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# **RCMS 2811 Multi Service Fiber Optical Ethernet Multiplexer User Manual**

XX-XXXX-XXXX-XXXXXX-XX



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Comments and questions about how the NView iEMS system software works are welcomed. Please review the FAQ in the related manual, and if your question is not covered, send email by using the following web page:

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If you have comments on the NView iEMS specification, instead of the web page above, please send comments to:

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We hope to hear from you!

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# Preface

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## About This Manual

This manual introduces primary functions of the configuration management software for RC series products.

## Who Should Read This Manual

Sales and marketing engineers, after service staff and telecommunication network design engineers could use this manual as a valuable reference. If you want to get an overview on features, applications, architectures and specifications of Raisecom RC series integrated access devices, you could find useful information in this manual as well.

## Compliance

The RC series products developed by Raisecom are strictly complied with the following standards as well as ITU-T, IEEE, IETF and related standards from other international telecommunication standard organizations:

YD/T900-1997 SDH Equipment Technical Requirements - Clock

YD/T973-1998 SDH 155Mb/s and 622Mb/s Technical conditions of optical transmitter module and receiver module

YD/T1017-1999 Network node interface for the Synchronous Digital Hierarchy (SDH)

YD/T1022-1999 Requirement of synchronous digital hierarchy (SDH) equipment function

YD/T1078-2000 SDH Transmission Network Technique Requirements-Interworking of Network Protection Architectures

YD/T1111.1-2001 Technical Requirements of SDH Optical Transmitter/Optical Receiver Modules——2.488320 Gb/s Optical Receiver Modules

YD/T1111.2- 2001 Technical Requirements of SHD Optical Transmitter/Optical Receiver Modules——2.488320 Gb/s Optical Transmitter Modules

YD/T1179- 2002 Technical Specification of Ethernet over SDH

G.703 Physical/electrical characteristics of hierarchical digital interfaces

G.704 Synchronous frame structures used at 1544, 6312, 2048, 8448 and 44 736 kbit/s hierarchical levels

G.707 Network node interface for the synchronous digital hierarchy (SDH)

G.774 Synchronous digital hierarchy (SDH) - Management information model for the network element view

G.781 Synchronization layer functions

G.783 Characteristics of synchronous digital hierarchy (SDH) equipment functional blocks

G.784 Synchronous digital hierarchy (SDH) management

G.803 Architecture of transport networks based on the synchronous digital hierarchy (SDH)

G.813 Timing characteristics of SDH equipment slave clocks (SEC)

G.823 The control of jitter and wander within digital networks which are based on the 2048 kbit/s hierarchy

G.825 The control of jitter and wander within digital networks which are based on the synchronous digital hierarchy (SDH)

G.826 End-to-end error performance parameters and objectives for international, constant bit-rate digital paths and connections

G.828 Error performance parameters and objectives for international, constant bit-rate synchronous digital paths

G.829 Error performance events for SDH multiplex and regenerator sections

G.831 Management capabilities of transport networks based on the synchronous digital hierarchy (SDH)

G.841 Types and characteristics of SDH network protection architectures

G.842 Interworking of SDH network protection architectures

G.957 Optical interfaces for equipments and systems relating to the synchronous digital hierarchy

G.691 Optical interfaces for single channel STM-64 and other SDH systems with optical amplifiers

G.664 Optical safety procedures and requirements for optical transport systems

I.731 ATM Types and general characteristics of ATM equipment

I.732 ATM Functional characteristics of ATM equipment

IEEE 802.1Q Virtual Local Area Networks (LANs)

IEEE 802.1p Traffic Class Expediting and Dynamic Multicast Filtering

IEEE 802.3 CSMA/CD Access Method and Physical Layer Instruction



# Chapter 1 System Overview

RCMS2811 is an ideal transmission device of optical fiber for point-to-point networks, medium-sized and small capacity networks, such as wireless communication base stations, private communication networks and switch networks. It can be applied to either public networks or various private networks.

The transmission capacity of RCMS2811 is optional. The maximum capacity is 16 E1 channels and one Fast Ethernet ports. RCMS2811 can be remotely managed.

- ✧ Main Features
- ✧ Device Part Number Description
- ✧ RCMS Series Model List

## Main Features

The device’s main features include:

- Low power consumption due to extra large-scale ASIC chips; high reliability due to 4-layer PCB
- Provide local/remote network management
- Alarm indicators of local and remote equipments
- Remote device power off alarm
- Support ALS function
- Provide two fiber optical interface for redundant fiber optic link to improve stability
- Provide maximum 16 E1 interfaces (2048Kbps), transparent mode
- Local/remote E1 channel loop-back test function, easy fault location
- One 10/100Mbps auto-negotiation Ethernet port
- Support auto-negotiation and force working mode of Ethernet port
- The maximum Ethernet frame size is 1916 bytes
- Support flow control of IEEE802.3x in full duplex mode and back pressure in half duplex mode
- One extend slot can be used for one channel V.35 service
- Redundant power supply of 220V, -48V and +24V.
- Power consumption <10W, good working stability

## Device Part Number Description

RCMS2811 series standalone Ethernet multiplexer’s part number is defined as the following rules:

RCMS2811 - A - B - C - D

Here A, B, C and D are alterable in the part number.

A: 120FE, 240FE and 480FE.

120FE/240FE/480FE means there are 4/8/16 channels E1 services and one Ethernet.

B:

Blank means E1 is 75 Ω unbalanced interface;

BL means E1 is 120 Ω balanced interface.

Note: As to the 4 E1 channels multiplexer, it has both balanced and unbalanced E1 interface so it has no B option.

C: M, S1, S2, S3, SS1 and SS2

M means the optical port is dual-strand multi-mode and the transmission distance is 0-2km;

S1 means the optical port is dual-strand single mode and the transmission distance is 0-25km;

S2 means the optical port is dual-strand single mode and the transmission distance is 10-60km;

S3 means the optical port is dual-strand single mode and the transmission distance is 15-120km;

SS1 means the optical port is single strand single mode dual wavelength and the transmission distance is 0-25km. The Tx wavelength of optical port A is 1310nm and port B is 1550nm;

SS2 means the optical port is single strand single mode dual wavelength and the transmission distance is 10-50km. The Tx wavelength of optical port A is 1310nm and port B is 1550nm;

D: AC, DC48 and DC24.

AC means the power supply is AC;

DC48 means the power supply is DC -48V;

DC24 means the power supply is DC +24V.

Part number example:

RCMS 2811-240FE-BL-S1-AC

The specification of this device is: standalone 19 inches, 8 channels 120 Ω balanced E1 interfaces, one Fast Ethernet interface, one extend slot ( can insert V.35 card), transmission distance is 0-25km, two 220V AC power supplies.

## RCMS2811 Series Model List

The RCMS series standalone dual optical port Ethernet multiplexer has 5 models as below table:

Part Number	Description
RCMS2811-240FE-BL	One 10/100Mbps auto-negotiation Ethernet port(RJ45), 8 E1 interfaces, 120 Ω balanced (RJ45).
RCMS2811-480FE-BL	One 10/100Mbps auto-negotiation Ethernet port(RJ45), 16 E1 interfaces, 120 Ω balanced (RJ45).
RCMS2811-120FE	One 10/100Mbps auto-negotiation Ethernet port(RJ45),4 E1 interfaces, both 120 Ω balanced (RJ45) and 75 Ω unbalanced (BNC).
RCMS2811-240FE	One 10/100Mbps auto-negotiation Ethernet port(RJ45), 8 E1 interfaces, 75 Ω unbalanced (DB37).
RCMS2811-480FE	One 10/100Mbps auto-negotiation Ethernet port(RJ45), 16 E1 interfaces, 75 Ω unbalanced (DB37).



