RG-RSR10-02E Series Routers

Hardware Installation and Reference Guide 1.20

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Preface

Thank you for using our products. This manual will guide you through the installation of the router.

Scope

It is intended for the users who have some experience in installing and maintaining network hardware. At the same time, it is assumed that the users are already familiar with the related terms and concepts.

Obtaining Technical Assistance

- Ruijie Networks website: http://www.ruijienetworks.com/
- Online customer services: http://webchat.ruijie.com.cn
- Customer service center: http://www.ruijie.com.cn/service.aspx
- Customer services hotline: +86-4008-111-000
- BBS: http://support.ruijie.com.cn
- Customer services email: service@ruijie.com.cn

Related Documents

Documents	Description
Configuration Guide	Describes network protocols and related mechanisms that supported by the product, with configuration examples.
Command Reference	Describes the related configuration commands, including command modes, parameter descriptions, usage guides, and related examples.

Documentation Conventions

The symbols used in this document are described as below:

This symbol brings your attention to some helpful suggestions and references.

This symbol means that you must be extremely careful not to do some things that may damage the device or cause data loss.

Chapter 1 Product Overview

The Ruijie 10-02E series Reliable multi-Service Router (RSR) is a proprietary data communications product developed with advanced semiconductor and communication & control technologies. The RSR10-02E series routers are in compliance with international standards and are interoperable with mainstream routers both in operation and configuration methods. If you are familiar with configuration commands of mainstream routers, you may read this manual without any prior training.

About the RG-RSR10-02E

The RSR10-02E modular router is an enterprise-class networking product integrating a high-performance 32-bit Reduced Instruction Set Computing (RISC) microprocessor. The router is based on Ruijie RGOS operating system that provides an industry-standard command line interface. The router integrates routing, switching, voice, security, transmission and video, and satisfies personalized requirements in various application environments. The router also provides rich software features such as Voice over Internet Protocol (VoIP), Virtual Private Network (VPN), Internet Protocol Version 6 (IPv6), Multicast VPN Routing & Forwarding (MVRF), Multi-Protocol Label Switching (MPLS), multicasting as well as backup schemes and Quality of Service (QoS) features. The features are applied to solutions of access services such as data, video and voice. These features enable a three-network-in-one solution for small and medium enterprises.

The RSR10-02E modular router supports up to two optional Smart Interface Cards (SIC).

Different SIC slots support different SIC cards. For your convenience, each slot is marked with the supported SIC types. There are five types of SIC cards in total. See Table 1-1.

Table 1-1 SIC Cards Supported by the RSR10-02E Router

Type	Supported SIC Cards
A	SIC-8A, SIC-1B-U, SIC-1B-S/T, SIC-2FXS,SIC-2FXO,SIC-SEC encrypted key
B	SIC-1HS, SIC-3G-TD,SIC-3G-CDMA,SIC-3G-WCDMA
C	SIC-1CE1, SIC-1E1-F
D	N/A
E	SIC-3G-CDMA-E, SIC-3G-WCDMA-E, SIC-3G-WCDMA-H-E

Table 1-2 SIC Types Supported by Each SIC Slot on the RSR10-02E Router

	Type A	Type B	Type C	Type D	Type E
Slot 2	Supported	Supported	Supported	Not Supported	Supported
Slot 3	Supported	Supported	Supported	Not Supported	Supported

Note The entire device supports one SIC-SEC with the key encryption function in any slot.

For your convenience, each slot is marked with the supported SIC types. For example, in Figure 1-1, SIC SLOT 3 supports Type A, Type B, Type C, and Type E SIC cards. SIC SLOT 2 supports Type A, Type B, Type C and Type E SIC cards.

Figure 1-1 SIC Types Marked Above the SIC SLOT 3 and SLOT 2

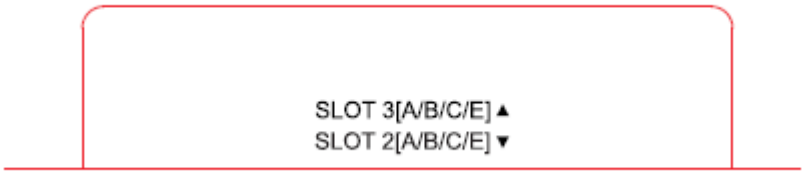
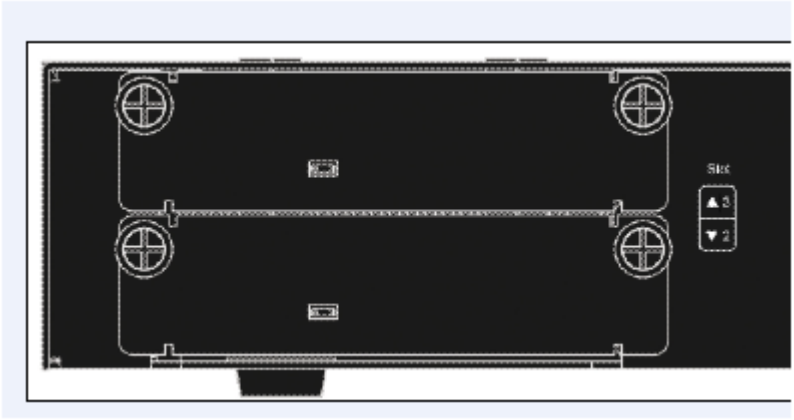


Figure 1-2 Part of Back Panel of the RSR10-02E Series Routers



Technical Specifications

Table 1-3 Technical Specifications of the RSR10-02E Router

Model	RSR10-02E
Interfaces	1 Console port 1 AUX port 1 USB interface 1 SD card interface 1 FUNC button 8 10/100 Mbps Ethernet ports 2 Gigabit Ethernet ports
SIC Slots	2 **Note**: You can configure up to two SIC modules as required.
Processor	RISC
BOOT ROM	2 MB
NAND FLASH	128 MB
DDR II	512 MB
Input Voltage	100 VAC to 240 VAC, 50 Hz to 60 Hz

Power Consumption	Less than 25 W
Operating Temperature	0°C to 45°C
Storage Temperature	-40°C to 70°C
Operating Humidity	10% to 95% RH
Dimensions (W x H x D)	288 mm x 44 mm x 204 mm

Product Features

Access density and processing capacity

The two SIC slots support up to 2 non-channelized E1 interfaces, 2 ISDN U or S/T interfaces, 2 synchronous serial interfaces, or 16 asynchronous serial interfaces, 2 3G networks to provide a high-density solution for remote office. The router has 8 fast Ethernet ports, and 2 Gigabit Ethernet ports. It offers a FUNC button to upgrade the RGOS operating system from an SD card or USB stick to the router. The E1 interface complies with ITU-T G.703, the ISDN U interface complies with ITU-T G.961 ANSI T1.601, and the ISDN S/T interface complies with ITU-T I.430. The synchronous serial interface can connect to the Digital Divide Network (DDN), frame relay, and X.25 networks. These features make the router an ideal access router for medium- and large-sized branches.

Reliability

The router adopts backup center technologies, which greatly improves network reliability. Various backup modes are available for high reliability requirements.

Compatibility

The router is fully compatible with devices from other vendors.

Power supply

By using high-quality standard power supplies, the router provides protection against surge, overvoltage, undervoltage, overcurrent to deliver stable and reliable output. In addition, it supports transient power interruption protection.

Construction

With the rack mount 1U chassis with EMI shielding, the router is highly resistant to shock, high/low temperature, and electromagnetic radiation, and works stably.

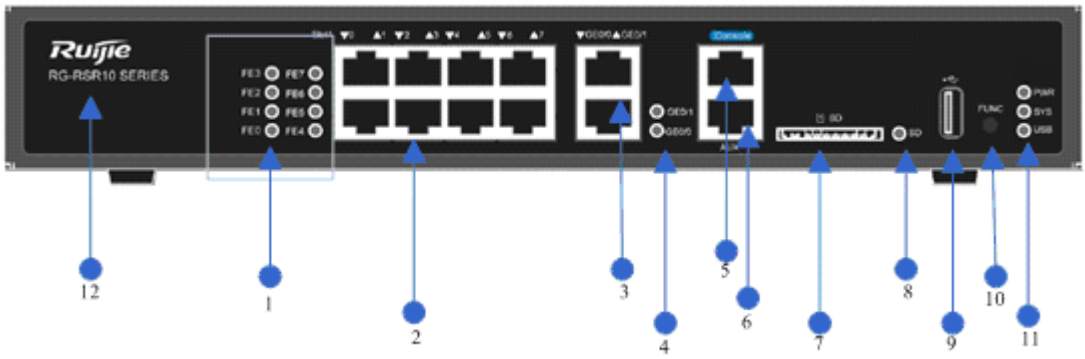
Certificate

The router has passed the network access license (NAL) testing by the Ministry of Information Industry (MII), P.R. China.

Product Images

Front Panel

Figure 1-3 Front Panel of the RSR10-02E Router



Note:

1: FE1/0 to FE1/7 indicator
2: FE1/0 to FE1/7 port
3: GE0/0 to GE0/1 port
4: GE0/0 to GE0/1 port indicator
5: Console port
6: Aux ports
7: SD card interface
8: SD indicator
9: USB interface
10: FUN button
11: PWR indicator, SYS indicator, USB indicator
12: Ruijie Networks RSR10 Series logo

LED Indicators

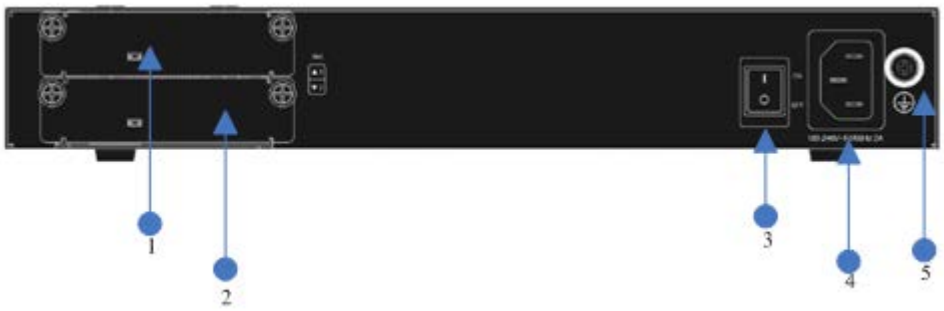
Table 1-4 LED Indicators on the RSR10-02E Router

Indicator	Status	Meaning
SYS	Off	The router is not receiving power.
	Blinking green	The router starts up.
	Solid green	The router is operational.
	Solid red	The router is not working properly.
PWR	Off	Power off.
	Solid green	Power on.
SD	Off	SD card is not present.
	Green on	SD card is connected to the device and is recognized.
	Blinking green	SD card is receiving or transmitting data.
	Solid red or blinking red	SD card is not working properly.
USB	Green on	USB device is connected to the device and is recognized.
	Blinking green	USB device is receiving or transmitting data.
FE Port	Off	No link.
	Solid green	FE port link up at 10/100 Mbps.
	Blinking green	FE port link up at 10/100 Mbps, and is receiving or transmitting data.

GE Port	Off	No link.
	Solid green	GE port link up at 1000 Mbps
	Blinking green	GE port link up at 1000 Mbps, and is receiving or transmitting data.
	Solid yellow	GE port link up at 10/100 Mbps.
	Blinking yellow	GE port link up at 10/100 Mbps, and is receiving or transmitting data.

Back Panel

Figure 1-4 Back Panel of the RSR10-02E Router



Note:	1: SLOT 3	5: Chassis ground connector
	2: SLOT 2	
	3: Power switch	
	4: Power receptacle	

Note

If you cannot determine which slot is occupied by the current module, you can run the **show slots** command in privileged EXE mode to view the slot number in router version information

About Fixed Ports

This section describes fixed ports on the RSR10-02E series router.

Console Port and Auxiliary Port

Features

The RSR10-02E series router provides one console port and one AUX port.

Table 1-5 Specifications of the Console port

Index	Parameter
Interface Standard	EIA/TIA-RS232
Connector	RJ-45
Rate	Supports 9600 to 115200 bps baud rates. The configurable frequency points are 9600, 57600

	and 115200 bps. The default is 9600 bps.

