



RRU3008

V300R008

User Guide

Issue 03
Date 2009-04-20

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About This Document

Purpose

This document provides a reference for you to plan and deploy the RRU3008. It describes the appearance, ports, and functions of the RRU3008, categories of the cables, and specifications and installation positions of the connectors. This document also provides methods for maintaining the RRU3008.

Product Version

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

Product Name	Product Version
RRU3008	V300R008

Intended Audience

This document is intended for:

- RRU3008 installers
- Technical support engineers
- Maintenance engineers

Organization

[1 Changes in the RRU3008 User Guide](#)

This describes the changes in the *RRU3008 User Guide*.

[2 RRU3008 Hardware](#)

This describes the functional modules, cables, and auxiliary equipment of the RRU3008.

[3 Maintaining the RRU3008](#)

This describes how to maintain the RRU3008. After the site is put into formal operation, you should perform routine maintenance on the RRU3008 to ensure that it runs properly. This document describes the maintenance items of the RRU3008, the power-on and power-off operations, and the method of replacing the RRU3008 modules and cables.






[4 Auxiliary Device of the RRU](#)

The auxiliary device of the RRU refers to the AC power surge protection box used for the AC RRU in outdoor applications.

Conventions

Symbol Conventions

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

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

General Conventions

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

Convention	Description
Times New Roman	Normal paragraphs are in Times New Roman.
Boldface	Names of files, directories, folders, and users are in boldface . For example, log in as user root .
<i>Italic</i>	Book titles are in <i>italics</i> .
Courier New	Examples of information displayed on the screen are in Courier New.

Command Conventions

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

Convention	Description
Boldface	The keywords of a command line are in boldface .
<i>Italic</i>	Command arguments are in <i>italics</i> .

Convention	Description
[]	Items (keywords or arguments) in brackets [] are optional.
{ x y ... }	Optional items are grouped in braces and separated by vertical bars. One item is selected.
[x y ...]	Optional items are grouped in brackets and separated by vertical bars. One item is selected or no item is selected.
{ x y ... }*	Optional items are grouped in braces and separated by vertical bars. A minimum of one item or a maximum of all items can be selected.
[x y ...]*	Optional items are grouped in brackets and separated by vertical bars. Several items or no item can be selected.

GUI Conventions

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

Convention	Description
Boldface	Buttons, menus, parameters, tabs, window, and dialog titles are in boldface . For example, click OK .
>	Multi-level menus are in boldface and separated by the ">" signs. For example, choose File > Create > Folder .

Keyboard Operations

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

Format	Description
Key	Press the key. For example, press Enter and press Tab .
Key 1+Key 2	Press the keys concurrently. For example, pressing Ctrl+Alt+A means the three keys should be pressed concurrently.
Key 1, Key 2	Press the keys in turn. For example, pressing Alt, A means the two keys should be pressed in turn.

Mouse Operations

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

Action	Description
Click	Select and release the primary mouse button without moving the pointer.

Action	Description
Double-click	Press the primary mouse button twice continuously and quickly without moving the pointer.
Drag	Press and hold the primary mouse button and move the pointer to a certain position.

1 Changes in the RRU3008 User Guide

This describes the changes in the *RRU3008 User Guide*.

03 (2009-04-20)

This is the third commercial release.

Compared with issue 02 (2009-01-20) of V300R008, no contents are added, deleted or revised.

02 (2009-01-20)

This is the second commercial release.

Compared with release 01 (2008-09-05) of V300R008, this release does not delete information but incorporates the following modifications:

- The description of the list of RRU Cables is revised. For details, see [2.2.1 RRU3008 Cable List](#).
- The description of the AC RRU power cable is added. For details, see [2.2.4 AC Power Cable of the AC RRU](#).
- The description of the AC power surge protection box is added. For details, see [4.1 AC Power Surge Protection Box](#).

01 (2008-09-05)

This is the initial trial release.

2 RRU3008 Hardware

About This Chapter

This describes the functional modules, cables, and auxiliary equipment of the RRU3008.

[2.1 RRU3008 Equipment](#)

The RRU3008 is an outdoor remote RF unit. It processes baseband signals and RF signals.

[2.2 RRU3008 Cables](#)

The RRU3008 cables consist of the PGND cable, power cable, CPRI optical cable, RRU RF cable, alarm cable, signal cable between the CPRI ports on the cascaded RRUs, AISG multi-wire cable, and AISG extension cable.

2.1 RRU3008 Equipment

The RRU3008 is an outdoor remote RF unit. It processes baseband signals and RF signals.

The functions of the RRU3008 are as follows:

- One RRU3008 module supports eight carriers.
- Providing CPRI ports for communication with the BBU3900
- The frequency conversion technique is implemented in the transmit channel. The RRU3008 up-converts the baseband signals, performs digital-to-analog conversion, and then up-converts the IF signals to the GSM transmit frequency band. After filtered and amplified, the RF signals are sent to the antenna for transmission through the duplexer in the RF front-end unit.
- Receives RF signals from the antenna and performs down-conversion, amplification, analog-to-digital conversion, digital down-conversion, matched filtering, and Automatic Gain Control (AGC), and then transmits the signals to the BBU3900 or macro BTS for further processing.
- Power control and Voltage Standing Wave Ration (VSWR) detection
- Enabling frequency synthesis
- Generation and recovery of the clock circuitry at the CPRI interface, and the alarm detection

2.1.1 Appearance of the RRU

The RRU3008 has a modular structure. The external ports of the RRU3008 are located at the bottom of the RRU3008 and in the cabling cavity.

2.1.2 Panels of the RRU Module

The RRU module has a bottom panel, a cabling cavity panel, and an area attached with LEDs.

2.1.3 LEDs on the RRU3008

The RRU3008 has six LEDs that indicate its operating status.

2.1.1 Appearance of the RRU

The RRU3008 has a modular structure. The external ports of the RRU3008 are located at the bottom of the RRU3008 and in the cabling cavity.

Figure 2-1 shows the RRU3008.

Figure 2-1 Appearance of the RRU3008

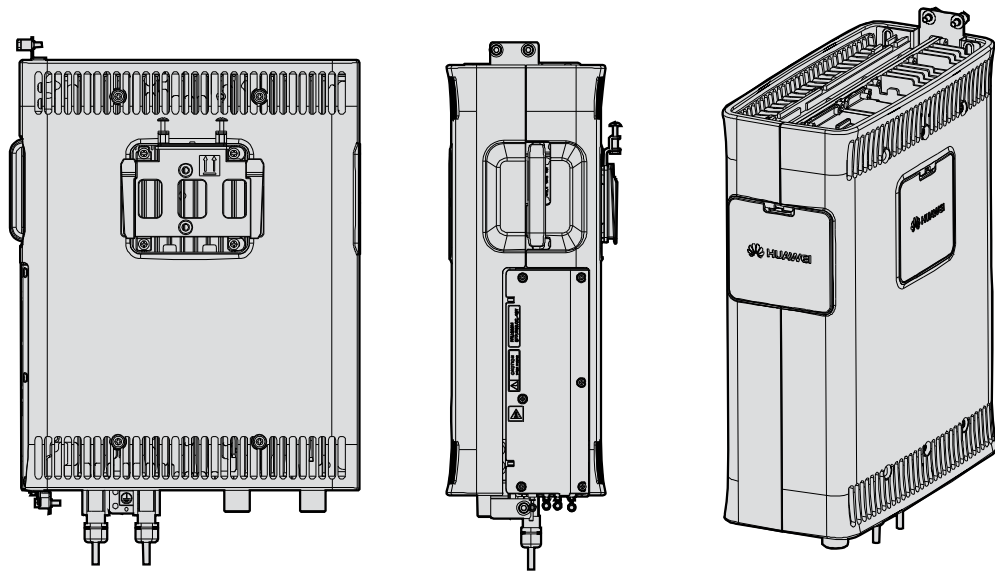


Figure 2-2 shows the AC RRU module.

Figure 2-2 AC RRU module



2.1.2 Panels of the RRU Module

The RRU module has a bottom panel, a cabling cavity panel, and an area attached with LEDs.

Figure 2-3 shows the panels of the DC RRU module.