## Chapter 2 Parameters

This section contains the following information:

- ✧ Basic Configuration
- ✧ Optical Port Characteristic
- ✧ E1 Port Characteristic
- ✧ Fast Ethernet Port Characteristic
- ✧ PC Agent Network Management
- ✧ V.35 Interface Characteristic
- ✧ Power Supply
- ✧ Ambience
- ✧ Dimension & Weight

### Basic Configuration

The device's basic configuration is as below:

- 2 optical ports, 4/8/16 E1 interfaces, one Fast Ethernet port and one extend slot for V.35 card;
- Power supply: 220VAC, -48VDC and +24VDC;
- Management port: PC Agent port.

### Optical Port Characteristic

- Rate: 150Mbps;
- Line Code: NRZ plus scrambling code
- Optical port mode: SC connector ( FC connector can be optional)

### E1 Port Characteristic

- Bit rate: 2048Kbps±50ppm
- Line code: HDB3
- Impedance of interface: 75Ω (unbalanced BNC interface) or 120Ω (balanced RJ-45 interface)
- Electrical characteristics: complies with ITU-T G.703
- Jitter Transfer characteristics: complies with ITU-T G.823
- Input jitter tolerance: complies with ITU-T G.823

### Fast Ethernet Port Characteristic

- Port Type: RJ45;
- Complied with IEEE802.3 standard;
- 10/100 auto-negotiation;
- MDX/MDIX auto-negotiation.

### PC Agent Network Management Port Characteristic

- Port Type: RJ45;
- Complied with RS232 standard;
- Baud Rate: 19200bps.

## V.35 Interface Characteristic

- Port Type: HDB26 Female;
- Physics Characteristic: Complied with ITU suggestion;
- Rate: E1 fractional mode V.35 rate is  $N \times 64\text{Kbps}$  ( $N=1 \sim 31$ ) ;  
E1 unframed mode V.35 rate is 2048Kbps.

## Power Supply

- Power supply voltage:  
DC: -48V Voltage: -36V ~ -72V;  
DC: +24V Voltage: +18V ~ +36V;  
AC: 220V Voltage: 180V ~ 260V.
- Power consumption: <10 W

## Ambience

- Temperature: 0 ~ 45°C
- Humidity: ≤90% (25°C)

## Dimension & Weight

- Dimension: 440mm (W) × 43.6mm (H) × 235mm (D);
- Weight: 3Kg (including sub card).

# Chapter 3 How to use

This Chapter introduces configuration and operation of RCMS2811 series five types' devices:

- ✧ Panel Introduction
- ✧ E1 Loop-back Test
- ✧ Application Example

## Panel Introduction

### RCMS2811 Series Front Panel



Figure 3-1 RCMS 2811-480FE-BL Front Panel



Figure 3-2 RCMS 2811-480FE Front Panel



Figure 3-3 RCMS 2811-240FE-BL Front Panel



Figure 3-4 RCMS 2811-240FE Front Panel

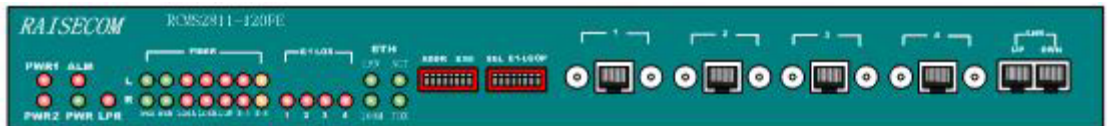


Figure 3-5 RCMS 2811-120FE Front Panel



3	ALM	RED	General Alarm Indicator It is stably on when there is a local alarm; It is flash when there is remote alarm but no local alarm; It is stably on when there are both local and remote alarm; It is off when there is no local or remote alarm.
4	PWR	GREEN	Power Indicator. It is on when the power supply works normally.
5	LPR	RED	Remote device power off indicator It is on when remote device power off after local and remote devices works normally; It is stably off on other conditions.
6	L WKA	GREEN	It is on when local optical port A is working.
7	R WKA	GREEN	It is on when remote optical port A is working.
8	L WKB	GREEN	It is on when local optical port B is working.
9	R WKB	GREEN	It is on when remote optical port B is working.
10	L LOSA	RED	It is on when the Rx signal of local optical port A is lost.
11	R LOSA	RED	It is on when the Rx signal of remote optical port A is lost.
12	L LOSB	RED	It is on when the Rx signal of local optical port B is lost.
13	R LOSB	RED	It is on when the Rx signal of remote optical port B is lost.
14	L LOF	RED	It is on when there is loss of frame alarm in local optical Rx signal.
15	R LOF	RED	It is on when there is loss of frame alarm in remote optical Rx signal.
16	L E-3	RED	It is on when the bit error rate of local optical Rx signal is beyond 1E-3.
17	R E-3	RED	It is on when the bit error rate of remote optical Rx signal is beyond 1E-3.
18	L E-6	YELLOW	It is on when the bit error rate of local optical Rx signal is beyond 1E-6.
19	R E-6	YELLOW	It is on when the bit error rate of remote optical Rx signal is beyond 1E-6.
20-35	LOS1-16	RED	1-16 E1 tributary Rx signal's LOS alarm indicator. It is on when there is LOS alarm of only local E1; It is flash when there is LOS alarm of only remote E1; It is on when there is LOS alarm of both local and remote E1; It is off when there is no LOS alarm of local or remote E1.
36	LNK	GREEN	It is on when the Ethernet port links normally; It is off when the Ethernet port doesn't link or links abnormally.
37	100M	GREEN	It is on when the working speed of Ethernet port is 100M; It is off when the working speed of Ethernet port is 10M.
38	ACT	GREEN	It is flash when there is data transmission currently; It is off when there is no data transmission currently.
39	FDX	GREEN	It is on when the Ethernet port is working on full duplex mode; It is off when the Ethernet port is working on half duplex mode; It is flash when the Ethernet port is working on half duplex mode and there is data collision.

---

**NOTE:** The upper row of indicators of "FIBER" group on front panel are local status indicators and the below ones are remote status indicators.

---

## 2. Dip-switch of system controlling

The dip-switches are used to control optical port, E1 port and Ethernet port.