Table 1-6 Specifications of the AUX port

Index	Parameter
Interface Standard	EIA/TIA-RS232
Connector	RJ-45
Rate	Supports 9600 to 115200 bps baud rates. The configurable frequency points are 9600, 19200, 38400, 57600 and 115200 bps. The default is 9600 bps.

Cables

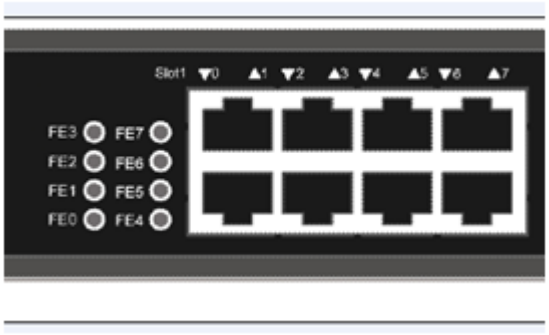
Serial cables are supplied with the RSR10-02E router.

FE Ports

Port Image and LED Indicators

The following figure shows the fixed FE ports and its corresponding Link/ACT LED indicators.

Figure 1-5 FE Ports and Corresponding LED Indicators



For descriptions of FE port Link/ACT LED indicators, see the “LED Indicators” section in Chapter 1.

An RSR10-02E series router provides eight fixed 10/100 Mbps Ethernet ports.

The following table describes the basic features of the Ethernet ports.

Table 1-7 Specifications of the FE ports

Protocol	IEEE Std 802.3-2008
Quantity	8
Interface Type	10Base-T/100Base-TX interface

Cables

All FE ports use Category 5 unshielded twisted pair (UTP) RJ-45 cables.

Straight-through cable: All wire pairs are in the same order on each end of the RJ-45 cable. The straight-through cable is used to connect a terminal device such as a PC or router to a hub or LAN switch.

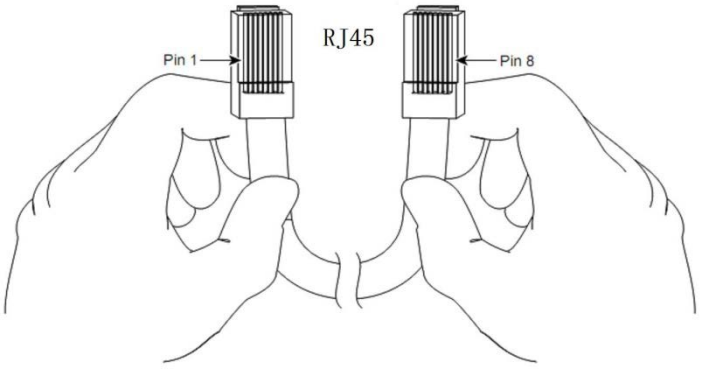
Crossover cable: Pin 1 and pin 2 at one end of the cable correspond to pin 3 and pin 6 at the other end, respectively. The crossover cable is used to connect two terminal devices, such as connecting a PC to a PC, and connecting a router to a router.

If the port supports Auto-MDI/MDIX, both straight-through and crossover cables can be used.

Considering that you may customize cables, the following section describes how to wire straight-through and crossover cables.

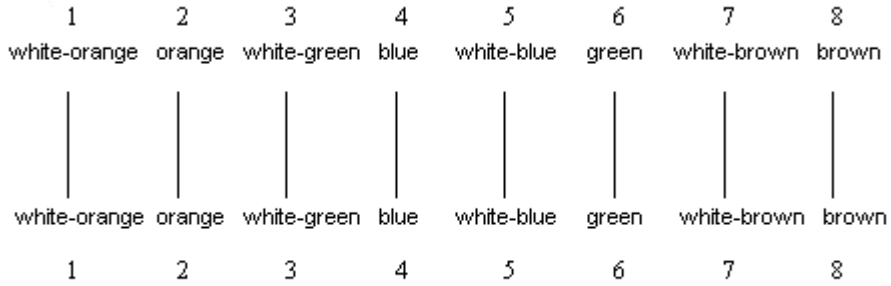
As shown in the following figure, the pins of the RJ-45 connector are numbered 1 to 8, counting from left to right when the connector is viewed from the side without the latching tab.

Figure 1-6 RJ-45 Connector Pin Number



For a straight-through cable, use the same wiring.

Figure 1-7 Straight-through Wiring Diagram



For a crossover cable, swap the positions of the two pairs.

Figure 1-8 Crossover Wiring Diagram

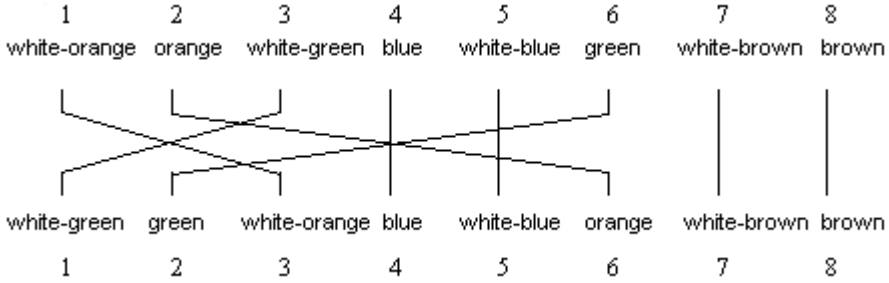


Table 1-8 Crossover Cable Pinouts

RJ45 Pin # End 1	Signal	Color	RJ45 Pin # End 2	Signal	Color
1	TX+	White-green	1	TX+	White-orange
2	TX-	Green	2	TX-	Orange
3	RX+	White-orange	3	RX+	White-green
6	RX-	Orange	6	RX-	Green

GE Ports

Port Image and LED Indicators

The following figure shows the fixed GE ports and its corresponding Link/ACT LED indicators.

Figure 1-9 GE Ports and Corresponding LED Indicators

For descriptions of GE port Link/ACT LED indicators, see the “LED Indicators” section.

An RSR10-02E series router provides two fixed 10/100/1000 Mbps Ethernet ports. The copper port uses an RJ-45 connector.

Features

The following table describes the basic features of the GE ports.

Table 1-9 Specifications of the GE ports

Parameter	Description
Interface	Two 10/100/1000Base-T/1000Base-TX interfaces
Interface standard	IEEE Std 802.3-2008

Cables

10/100/1000Base-T uses the Category 5e UTP or STP with the maximum transmission distance of 100 meters.

Straight-through cable: All wire pairs are in the same order on each end of the RJ45 cable. The straight-through cable is used to connect a terminal device such as a PC or router to a hub or LAN switch.

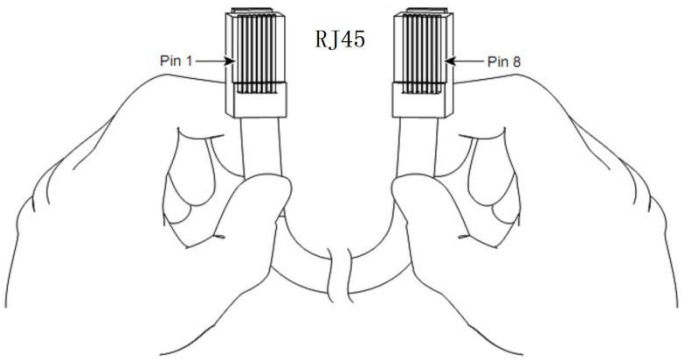
Crossover cable: Pin 1 and pin 2 at one end of the cable correspond to pin 3 and pin 6 at the other end, respectively. The crossover cable is used to connect two terminal devices, such as connecting a PC to a PC, and connecting a router to a router.

If the port supports Auto-MDI/MDIX, both straight-through and crossover cables can be used.

Considering that you may customize cables, the following section describes how to wire straight-through and crossover cables.

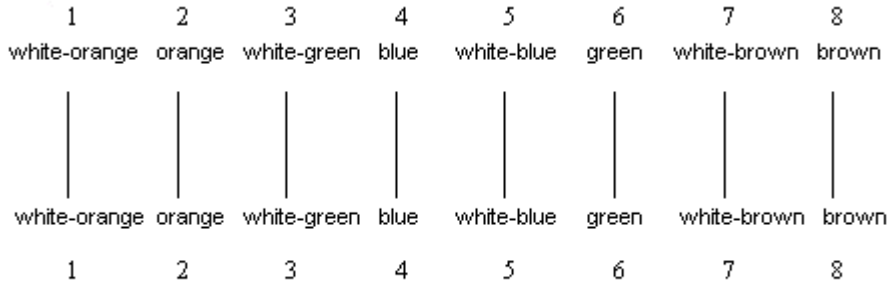
As shown in the following figure, the pins of the RJ-45 connector are numbered 1 to 8, counting from left to right when the connector is viewed from the side without the latching tab.

Figure 1-10 RJ-45 Connector Pin Number



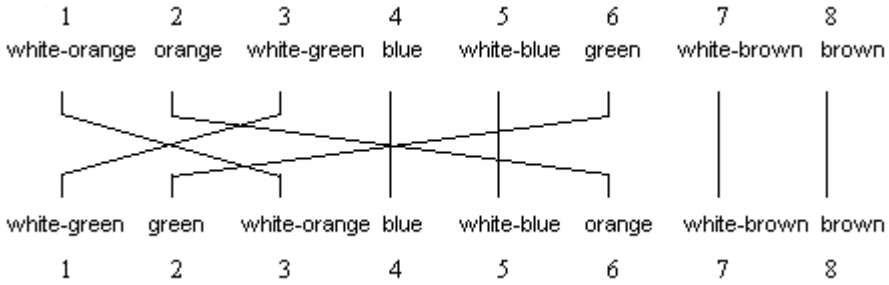
For a straight-through cable, use the same wiring.

Figure 1-11 Straight-through Wiring Diagram



For a crossover cable, swap the positions of the two pairs.

Figure 1-12 Crossover Wiring Diagram



USB Port

LED Indicator

For descriptions of USB port indicator, see the “LED Indicators” section.

Features

The RSR10-02E series router provides one fixed USB port, through which the user can read configurations from the USB device, or save configurations to the USB device.

Table 1-10 Specifications of the USB Port

Index	Parameters
Interface Standard	USB 2.0
Connector	USB Host
Rate	1.5 Mbps, 12 Mbps, 480 Mbps
Interface Type	Host
Hot Swapping	Supported

The hot swapping for the USB device must strictly follow the “Configuring Reliability” chapter in the related software configuration guide. For the avoidance of system abnormality, hot swapping is not allowed unless the command for unplugging the USB is entered.

The USB device here refers to USB flash disks.

Cables

If you connect a USB device with a USB extension cable, the cable must be less than 5 meters.

SD Card Slot

LED Indicator

For descriptions of SD card indicator, see the “LED Indicators” section.

Features

The RSR10-02E series router provides one fixed SD card slot, through which the user can read configurations from an SD card, or save configurations to the SD card.

Table 1-11 Specifications of the SD Card Slot

Index	Parameters
Interface Standard	SD/SDHC
Connector	SD connector, 1 FUNC button

Index	Parameters
Rate	1.5 Mbps
Interface Type	Device
SD Card	Ruijie Networks SDHC card/ Kingston/ 4GB/ class_4
Hot Swapping	Supported

Caution The hot swapping for the SD device must strictly follow the “Configuring Reliability” chapter in the related software configuration guide. For the avoidance of system abnormality, hot swapping is not allowed unless the command for unplugging the SD card is entered.

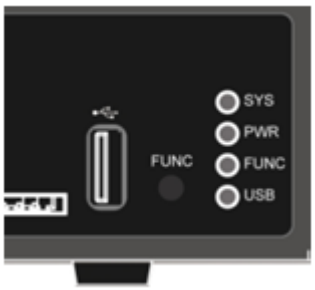
Cables

Ruijie Networks SDCH card / Kingston /4GB/class_4

FUNC Button

FUNC Button Image

Figure 1-13 FUNC Button



The FUNC button is close to the USB interface on the front panel. It is used for one-button upgrade. To avoid careless touching, the button is designed to be pressed using a tiny needle.