Figure 2-3 Panels of the DC RRU module

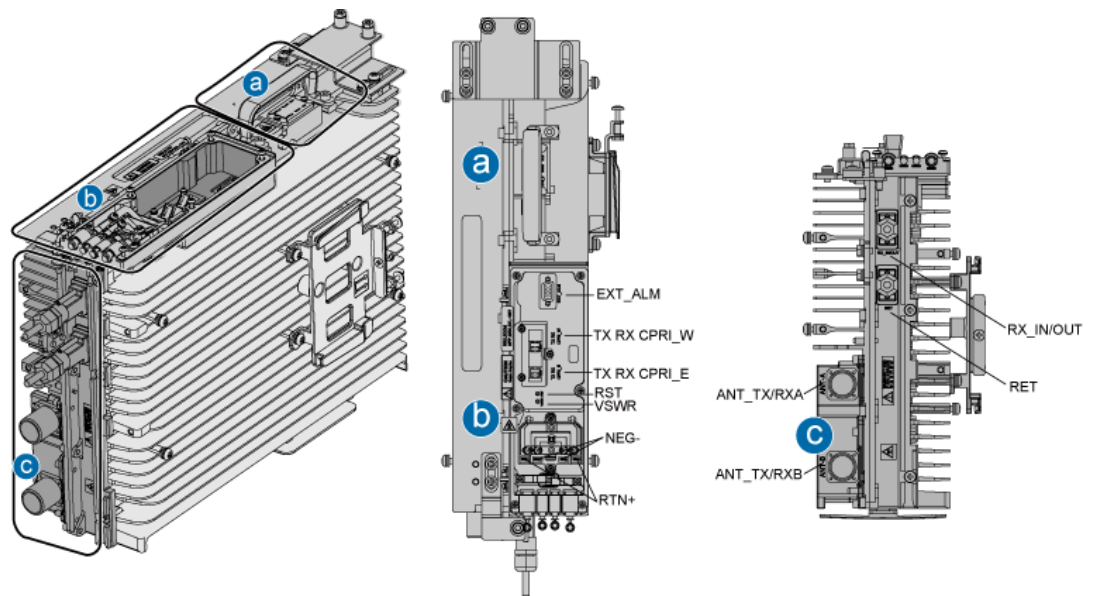
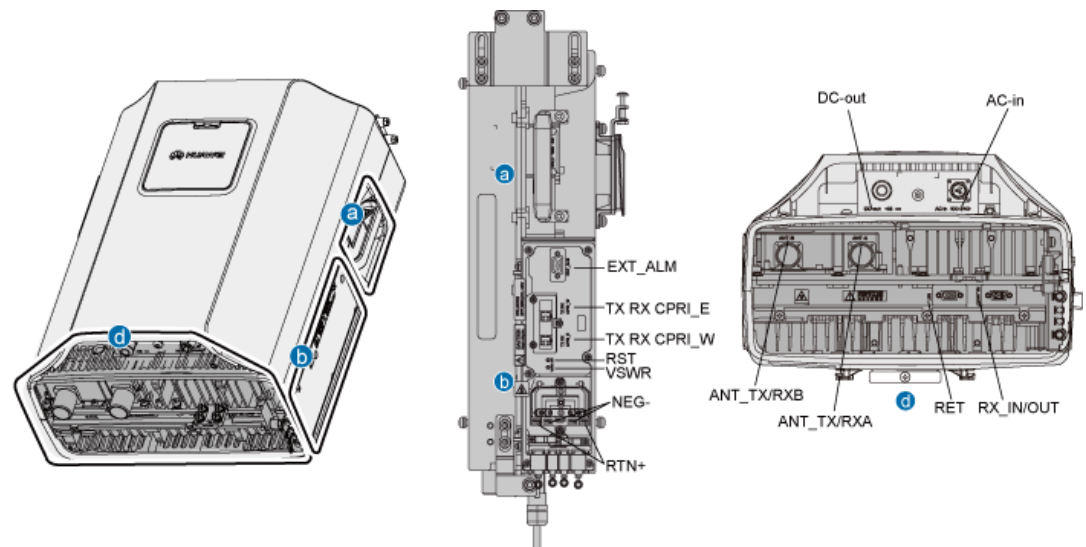


Figure 2-4 shows the panels of the AC RRU.

Figure 2-4 Panels of the AC RRU module



The DC RRU has the same LED panel and cabling cavity panel as the AC RRU. The bottom panels of the two RRUs are different. **Table 2-1** describes the LEDs, cabling cavity panel, and bottom panel of the RRU.

Table 2-1 Ports, buttons, and LEDs on the panels of the RRU module

Item	Label	Description
(a) LED	RUN	Refer to 2.1.3 LEDs on the RRU3008 .
	ALM	
	VSWR	
	TX_ACT	
	CPRI_W	
	CPRI_E	
(b) Cabling cavity panel	RTN+	Power wiring post
	NEG-	
	TX RX CPRI_E	Eastward optical/electrical port
	TX RX CPRI_W	Westward optical/electrical port
	EXT_ALM	Alarm port
	RST	Hardware reset button
	VSWR	Test button for VSWR alarms
(c) Bottom panel of the DC RRU	RX_IN/OUT	RF interconnection port
	RET	RET antenna port
	ANT_TX/RXA	RF TX/RX port A
	ANT_TX/RXB	RF TX/RX port B
(d) Bottom panel of the AC RRU	RX_IN/OUT	Interconnection port for RF signals
	RET	RET antenna communication port
	ANT_TX/RXA	RF TX/RX port A
	ANT_TX/RXB	RF TX/RX port B
	AC-in	AC power supply socket
	-	DC power supply socket

2.1.3 LEDs on the RRU3008

The RRU3008 has six LEDs that indicate its operating status.

For the positions of the LEDs on the RRU3008, see [2.1.2 Panels of the RRU Module](#).

[Table 2-2](#) lists the LEDs on the RRU3008.

Table 2-2 LEDs on the RRU3008

Label	Color	Status	Meaning
RUN	Green	ON	The board is faulty or undergoing version verification.
		OFF	No power input is available.
		Blinking (ON for 1s and OFF for 1s)	The board is operational.
		Blinking (ON for 0.25s and OFF for 0.25s)	The software is being loaded.
ALM	Red	Blinking (ON for 0.25s and OFF for 0.25s)	The alarms (excluding VSWR related alarms) are reported.
		OFF	No alarms (excluding VSWR related alarms) are reported.
TX_ACT	Green	ON	The board is operational.
		OFF	No power input is available.
VSWR	Red	ON (red)	The power amplifier is not operational. VSWR alarms reported from the ANT_TX/RX port are being held.
		Blinking (ON for 0.25s and OFF for 0.25s) (red)	The power amplifier is operational. VSWR alarms are reported from the ANT_TX/RX port.
		OFF	No VSWR alarms are reported.
CPRI_W (westward CPRI LED)	Red/green	ON (green)	The CPRI link is functional.
		ON (red)	The reception of the optical module is abnormal and an alarm is generated.
		Blinking (ON for 0.25s and OFF for 0.25s) (red)	The CPRI link has a loss-of-lock error.
		OFF	The SFP is out-of-position or the optical module is powered off.
CPRI_E (eastward CPRI LED)	Red/green	ON (green)	The CPRI link is functional.
		ON (red)	The reception of the optical module is abnormal and an alarm is generated.

Label	Color	Status	Meaning
		Blinking (ON for 0.25s and OFF for 0.25s) (red)	The CPRI link has a loss-of-lock error.
		OFF	The SFP is out-of-position or the optical module is powered off.

2.2 RRU3008 Cables

The RRU3008 cables consist of the PGND cable, power cable, CPRI optical cable, RRU RF cable, alarm cable, signal cable between the CPRI ports on the cascaded RRUs, AISG multi-wire cable, and AISG extension cable.

2.2.1 RRU3008 Cable List

The RRU3008 cables are the PGND cable, power cable, CPRI optical cable, RF jumper, interconnect jumper, alarm cable, signal cable between the CPRI ports on the cascaded RRUs, AISG multi-wire cable, and AISG extension cable.

2.2.2 PGND Cable of the RRU

The RRU PGND cable connects the RRU to the grounding bar to ensure the proper grounding of the RRU. When two RRUs are cascaded, you may connect one RRU to the external grounding and then equipotentially connect the two RRUs through the PGND cable. Alternatively, you may respectively connect the two RRUs to the grounding bar through external PGND cable.

2.2.3 DC RRU Power Cable

The DC RRU power cable is used to lead the -48 V DC power from the external device and supply the working power to the DC RRU.

2.2.4 AC Power Cable of the AC RRU

The AC power cable of the AC RRU feeds AC power from external equipment to the AC RRU.

2.2.5 DC Output Signal Cable of the AC RRU

The DC output signal cable of the AC RRU feeds power to the AC RRU and monitors the running status of the RRU.

2.2.6 CPRI Optical Cable

This describes the CPRI optical cable. The CPRI optical cable connects the BBU and the RRU, and transmits CPRI signals. The CPRI optical cable is classified into the single-mode optical cable and the multi-mode optical cable. The following describes the multi-mode optical cable.

2.2.7 RRU RF Cable

The RRU RF cable consists of the RF jumper and the interconnect jumper. The RF jumper can be connected to the feeder or directly to the antenna. The interconnect jumper is used to connect the **RX_IN/OUT** ports of two RRUs so that RF signals can be transmitted between the two RRUs.

2.2.8 Alarm Cable of the DC RRU

This describes the alarm cable of the DC RRU. The alarm cable of the DC RRU transmits alarm signals from the external equipment to the DC RRU, and monitors the external signals.

2.2.9 Signal Cable Between the CPRI Ports on the Cascaded RRUs

The signal cable between the CPRI ports on cascaded RRUs transmits data and control signals sent by the BBU.

2.2.10 AISG Multi-Wire Cable of the RRU

This describes the AISG multi-wire cable of the RRU. The AISG multi-wire cable connects the RRU and RCU, and transmits the BTS signals for controlling the RET antenna.

2.2.11 AISG Extension Cable of the RRU

This describes the AISG extension cable. If the distance between the RRU and the RCU exceeds 5 meters and the AISG multi-wire cable cannot cover the distance, you need to use the AISG extension cable to extend the AISG multi-wire cable.

2.2.1 RRU3008 Cable List

The RRU3008 cables are the PGND cable, power cable, CPRI optical cable, RF jumper, interconnect jumper, alarm cable, signal cable between the CPRI ports on the cascaded RRUs, AISG multi-wire cable, and AISG extension cable.

Table 2-3 lists the cables.