*Table 3-2 RCMS 2811-480FE-BL Front Panel Description 2-ADDR Dip-switch*

NO.	Name	Bits	Description				
			Bit4	Bit3	Bit2	Bit1	Device Type
40	ADDR Dip-switch		OFF	OFF	OFF	OFF	Remote Device
			OFF	OFF	OFF	ON	The 1 <sup>st</sup> local Device
			OFF	OFF	ON	OFF	The 2 <sup>nd</sup> local Device
			OFF	OFF	ON	ON	The 3 <sup>rd</sup> local Device
			OFF	ON	OFF	OFF	The 4 <sup>th</sup> local Device
			OFF	ON	OFF	ON	The 5 <sup>th</sup> local Device
			OFF	ON	ON	OFF	The 6 <sup>th</sup> local Device

		4 bits	OFF	ON	ON	ON	The 7 <sup>th</sup> local Device
			ON	OFF	OFF	OFF	The 8 <sup>th</sup> local Device
			ON	OFF	OFF	ON	The 9 <sup>th</sup> local Device
			ON	OFF	ON	OFF	The 10 <sup>th</sup> local Device
			ON	OFF	ON	ON	The 11 <sup>th</sup> local Device
			ON	ON	OFF	OFF	The 12 <sup>th</sup> local Device
			ON	ON	OFF	ON	The 13 <sup>th</sup> local Device
			ON	ON	ON	OFF	The 14 <sup>th</sup> local Device
			ON	ON	ON	ON	The 15 <sup>th</sup> local Device
Local device can be connected by PC serial port through LNK-UP port to realize network management. Address numbers of devices which are concatenated on a PC serial port mustn't be repeated. Local concatenated devices are maximum 15pcs.							

Table 3-3 RCMS 2811-480FE-BL Front Panel Description 3-ETH Dip-switch

NO.	Name	Bits	Description
41	ETH Dip-switch	4 bits	Bit1 Ethernet port auto-negotiation configuration. Bit1 = OFF, Ethernet auto-negotiation is enable. Bit1 = ON, Ethernet auto-negotiation is disable. When the Ethernet negotiation is disabled the port's MDI/MDIX function is disabled too, so when connecting to switch the straight-through cable is needed and when connecting to NIC and router the cross-over cable is needed.
			Bit2 Ethernet port's speed configuration when auto-negotiation is disabled. When Bit1 = ON, If Bit2 = OFF the Ethernet port's speed is 100M; If Bit2 = ON the Ethernet port's speed is 10M; When Bit1 = OFF the Bit2 is invalid.
			Bit3 Ethernet port's duplex mode configuration when auto-negotiation is disabled. When Bit1 = ON, If Bit3 = OFF the Ethernet port is on full-duplex mode; If Bit3 = ON the Ethernet port is on half-duplex mode; When Bit1 = OFF the Bit3 is invalid.
			Bit4 the configuration of ALS function. Bit4 = OFF, ALS function is disable. Bit4 = ON, ALS function is enable.

Table 3-4 RCMS 2811-480FE-BL Front Panel Description 4-SEL Dip-switch

NO.	Name	Bits	Description
42	SEL Dip-switch	4 bits	Bit1, Bit2 Optical port Auto-negotiation/Force configuration. Bit1, Bit2 = OFF OFF, Optical port A and B can be chosen automatically. Bit1, Bit2 = OFF ON, Optical B is chosen. Bit1, Bit2 = ON X, Optical A is chosen.
			Bit3 mask/unmask alarm configuration of idle E1 tributary. Bit3 = OFF, unmask alarm configuration of idle E1 tributary. Bit3 = ON, mask alarm configuration of idle E1 tributary.
			Bit4 Local/Remote E1 loop-back position configuration. Bit4 = OFF, E1 remote loop-back. Bit4 = ON, E1 local loop-back.

Table 3-5 RCMS 2811-480FE-BL Front Panel Description 5-E1 Loop Dip-switch

NO.	Name	Bits	Description
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43	E1-LOOP Dip-switch	8 bits	Bit1-8 the 1 <sup>st</sup> to 8 <sup>th</sup> E1 tributary loop-back configuration. Bit1 = OFF, the 1 <sup>st</sup> E1 tributary is not loop-back; Bit1 = ON, the 1 <sup>st</sup> E1 tributary is loop-back. The configuration method of Bit2 to Bit 8 is same as Bit 1.
44	E1-LOOP Dip-switch	8 bits	Bit1-8 the 9 <sup>th</sup> to 16 <sup>th</sup> E1 tributary loop-back configuration. Bit1 = OFF, the 9 <sup>th</sup> E1 tributary is not loop-back; Bit1 = ON, the 9 <sup>th</sup> E1 tributary is loop-back. The configuration method of Bit2 to Bit 8 is same as Bit 1.

**NOTE:** The default status of all dip-switches is OFF.

### 3. Interface on front panel

There are E1 and PC-AGENT ports on front panel.

Table 3-6 RCMS 2811-480FE-BL Front Panel Description 6-Interface

NO.	Name	Bits	Description
45	1-8	RJ45	1 <sup>st</sup> -8 <sup>th</sup> tributary 120Ω E1 balanced interfaces.
46	9-16	RJ45	9 <sup>th</sup> -16 <sup>th</sup> tributary 120Ω E1 balanced interfaces.
47	LNK-UP	RJ45	Local network management interface. LNK-UP connects to PC serial port or connects to upper device's LNK-DWN interface when concatenating.
	LNK-DWN	RJ45	LNK-DWN connects to upper device's LNK-UP interface when concatenating. It complies with RS232 electrical standard and the baud rate is 19200bps.

**NOTE:** 1. Hot-swapping of LNK-UP and LNK-DWN interfaces is forbidden.  
2. Hot-swapping of sub-card interface on back panel is forbidden.

### RCMS 2811-480FE Device Operation Introduction

The operation introduction is same as RCMS2811-480FE-BL except for E1 interface description.

Table 3-7 RCMS 2811-480FE Front Panel Description 1-Interface

NO.	Name	Bits	Description
45	1-8	DB37	1 <sup>st</sup> -8 <sup>th</sup> tributary 75Ω E1 unbalanced interfaces.
46	9-16	DB37	9 <sup>th</sup> -16 <sup>th</sup> tributary 75Ω E1 unbalanced interfaces.

### RCMS 2811-240FE-BL Device Operation Introduction

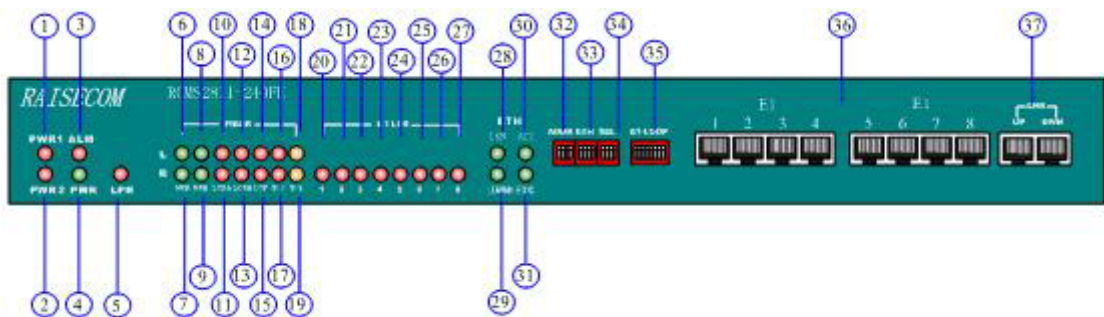


Figure 3-9 RCMS 2811-240FE-BL Front Panel Description

## 1. System Indicator

The System indicators mainly indicate the working status of optical port, E1 port and Ethernet port.