Features

One-button upgrade is the process that users press the FUNC button on the device panel to reset the system. Before the system resets, you can use the files in SD cards or USB flash disks to upgrade software versions or configuration files, or upgrade both of them simultaneously. The functions of one-button upgrade include:

- One-button system reset
  When no SD card or USB flash disk is inserted into the device, or an SD card or a USB flash disk is inserted but no software versions or configuration files for upgrade exist, press the FUNC multi-functional button to reset the system. The system will restart based on the original software versions.
- One-button upgrade of software versions and configuration files

When an SD card or a USB flash disk is inserted into the device, press the FUNC button. Then, the system searches for the installation packages and configuration files that are applicable to the current device in the root directories of the SD card and USB flash disk in sequence. After successfully finding the corresponding installation packages and configuration files, the system checks the validity of the files and then upgrades the device by using the installation packages and configuration files. After the upgrade, the system resets and restarts based on the new software versions and configuration files.

Note

When a storage medium is inserted, the system scans for an SD card first. If no SD card is inserted or the inserted SD card does not contain applicable installation packages or configuration files, the system scans for a USB flash drive. If neither the inserted SD card nor the USB flash drive contains applicable installation packages or configuration files, the software versions and configuration files are not upgraded. Only the system resets, and restarts based on the original software versions and configuration files.

About SIC Cards

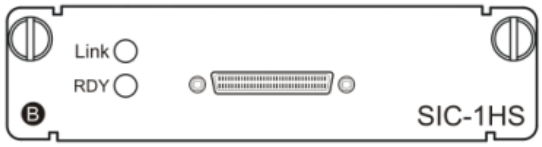
This section describes the features of SIC modules supported by the RSR10-02E series router.

SIC-1HS Synchronous Interface Card

Product model: SIC-1HS

Image and Indicators

Figure 1-14: SIC-1HS high-speed synchronous serial interface card



The SIC-1HS is a Type B SIC, which can be inserted in a slot marked with “B”.

Each card has an interface status indicator (**LINK** indicator) and the card **Ready** indicator.

The following table describes LED indicators.

Table 1-12 LED Indicators on the SIC-1HS Card

Indicator	Status	Meaning
Link	On	Physical link has been established successfully.
	Off	Failed to establish the physical link.
RDY	On	Initialization completed.
	Off	Initialization failed.

Features

The following table describes basic features of high-speed synchronous serial interface (HS):

Table 1-13 Specifications of the SIC-1HS Card

Protocol	V.24 and V.35 are supported with cable automatic identification.
Rate	The synchronous port of a single-synchronous card supports from 9600 to 8192000 bps.
Indicator	There are two LED indicators. One LED indicating the LINK status of one port, which turns on when the physical link is set up and the upper layer protocol is up. One LED indicating the RDY status of one link card, which turns on when the motherboard detects the module.
Interface	DB26
Environmental	Operating temperature: 0°C to 45°C Operating humidity: 10% to 90% RH; Storage temperature: –40°C to 70°C
EMC	EMI: GB 9254-2008 Class A EMS: GB/T 17618-1998

Cables

The following cables can be used:

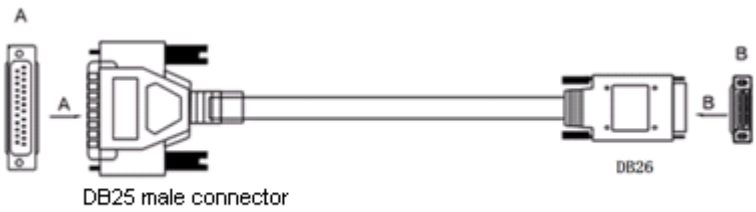
- V.24 DTE
- V.24 DCE
- V.35 DTE
- V.35 DCE
- V.35 DTE-V.35 DCE

The figures of these cables are as below.

V.24 DTE

One end of this cable is the DB25 male connector, and the other end is the DB26 male connector.

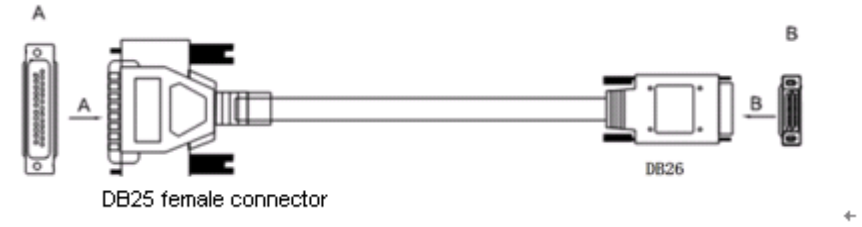
Figure 1-15 V.24 DTE cable



V.24 DCE

One end of this cable is the DB25 female connector, and the other end is the DB26 male connector.

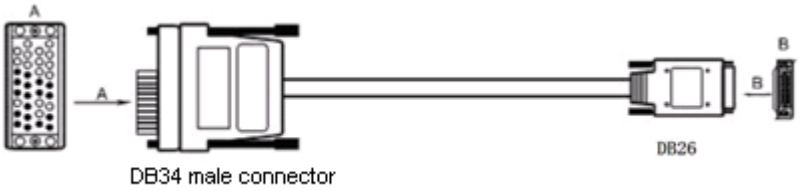
Figure 1-16 V.24 DCE cable



V.35 DTE

One end of this cable is the DB34 male connector, and the other end is the DB26 male connector.

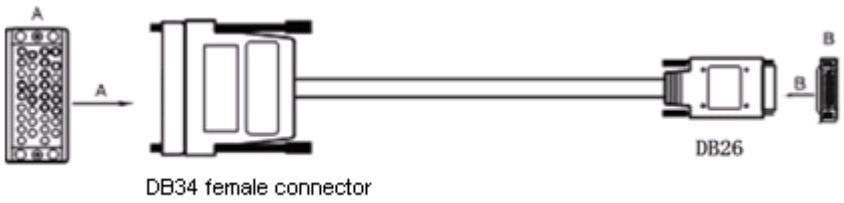
Figure 1-17 V.35 DTE cable



V.35 DCE

One end of this cable is the DB34 female connector, and the other end is the DB26 male connector.

Figure 1-18 V.35 DCE cable



V.35 DTE-V.35 DCE

Both ends of this cable are DB26 male connectors.

Figure1-19 V.35 DTE-V.35 DCE cable

The cables are customer supplied. All types of SIC-1HS cables connect to the router through the DB26 interface. Choose connectors of the right type when purchasing cables. For the use of the cables, see Chapter 6.

ISDN Interface Card

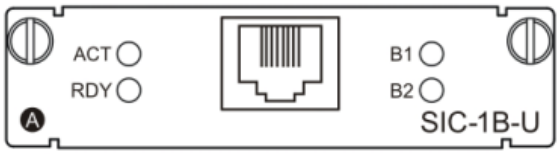
Two models are available:

- 1-port ISDN U-interface card (SIC-1B-U)
- 1-port ISDN S/T interface card (SIC-1B-S/T)

Images and Indicators

The following figure shows the image of the 1-port ISDN U-interface card (SIC-1B-U).

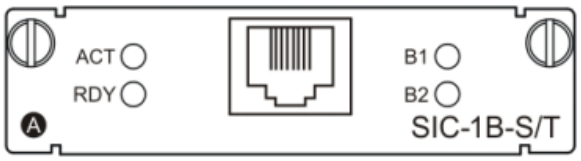
Figure 1-20 ISDN-1B-U



The SIC-1B-U is a Type A SIC, which can be inserted in a slot marked with “A”.

The following figure shows the image of the 1-port ISDN S/T U-interface card (SIC-1B-S/T).

Figure 1-21 SIC-1B-S/T



The SIC-1B-S/T is a Type A SIC, which can be inserted in a slot marked with “A”.

Each card has a port working status **ACT** indicator and the card **Ready** indicator. Besides, each ISDN card has two status indicators: **B1** and **B2**.

The following table describes panel indicators.

Table 1-14 LED Indicators on the ISDN Card

Indicator	Status	Meaning
ACT	Solid on	The U interface or S/T is active.
	Off	The U interface or S/T is idle.
RDY	On	Initialization completed.
	Off	Initialization failed.
B1	On	B1 channel is active.
	Off	B1 channel is idle.
B2	On	B2 channel is active.
	Off	B2 channel is idle.

Features

The following table describes the basic features:

Table 1-15 Specifications of the SIC-1B-U Card

Number of Ports	One
Interface Type	RJ-45 port (compatible with RJ-11)
Cables	Telephone cable
Standard Compliance	ITU-T I.430,Q.921,Q.931
Temperature:	Operating temperature: 0°C to 45°C Storage temperature: -40°C to 70°C
Humidity	Operating humidity: 10% to 90% RH
EMC	EMI: GB 9254-2008 Class A
	EMS: GB/T 17618-1998

Table 1-16 Specifications of the SIC-1B-S/T Card

Number of Ports	One
Interface Type	RJ-45
Cables	ISDN S/T cables
Terminal Resistance	Built-in 100Ω
Standard compliance	ITU-T I.430,Q.921,Q.931
Operating Temperature:	Operating temperature: 0°C to 45°C Storage temperature: -40°C to 70°C
Humidity	Operating humidity: 10% to 90% RH
EMC	EMI: GB 9254-2008 Class A
	EMS: GB/T 17618-1998

Cables

The SIC-1B-U module uses standard telephone cables.

The SIC-1B-S/T module uses standard ISDN S/T cables or RJ-45 to R-J45 straight-through cables.

The cables are customer supplied.

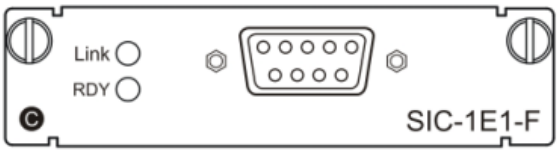
SIC-1E1- F Interface Card

SIC card model: SIC-1E1-F

Image and Indicators

The following figure shows the image of a 1-port non-channelized E1 card (SIC-1E1-F).

Figure 1-22 SIC-1E1-F



The SIC-1E1-F is a Type C line card, which can be inserted in a slot marked with “C”.

The following table describes panel indicators.

Table 1-17 LED Indicators on the SIC-1E1-F Card

Indicator	Status	Meaning
Link	Solid on	Upper link has been established.
	Off	Failed to establish the upper link.
RDY	On	Initialization completed.
	Off	Initialization failed.

Features

The following table describes the basic features.

Table 1-18 Specifications of the SIC-1E1-F Card

Number of Ports	One
Interface Type	DB9 female connector
Cables	Balanced cables or non-balanced cables
Standard Compliance	ITU-T G.703
Operating Temperature	Operating temperature: 0°C to 45°C Storage temperature: -40°C to 70°C
Humidity	Operating humidity: 10% to 90% RH
EMC	EMI: GB 9254-2008 Class A
	EMS: GB/T 17618-1998

Cables

The following cables are provided:

- Balanced cable with the crystal connector
- Balanced cable with the crystal jack
- Non-balanced cable

Balanced cable with the RJ-45 Plug

One end is the DB9 male connector, and the other end is the RJ-45 plug. The characteristic impedance of the cable is 120Ω.

Figure 1-23: Balanced cable with the RJ-45 Plug

Considering that you may customize cables, the following section describes connection modes and the signal.

Table 1-19 Signals of the DB9 Male to RJ-45 Plug Cable

DB9M	RJ-45 Plug	Signal
1	5	RX Ring
2	4	RX Tip
4	1	TX Tip
5	2	TX Ring

Balanced cable with the RJ-45 jack

One end is the DB9 male connector, and the other end is the RJ-45 jack. The characteristic impedance of the cable is 120Ω.

Figure 1-24: Balanced cable with the RJ-45 jack

Considering that you may customize cables, the following section describes connection modes and the signal.

Table 1-20 Signals of the DB9 Male to RJ-45 Jack Cable

DB9M	RJ-45 Jack	Signal
1	2	RX Ring
2	1	RX Tip
4	4	TX Tip
5	5	TX Ring

Non-balanced cable

One end is the DB9 male connector, and the other end is attached with two male BNC connectors. The characteristic impedance of the cable is 75Ω

Figure 1-25: Non-balanced cable

The cables are customer supplied. For the use of cables, see Chapter 6.