Table 2-3 Cable list

Cable	Status Before Delivery	Installation Position
2.2.2 PGND Cable of the RRU	Neither end of the cable is connected before delivery. Therefore, the cable should be installed on site.	<ul style="list-style-type: none"> ● PGND cable between the AC RRU and the AC surge protection box <ul style="list-style-type: none"> - One end is connected to the grounding bolt at the bottom of one RRU. - The other end is connected to the grounding bolt at the side of the AC surge protection box. ● AC surge protection box PGND cable <ul style="list-style-type: none"> - One end is connected to the grounding bolt at the side of the AC surge protection box. - The other end is connected to the wiring terminal of the PGND bar. ● RRU PGND cable <ul style="list-style-type: none"> - One end is connected to the grounding bolt at the bottom of the RRU. - The other end is connected to the wiring terminal of the PGND bar.

Cable	Status Before Delivery	Installation Position
2.2.3 DC RRU Power Cable	Neither end of the DC RRU power cable is connected before delivery. Therefore, the cable should be installed on site.	One end is connected to the NEG(-) (for the blue wire) and RTN(+) (for the brown or black wire) wiring posts in the cabling cavity of the DC RRU. The other end is connected to the wiring post (20 A) on the external power device.

Cable	Status Before Delivery	Installation Position
<p>2.2.4 AC Power Cable of the AC RRU</p>	<ul style="list-style-type: none"> ● Neither end of the power cable between the AC surge protection box and the AC RRU is connected before delivery. Therefore, the cable should be installed on site. ● Neither end of the power cable between the AC RRU and the external power system is connected before delivery. Therefore, the cable should be installed on site. ● Neither end of the power cable between the AC surge protection box and the external power system is connected before delivery. Therefore, the cable should be installed on site. 	<ul style="list-style-type: none"> ● Power cable between the AC RRU and the AC surge protection box <ul style="list-style-type: none"> - One end is connected to the AC-in port on the bottom panel of the AC RRU. - The other end is connected to the L/L' (for the brown wire), N/N' (for the blue wire), and GND (for the green and yellow wire) terminals on the AC protection box. ● Power cable between the AC RRU and the external power system <ul style="list-style-type: none"> - One end is connected to the AC-in port on the bottom panel of the AC RRU. - The other end is connected to the external power system. ● Power cable between the AC surge protection box and the external power system <ul style="list-style-type: none"> - One end is connected to the L/L' (for the brown wire), N/N' (for the blue wire), and GND (for the green and yellow wire) terminals on the AC protection box. - The other end is connected to the external power system.

Cable	Status Before Delivery	Installation Position
2.2.5 DC Output Signal Cable of the AC RRU	The cable is installed before delivery.	One end is connected to the AC/DC power module of the AC RRU. The other end is connected to the NEG(-) (for the blue wire) and RTN(+) (for the brown wire) wiring posts and the EXT_ALM port in the cabling cavity of the AC RRU.
2.2.6 CPRI Optical Cable	Neither end of the cable is connected before delivery. Therefore, the cable should be installed on site.	One end is connected to the CPRI_W port in the cabling cavity of the RRU. The other end is connected to the CPRI port on the BBU.
2.2.7.1 RRU RF Jumper	Neither end of the cable is connected before delivery. Therefore, the cable should be installed on site.	One end is connected to the ANT_TX/RX port at the bottom of the RRU. The other end is connected to the antenna or feeder.
2.2.7.2 Interconnect Jumper of the RRU	Neither end of the cable is connected before delivery. Therefore, the cable should be installed on site.	One end is connected to the RX_IN/OUT port on one RRU. The other end is connected to the RX_IN/OUT port on the other RRU.
2.2.8 Alarm Cable of the DC RRU	Neither end of the cable is connected before delivery. Therefore, the cable should be installed on site.	One end is connected to the EXT_ALM port in the cabling cavity of the RRU. The other end is connected to the ports for alarm signals on the external device.
2.2.9 Signal Cable Between the CPRI Ports on the Cascaded RRUs	Neither end of the cable is connected before delivery. Therefore, the cable should be installed on site.	One end is connected to the CPRI_E port in the cabling cavity of one RRU. The other end is connected to the CPRI_W port in the cabling cavity of the other RRU.

Cable	Status Before Delivery	Installation Position
2.2.10 AISG Multi-Wire Cable of the RRU	Neither end of the cable is connected before delivery. Therefore, the cable should be installed on site.	One end is connected to the RET port at the bottom of the RRU. The other end is connected to the corresponding port on the RCU or to the AISG extension cable.
2.2.11 AISG Extension Cable of the RRU	Neither end of the cable is connected before delivery. Therefore, the cable should be installed on site.	One end is linked to the standard AISG female connector of the AISG multi-wire cable. The other end is connected to the corresponding port on the RCU.

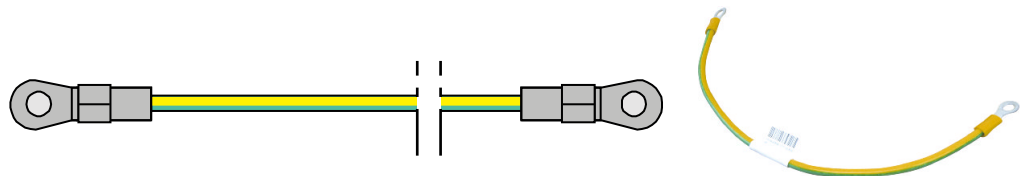
2.2.2 PGND Cable of the RRU

The RRU PGND cable connects the RRU to the grounding bar to ensure the proper grounding of the RRU. When two RRUs are cascaded, you may connect one RRU to the external grounding and then equipotentially connect the two RRUs through the PGND cable. Alternatively, you may respectively connect the two RRUs to the grounding bar through external PGND cable.

Appearance

The cross-sectional area of the green and yellow PGND cable is 16 mm². Both ends of the cable are OT terminals. The OT terminals need to be assembled on site. [Figure 2-5](#) shows the PGND cable.

Figure 2-5 PGND cable



NOTE

- When an AC surge protection box is configured, the PGND cable is used to connect the AC surge protection box and the RRU so that the electric potential at the modules is equal.
- When an AC surge protection box is configured, the PGND cable connects the AC surge protection box and the grounding bar to ensure the proper grounding of the AC surge protection box.
- One end of the PGND cable that is connected to the RRU or AC surge protection box has M6 OT terminals, and the other end needs to be assembled with OT terminals of a proper size depending on the external ground bar on site.

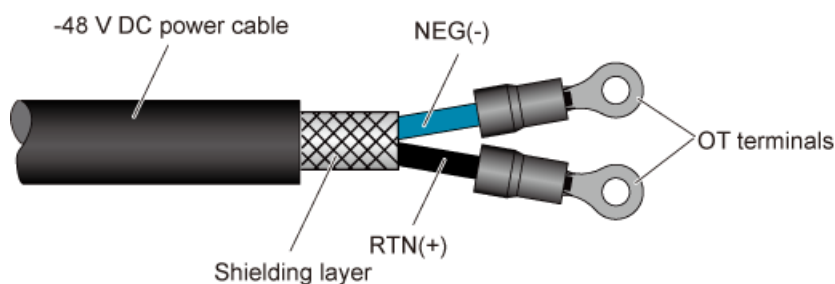
2.2.3 DC RRU Power Cable

The DC RRU power cable is used to lead the -48 V DC power from the external device and supply the working power to the DC RRU.

Appearance

The end that is connected to the DC RRU is two M4 OT terminals, and the other end needs to be added with OT terminals based on the external power device on site, as shown in [Figure 2-6](#).

Figure 2-6 DC RRU power cable



Pin Assignment

The DC RRU power cable is a 2-wire cable. [Table 2-4](#) and [Table 2-5](#) describe the pin assignment for the wires of the DC RRU power cable.

Table 2-4 Pin assignment for the wires of the DC RRU power cable (North American standard)

Wire Type	Color
NEG	Blue
RTN	Black

Table 2-5 Pin assignment for the wires of the DC RRU power cable (European standard)

Wire Type	Color
NEG	Blue
RTN	Brown

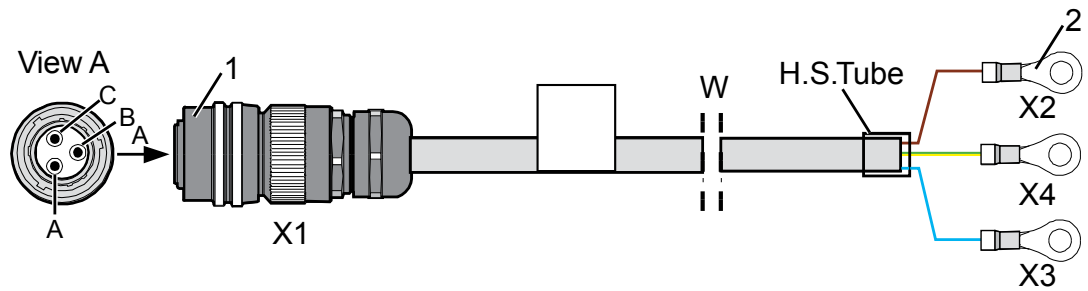
2.2.4 AC Power Cable of the AC RRU

The AC power cable of the AC RRU feeds AC power from external equipment to the AC RRU.

Appearance

[Figure 2-7](#) shows the power cable between the AC RRU and the AC surge protection box.