Table 3-8 RCMS 2811-240FE-BL Front Panel Description 1-Indicator

No.	Name	Color	Description
1	PWR1	RED	The 1 <sup>st</sup> power alarm indicator It is on when the 1 <sup>st</sup> power is not linked or working abnormally. It is off when the 1 <sup>st</sup> power works normally.
2	PWR2	RED	The 2 <sup>nd</sup> power alarm indicator It is on when the 2 <sup>nd</sup> power is not linked or working abnormally. It is off when the 2 <sup>nd</sup> power works normally.
3	ALM	RED	General Alarm Indicator It is stably on when there is a local alarm; It is flash when there is remote alarm but no local alarm; It is stably on when there are both local and remote alarm; It is off when there is no local or remote alarm. <i>Note: It is not include the loss of unworking fiber port.</i>
4	PWR	GREEN	Power Indicator. It is on when the power supply works normally.
5	LPR	RED	Remote device power off indicator It is on when remote device power off after local and remote devices works normally; It is stably off on other conditions.
6	L WKA	GREEN	It is on when local optical port A is working.
7	R WKA	GREEN	It is on when remote optical port A is working.
8	L WKB	GREEN	It is on when local optical port B is working.
9	R WKB	GREEN	It is on when remote optical port B is working.
10	L LOSA	RED	It is on when the Rx signal of local optical port A is lost.
11	R LOSA	RED	It is on when the Rx signal of remote optical port A is lost.
12	L LOSB	RED	It is on when the Rx signal of local optical port B is lost.
13	R LOSB	RED	It is on when the Rx signal of remote optical port B is lost.
14	L LOF	RED	It is on when there is loss of frame alarm in local optical Rx signal.
15	R LOF	RED	It is on when there is loss of frame alarm in remote optical Rx signal.
16	L E-3	RED	It is on when the bit error rate of local optical Rx signal is beyond 1E-3.
17	R E-3	RED	It is on when the bit error rate of remote optical Rx signal is beyond 1E-3.
18	L E-6	YELLOW	It is on when the bit error rate of local optical Rx signal is beyond 1E-6.
19	R E-6	YELLOW	It is on when the bit error rate of remote optical Rx signal is beyond 1E-6.
20-27	LOS1-8	RED	1-8 E1 tributary Rx signal's LOS alarm indicator. It is on when there is LOS alarm of only local E1; It is flash when there is LOS alarm of only remote E1; It is on when there is LOS alarm of both local and remote E1; It is off when there is no LOS alarm of local or remote E1.
28	LNK	GREEN	It is on when the Ethernet port links normally; It is off when the Ethernet port doesn't link or links abnormally.
29	100M	GREEN	It is on when the working speed of Ethernet port is 100M; It is off when the working speed of Ethernet port is 10M.
30	ACT	GREEN	It is flash when there is data transmission currently; It is off when there is no data transmission currently.
31	FDX	GREEN	It is on when the Ethernet port is working on full duplex mode; It is off when the Ethernet port is working on half duplex mode; It is flash when the Ethernet port is working on half duplex mode and there is data collision.

## 2. Dip-switch of system controlling

The dip-switches are used to control optical port, E1 port and Ethernet port.

Table 3-9 RCMS 2811-240FE-BL Front Panel Description 2-ADDR Dip-switch

NO.	Name	Bits	Description
-----	------	------	-------------



32	ADDR Dip-switch	4 bits	Bit4	Bit3	Bit2	Bit1	Device Type
			OFF	OFF	OFF	OFF	Remote Device
			OFF	OFF	OFF	ON	The 1 <sup>st</sup> local Device
			OFF	OFF	ON	OFF	The 2 <sup>nd</sup> local Device
			OFF	OFF	ON	ON	The 3 <sup>rd</sup> local Device
			OFF	ON	OFF	OFF	The 4 <sup>th</sup> local Device
			OFF	ON	OFF	ON	The 5 <sup>th</sup> local Device
			OFF	ON	ON	OFF	The 6 <sup>th</sup> local Device
			OFF	ON	ON	ON	The 7 <sup>th</sup> local Device
			ON	OFF	OFF	OFF	The 8 <sup>th</sup> local Device
			ON	OFF	OFF	ON	The 9 <sup>th</sup> local Device
			ON	OFF	ON	OFF	The 10 <sup>th</sup> local Device
			ON	OFF	ON	ON	The 11 <sup>th</sup> local Device
			ON	ON	OFF	OFF	The 12 <sup>th</sup> local Device
			ON	ON	OFF	ON	The 13 <sup>th</sup> local Device
			ON	ON	ON	OFF	The 14 <sup>th</sup> local Device
ON	ON	ON	ON	The 15 <sup>th</sup> local Device			
Local device can be connected by PC serial port through LNK-UP port to realize network management. Address numbers of devices which are concatenated on a PC serial port mustn't be repeated. Local concatenated devices are maximum 15pcs.							

Table 3-10 RCMS 2811-240FE-BL Front Panel Description 3-ETH Dip-switch

NO.	Name	Bits	Description
33	ETH Dip-switch	4 bits	Bit1 Ethernet port auto-negotiation configuration. Bit1 = OFF, Ethernet auto-negotiation is enable. Bit1 = ON, Ethernet auto-negotiation is disable. When the Ethernet negotiation is disabled the port's MDI/MDIX function is disabled too, so when connecting to switch the straight-through cable is needed and when connecting to NIC and router the cross-over cable is needed.
			Bit2 Ethernet port's speed configuration when auto-negotiation is disabled. When Bit1 = ON, If Bit2 = OFF the Ethernet port's speed is 100M; If Bit2 = ON the Ethernet port's speed is 10M; When Bit1 = OFF the Bit2 is invalid.
			Bit3 Ethernet port's duplex mode configuration when auto-negotiation is disabled. When Bit1 = ON, If Bit3 = OFF the Ethernet port is on full-duplex mode; If Bit3 = ON the Ethernet port is on half-duplex mode; When Bit1 = OFF the Bit3 is invalid.
			Bit4 The configuration of ALS function. Bit4 = OFF, ALS function is disable. Bit4 = ON, ALS function is enable.

Table 3-11 RCMS 2811-240FE-BL Front Panel Description 4-SEL Dip-switch

NO.	Name	Bits	Description
34	SEL Dip-switch	4 bits	Bit1, Bit2 Optical port Auto-negotiation/Force configuration. Bit1, Bit2 = OFF OFF, Optical port A and B can be chosen automatically. Bit1, Bit2 = OFF ON, Optical B is chosen. Bit1, Bit2 = ON X, Optical A is chosen.
			Bit3 mask/unmask alarm configuration of idle E1 tributary. Bit3 = OFF, unmask alarm configuration of idle E1 tributary. Bit3 = ON, mask alarm configuration of idle E1 tributary.
			Bit4 Local/Remote E1 loop-back position configuration. Bit4 = OFF, E1 remote loop-back. Bit4 = ON, E1 local loop-back.

Table 3-12 RCMS 2811-240FE-BL Front Panel Description 5-E1 Loop Dip-switch

NO.	Name	Bits	Description
35	E1-LOOP Dip-switch	8 bits	Bit1-8 the 1 <sup>st</sup> to 8 <sup>th</sup> E1 tributary loop-back configuration. Bit1 = OFF, the 1 <sup>st</sup> E1 tributary is not loop-back; Bit1 = ON, the 1 <sup>st</sup> E1 tributary is loop-back. The configuration method of Bit2 to Bit 8 is same as Bit 1.

3. Interface on front panel

There are E1 and PC-AGENT ports on front panel.