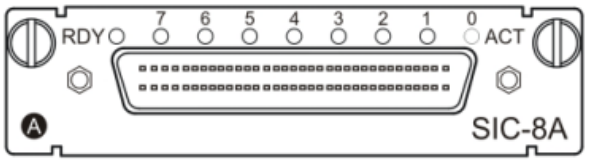
SIC-8A Interface Card

SIC card model: SIC-8A

Image and Indicators

The following figure shows the image of an 8-port asynchronous interface card.

Figure 1-26 SIC-8A



The SIC-8A is a Type A SIC, which can be inserted in a slot marked with “A”

The interface card includes one SCSI DB68 connector and eight asynchronous interfaces. It includes one RDY indicator, and eight ACT indicators.

The following table describes panel indicators:

Table 1-21 LED Indicators on the SIC-8A Card

Indicator	Status	Meaning
ACT	Blinking	Data is being transmitted.
	Off	No data is being transmitted.
RDY	On	Initialization completed.
	Off	Initialization failed.

Features

The following table describes the basic features:

Table 1-22 Specifications of the SIC-8A Card

Number of Ports	One
Interface Type	SCSI DB68 female connector

Cables	STAR-C08A asynchronous card SCSI interface cables with RJ-45 plugs or STAR-C08A asynchronous card SCSI interface cables with RJ-45 jacks
Rate	Each asynchronous serial interface supports 9600, 19200, 38400, 57600, and 115200 bps baud rates.
Flow Control	Each asynchronous serial interface supports auto flow control of hardware and software.
Operating Temperature:	Operating temperature: 0°C to 45°C Storage temperature: -40°C to 70°C
Humidity	Operating humidity: 10% to 90% RH
EMC	EMI: GB 9254-2008Class A
	EMS: GB/T 17618-1998

Cables

The following cables are provided:

- Asynchronous cable with1 DB68 male connector to 8 RJ-45 plugs
- Asynchronous cable with 1DB68 male connector to 8 RJ-45 jacks

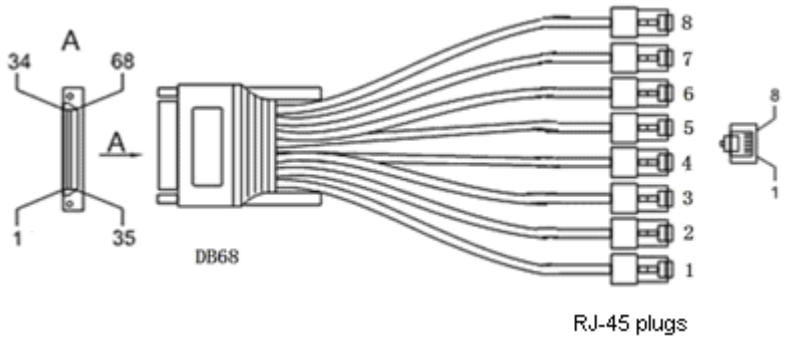
The following three types of converters are provided:

- RJ-45 jack to DB25 female connector converter
- RJ-45 jack to DB25 male connector converter
- RJ-45 jack to DB9 female connector converter

Asynchronous cable with 1 DB68 male connector to 8 RJ-45 plugs

One end is a DB68 male connector, and the other end is attached with eight RJ-45 plugs

Figure 1-27 Asynchronous Cable with 1 DB68 Male Connector to 8 RJ-45 Plugs



Considering that you may customize cables, the following section describes connection modes and the signal.

The following table describes cable pinout.

Table 1-23 Asynchronous Cable Pinout

Signal	**RJ-45 1/2/3/4/5/6/7/8**	**HPDB68M**							
CTS	1	39	43	47	51	55	59	63	67
DSR	2	5	9	13	17	21	25	29	33

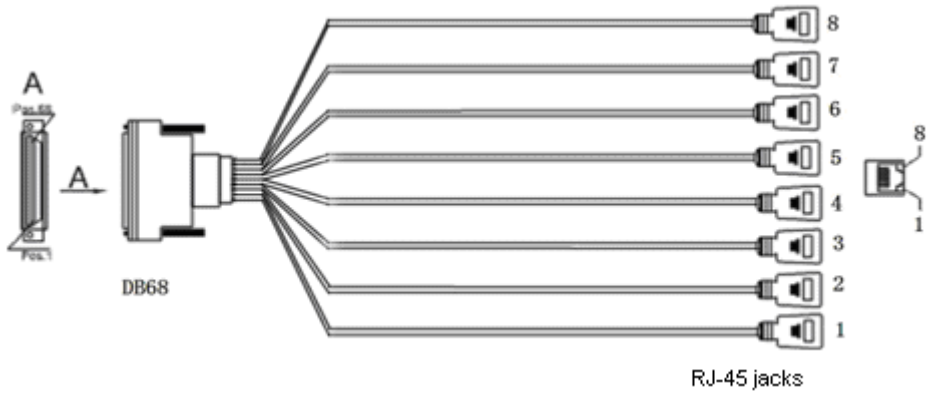
RXD	3	38	42	46	50	54	58	62	66
GND	4	4	8	12	16	20	24	28	32
DCD	5	37	41	45	49	53	57	61	65
TXD	6	3	7	11	15	19	23	27	31
DTR	7	36	40	44	48	52	56	60	64
RTS	8	2	6	10	14	18	22	26	30
	Iron shell	Iron shell							

The signal definition of the RJ-45 plug or the RJ-45 female socket attached by the converter cable is for the routers.

Asynchronous cable with 1 DB68 male connector to 8 RJ-45 jacks

One end is a DB68 male connector, and the other end is attached with eight RJ-45 jacks.

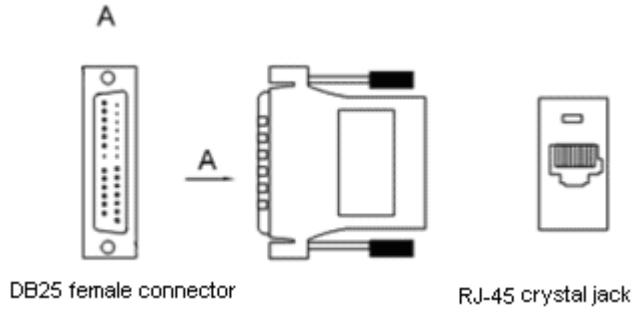
Figure 1-28 Asynchronous Cable with 1 DB68 Male Connector to 8 RJ-45 Jacks



For the cable pinout, please see Table 1-24.

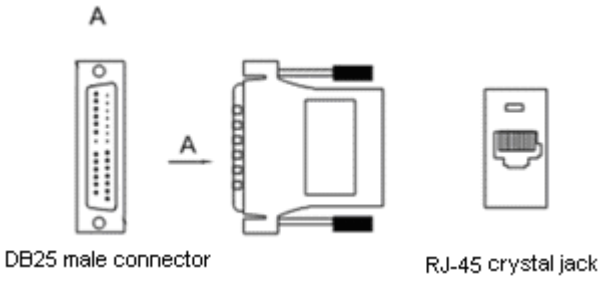
RJ-45 jack to DB25 female connector converter

Figure 1-29 RJ-45 Jack to DB25 Female Connector Converter



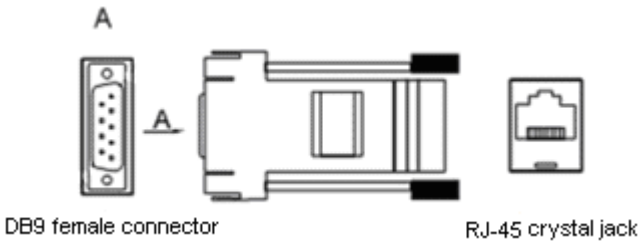
RJ-45 jack to DB25 male connector converter

Figure 1-30 RJ-45 Jack to DB25 Male Connector Converter



RJ-45 jack to DB9 female connector converter

Figure 1-31 RJ-45 Jack to DB9 Female Connector Converter



The cables are customer supplied. For the use of cables, see Chapter 6.

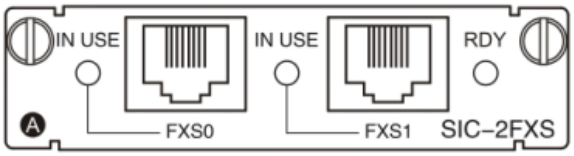
SIC-2FXS Interface Card

SIC card model: SIC-2FXS

Image and Indicators

The following figure shows the image of an SIC-2FXS interface card.

Figure 1-32 SIC-2FXS



The SIC-2FXS is a Type A SIC, which can be inserted in a slot marked with “A”.

The interface card includes the **IN USE** indicators for ports and one **RDY** indicator.

The following table describes panel indicators.

Table 1-24 LED Indictors on the SIC-2FXS Card

Indicator	Status	Meaning
IN USE	Solid on	The port is active.
	Off	The port is idle.
RDY	On	Initialization completed.

Indicator	Status	Meaning
	Off	Initialization failed.

Features

The following table describes the basic features:

Table 1-25 Specifications of the SIC-2FXS Card

Number of Ports	Two
Interface Type	RJ-45 connector (compatible with RJ-11)
Cables	Telephone cables
Standard Compliance	Voice code: G.711, G.729A, and G.723.1
Operating Temperature:	Operating temperature: 0°C to 45°C Storage temperature: -40°C to 70°C
Humidity	Operating humidity: 10% to 90% RH
EMC	EMI: GB 9254-2008 Class A
	EMS: GB/T 17618-1998

Cables

The SIC-2FXS interface module uses standard phone cables.

The cables are customer supplied.

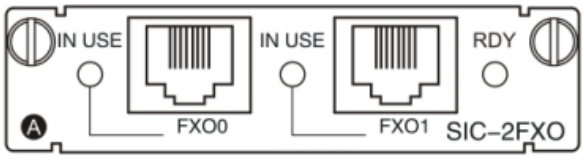
SIC-2FXO Interface Card

SIC card model: SIC-2FXO

Image and Indicators

The following figure shows the image of an SIC-2FXO interface card.

Figure 1-33 SIC-2FXO



The SIC-2FXO is a Type A SIC, which can be inserted in a slot marked with “A”.

The interface card includes the **IN USE** indicators for ports and one **RDY** indicator.

The following table describes panel indicators.

Table 1-26 LED Indictors on the SIC-2FXO Card

Indicator	Status	Meaning
IN USE	Solid on	The port is active.
	Off	The port is idle.
RDY	On	Initialization completed.
	Off	Initialization failed.

Features

The following table describes the basic features:

Table 1-27 Specifications of the SIC-2FXO Card

Number of Ports	Two
Interface Type	RJ-45 connector (compatible with RJ-11)
Cables	Telephone cables
Standard Compliance	Voice code: G.711, G.729A, and G.723.1
Operating Temperature:	Operating temperature: 0°C to 45°C Storage temperature: -40°C to 70°C
Humidity	Operating humidity: 10% to 90% RH
EMC	EMI: GB 9254-2008 Class A
	EMS: GB/T 17618-1998

Cables

The SIC-2FXO module uses standard phone cables.

The cables are customer supplied.

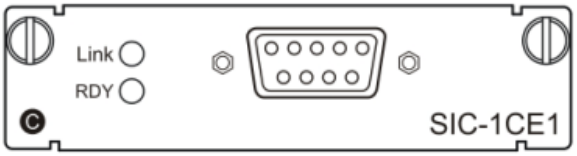
SIC-1CE1 Interface Card

SIC card model: SIC-1CE1

Image and Indicators

The following figure shows the image of a 1-port channelized E1 card (SIC-1CE1).

Figure 1-34 SIC-1CE1



The SIC-1CE1 is a Type C module, which can be inserted in a slot marked with “C”.

The following table describes panel indicators.

Table 1-28 LED Indictors on the SIC-1CE1 Card

Indicator	Status	Meaning
Link	Solid on	The upper link has been established.
	Off	Failed to establish the upper link.
RDY	On	Initialization completed.
	Off	Initialization failed.

