC	Electromagnetic Compatibility
ESD	Electro Static Discharge
ETSI	European Telecommunications Standards Institute

F

FE	Fast Ethernet

G

GE	Gigabit Ethernet

H

HDB3	High Density Bipolar of Order 3 Code

I

IEC	International Electrotechnical Commission

L

LACP	Link Aggregation Control Protocol
LCAS	Link capacity adjustment scheme

N

NRZ	Non Return to Zero

O

OAM	Operation, Maintenance, and Management

P

PDH	Plesiochronous Digital Hierarchy
PSTN	Public Switched Telephone Network

Q

QoS	Quality of Service

R

RH	Relative Humidity

S

SDH	Synchronous Digital Hierarchy
SerDes	SERializer/DESerializer
SFP	Small Form-factor Pluggable
SGMII	Serial Gigabit Media Independent Interface
SNCP	Sub-Network Connection Protection
SNMP	Simple Network Management Protocol
STM-N	Synchronous Transport Module Level-N

V

VC	Virtual Container
VCXO	Voltage Controled X-tal Oscillator
VLAN	Virtual LAN

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