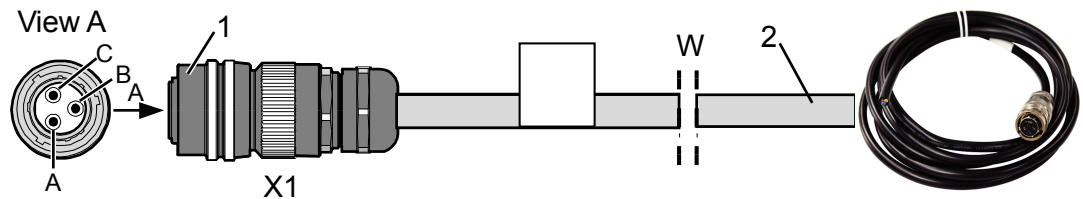
Figure 2-7 Power cable between the AC RRU and the AC surge protection box



(1) 3-pin round connector	(2) OT terminal
---------------------------	-----------------

Figure 2-8 shows the power cable between the AC RRU and the external power equipment when the AC surge protection box is not configured.

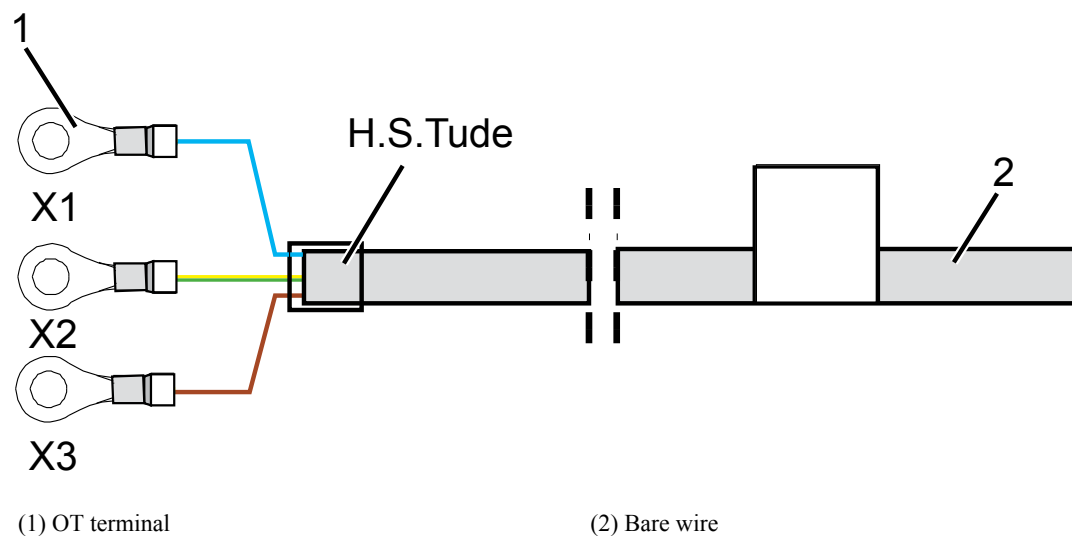
Figure 2-8 Power cable between the AC RRU and the external power equipment



(1) 3-pin round connector	(2) Bare wire
---------------------------	---------------

Figure 2-9 shows the power cable between the AC surge protection box and the external power equipment.

Figure 2-9 Power cable between the AC surge protection box and the external power equipment



Pin Assignment

Table 2-6 describes the pin assignment for the power cable between the AC RRU and the AC surge protection box and that between the AC RRU and the power equipment.

Table 2-6 Pin assignment for the wires of the AC power cable between the AC RRU and the AC surge protection box and that for the AC RRU and the power equipment

One End	Color	The Other End Connected to the AC Surge Protection Box	The Other End Connected to the Power Equipment	Description
X1.A	Brown	X2	Bare wire	L
X1.B	Blue	X4		N
X1.C	Green and yellow	X3		PE

Table 2-7 describes the pin assignment for the wires of the power cable between the AC surge protection box and the power equipment.

Table 2-7 Pin Assignment for the wires of the power cable between the AC surge protection box and the power supply device

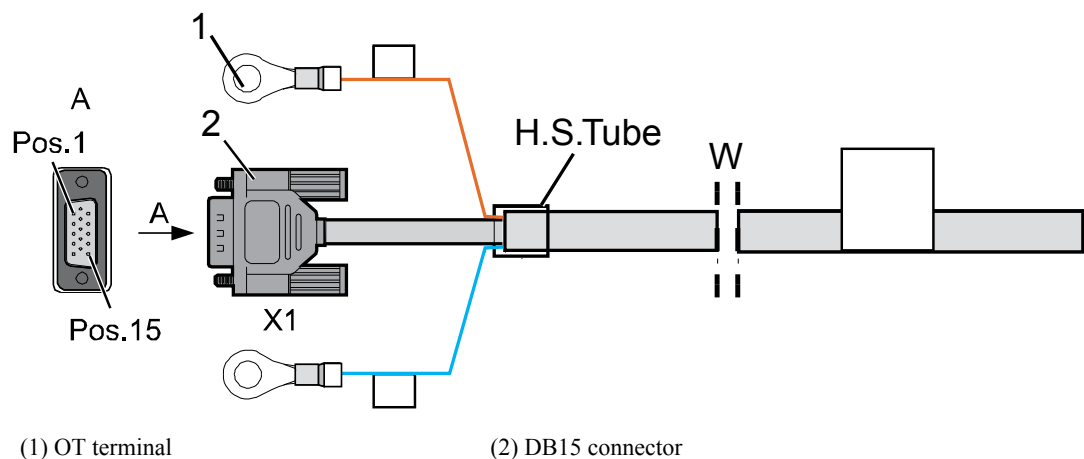
One End	The Other End	Color	Description
X1	Bare wire	Brown	L
X2		Blue	N
X3		Green and yellow	PE

2.2.5 DC Output Signal Cable of the AC RRU

The DC output signal cable of the AC RRU feeds power to the AC RRU and monitors the running status of the RRU.

Appearance

Figure 2-10 shows the DC output signal cable of the AC RRU.

Figure 2-10 DC output signal cable of the AC RRU

Cable Description

The DC output signal cable of the AC RRU is connected before delivery. One end of the cable is connected to the AC/DC power module of the AC RRU, and the other end of the cable is connected to the RTN(+) and NEG(-) terminals and EXT_ALM port in the cabling cavity of the AC RRU.

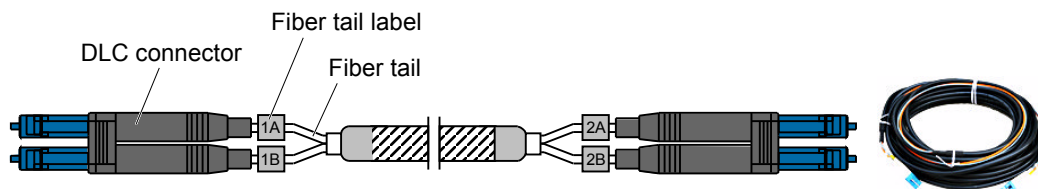
2.2.6 CPRI Optical Cable

This describes the CPRI optical cable. The CPRI optical cable connects the BBU and the RRU, and transmits CPRI signals. The CPRI optical cable is classified into the single-mode optical cable and the multi-mode optical cable. The following describes the multi-mode optical cable.

Appearance

The CPRI optical cable is a multi-mode 2-wire cable with a DLC connectors at each end. [Figure 2-11](#) shows the CPRI optical cable.

Figure 2-11 CPRI optical cable



Pin Assignment

None.

2.2.7 RRU RF Cable

The RRU RF cable consists of the RF jumper and the interconnect jumper. The RF jumper can be connected to the feeder or directly to the antenna. The interconnect jumper is used to connect the **RX_IN/OUT** ports of two RRUs so that RF signals can be transmitted between the two RRUs.

2.2.7.1 RRU RF Jumper

The RF jumpers of the RRU are 1/2-inch jumpers. The RF jumper connects the **ANT_TX/RX** port at the bottom of the RRU module to the feeder or antenna. It transfers the input and output RF signals, thus facilitating the signal exchange between the NodeB and the antenna system.

2.2.7.2 Interconnect Jumper of the RRU

This describes the interconnect jumper of the RRU. The interconnect jumper of the RRU connects the **RX_IN/OUT** ports of two RRUs, and transmits the RF signals between the RRUs in the same cell.

2.2.7.3 RF Cable Connections of the RRU3008

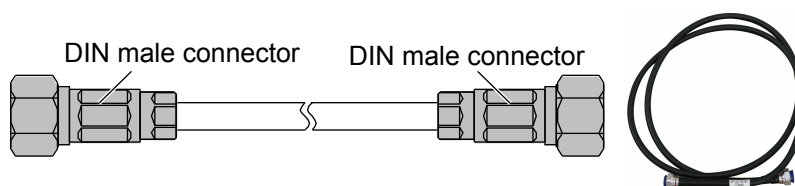
You can determine the appropriate RF cable connections based on the actual networking mode.

RRU RF Jumper

The RF jumpers of the RRU are 1/2-inch jumpers. The RF jumper connects the **ANT_TX/RX** port at the bottom of the RRU module to the feeder or antenna. It transfers the input and output RF signals, thus facilitating the signal exchange between the NodeB and the antenna system.

Appearance

The RF jumper has a DIN male connector at one end and a connector made based on field requirements at the other end. [Figure 2-12](#) shows an example of the RF jumper where both ends are DIN male connectors.

Figure 2-12 RF jumper

Pin Assignment

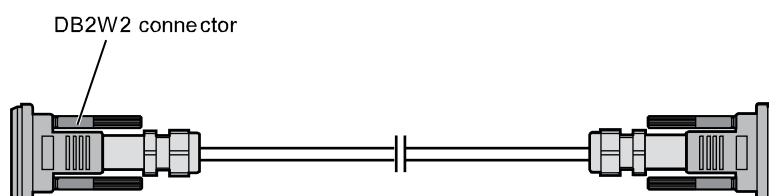
None.