Features

The following table describes the basic features:

Table 1-29 Specifications of the SIC-1CE1 Card

Number of Ports	One
Interface Type	DB9 female connector
Cables	Balanced cables or non-balanced cables
Standard Compliance	ITU-T G.703
Operating Temperature:	Operating temperature: 0°C to 45°C Storage temperature: -40°C to 70°C
Humidity	Operating humidity: 10%–90% RH
EMC	EMI: GB 9254-2008 Class A
	EMS: GB/T 17618-1998

Cables

The following types of cables are provided:

Balanced cable with the RJ-45 plug: One end is the DB9 male connector, and the other end is the RJ-45 plug. The characteristic impedance of the cable is 120Ω.

Balanced cable with the RJ-45 jack: One end is the DB9 male connector, and the other end is the RJ-45 jack. The characteristic impedance of the cable is 120Ω.

Non-balanced cable: One end is the DB9 male connector, and the other end is attached with two male BNC connectors. The characteristic impedance of the cable is 75Ω.

The cables are customer supplied.

SIC-SEC

SIC card model: SIC-SEC

Image and Indicators

The following figure shows the image of a Ruijie IPSec SIC with the key encryption function.

Figure 1-35 SIC-SEC

The following table describes panel indicators.

Table 1-30 LED Indicator on the SIC-SEC Card

Indicator	Status	Meaning
RDY	On	Initialization completed.
	Off	Initialization failed.

Features

The following table describes the basic features:

Table 1-31 Specifications of the SIC-SEC Card

Number of Ports	None
Interface Type.	N/A
Cables	N/A
Function Description	The module encrypts keys and enables the encryption algorithm.
Operating Temperature	Operating temperature: 0°C to 50°C Storage temperature: -40°C to 70°C
Humidity	Operating humidity: 10% to 95% RH (non condensing)
EMC	EMI: GB 9254-2008 ClassA
	EMS: GB/T 17618-1998

Cables

The cables are not supplied with the router.

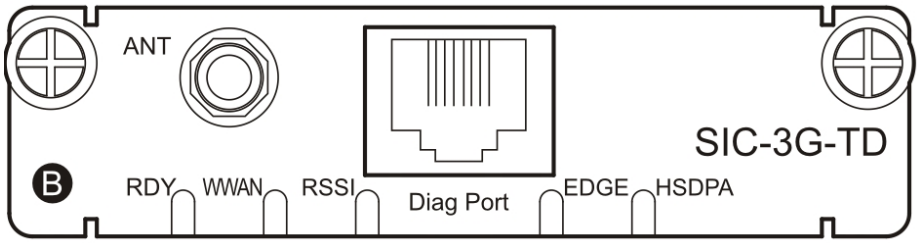
SIC-3G-TD Interface Card

SIC card model: SIC-3G-TD

Image and Indicator

The following figure shows the image of an SIC-3G-TD interface card.

Figure 1-36 SIC-3G-TD



The following table describes panel indicators.

Table 1-32 LED Indicators on the SIC-3G-TD Card

Indicator	Status	Meaning
WWAN (network status)	Solid green	Link up
	Blinking green	Data is being transmitted.
RSSI	Solid green	Strong signal
	Blinking green	Intermediate or low signal
	Off	Signal is weak or not present
HSDPA	Solid green	Effective HSDPA service
	Off	No HSDPA service
EDGE	Solid green	Effective EDGE service
	Off	No EDGE service
RDY	On	Initialization completed.
	Off	Initialization failed.

Features

The following table describes the basic features:

Table 1-33 Specification of the SIC-3G-TD Card

Number of Ports	One
Interface Type	RJ-45
Cables	Serial cables
Rate	HSDPA (downlink 2.8 Mbps, uplink 384 Kbps) EDGE (downlink 236.8 Kbps, uplink 236.8 Kbps) TD-SCDMA (downlink 384 Kbps, uplink 384 Kbps) GPRS (downlink 85.6 Kbps, uplink 85.6 Kbps)
Operating Temperature:	Operating temperature: 0°C to 45°C Storage temperature: -40°C to 70°C
Humidity	Operating humidity: 10% to 90% RH
EMC	EMI: GB 9254-2008 Class A
	EMS: GB/T 17618-1998

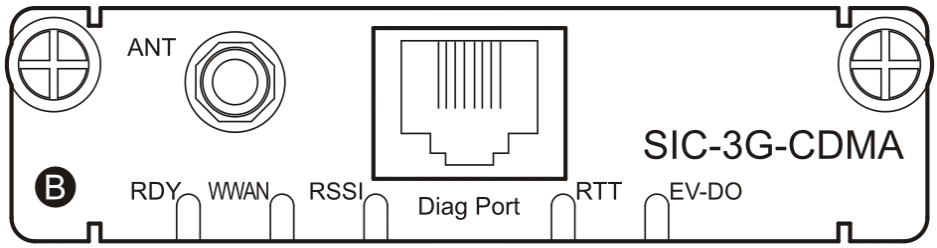
SIC-3G-CDMA-E Interface Card

SIC card model: SIC-3G-CDMA

Image and Indicators

The following figure shows the image of SIC-3G-CDMA.

Figure 1-37 SIC-3G-CDMA



The SIC-3G-CDMA is a Type B SIC module, which can be inserted in a slot marked with “B”.

The following table describes panel indicators.

Table 1-34 LED Indicators on the SIC-3G-CDMA Card

Indicator	Status	Meaning
WWAN (network status)	Solid green	Link up
	Blinking green	Data is being transmitted.
RSSI	Solid green	Strong signal
	Blinking green	Intermediate or low signal
	Off	Signal is weak or not present
EV-DO	Solid green	Effective EV-DO service
	Off	No EV-DO service
RTT	Solid green	Effective RTT service
	Off	No RTT service
RDY	On	Initialization completed.
	Off	Initialization failed.

Features

The following table describes the basic features

Table 1-35 Specification of the SIC-3G-CDMA Card

Number of Ports	One
Interface Type	RJ-45
Cables	Serial cables
Rate	1x EV-DO Rev.A (downlink 3.1 Mbps; uplink 1.8 Mbps) 1x EV-DO Rev.0 (downlink 2.4 Mbps; uplink 153.6 Kbps) 1x RTT (downlink 153.6 Kbps; uplink 153.6 Kbps)
Operating Temperature:	Operating temperature: 0°C to 45°C Storage temperature: -40°C to 70°C
Humidity	Operating humidity: 10% to 90% RH
EMC	EMI: GB 9254-2008 Class A

	EMS: GB/T 17618-1998

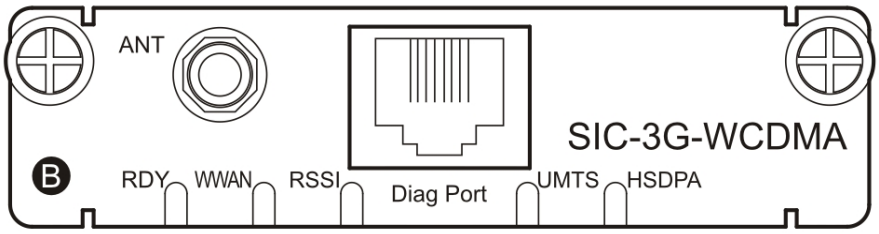
SIC-3G-WCDMA Interface Card

SIC card model: SIC-3G-WCDMA

Image and Indicators

The following figure shows the image of SIC-3G-WCDMA.

Figure 1-38 SIC-3G-WCDMA



The SIC-3G-WCDMA is a Type B module, which can be inserted in a slot marked with “B”.

The following table describes panel indicators.

Table 1-36 LED Indicators on the SIC-3G-WCDMA Card

Indicator	Status	Meaning
WWAN (network status)	Solid green	Link up
	Blinking green	Data is being transmitted.
RSSI	Solid green	Strong signal
	Blinking green	Intermediate or low signal
	Off	Signal is weak or not present
HSDPA	Solid green	Effective HSDPA service
	Off	No HSDPA service
UMTS	Solid green	Effective UMTS service
	Off	No UMTS service
RDY	On	Initialization completed.
	Off	Initialization failed.

Features

The following table describes the basic features:

Table 1-37 Specification of the SIC-3G-WCDMA Card

Number of Ports	One
Interface Type	RJ-45
Cables	Serial cables
Rate	HSDPA (downlink 7.2 Mbps; uplink 5.76 Mbps) UMTS (downlink 384 Kbps; uplink 384 Kbps)

	EDGE (downlink 236.8 Kbps; uplink 236.8 Kbps) GPRS (downlink 85.6 Kbps; uplink 85.6 Kbps)
Operating Temperature:	Operating temperature: 0°C to 45°C Storage temperature: -40°C to 70°C
Humidity	Operating humidity: 10% to 90% RH
EMC	EMI: GB 9254-2008 Class A
	EMS: GB/T 17618-1998

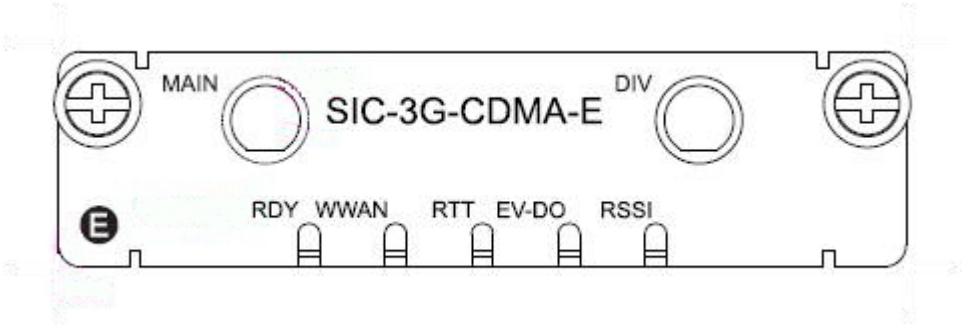
SIC-3G-CDMA-E Interface Card

SIC card model: SIC-3G-CDMA-E

Image and Indicators

The following figure shows the image of SIC-3G-CDMA-E.

Figure 1-39 SIC-3G-CDMA-E



The SIC-3G-CDMA-E is a Type E module, which can be inserted in a slot marked with “E”.

The following table describes panel indicators.

Table 1-38 LED Indicators on the SIC-3G-CDMA-E Card

Indicator	Status	Meaning
WWAN (network status)	Solid green	Link up
	Blinking green	Data is being transmitted.
RSSI	Solid green	Strong signal
	Blinking green	Intermediate or low signal
	Off	Signal is weak or not present
EV-DO	Solid green	Effective EV-DO service
	Off	No EV-DO service
RTT	Solid green	Effective RTT service
	Off	No RTT service
RDY	On	Initialization completed.
	Off	Initialization failed.

Features

The following table describes the basic features:

Table 1-39 Specification of the SIC-3G-CDMA-E Card

Number of Ports	One
Interface Type	RJ-45
Cables	Serial cables
Rate	1x EV-DO Rev.A (downlink 3.1 Mbps; uplink 1.8 Mbps) 1x EV-DO Rev.0 (downlink 2.4 Mbps; uplink 153.6 Kbps) 1x RTT (downlink 153.6 Kbps; uplink 153.6 Kbps)
Operating Temperature:	Operating temperature: 0°C to 45°C Storage temperature: -40°C to 70°C
Humidity	Operating humidity: 10% to 90% RH
EMC	EMI: GB 9254-2008 Class A
	EMS: GB/T 17618-1998

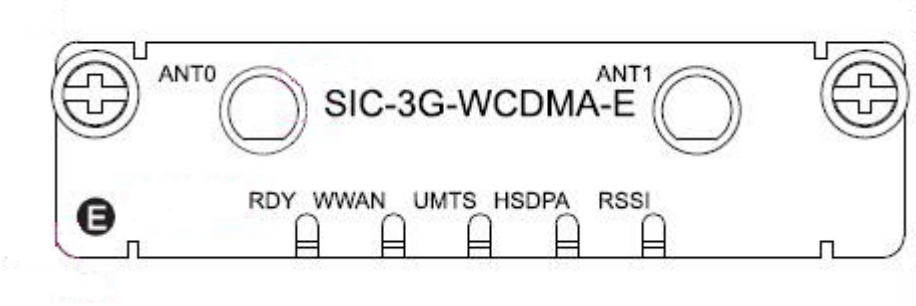
SIC-3G-WCDMA-E Interface Card

SIC card model: SIC-3G-WCDMA-E

Image and Indicators

The following figure shows the image of SIC-3G-WCDMA-E.