Table 3-13 RCMS 2811-240FE-BL Front Panel Description 6-Interface

NO.	Name	Bits	Description
36	1-8	RJ45	1 <sup>st</sup> -8 <sup>th</sup> tributary 120Ω E1 balanced interfaces.
37	LNK-UP	RJ45	Local network management interface. LNK-UP connects to PC serial port or connects to upper device's LNK-DWN interface when concatenating.
	LNK-DWN	RJ45	LNK-DWN connects to upper device's LNK-UP interface when concatenating. It complies with RS232 electrical standard and the baud rate is 19200bps.

**RCMS 2811-240FE Device Operation Introduction**

The operation introduction is same as RCMS2811-240FE-BL except for E1 interface description.

Table 3-14 RCMS 2811-240FE Front Panel Description 1-Interface

NO.	Name	Bits	Description
45	1-8	DB37	1 <sup>st</sup> -8 <sup>th</sup> tributary 75Ω E1 unbalanced interfaces.

**RCMS 2811-120FE Device Operation Introduction**

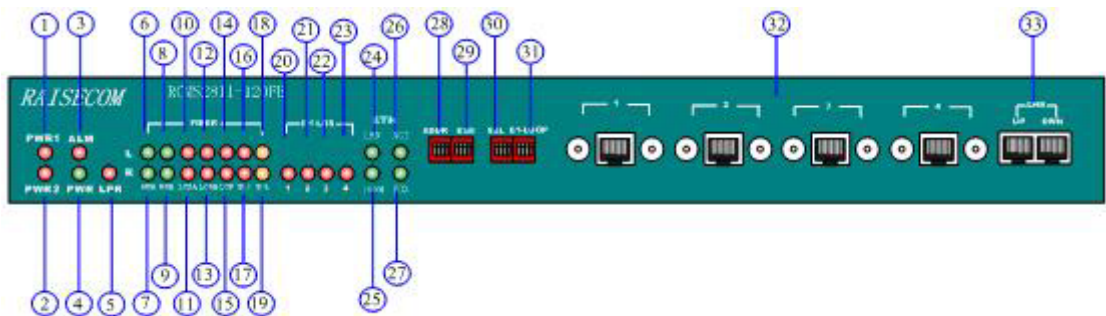


Figure 3-10 RCMS 2811-120FE Front Panel Description

1. System Indicator

The System indicators mainly indicate the working status of optical port, E1 port and Ethernet port.

Table 3-15 RCMS 2811-120FE Front Panel Description 1-Indicator

No.	Name	Color	Description
-----	------	-------	-------------

1	PWR1	RED	The 1 <sup>st</sup> power alarm indicator It is on when the 1 <sup>st</sup> power is not linked or working abnormally. It is off when the 1 <sup>st</sup> power works normally.
2	PWR2	RED	The 2 <sup>nd</sup> power alarm indicator It is on when the 2 <sup>nd</sup> power is not linked or working abnormally. It is off when the 2 <sup>nd</sup> power works normally.
3	ALM	RED	General Alarm Indicator It is stably on when there is a local alarm; It is flash when there is remote alarm but no local alarm; It is stably on when there are both local and remote alarm; It is off when there is no local or remote alarm. <i>Note: It is not include the loss of unworking fiber port.</i>
4	PWR	GREEN	Power Indicator. It is on when the power supply works normally.
5	LPR	RED	Remote device power off indicator It is on when remote device power off after local and remote devices works normally; It is stably off on other conditions.
6	L WKA	GREEN	It is on when local optical port A is working.
7	R WKA	GREEN	It is on when remote optical port A is working.
8	L WKB	GREEN	It is on when local optical port B is working.
9	R WKB	GREEN	It is on when remote optical port B is working.
10	L LOSA	RED	It is on when the Rx signal of local optical port A is lost.
11	R LOSA	RED	It is on when the Rx signal of remote optical port A is lost.
12	L LOSB	RED	It is on when the Rx signal of local optical port B is lost.
13	R LOSB	RED	It is on when the Rx signal of remote optical port B is lost.
14	L LOF	RED	It is on when there is loss of frame alarm in local optical Rx signal.
15	R LOF	RED	It is on when there is loss of frame alarm in remote optical Rx signal.
16	L E-3	RED	It is on when the bit error rate of local optical Rx signal is beyond 1E-3.
17	R E-3	RED	It is on when the bit error rate of remote optical Rx signal is beyond 1E-3.
18	L E-6	YELLOW	It is on when the bit error rate of local optical Rx signal is beyond 1E-6.
19	R E-6	YELLOW	It is on when the bit error rate of remote optical Rx signal is beyond 1E-6.
20-23	LOS1-16	RED	1-4 E1 tributary Rx signal's LOS alarm indicator. It is on when there is LOS alarm of only local E1; It is flash when there is LOS alarm of only remote E1; It is on when there is LOS alarm of both local and remote E1; It is off when there is no LOS alarm of local or remote E1.
24	LNK	GREEN	It is on when the Ethernet port links normally; It is off when the Ethernet port doesn't link or links abnormally.
25	100M	GREEN	It is on when the working speed of Ethernet port is 100M; It is off when the working speed of Ethernet port is 10M.
26	ACT	GREEN	It is flash when there is data transmission currently; It is off when there is no data transmission currently.
27	FDX	GREEN	It is on when the Ethernet port is working on full duplex mode; It is off when the Ethernet port is working on half duplex mode; It is flash when the Ethernet port is working on half duplex mode and there is data collision.

2. Dip-switch of system controlling

The dip-switches are used to control optical port, E1 port and Ethernet port.

Table 3-16 RCMS 2811-120FE Front Panel Description 2-ADDR Dip-switch

NO.	Name	Bits	Description				
			Bit4	Bit3	Bit2	Bit1	Device Type
28	ADDR Dip-switch		OFF	OFF	OFF	OFF	Remote Device
			OFF	OFF	OFF	ON	The 1 <sup>st</sup> local Device
			OFF	OFF	ON	OFF	The 2 <sup>nd</sup> local Device
			OFF	OFF	ON	ON	The 3 <sup>rd</sup> local Device
			OFF	ON	OFF	OFF	The 4 <sup>th</sup> local Device
			OFF	ON	OFF	ON	The 5 <sup>th</sup> local Device
			OFF	ON	ON	OFF	The 6 <sup>th</sup> local Device

		4 bits	OFF	ON	ON	ON	The 7 <sup>th</sup> local Device
			ON	OFF	OFF	OFF	The 8 <sup>th</sup> local Device
			ON	OFF	OFF	ON	The 9 <sup>th</sup> local Device
			ON	OFF	ON	OFF	The 10 <sup>th</sup> local Device
			ON	OFF	ON	ON	The 11 <sup>th</sup> local Device
			ON	ON	OFF	OFF	The 12 <sup>th</sup> local Device
			ON	ON	OFF	ON	The 13 <sup>th</sup> local Device
			ON	ON	ON	OFF	The 14 <sup>th</sup> local Device
			ON	ON	ON	ON	The 15 <sup>th</sup> local Device
Local device can be connected by PC serial port through LNK-UP port to realize network management. Address numbers of devices which are concatenated on a PC serial port mustn't be repeated. Local concatenated devices are maximum 15pcs.							