Interconnect Jumper of the RRU

This describes the interconnect jumper of the RRU. The interconnect jumper of the RRU connects the **RX_IN/OUT** ports of two RRUs, and transmits the RF signals between the RRUs in the same cell.

Appearance

Both ends of the interconnect jumper are DB2W2 connectors. [Figure 2-13](#) shows the interconnect jumper.

Figure 2-13 Interconnect jumper

Pin Assignment

None.

RF Cable Connections of the RRU3008

You can determine the appropriate RF cable connections based on the actual networking mode.

[Table 2-8](#) describes the RF cable connections in different networking modes.

NOTE

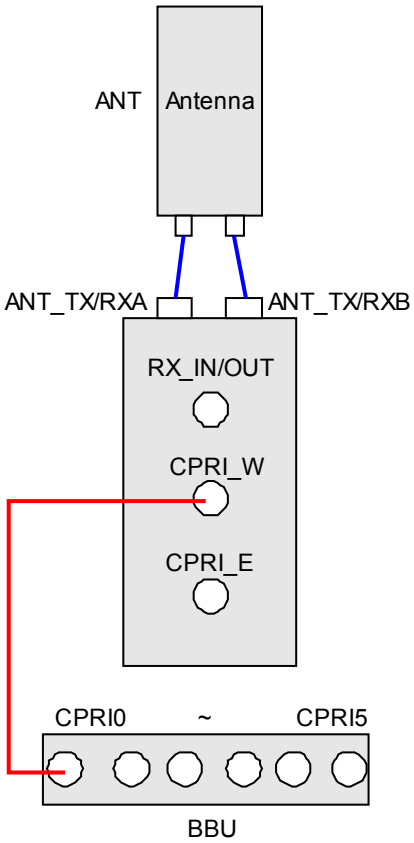
[Table 2-8](#) takes the star topology between the BBU3900 and the RRU3008 as an example.

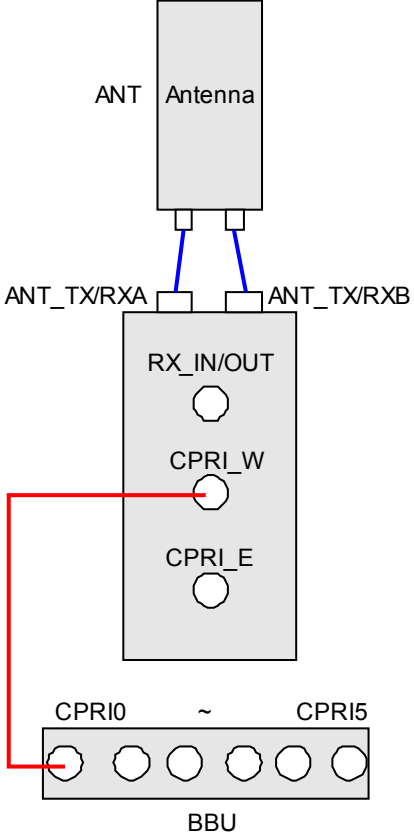
The RF cables differ from each other in colors. [Figure 2-14](#) shows the mapping between the RF signal cables and their colors.

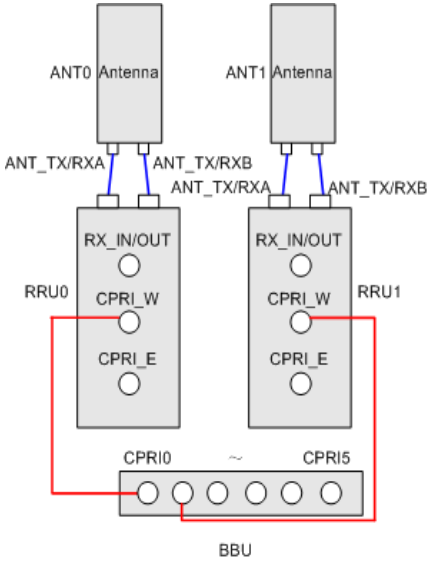
Figure 2-14 Mapping between the RF cables and their colors

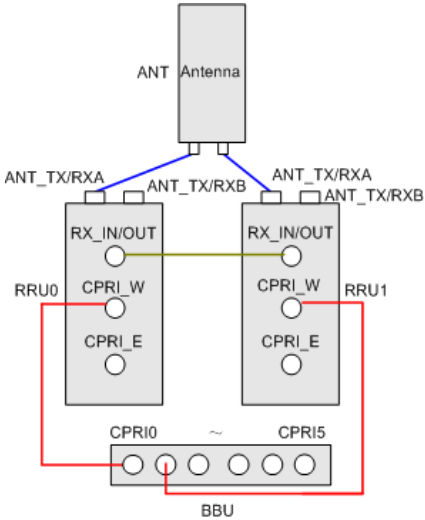
- Feeder jumper
- CPRI optical cable
- CPRI signal cable for cascaded RRU modules
- RF jumper of cascaded RRU modules

Table 2-8 RF cable connections of the RRU3008 in different configurations

Typical Configuration	Hardware Configuration	Software Configuration
S1-S8	<ul style="list-style-type: none"> ● One RRU3008 module ● One dual-polarized antenna <p>Figure 2-15 shows the related RF cable connections.</p> <p>Figure 2-15 RF cable connections (1)</p> 	<p>The settings of TRX attributes and antenna mode on the BSC side are as follows:</p> <ul style="list-style-type: none"> ● Transmit mode: No Combining ● Receive mode: Main Diversity ● Antenna mode: Double Feeder (2TX + 2RX)

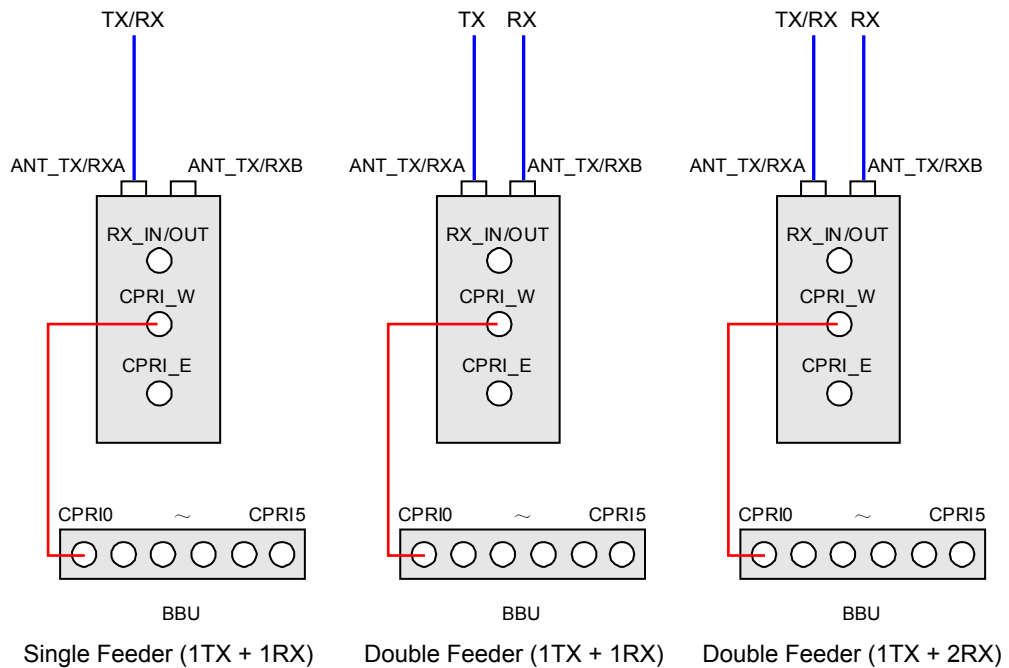
Typical Configuration	Hardware Configuration	Software Configuration
<p>S1-S4</p>	<ul style="list-style-type: none"> • One RRU3008 module • One dual-polarized antenna <p>Figure 2-16 shows the related RF cable connections.</p> <p>Figure 2-16 RF cable connections (2)</p>  <p>The diagram illustrates the hardware connections. At the top is a rectangular box labeled 'ANT Antenna'. Two blue lines connect its bottom ports to the 'ANT_TX/RXA' and 'ANT_TX/RXB' ports of the RRU3008 module. The RRU3008 module is a vertical rectangle with ports labeled 'RX_IN/OUT', 'CPRI_W', and 'CPRI_E'. A red line connects the 'CPRI_W' port of the RRU3008 module to the 'CPRI0' port of the BBU. The BBU is a horizontal rectangle with ports labeled 'CPRI0', '~', and 'CPRI5'.</p>	<p>The settings of TRX attributes and antenna mode on the BSC side are as follows:</p> <ul style="list-style-type: none"> • Transmit mode: Transmit Diversity • Receive mode: Main Diversity • Antenna mode: Double Feeder (2TX + 2RX)

Typical Configuration	Hardware Configuration	Software Configuration
<p>S5-S16</p>	<ul style="list-style-type: none"> • Two RRU3008 modules • Two dual-polarized antennas <p>Figure 2-17 shows the related RF cable connections.</p> <p>Figure 2-17 RF cable connections (3)</p> 	<p>The settings of TRX attributes and antenna mode on the BSC side are as follows:</p> <ul style="list-style-type: none"> • Transmit mode: No Combining • Receive mode: Main Diversity • Antenna mode: Double Feeder (2TX + 2RX)

Typical Configuration	Hardware Configuration	Software Configuration
<p>S5-S16</p>	<ul style="list-style-type: none"> • Two RRU3008 modules • One dual-polarized antenna <p>Figure 2-18 shows the related RF cable connections.</p> <p>Figure 2-18 RF cable connections (4)</p> 	<p>The settings of TRX attributes and antenna mode on the BSC side are as follows:</p> <ul style="list-style-type: none"> • Transmit mode: Combining • Receive mode: Main Diversity • Antenna mode: Single Feeder (1TX + 2RX)

The other available antenna modes for the RRU3008 are **Single Feeder (1TX + 1RX)**, **Double Feeder (1TX + 1RX)**, and **Double Feeder (1TX + 2RX)**. **Figure 2-19** shows cable connections.