Figure 1-40 SIC-3G-WCDMA-E



The SIC-3G-WCDMA-E is a Type E module, which can be inserted in a slot marked with “E”.

The following table describes panel indicators.

Table 1-40 LED Indicators on the SIC-3G-WCDMA-E Card

Indicator	Status	Meaning
WWAN (network status)	Solid green	Link up
	Blinking green	Data is being transmitted.
RSSI	Solid green	Strong signal
	Blinking green	Intermediate or low signal

Indicator	Status	Meaning
	Off	Signal is weak or not present
HSDPA	Solid green	Effective HSDPA service
	Off	No HSDPA service
UMTS	Solid green	Effective UMTS service
	Off	No UMTS service
RDY	On	Initialization completed.
	Off	Initialization failed.

Features

The following table describes the basic features:

Table 1-41 Specification of the SIC-3G-WCDMA-E Card

Number of Ports	One
Interface Type	N/A
Cables	N/A
Rate	HSDPA (downlink 7.2 Mbps; uplink 5.76 Mbps) UMTS (downlink 384 Kbps; uplink 384 Kbps) EDGE (downlink 236.8 Kbps; uplink 236.8 Kbps) GPRS (downlink 85.6 Kbps; uplink 85.6 Kbps)
Operating Temperature:	Operating temperature: 0°C to 45°C Storage temperature: -40°C to 70°C
Humidity	Operating humidity: 10% to 90% RH
EMC	EMI: GB 9254-2008 Class A
	EMS: GB/T 17618-1998

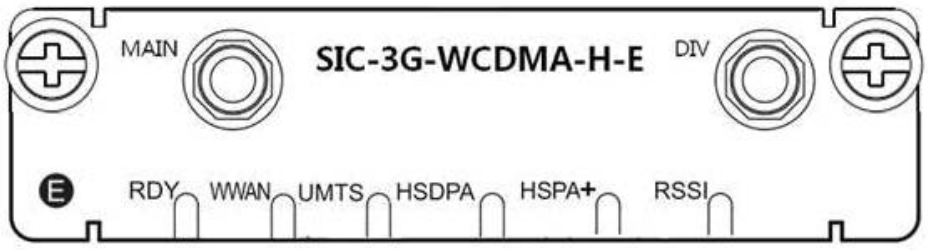
SIC-3G-WCDMA-H-E Interface Card

SIC model: SIC-3G-WCDMA-H-E

Image and Indicators

The following figure shows the image of SIC-3G-WCDMA-H-E

Figure 1-41 SIC-3G-WCDMA-H-E



The SIC-3G-WCDMA-H-E is a Type E line card, which can be inserted in a slot marked with “E”.

The following table describes panel indicators.

Table 1-42 LED Indicators on the SIC-3G-WCDMA-H-E Card

Indicator	Status	Meaning
WWAN (network status)	Solid green	Link up
	Blinking green	Data is being transmitted.
RSSI	Solid green	Strong signal
	Blinking green	Intermediate or low signal
	Off	Signal is weak or not present
HSDPA	Solid green	Effective HSDPA service
	Off	No HSDPA service
UMTS	Solid green	Effective UMTS service
	Off	No UMTS service
RDY	On	Initialization completed.
	Off	Initialization failed.

Features

The following table describes the basic features:

Table 1-38 Specification of the SIC-3G-WCDMA-H-E Card

Number of Ports	One
Interface Type	N/A
Cables	N/A
Rate	HSDPA (downlink 7.2 Mbps; uplink 5.76 Mbps) UMTS (downlink 384 Kbps; uplink 384 Kbps) EDGE (downlink 236.8 Kbps; uplink 236.8 Kbps) GPRS (downlink 85.6 Kbps; uplink 85.6 Kbps)
Operating Temperature:	Operating temperature: 0°C to 45°C Storage temperature: -40°C to 70°C
Humidity	Operating humidity: 10% to 90% RH
EMC	EMI: GB 9254-2008 Class A
	EMS: GB/T 17618-1998

Other SIC Cards

The RSR10-02E series router currently supports 15 types of SIC cards: SIC-1HS, SIC-1E1-F, SIC-1B-U, SIC-1B-S/T, SIC-8A, SIC-2FXS, SIC-2FXO, SIC-1CE1, SIC-SEC, SIC-3G-TD, SIC-3G-CDMA, SIC-3G-WCDMA, SIC-3G-CDMA-E, SIC-3G-WCDMA-E and SIC-3G-WCDMA-H-E. The descriptions of the subsequent SIC cards will be updated when the cards are launched.

Features of RSR10-02E Series Routers

Note For software functions, see the supporting software description.

Supporting Multiple Protocols

- Applicable to various network environments.
- Providing RJ-45 interfaces for twisted pairs, supporting Ethernet, ARP, and 802.1Q protocols.
- Supporting various WAN protocols, including X.25, frame relay, HDLC, PPP, and SLIP.
- Supporting the TCP/IP protocol stack and the protocols such as IP, Internet Control Message Protocol (ICMP), Internet Group Management Protocol (IGMP), TCP and UDP on the network layer.
- Supporting multiple dynamic routing protocols over IP, including RIP (V1/V2), RIPng, Open Shortest Path First (OSPF) (V1/V2/V3), and policy-based routing.
- Supporting the Simple Network Management Protocol (SNMP).
- Supporting Telnet and reverse Telnet.
- Supporting Dynamic Host Configuration Protocol (DHCP) Server, DHCP Client, DHCP Relay, and Trivial File Transfer Protocol (TFTP).
- Supporting backup, Virtual Router Redundancy Protocol (VRPP) with high reliability.
- Supporting Point-to-Point Protocol over Ethernet (PPPOE).
- Supporting DNS static domain name resolution and Dynamic Domain Name Server (DDNS). DNS indicates Domain Name System.
- Supporting upgrade over the asynchronous file transfer protocols of X-MODEM.
- Supporting NAT/NAT-PT, ACL and AAA.
- Supporting Internet Protocol Security (IPSEC), Layer 2 Tunneling Protocol (L2TP), and Point to Point Tunneling Protocol (PPTP).

User-Friendly Interfaces

- Providing standard operating interfaces and intuitive configuration procedures with each command described in details in on-line help.
- Providing descriptions and examples of each command as well as comprehensive fault analysis.

Powerful Backup Function

- Supporting route backup through routing protocols.
- Supporting the interface backup function

Multiple Diagnosis and Management Tools

- Providing complete debugging and tracing tools as well as complete DEBUG commands for easier accurate location of various network faults.
- Providing rich statistics and information display functions to allow the users to easily know the network performance and running status.
- Supporting SNMP for monitoring and controlling the router by using common network management software.

- Supporting login through terminals.

1) Supporting configuration over the Console port
2) Supporting login and configuration over telnet.
3) Supporting login and configuration over the serial port.
4) Supporting login and configuration over remote dial-up.

Superior Security

- Using perfect firewall and IP packet filtering technology to enforce strict check on network addresses, port numbers, or protocol types.
- Supporting AAA and RADIUS.
- Realizing Password Authentication Protocol (PAP) and Challenge Handshake Authentication Protocol (CHAP) on Point-to-Point Protocol (PPP), supporting callback, and enhancing security.
- Providing level-based password check and security logs.
- Implementing dynamic routing-protocol password/key authentication in OSPF and RIP V2.
- Supporting NAT.
- Providing IPSEC/IKE data encryption
- Supporting GRE tunnel encapsulation
- Providing VLAN technology

Multiple Terminal Functions

- Enabling both the synchronous and asynchronous ports to connect the terminals.
- Supporting the autocommand function (automatically run commands) and the user-based autocommand function (allow different users to run different commands) on terminal ports.
- Supporting the command alias and telnet script, which can be used together with the autocommand function to directly log in to the server after pressing **Enter** on the terminal.
- Supporting the fixed terminal dial-up function based on different operating systems, where a terminal uses the same terminal number for multiple times of login.
- Supporting the real terminal. The terminal logs in to the server over the router and act as a real terminal (tty) for the server, not needing the modification of the old programs, thereby protecting the existing investment.
- Implementing the router-based multi-screen terminal function, which allows the terminal to easily switch over between different servers or different screens of one server.
- Supporting the reverse Telnet function, which enables easy management of various serial port devices over a router.

Easy Upgrade

- Supporting the asynchronous file transfer X-MODEM protocol, which allows the download of new versions over the Console port or synchronous port in various operation environments (Windows XP, Windows NT, UNIX, and DOS).
- Supporting the download of the new software versions over TFTP.
- Supporting BOOTROM online upgrade.
- Supporting the SD card for one-key system upgrade

Chapter 2 Preparing for Installation

Precautions

Routers are critical repeaters in network connection, and affect the operation of the whole network.

The following are recommended during the installation and use of a router:

- Keep the router dry.
- Place the router away from heating sources.
- Ensure the normal grounding.
- Wear electrostatic discharge (ESD) straps during installation and maintenance.
- Do not plug/unplug routers' modules during power on.
- Do not plug/unplug any cables when energized.
- Do not wear any loose clothes that may hook the components. Therefore, fasten your belts, scarves, and tuck the sleeves.
- Keep the tools and components away from walking areas.
- Use Uninterruptible Power Supply (UPS) to avoid power failure as well as power interference.
- Replace the battery with an equal one made by the same factory.

Risk of Explosion if battery is replaced by an incorrect type.
Dispose or used batteries according to the instructions.

Installation Environment Requirements

Ruijie routers are intended for indoor use. For their normal operation and maximum service life, they must be installed at locations that meet the following requirements:

- Temperature and humidity requirements
- Cleanness requirements
- Anti-static requirements
- Anti-interference requirements
- Anti-lightning requirements
- Installation platform check

Temperature and Humidity Requirements

To ensure the normal operation and maximize the service life of a router, you should keep proper temperature and humidity in the equipment room. If the relative humidity is high for a long time, the insulating materials may have poor insulation, electric leakage or other mechanical performance degrade may occur. And if the relative humidity is too low, the insulating washers may become dry and shrink, which may cause loosened screws. In addition, static electricity may

easily occur in dry weathers, harming the internal circuitry of the router. High temperature will speed the aging of insulation materials, lowering the router's reliability and shorten its service life.

The following are Ruijie RSR10-02E series routers' Requirements for the temperate and humidity requirements:

Temperature: 0ºC to 45ºC

Relative humidity: 10%–95% RH

Note

The ambient temperature and humidity refer to the values measured at the place 1.5 m above the floor and 0.4 m in the front of the router rack without protective boards.

The temperature and humidity requirements may be different for different products. For details, see descriptions about the characteristic parameters for each product.

Cleanness Requirements

Dust poses a serious threat to device operation. Dust that falls onto the surface of the device can be absorbed onto metal contact points by static electricity, resulting in poor contact. Electrostatic absorption of dust occurs more easily when the relative humidity is low, which may shorten the useful life of the device and cause communication failures.

The following table describes Ruijie routers' requirements for the dust content and granularity in the equipment room:

Maximum diameter (μm)	0.5	1	3	5
Maximum concentration (Particles/m^3)	1.4×10^7	7×10^5	2.4×10^5	1.3×10^5

Besides, the content of salts, acids and sulfides in the air are also strictly limited for the equipment room. These substances can accelerate metal corrosion and aging of some parts. The following table describes the limit of some hazardous gases such as SO_2, H_2S, NO_2 and Cl_2 in the equipment room.

Gas	**Average (mg/m^3)**	**Maximum (mg/m^3)**
SO_2	0.2	1.5
H_2S	0	0.03
NO_2	0.04	0.15
NH_3	0.05	0.15
Cl_2	0.01	0.3

Anti-static Requirements

The router circuitry is designed with anti-static protection, but excessive static electricity may still damage router circuit boards. The static electricity of the network connected with the routers comes largely from the following sources:

- Outdoor electric field produced by the high-voltage supply cable and lightning.
- Indoor systems such as the indoor floor and the entire structure.