Table 3-17 RCMS 2811-120FE Front Panel Description 3-ETH Dip-switch

NO.	Name	Bits	Description
29	ETH Dip-switch	4 bits	Bit1 Ethernet port auto-negotiation configuration. Bit1 = OFF, Ethernet auto-negotiation is enable. Bit1 = ON, Ethernet auto-negotiation is disable. When the Ethernet negotiation is disabled the port's MDI/MDIX function is disabled too, so when connecting to switch the straight-through cable is needed and when connecting to NIC and router the cross-over cable is needed.
			Bit2 Ethernet port's speed configuration when auto-negotiation is disabled. When Bit1 = ON, If Bit2 = OFF the Ethernet port's speed is 100M; If Bit2 = ON the Ethernet port's speed is 10M; When Bit1 = OFF the Bit2 is invalid.
			Bit3 Ethernet port's duplex mode configuration when auto-negotiation is disabled. When Bit1 = ON, If Bit3 = OFF the Ethernet port is on full-duplex mode; If Bit3 = ON the Ethernet port is on half-duplex mode; When Bit1 = OFF the Bit3 is invalid.
			Bit4 the configuration of ALS function. Bit4 = OFF, ALS function is disable. Bit4 = ON, ALS function is enable.

Table 3-18 RCMS 2811-120FE Front Panel Description 4-SEL Dip-switch

NO.	Name	Bits	Description
30	SEL Dip-switch	4 bits	Bit1, Bit2 Optical port Auto-negotiation/Force configuration. Bit1, Bit2 = OFF OFF, Optical port A and B can be chosen automatically. Bit1, Bit2 = OFF ON, Optical B is chosen. Bit1, Bit2 = ON X, Optical A is chosen.
			Bit3 mask/unmask alarm configuration of idle E1 tributary. Bit3 = OFF, unmask alarm configuration of idle E1 tributary. Bit3 = ON, mask alarm configuration of idle E1 tributary.
			Bit4 Local/Remote E1 loop-back position configuration. Bit4 = OFF, E1 remote loop-back. Bit4 = ON, E1 local loop-back.

Table 3-19 RCMS 2811-120FE Front Panel Description 5-E1 Loop Dip-switch

NO.	Name	Bits	Description
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31	E1-LOOP Dip-switch	4 bits	Bit1-4 the 1 <sup>st</sup> to 4 <sup>th</sup> E1 tributary loop-back configuration. Bit1 = OFF, the 1 <sup>st</sup> E1 tributary is not loop-back; Bit1 = ON, the 1 <sup>st</sup> E1 tributary is loop-back. The configuration method of Bit2 to Bit 4 is same as Bit 1.
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3. Interface on front panel

There are E1 and PC-AGENT ports on front panel.

Table 3-20 RCMS 2811-120FE Front Panel Description 6-Interface

NO.	Name	Bits	Description
32	1-4	RJ45 and BNC	1 <sup>st</sup> -4 <sup>th</sup> E1 tributary interface (750Ω is BNC interface and 120Ω is RJ45 interface).
33	LNK-UP	RJ45	Local network management interface. LNK-UP connects to PC serial port or connects to upper device's LNK-DWN interface when concatenating. It complies with RS232 electrical standard and the baud rate is 19200bps.
	LNK-DWN	RJ45	LNK-DWN connects to upper device's LNK-UP interface when concatenating. It complies with RS232 electrical standard and the baud rate is 19200bps.

E1 Loop-back Test

The E1 loop-back position can be configured by SEL Bit4 dip-switch. Remote loop-back and local loop-back are shown in following figure 3-11 and 3-12.

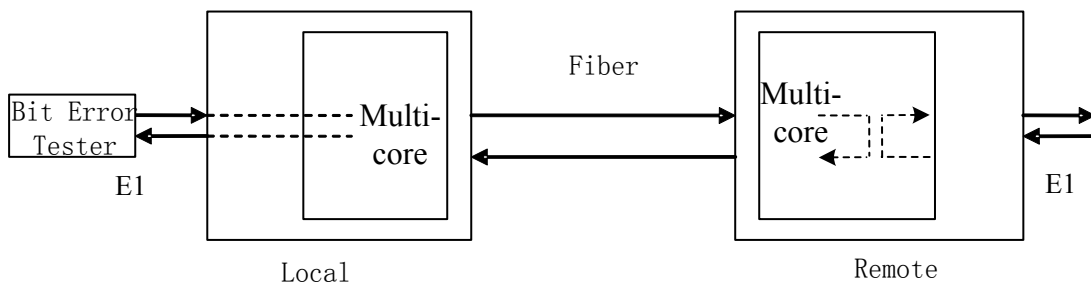


Figure 3-11 sketch map of setting remote loop-back on local site

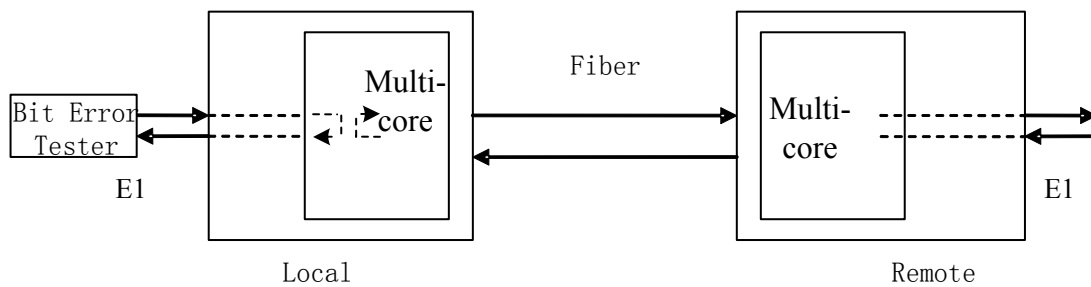


Figure 3-12 sketch map of setting local loop-back on local site

- NOTE:**
1. Please make sure that there is no alarm on optical port before configuring the remote E1 loop-back.
  2. When configuring any loop-back on local multiplexer, all E1 loop-back dip-switches on remote multiplexer must be OFF in default.

### Application Example

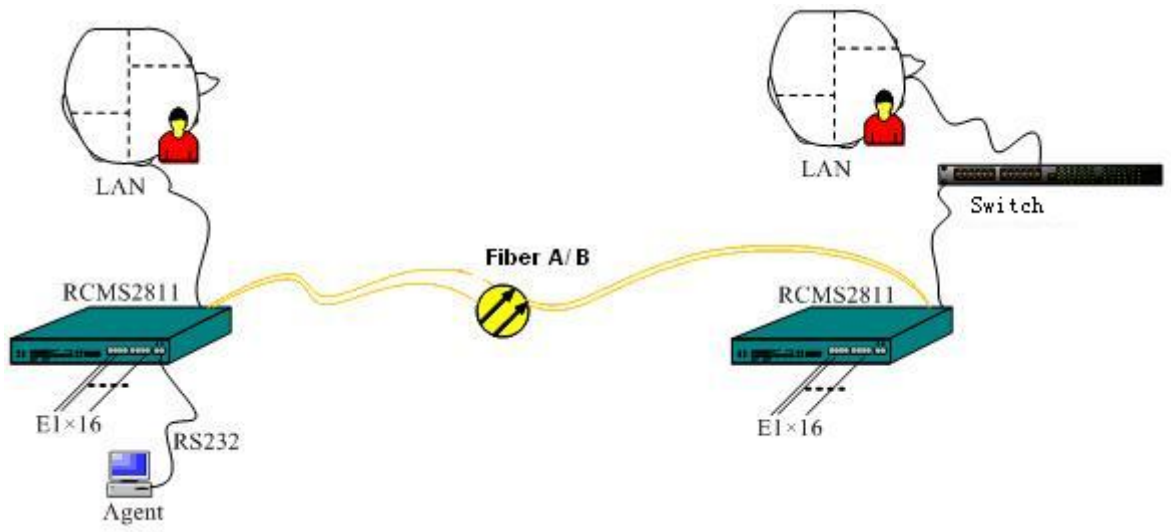


Figure 3-13 Point to point application example

## Chapter 4 Installation and Test

This section contains the following information:

- ◇ Preparation
- ◇ Installation Steps
- ◇ Power On Test
- ◇ E1 Bit Error Test
- ◇ Mask Dummy E1 LOS Alarm

### Preparation

Please at first check the part number and quantity of device and spare parts according to packing list, and then check appearance to find whether the device is in good condition. If the device is affected with dump please dry it firstly.