Figure 2-19 RF cable connections of the RRU3008



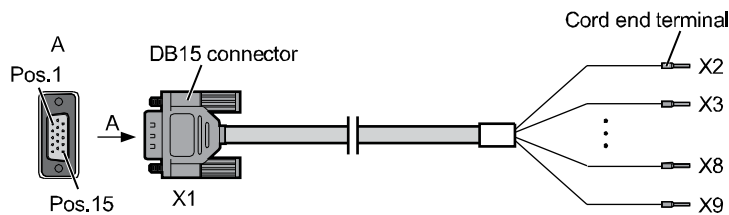
2.2.8 Alarm Cable of the DC RRU

This describes the alarm cable of the DC RRU. The alarm cable of the DC RRU transmits alarm signals from the external equipment to the DC RRU, and monitors the external signals.

Appearance

One end of the alarm cable is a DB15 connector, and the other end is eight cord end terminals. [Figure 2-20](#) shows the alarm cable.

Figure 2-20 Alarm cable



Pin Assignment

[Table 2-9](#) describes the pin assignment for the alarm cable.

Table 2-9 Pin assignment for the alarm cable

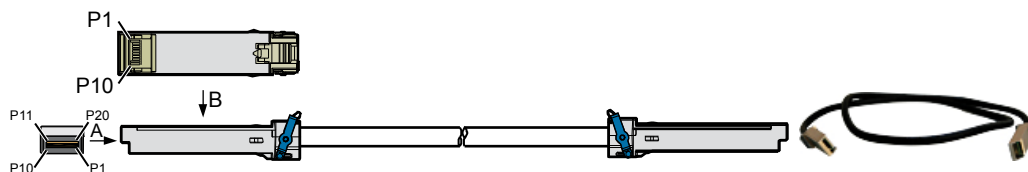
Pin of the DB15 Connector	Signal name of DB15 connector	Wire Color	Wire Type	Cord End Terminal	Label
X1.2	SWITCH_IN PUTO+	White and blue	Twisted pair	X2	SWITCH_I NPUT0+
X1.3	GND	Blue		X3	GND
X1.6	SWITCH_IN PUT1+	White and orange	Twisted pair	X4	SWITCH_I NPUT1+
X1.7	GND	Orange		X5	GND
X1.10	RS485_TX-	White and Green	Twisted pair	X6	APM RX-
X1.11	RS485_TX+	Green		X7	APM RX+
X1.13	RS485_RX-	White and Brown	Twisted pair	X8	APM TX-
X1.14	RS485_RX+	Brown		X9	APM TX+

2.2.9 Signal Cable Between the CPRI Ports on the Cascaded RRUs

The signal cable between the CPRI ports on cascaded RRUs transmits data and control signals sent by the BBU.

Appearance

The signal cable between the CPRI ports on cascaded RRUs is an SFP high-speed cable (2 m) or an optical cable. [Figure 2-21](#) shows the SFP high-speed cable.

Figure 2-21 Signal cable between the CPRI ports on cascaded RRUs

Pin Assignment

None.

2.2.10 AISG Multi-Wire Cable of the RRU

This describes the AISG multi-wire cable of the RRU. The AISG multi-wire cable connects the RRU and RCU, and transmits the BTS signals for controlling the RET antenna.

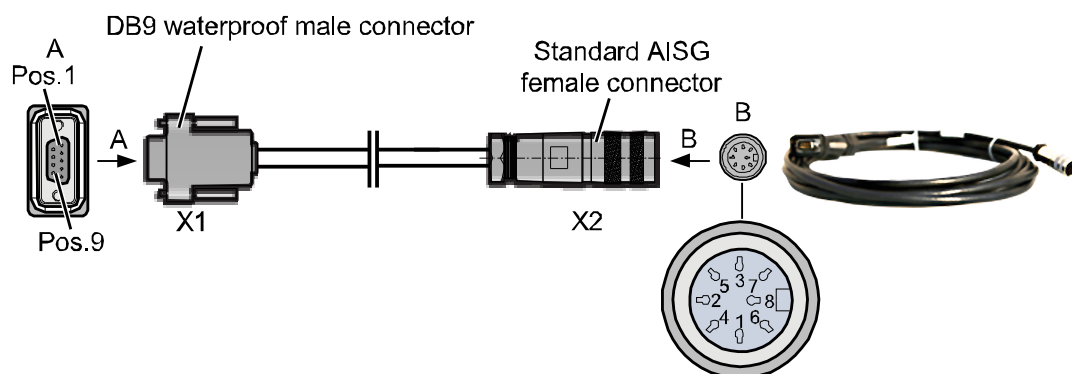
NOTE

The Remote Control Unit (RCU) is the driving motor of the phase shifter inside the RET antenna. The RCU runs the control commands received from the BTS to drive the stepper motor. The adjustable phase shifter inside the antenna is driven by the actuator so that the tilt of the antenna can be adjusted.

Appearance

One end of the AISG multi-wire cable is a DB9 waterproof connector and the other end is a standard AISG female connector, as shown in [Figure 2-22](#).

Figure 2-22 AISG multi-wire cable



Pin Assignment

[Table 2-10](#) describes the pin assignment for the AISG multi-wire cable.

Table 2-10 Pin assignment for the AISG multi-wire cable

X1 End (Pin of the DB9 Waterproof Connector)	Wire Type	X2 End (Pin of the Standard AISG Female Connector)	Core Description
X1.1	Twisted pair	X2.1	+12 V
X1.7	Twisted pair	X2.7	DC-GND
X1.9			AISG_Switch
X1.3	Twisted pair	X2.3	RS485 -
X1.5		X2.5	RS485 +

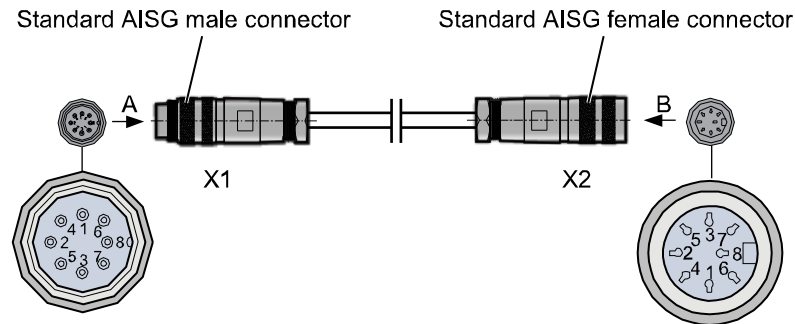
2.2.11 AISG Extension Cable of the RRU

This describes the AISG extension cable. If the distance between the RRU and the RCU exceeds 5 meters and the AISG multi-wire cable cannot cover the distance, you need to use the AISG extension cable to extend the AISG multi-wire cable.

Appearance

One end of the AISG extension cable is a standard AISG male connector and the other end is a standard AISG female connector, as shown in [Figure 2-23](#).

Figure 2-23 AISG extension cable



Pin Assignment

[Table 2-11](#) describes the pin assignment for the AISG extension cable.

Table 2-11 Pin assignment for the AISG extension cable

X1 End (Pin of the Standard AISG Male Connector)	Wire Type	X2 End (Pin of the Standard AISG Female Connector)	Color	Core Description
X1.1	Twisted pair	X2.1	White and blue	+12 V
			Blue	
X1.7	Twisted pair	X2.7	White and orange	DC Return A
			Orange	
X1.3	Twisted pair	X2.3	White and green	RS485 B
X1.5		X2.5	Green	RS485 A
X1.6	Twisted pair	X2.6	White and brown	+24 V
			Brown	

3 Maintaining the RRU3008

About This Chapter

This describes how to maintain the RRU3008. After the site is put into formal operation, you should perform routine maintenance on the RRU3008 to ensure that it runs properly. This document describes the maintenance items of the RRU3008, the power-on and power-off operations, and the method of replacing the RRU3008 modules and cables.

[3.1 Maintenance Items of the RRU](#)

This describes the maintenance items associated with the RRU. These maintenance items involve the checking of the equipment surface, equipment cleanness, and LEDs.

[3.2 Powering On and Powering Off the RRU](#)

This describes how to power on and power off the RRU. When powering on the RRU, you should check the power supply voltage of the RRU and the status of the LEDs on the RRU. When powering off the RRU, you can perform normal power-off or emergency power-off operation based on field requirements.

[3.3 Replacing an RRU3008](#)

This describes how to replace an RRU. The RRU, a remote radio unit, forms a distributed NodeB system with the BBU. Replacing an RRU disrupts all the services carried by the RRU. In this case, an alarm is reported.

[3.4 Replacing an Optical Module](#)

This describes how to replace the optical module. The optical module provides the electrical-optical interface for the optical transmission between the RRU and other devices. During the replacement of the optical module, the optical cable is removed. Thus, the CPRI signal transmission is disrupted.