Therefore, the following requirements must be met:

- Ensure proper grounding of the device and floor.
- Prevent indoor dust.
- Maintain proper temperature and humidity.
- Wear ESD wrist straps and ESD lab coats when touching a circuit board.
- Put the removed circuit board face up on an anti-static workbench or in an electromagnetic shielding bag.
- Touch the external edge of the board and avoid touching the parts on the board directly with hands when observing or carrying the detached circuit board.

Anti-interference Requirements

Anti-interference indicates the electromagnetic and current interference. The following are the anti-interference requirements:

- Take effective measures for the power system to prevent the interference from the electric grid.
- Separate the working ground of the network output engine from the grounding device of the power equipment or the anti-lightning grounding device.
- Keep away from the high-frequency large-current devices like high-power radio transmitters and radar transmitters.
- Take electromagnetic shielding measures when necessary.

Anti-Lightning Requirements

Ruijie series routers are provided with anti-lighting protection. However, as an electric device, it is still vulnerable to powerful lightning. Therefore, the following measures must be taken to prevent lightning:

- Ensure good contact between the grounding cable of the router and the ground.
- Ensure that the neutral point of the AC power socket is in good contact with the ground.
- Add a lighting arrester in front of the input of the power supply to enhance the anti-lightning effect of the power supply.
- For improve the anti-lightning effect, users can attach special lightning prevention equipment to the input end of outdoor signal lines such as telephone line, E1 line and T1 line that connected with the interface modules of RSR10-02E series.

Checking the Installation

The following requirements must be met whether routers are installed in a cabinet or placed on a workbench:

- Sufficient spacing is reserved at the air inlets and outlets of the routers for good heat dissipation of the routers. Ruijie Networks Routers come with cooling fans, and the cooling principle is like: Cool air is drawn in through the ventilation holes at the four sides of the chassis, and then dissipated through the fans at the bottom of the chassis. Therefore, leave at least 10 cm space around the ventilation holes. It is recommended install the routers on the standard 19-inch cabinet. If the environment condition is limited, horizontally place the routers on a clean workbench. Air conditioner is recommended in hot areas.
- The cooling systems of the cabinet and the workbench are proper.
- The cabinet or workbench is firm enough to support the router and its accessories.
- The cabinet and workbench are properly mounted.

Installation Tools

The following must be ready for smooth installation:

- Installation tools
- Connection cables
- Related devices

Installation tools include:

- Phillips screwdrivers
- Slotted screwdriver
- ESD wrist strap

Connection cables include:

- Power cable
- Configuration cable
- Ethernet cable
- Module interface cable

Note

The power cables and the configuration cables are provided along with Ruijie RSR10-02E series router delivery, but the Ethernet cables and module interface cables are customer supplied.

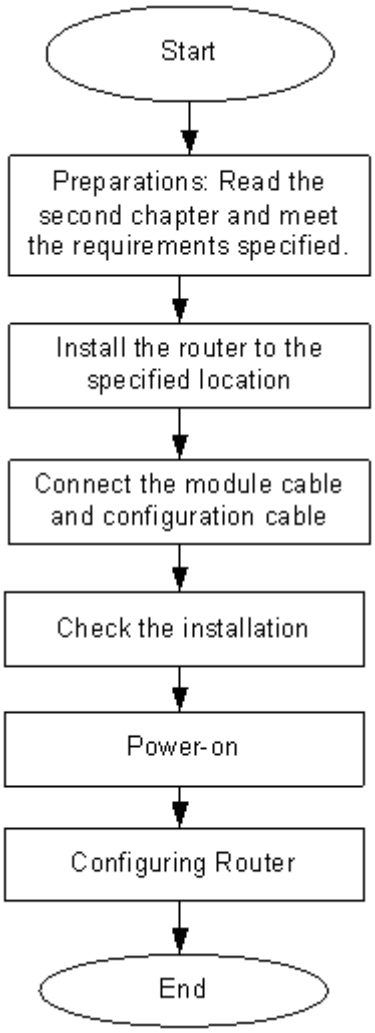
Related devices include:

- HUB or switch
- CSU/DSU or other DCE device
- Configuration terminal that can be a terminal or a PC installed with HyperTerminal
- Router modules
- Power socket

Chapter 3 Installing the Router

Installation Flowchart

The following is the flowchart of installing a Ruijie series router. Follow the process to ensure a smooth installation and avoid any damage to the router.



Fastening the Router

Fastening a router refers to the process of mounting a router to the specified location, which occurs after the installation preparation is complete. Routers are usually mounted:

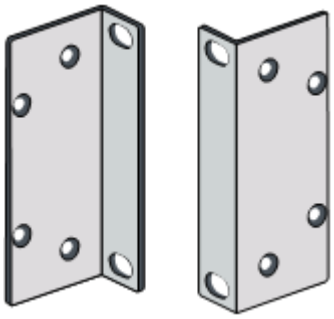
- In the cabinet
- On the workbench
- On the wall

Mounting on the Cabinet

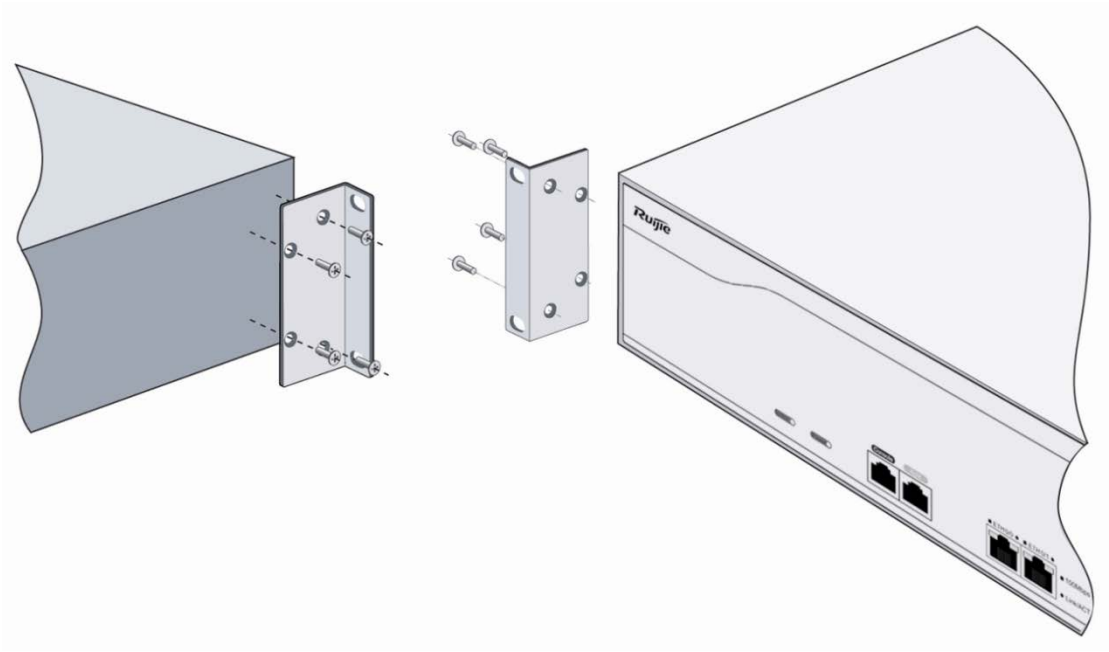
The Ruijie Networks RSR series router is designed with the 19-inch standard cabinet. Use the supplied fixing accessory for installation when needed.

RSR10-02E can be mounted on the cabinet using the shipped sunk screw and fixing accessories. The following figure shows how to install the RSR10-02 on the rack. Follow the same method to install the RSR10-02E.

Brackets:



Mounting:



Note: The figure is only for reference, and the specific object prevails.

Mounting on the Workbench

In actual application, the standard 19-inch cabinet may be unavailable. In this case, the router is often mounted on a clean workbench. The operation is easy and the requirements are as follows:

- The workbench is stable and is properly grounded.
- The supplied plastic cushion is stuck to the small hole at the bottom of the router and a space of 10 cm is set aside around the router for dissipation.
- No weight is placed on the top of the router.

Mounting on the Wall

The RSR10-20E series router can be mounted on the concrete wall or wooden wall. The operation is as follows:

- Drill two holes on the wall. The space between the holes should be 144 mm.
- Insert the anchors into the holes, and fasten the anchors with screws.
- Align the two mounting holes on the bottom of the device over the screws. Mount the device on the wall.

Installing the Power Cable and the Grounding Cable

Ruijie RSR10-02E series routers support the following AC power supply:

AC: 100–240 VAC; 50 Hz to 60 Hz;

Verify that the power supply meets the requirement.

The router power cable is composed of three wires. You are recommended use a single-phase power socket with a natural connector or a multifunctional PC power socket. The neutral point of the power supply should be reliably grounded in the building. For common buildings, the neutral points have been buried into the ground during construction and wiring. You must verify if the power supply of the building has been properly grounded.

The following table describes the procedure for installing the power cable:

1) Verify that the router switch is off. Connect one end of the supplied power cable to the socket on the rear panel of the cabinet and the other end to the AC power socket.
2) Switch the router to power on position.
3) For the RSR10-02E series router, verify that the PWR indicator on the front panel is on. If so, it indicates that the power cable is correctly connected.

Note

The power supply socket should be installed near the device for convenient plugging.
Disconnect all pluggable communication networks ends and power distribution system ends before disconnecting the power cables.

Connecting the Console

Ruijie series routers supply an EIA/TIA-232 configuration console for local configuration. This interface enables user to complete the local configuration of the routers.

The following table describes the configuration attributes.

Parameters	Description
Connector	RJ-45
Interface Standard	Asynchronous EIA/TIA-232
Baud Rate	Default: 9600 bps
Supported Services	1. Command line interface 2. Connection to the character terminal

To connect the console port of the router:

Connect one end of the supplied configuration cable to the console port of the router and the other end to the DB-9 male connector used to configure the router. Verify that a Super Terminal is run on the PC.

Installing Line Cards

This section introduces how to install the line card including SIC cards supported by the RSR10-02E series router.

Installing Line Card Modules

1) Switch off all power supply connected to the router. Otherwise electric shock and device damage may occur.

2) Face the router rear panel, and remove the blank panel with screwdrivers.
3) Flush the line card interface board and the edge of the opening of the back panel of the router base.
4) Push the line card to the router until the interface board closely touches the backplane of the router.
5) Tighten the fastening screws on the line card.
6) Repeat Step 3 through Step 5 until all the line cards have been installed.


Caution

Before installing line cards, switch off all power supply connected to the router. Otherwise, electric shock or device damage may occur.

At Step 3 and Step 4, operate gently. A line card should be inserted gently and smoothly. If you find it difficult to push the line card, do not adopt forcible measures. Instead, unplug the line card and check if the SIC card interface board has been aligned with the edge of the opening on the rear panel at the base of the router. Otherwise, the line card may be damaged.

Removing Line Cards

1) Switch off the router.
2) Face the router rear panel.
3) Unplug the cables of the ports on the module to be removed.
4) Remove the fastening screws on the two sides of the line card interface board with a straight screwdriver.
5) Draw the line card to the front of you until the interface board completely disengages from the base of the router.
6) Repeat Step 4 and Step 5 until all required line card interface boards have been removed.


Caution

When you have removed a line card and are not going to install another one, install an SIC slot baffle in time to protect it against dust and ensure ventilation.

When you remove a line card, keep it distant from the passage in the working room to avoid any damage or accident due to bumping during removal.

Troubleshooting Line Cards

Troubleshooting line cards as follows if the router fails to operate after you have installed a line card:

- Check the interface cable of the module to see if the correct cable has been used.
- Observe the interface indicators of various modules to see if the module is working properly.
- In privileged EXEC mode, view interface information. Check whether each line card has accepted configuration and is operational.

Verification

Perform the following verification steps before powering up an installed router:

- If the router is stalled in a cabinet, verify the installation brackets of the cabinet and router are fixed. If the router is stalled on the workbench, verify whether there is enough room around the router for heat dissipation and whether the workbench is fixed.