To make sure the device can working normally please perform the installation and configuration according to the following steps:

- Read this manual carefully;
- Prepare fiber, E1 cable, Ethernet cable and Agent network management cable and make sure all the cables are in good condition, no short and no open;
- Make sure the voltage of power supply is in the range of working condition;
- Install and Deploy the device and pay attention to requirement of condition;
- Connect all fibers and cables and make sure they are all inserted to the end and fastened well.
- Use it normally.

### Installation Steps

#### Connecting Optical Port A and Optical Port B

Insert fiber to optical port A and B on back panel.

If the device’s optical port type is M, S1, S2 and S3 the connecting method is as figure 4-1. On the back panel TX indicates transmission of optical signal and RX indicates receiving.

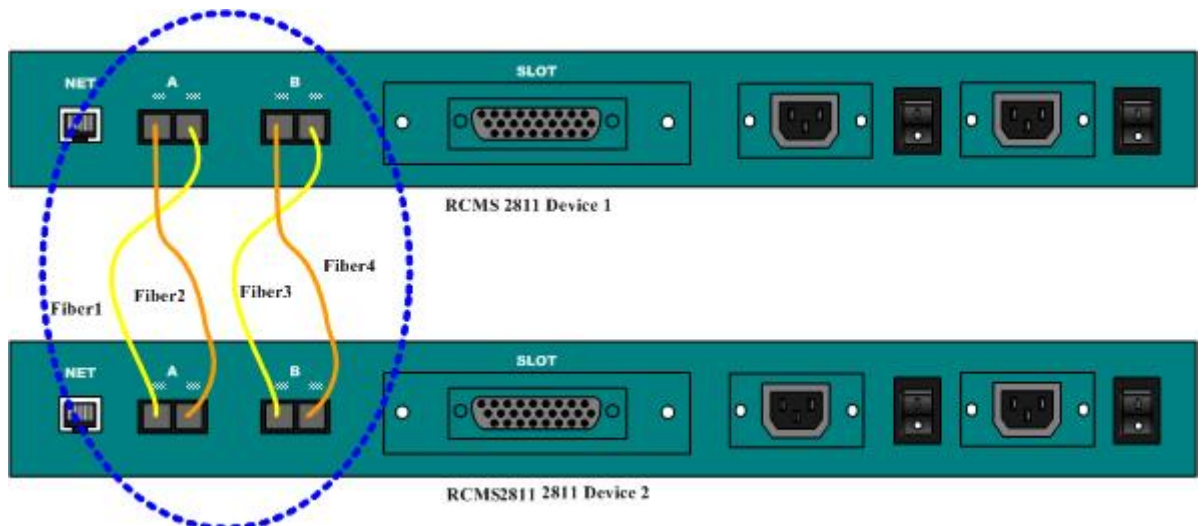


Figure 4-1 Optical Port Connecting Type 1

If the device’s optical port type is SS1 and SS2 the connecting method is as figure 4-2. The optical port A and B both transmit and receive so the TX and RX are insignificant.

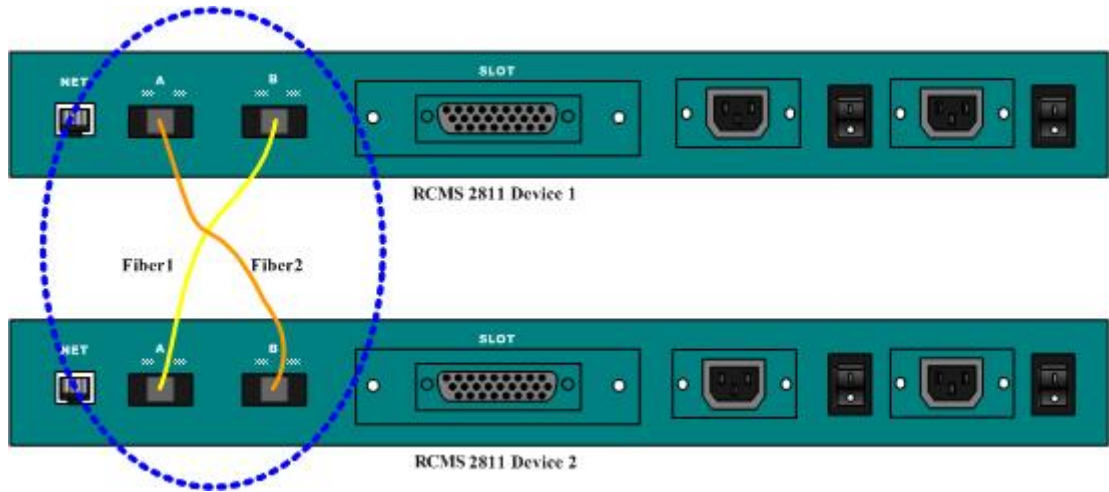


Figure 4-2 Optical Port Connecting Type 2

If the connecting is right, when receiving optical signal the LOS alarm indicators on the front panel will be all off automatically.

### Connecting E1 Interface

RCMS 2811-240FE-BL and RCMS 2811-480FE-BL devices: Using twisted-pair cable with RJ45 connectors to connect the 120Ω balanced interface on device. The line rule of RJ45 connector and cable making method are shown in Appendix A.

RCMS2811-240FE and RCMS2811-480FE devices: Using CBL-E1-DB37F/16BNM cable.

RCMS2811-120FE device:Using 75Ω unbalanced interface or 120Ω balanced interface but can not use this two types of interface at the same time. When using 75Ω unbalanced interface the coaxial cable with BNC male connector is needed. TX indicates the transmission of E1 signal and RX indicates receiving of E1 signal. The making method of coaxial cable with BNC connector is shown in Appendix A. When using 120Ω balanced interface the twisted pair cable with RJ45 connector is needed.

### Connecting Fast Ethernet Interface

Connect this device to relative network equipment by Ethernet cable with RJ45 connector. When the device is on auto-negotiation mode the straight-through and cross-over cable are both available. When the auto-negotiation is disabled the MDI/MDIX function is disabled correspondingly. So when connecting to switch the straight-through cable is needed and when connecting to NIC and router the cross-over cable is needed.

### Connecting Network Management Port

To perform network management please link the RJ45 connector of Agent cable to LNK\_UP interface of device, and at the same time link the DB9 connector of Agent cable to serial port on PC.

When perform concatenating please connect LNK\_DWN interface of upper device and LNK\_UP interface of lower device by RJ45-RJ45 cable.