3.1 Maintenance Items of the RRU

This describes the maintenance items associated with the RRU. These maintenance items involve the checking of the equipment surface, equipment cleanness, and LEDs.

Table 3-1 lists the maintenance items associated with the RRU.

Table 3-1 Maintenance items associated with the RRU

Item	Period	Operation Guide	Reference
Checking the equipment surface	Monthly or quarterly	Check whether there are dents, cracks, holes, or corrosion on the surface of the equipment and whether the cabinet label is legible.	None.
Checking the equipment cleanness	Monthly or quarterly	Check whether the equipment is clean.	The surface of the equipment is clean.
Checking the LEDs	Monthly or quarterly	Check whether the equipment operates normally by observing the LEDs on the equipment.	For details about the status of the LEDs, refer to 2.1.3 LEDs on the RRU3008 .

3.2 Powering On and Powering Off the RRU

This describes how to power on and power off the RRU. When powering on the RRU, you should check the power supply voltage of the RRU and the status of the LEDs on the RRU. When powering off the RRU, you can perform normal power-off or emergency power-off operation based on field requirements.

3.2.1 Powering On the RRU

This describes how to power on the RRU and check the RRU status. You should set the corresponding MCB on the auxiliary power device for the RRU to **ON** and then determine the operating status of the RRU based on the LED status.

3.2.2 Powering Off the RRU

This describes how to power off the RRU and check the RRU status. The RRU power-off is classified into normal power-off and emergency power-off.

3.2.1 Powering On the RRU

This describes how to power on the RRU and check the RRU status. You should set the corresponding MCB on the auxiliary power device for the RRU to **ON** and then determine the operating status of the RRU based on the LED status.

Prerequisite

- The equipment and cables of the RRU are installed.

- The input voltage of the DC RRU is within the range of -36 V DC to -57 V DC.
- The input voltage of the AC RRU is within the range of 90 V AC to 290 V AC.

Context



CAUTION

When the RRU is unpacked, it must be powered on within 24 hours. Each time the RRU is maintained after being put into use, the power-off duration cannot exceed 24 hours.

Procedure

Step 1 Power on the RRU.



DANGER

Do not look into the optical module after the RRU is powered on.

Step 2 Wait 3 to 5 minutes, and then check the status of the LEDs on the RRU. For the meaning of the LED status, see [2.1.3 LEDs on the RRU3008](#).



NOTE

If RRU modules are cascaded, check the status of the LEDs on each of the RRU modules.

Step 3 Take corresponding actions based on the LED status.

If...	Then...
The RRU runs properly	End the power-on task.
The RRU is faulty	Rectify the fault, and then go to Step 1 .

---End

3.2.2 Powering Off the RRU

This describes how to power off the RRU and check the RRU status. The RRU power-off is classified into normal power-off and emergency power-off.

Procedure

Step 1 Choose normal power-off or emergency power-off based on different situations.

If...	Then...
The RRU needs to be powered off in the case of an equipment swap or a foreseeable regional blackout	Go to Step 2 to perform the normal power-off.

If...	Then...
An emergency such as an electric spark, smoke, or water immersion occurs in the RRU	Go to Step 3 to perform the emergency power-off.

Step 2 Set the corresponding MCB on the auxiliary power device for the RRU to **OFF**.

 **NOTE**

If RRU modules are cascaded, take the impact on the lower-level RRU module into consideration when you power off an RRU module, so as to avoid disrupting ongoing services.

Step 3 Cut off the external input power of the auxiliary power device for the RRU. If time permits, set the corresponding MCB on the device to **OFF**.

----End

3.3 Replacing an RRU3008

This describes how to replace an RRU. The RRU, a remote radio unit, forms a distributed NodeB system with the BBU. Replacing an RRU disrupts all the services carried by the RRU. In this case, an alarm is reported.

Prerequisite

- The number of the RRU3008s to be replaced is determined, and the new RRU3008 are available.
- The installation positions of the RRU3008s are recorded.
- The mapping between each cable and the port on the RRU3008 is recorded.
- The user service tool kit is ready.

Context



CAUTION

You must take proper ESD prevention measures, for example, wear an ESD wrist strap or a pair of ESD gloves to prevent the boards, modules, or electrical components from being damaged by static electricity generated by your body.

Procedure

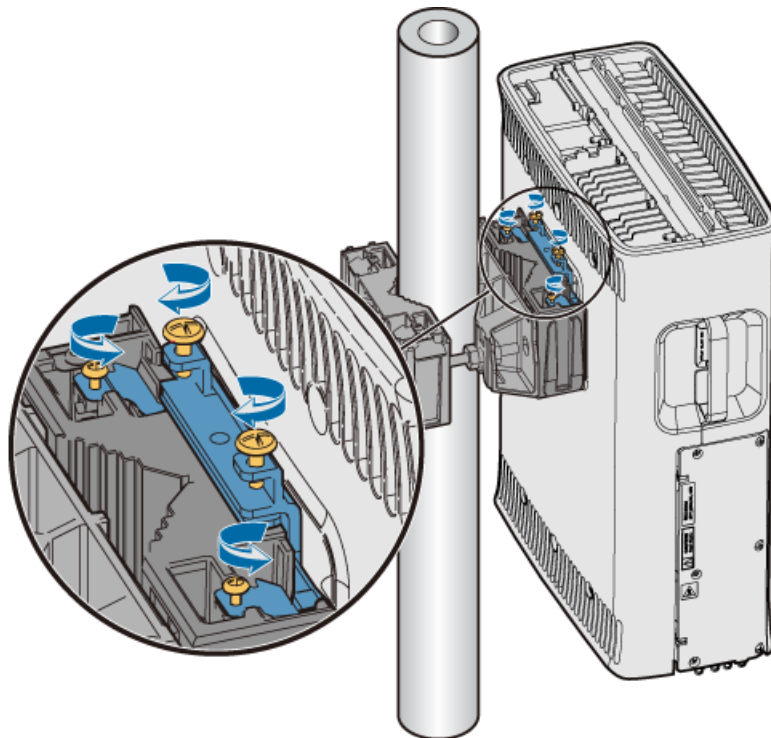
Step 1 Power off the RRU.

Step 2 Remove the cover plate from the cabling cavity of the RRU3008.

Step 3 Remove all the cables that are connected to the RRU3008 and take proper insulation measures.

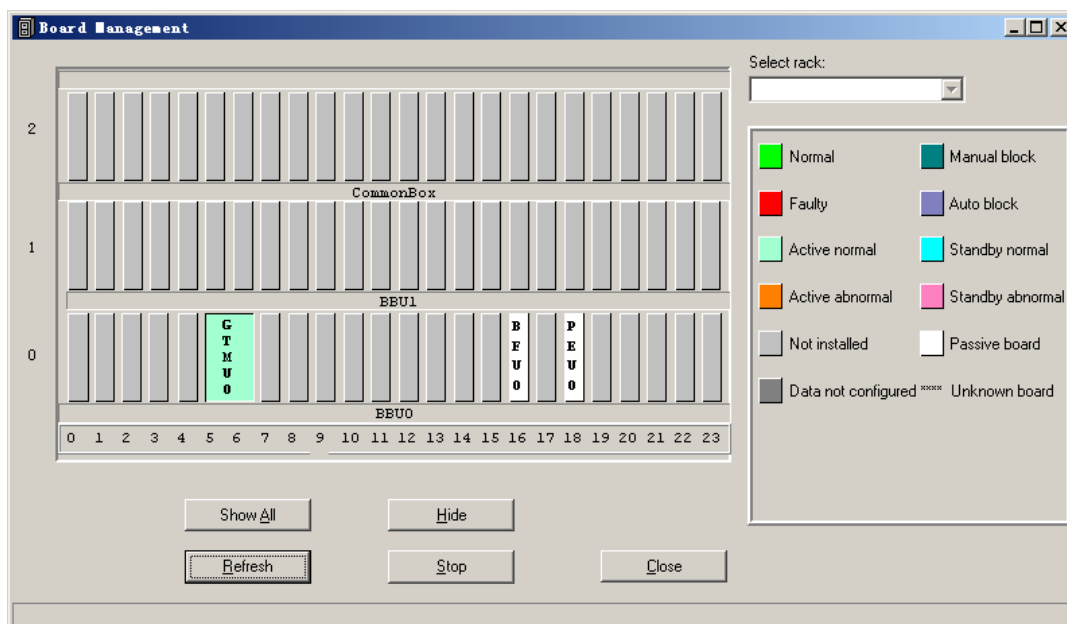
Step 4 Loosen the captive screws of the two fixers on the main fixture. Then, fix the two screws on the RRU attachment plate. Removing a DC RRU is the same as removing an AC RRU. [Figure 3-1](#) takes removing a DC RRU as an example.