- Verify whether the power supply meets the requirements.
- Verify whether the grounding cable is correctly connected.
- Verify whether the router is connected correctly to other devices like the configuration terminal.

Chapter 4 Starting and Configuring the Router

Starting a Router

Setting Up the Configuration Environment

When you use the router for the first time, you must configure the router over a console port as follows.

1) As shown in the following figure, connect the serial port of a character terminal or PC to the Console port of the network output engine through the standard RS232 cable and the Console. Set up the local configuration environment using the Console port.
2) Configure the communication setting parameters of a terminal. If a PC is used, you must run the terminal simulation program, for example, Windows HyperTerminal. The following describes the procedure with the HyperTerminal as example. Run the HyperTerminal software to set up a new connection. Select the serial port to connect the Console port of the network output engine. Set the communication parameters: 9600 for baud rate, eight data bits, one stop bit, no parity check, and no flow control. In addition, select VT100 as the simulation terminal type.
   1. Create a new connection
   2. Select the serial port to be connected with the router console
   3. Set the communication parameters of the serial port
   4. Select a terminal emulation type

   After setting up the configuration environment, power on the router.

Powering up the Router

Verification before Power-up

Verify the following before powering up the router:

- The power cable and the grounding cable are connected correctly.
- The power supply voltage meets the requirement.
- The cable connection is correct and the PC or terminal for configuration is started and set.


Caution Before power-up, verify the position of the power switch so that you can cut power supply in time in case of accident.

Powering up the Router

- Switch on the power supply.
- Switch the router to the **ON** position.

Verification after Power-up

- The indicators on the front panel operate properly.

Check method: For the RSR10-02E, the SYS indicator is solid green when the router is operational after powered-on.

- The configuration terminal displays properly.

When the router is powered up, information on router software self-decompression will be displayed on the terminal.

Startup Process

When the router is started for the first time, the following information is displayed:

```
*****************************************
System bootstrap ...
Boot Version: RGOS 10.3(4), Release(53498)
Nor Flash ID: 0x00010049, SIZE: 2097152Bytes
MTD_DRIVER-5-MTD_NAND_FOUND: 1 NAND chips(chip size : 33554432) detected
MTD_DRIVER-5-MTD_NAND_FOUND: 1 nand chip(s) found on the target.
Press Ctrl+C to enter Boot Menu ......
Main Program File Name rgos.bin, Load Main Program ...

Executing program, launch at: 0x00010000
Ruijie General Operating System Software
Release Software (tm), RGOS 10.3(4), Release(53498), Compiled Fri Apr  3 08:45:59 CST 2009
by ngcf31

Copyright (c) 1998-2009 by Ruijie Networks.
All Rights Reserved.
Decompiling or Reverse Engineering is Not Allowed.

00:00:00:00: %MTD_DRIVER-5-MTD_NAND_FOUND: 1 NAND chips(chip size : 33554432) detected
00:00:00:00: %MTD_DRIVER-5-MTD_NAND_FOUND: 1 nand chip(s) found on the target.
00:00:00:17: %LINK-5-CHANGED: Interface FastEthernet 0/1, changed state to up
00:00:00:17: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet 0/1, changed state
to up
00:00:00:17: %LINK-5-CHANGED: Interface FastEthernet 0/0, changed state to up
00:00:00:17: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet 0/0, changed state
to up
00:00:00:31: %SYS-5-COLDSTART: System coldstart.

Ruijie>
Ruijie>
Ruijie>
Ruijie>
Ruijie>
```

The information may vary with hardware configuration or software version.

You can start to configure the router upon seeing the information

Note When using the router for the first time, it is recommended you set basic parameters using the configuration function.

Configuring the Router

You need to configure a router before using it. For more information about router configuration, see the related Configuration Guide and Command Reference.

Chapter 5 Troubleshooting

Power Troubleshooting

For the RSR10-02E series, you can determine whether the power system has faults by the PWR indicator on the front panel. For the normal status of the indicator, see the description in Chapter 1. If exceptions occur, verify the following:

- The router power switch is in the on position.
- The power supply switch of the router is in the on position.
- The power cable is connected correctly.
- The power supply meets the requirements.

Caution Do not plug/unplug the power cable when energized. If the check shows everything is normal but the PWR/Status indicator is still off, please contact the local distributor or technical support personnel.

System Troubleshooting

After the router is powered up, the terminal will show the startup messages described in the previous chapter if the system is not operational. If the system configuration fails, the terminal may display no messages or illegible codes.

If the terminal does not display any messages, check:

- Whether the power system is operational.
- Whether the Console cable is properly connected.

If the problem remains, it is probably due to wrong configuration cable or wrong terminal parameter setting. In this case, modify the terminal parameters.

If the terminal displays illegible codes, it is probably because the terminal parameter configurations do not match. In this case, check the terminal parameters: baud rate of 9600; eight data bits; no parity check; one stop bit; no flow control; VT100 for the emulation terminal.

Note If the console port parameters of your router are modified, no message will be displayed on the terminal.

Chapter 6 Using the Cables

This chapter describes the use of various cables and converters when applying routers.

Physical Cable Connection

Connecting an Asynchronous Interface

Connecting an Asynchronous Interface Module to a Modem

As a DCE device, the modem has two types of serial interfaces: DB9F and DB25F female sockets.

Connecting the Asynchronous Card to the Modem

The asynchronous cable with 1-to-8 crystal connectors converts the 68-pin connector of the asynchronous interface into eight RJ-45 connectors, and then connects to the DB25F interface of the modem through the RJ-45 (crystal jack)-DB25 male converter.

When the asynchronous cable with 1-to-8 crystal jacks is used, you need to use a straight through cable to connect the converter cable of the asynchronous interface module to the converter.

This mode applies to SIC-8A.

Table : Connecting the asynchronous interface module to the Modem.

Device	Cable 1	Cable 2	Cable 3	Peer
SIC-8A	Asynchronous cable with 1-to-8 crystal connectors	RJ-45 (crystal jack)-DB25 male converter	N/A	DB25F interface of the Modem
	Asynchronous cable with 1-to-8 crystal jacks	Straight-through cable	RJ-45 (crystal jack)-DB25 male converter	

Connect the AUX Port to the Modem

The AUX port is connected to the Modem through a rollover cable with RJ-45 (crystal jack)-DB25 male converter or an RJ45-DB9 male converter.

Note

The AUX port connected through an RJ-45 rollover cable is the same as the asynchronous card connected through the asynchronous cable with 1-to-8 crystal connectors, and also similar in the connection to the Modem.

Table: Connecting the AUX port module to Modem

Device	Device	Device	Peer
AUX port	Rollover cable	RJ-45(crystal jack)-DB25 male converter	DB25F interface of the Modem

Connecting an Asynchronous Interface Module to a Terminal

The asynchronous cable with 1-to-8 crystal connectors converts the 68-pin connector of the asynchronous interface into eight RJ-45 connectors, and connects to the DB9M interface of a terminal (for instance, dumb terminal) through the RJ-45 (crystal jack)-DB9 female converter.

If you use the asynchronous cable with 1-to-8 crystal jacks, you need to use a straight network cable to connect the converter cable of the asynchronous interface module to the converter.

This mode applies to modules SIC-8A.

Table: Connecting the asynchronous interface module to a terminal.

Device	Cable 1	Cable 2	Cable 3	Peer	
SIC-8A	Asynchronous cable with 1-to-8 crystal connectors	Straight-through cable	RJ-45(crystal jack)-DB9 female converter	DB9M interface	Terminal (like a dumb terminal)
		RJ-45(crystal jack)-DB9 female converter	N/A	DB9M interface	

Connecting a Synchronous Interface

V.24 Mode

The synchronous interface of the router line card working in V.24 DTE mode is connected to the peer working in V.24 DCE mode through V.24 DTE cables. While the synchronous interface working in V.24 DCE mode is connected to the peer working in V.24 DTE mode through V.24 DCE cables.

This applies to the V.24 DTE/ V.24 DCE mode of line cards SIC-1HS.

Table : Connecting the synchronous interface of the router working in V.24 mode.

Device	Mode	Cable 1	Peer
The SIC-1HS and synchronous interface line cards with DB26 interface	V.24 DTE mode	V.24 DTE cables	V.24 Modem
	V.24 DCE mode	V.24 DCE cables	Device working in V.24 DTE mode

V.35 Mode

The synchronous interface of the router line card working in V.35DTE mode is connected to the peer as GV converter and V.35 Modem through V.35 DTE cables. While the synchronous interface working in V.35 DCE mode is connected to the peer working in V.35 DTE mode through V.35DCE cables..

This applies to the V.35 DTE/V.35 DCE mode of such line cards SIC-1HS.

In the laboratory, there is another special application that implements the back-to-back connection between our company's synchronous cards through the V.35 DTE-V.35 DCE cables

Table: Connecting the synchronous interface of the router working in V.35 mode.

Device	Mode	Cable 1	Peer
SIC-1HS	V.35 DTE mode	V.35 DTE cables	GV converter, and V.35 Modem
	V.35 DCE mode	V.35 DCE cables	Devices working in V.35 DTE mode
	Back-to-back mode	V.35 DTE-V.35 DCE cables	Ruijie Networks SIC-1HS NMX-4HSH

Connecting the E1 Interface

Connecting E1 line card to the Base Band Modem with an E1 cable.

Connecting a DB9F interface on an E1/CE1 line card to the Base Band Modem

1) Through a non-balanced cable
2) Through a balanced cable (with crystal interface)
3) Through a balanced cable (with crystal interface)

Table : Connecting a DB9F interface on an E1/CE1 line card to the base band modem.

Device	Cable 1	Cable 2	Peer	
SIC-1E1-F, SIC-1CE1	non-balanced cable	N/A	BNC interface	Base band Modem
	balanced cable (with crystal interface)	N/A	RJ-45 interface	
	balanced cable (with crystal interface)	Straight-through cable		

Connecting the Console Interface

The console interface of a switch/router is generally an RJ-45 connector that connects RJ-45 cables through DB9F or connects to the DB9M serial port of PC through the RJ45-DB9 jack matching rollover cable.

Table: Connecting the console interface.

Device	Cable 1	Cable 2	Peer
CONSOLE interface	DB9F-to-RJ45 cable	N/A	PC's DB9M serial interface

Ordering Information

Ruijie Networks provides all previously mentioned cables, except for modem cables shown in the following table are provided by the modem manufacturer.

Table: Cable ordering information

Number	Model	Name

V-03260025-000	CAB-V.35DTE/POS26-34PM/3M	V.35DTE cable
V-03260028-000	CAB-V.35DCE/POS26-34PF/3M	V.35DCE cable
V-03260024-000	CAB-V.35DTE-V.35DCE/POS26-POS26/1M	V.35DTE-V.35DCEc able
V-03260030-000	CAB-V.24DTE/POS26-DB25M/3M	V.24DTE cable
V-03260031-000	CAB-V.24DCE/POS26-DB25F/3M	V.24DCE cable
V-03260032-000	CAB-Asy/SCSIDB68-8*RJ45M/1.5m	Asynchronous cable (1 to 8 crystal connector)
V-03260047-000	CAB-Asy/SCSIDB68-8*RJ45F/1.5m	Asynchronous cable (1 to 8 crystal jack)
V-03260034-000	CAB-Rolled/RJ45M-RJ45M/3m	Rollover cable
V-03260060-000	ADAPTER/RJ45F-DB9F	RJ45 (crystal jack)-DB9 female converter
V-03260061-000	ADAPTER/RJ45F-DB25M	RJ45 (crystal jack)-DB25 male converter
V-03260062-000	ADAPTER/RJ45F-DB25F	RJ45 (crystal jack)-DB25 female converter
V-03260035-000	CAB-E1 UNBALANCED/DB9M-2*BNC/75 OHM/3M	Non-balanced cable
V-03260037-000	CAB-E1 BALANCED/DB9M-RJ45M/120 OHM/3M	Balanced cable (crystal connector interface)
V-03260036-000	CAB-E1 BALANCED/DB9M-RJ45F/120 OHM/3M	Balanced cable (crystal jack interface)