### Connecting V.35 interface on sub card

If there is V.35 sub card in accessory parts please insert it in device and connecting the V.35 port to



relative equipment by attached connecting cable. Hot-swapping of V.35 sub card is forbidden and the operation detail please refer to “**SUBM-FV35NX64K V.35 Interface Extend Module User Manual REV.B**”

### Connecting Power Supply

Insert the attached 220V AC power cable to standard three phase power supply plug and at the same time connect the -48V DC power cable to DC power connector (link device's BGND connector to power grounding, device's -48V connector to -48V power and device's PGND to earth). If the power supply is +24V DC, please take above connecting method as a reference.

### Power on Test

Link all needed cable and make sure they are connected well. Turn on the power and the PWR indicator will be on and PWR1 and PWR2 indicators will be off.

Just after power on the device will perform initialization and self-check for at most 10 seconds. During this process the ACT, 100M, FDX and LNK indicators will light circularly. Maybe LOF and E-6 indicators of the optical port will flash once. These are all normal phenomena and after ten seconds system will work normally.

Please make sure there are no alarms on optical port after the system works normally. If fiber is connected correctly there will be no LOS, LOF, E-3 and E-6 alarms.

### E1 Bit Error Test

Bit error rate of each E1 tributary can be test by 2M bit error rate tester cooperating with loop-back dip-switches on front panel. For the testing method please refer to section 5 for operation introduction.

### Mask Dummy E1 LOS Alarm

If there is no Los alarm on connected E1 tributaries but the LOS alarm indicators of unused E1 tributary are on, so these alarms are called dummy E1 Los alarm. Set the Bit3 of SEL dip-switch as on to mask local dummy alarms the relative E1 LOS alarm indicators will be off.

If disconnection occurs on linked E1 tributary, the LOS indicator of this tributary will be still on after masking unused E1 alarm.

## Chapter 5 Troubleshooting

If you have any problems during installation and using, try to solve them by the following proposals. If there is no solution, please contact with distributors for technical support.

- Green PWR indicator not on

Answer: PS faults. Check if PS working properly and –48 PS connection is not reverse.

- LOS red indicator of optical port is on

Answer: Loss of receiving signal occurs at optical port. Check if the input fiber is connected well and if there is reverse in connection. Check the received optical power using optical power meter, it should be greater than receiving sensitivity.

- LOF red indicator of optical port is on

Answer: Loss of frame of receiving signal at optical port. In this case, optical signal has received, but the optical power may be about critical value of sensitivity. Check RX optical power to ensure if it connects well at remote optical TX port.

- E-3 red indicator is on at optical port

Answer: The bit error of optical RX signal is greater than  $10^{-3}$ . Check if optical RX port connects well and RX optical power.

- E-6 yellow indicator of optical port is on

Answer: The bit error of optical RX signal is greater than  $10^{-6}$ . It is normal that there is E-6 alarm just after turning on the power, after about 10 seconds, the E-6 indicator will be off. If there is E-6 alarm during operation process please check if optical RX port connects well and test RX optical power.

- The LNK indicator of Ethernet port is not on

Answer: Firstly check if the Ethernet cable is well connected or not. And then whether the other end device works normally. At last check the cable referring to section 6.2.

- One E1 tributary is blocked

Answer: Check whether the E1 cable and fiber are well connected, and then check the E1 LOS alarm indicator on front panel. At the same time use the loop-back function which is provided by Bit4 of SEL dip-switch to confirm the problem position.

- LOS red indicator of E1 channel is on

Answer: Loss alarm of RX signal at E1 channel, there is no HDB3 signal received. Check if it connects well at E1 port; if the connection of 75  $\Omega$  cable reverse and if the string of 75  $\Omega$  cable in right order. If there is LOS alarm of unused E1 tributary, can press “mask” button to “on” to make alarm after configuration of device.

## Appendix A: Introduction of Cable making

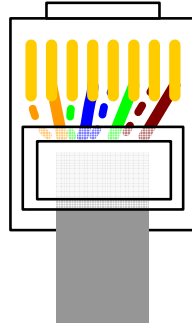


Figure A.1 RJ45 connector Pin Definition (from upper side)

1234

### E1 Cable Making

- 75ohm BNC Interface:  
Suggest using SYV75-5, SYV75-3 and SYV 75-2-2 coaxial cable. The longest distance is less than 200 meters. Take BNC connector out from accessories and screw off protecting sheath. Split the core and shielded layer of coaxial cable and then put protecting sheath onto cable. Firmly weld core of cable and core of BNC connector, and firmly weld shielded layer of coaxial cable and shell of BNC connector. At last fix the protecting sheath at the end of the connector.
- 120 ohm RJ45 Interface:

Table A.1 RJ 45 E1 Interface Line Definition

Pin No.	1	2	3	4	5	6	7	8
Definition	OUT+	OUT-	NC	IN+	IN-	NC	NC	NC

### A.2 Cable of Ethernet

This device has Auto MDI/MDIX function so the Ethernet cable can use straight-through or cross-over twisted pair line.

Table A.2 Ethernet Interface line definition

Pin NO.	1	2	3	4	5	6	7	8
MDI Definition	TX+	TX-	RX+	NC	NC	RX-	NC	NC
MDIX Definition	RX+	RX-	TX+	NC	NC	TX-	NC	NC

Use Cat 5 twisted pair to connect the equipment. Please ensure that the twisted pair is less than 100 meters. The line definition of RJ45 connector is shown in figure A.1.

Making straight-through cable the two ends should both comply with T568A or T568B standard at the same time. Making cross-over cable the two ends comply with T568A and T568B separately. The T568A and T568B line standard are shown in table A.3.

Table A.3 the T568A and T568B Line Standard

Line No. STD	1	2	3	4	5	6	7	8
T568A	White	Green	White	Blue	White	Orange	White	Palm

	Green		Orange		Blue		Palm	
T568B	White Orange	Orange	White Green	Blue	White Blue	Green	White Palm	Palm
Twisted Pair	A pair	A pair with 6	A pair	A pair with 3	A pair			

### A.3 Agent Cable Making

Agent cable is flat straight-through cable with RJ45 connector which line definition is shown in figure A.1.

Table A.4 LNK\_UP Connector Line Definition

Pin No.	1	2	3	4	5	6	7	8
Definition	NC	NC	IN	GND	NC	OUT	OUT	GND

Table A.5 LNK\_DWN Connector Line Definition

Pin No.	1	2	3	4	5	6	7	8
Definition	NC	NC	OUT	GND	NC	NC	IN	GND

The connection of LNK\_UP interface (RJ45) to PC serial port (DB9 Female) is shown in figure A.2.

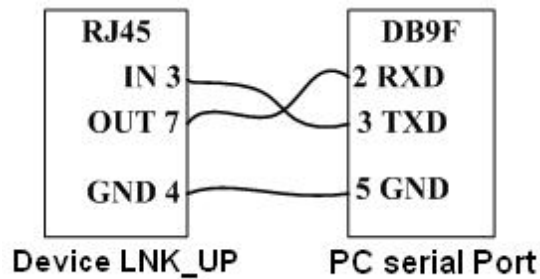


Figure A.2 Connection of Device to PC Serial Port

The linking cable of LNK\_UP port (RJ45) to LNK\_DWN port of lower lever device is straight-through Ethernet cable.

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**NOTE:** 1. Making above cables please use shield twisted pair in priority to ensure the requirement of EMC.  
 2. Making straight-through cable please use T568B line standard in priority.

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