Figure 3-1 Removing the RRU3008



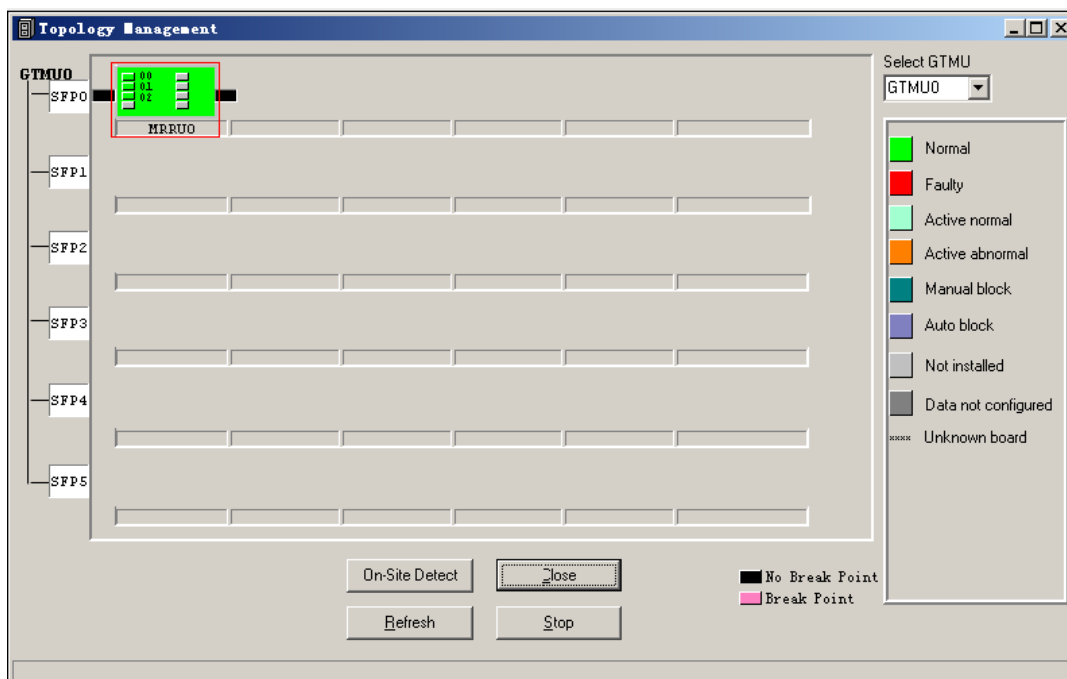
- Step 5** Hold the RRU bottom with both hands and lift the RRU to remove it.
- Step 6** Install a new RRU.
- Step 7** Connect all the cables to the new RRU.
- Step 8** Power on the RRU.
- Step 9** Check the LEDs on the panel of the RRU3008. If the **RUN** and **ACT** LEDs are ON, and the **ALM** LED is OFF, select **Board** on the left of the **Site Maintenance Terminal System** window. Double-click **Board Management** on the right. The **Board Management** window is displayed, as shown in [Figure 3-2](#).

Figure 3-2 Board Management window



Step 10 In the **Board Management** window, double-click the GTMU and check the status of the RRU in the displayed **Topology Management** window, as shown in **Figure 3-3**. Otherwise, check whether the cables connecting the RRU3008 are secured and whether the MCB on the auxiliary RRU3008 power device is set to **ON**.

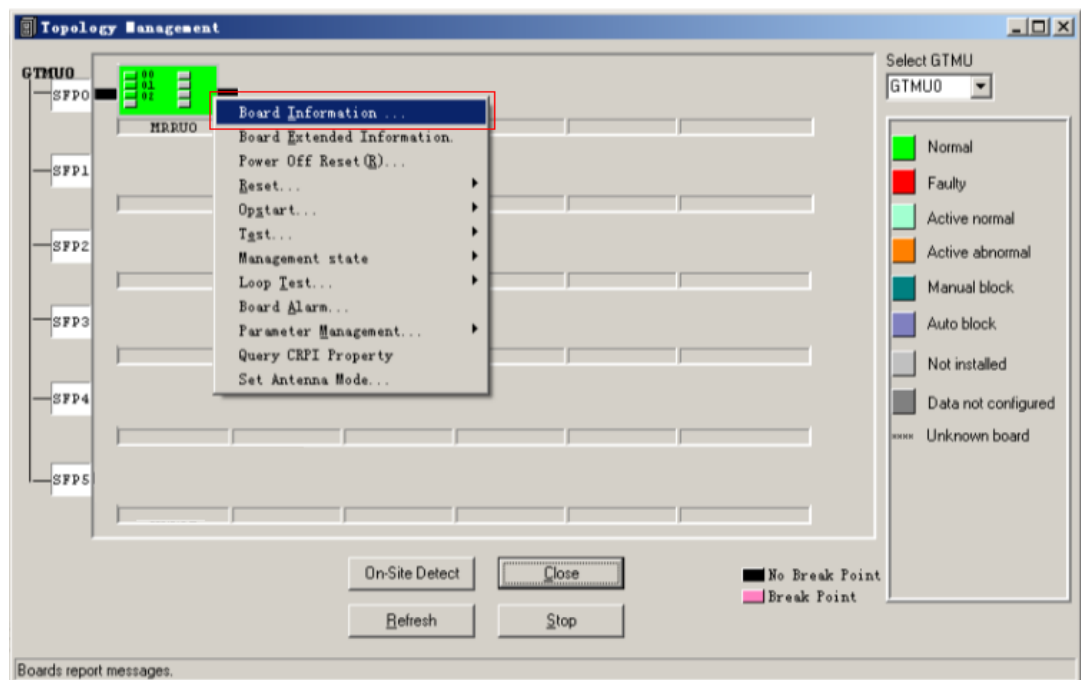
Figure 3-3 Checking whether the RRU runs normally



If...	Then...
The RRU3008 icon displayed is green	The RRU3008 runs normally. Then, go to the next step.
The RRU3008 icon displayed is not green	The RRU3008 does not run normally. Then, reinstall the RRU.

Step 11 In the **Topology Management** window, right-click the RRU3008 to be queried and choose **Board Information** from the shortcut menu. Check whether the software version of the RRU3008 matches the current BTS software version, as shown in [Figure 3-4](#).

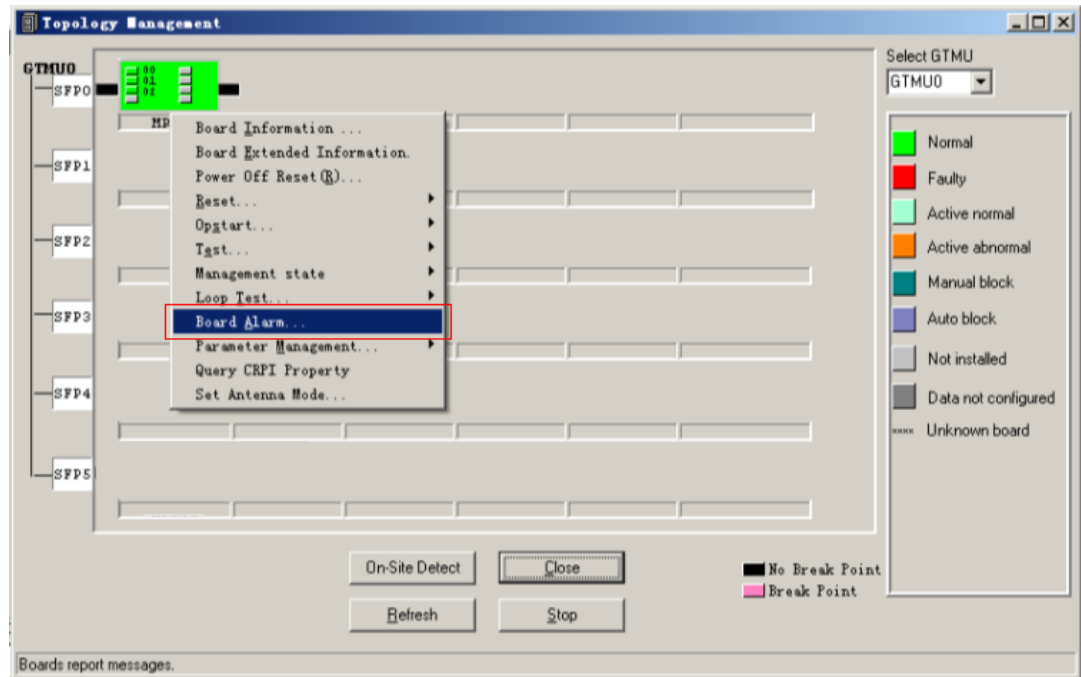
Figure 3-4 Querying the software version of the RRU3008



If...	Then...
The software version of the RRU3008 does not match the current BTS software version	Load and activate the software.
The software version of the RRU3008 matches the current BTS software version	Go to the next step.

Step 12 In the **Topology Management** window, right-click the RRU3008 to be queried and choose **Board Warning** from the shortcut menu. Check whether there are RRU3008-related alarms, as shown in [Figure 3-5](#).

Figure 3-5 Checking whether the RRU3008 incurs alarms



If...	Then...
Related alarms exist	Rectify the fault as recommended.
No related alarm exists	The replacement is successful.

Step 13 Perform dialing tests and ensure that the corresponding cell services of the new RRU3008 are normal.

Step 14 Apply the cover plate on the cabling cavity of the new RRU3008.

----End

Postrequisite

Contact the local Huawei office to dispose the faulty RRU3008.

3.4 Replacing an Optical Module

This describes how to replace the optical module. The optical module provides the electrical-optical interface for the optical transmission between the RRU and other devices. During the replacement of the optical module, the optical cable is removed. Thus, the CPRI signal transmission is disrupted.

Prerequisite

- The quantity and type of the faulty optical modules are checked, and new modules are ready.

- The installation positions and interconnection relations of the faulty optical modules and optical cables are recorded.
- The tools and materials are ready. The tools and materials are the ESD wrist strap or gloves, and ESD box or bag.

Context

The optical module is hot-swappable.

It takes about five minutes to replace the optical module of the RRU. The duration of the replacement involves the removal of the optical cable and the faulty optical module, the installation of the new optical module, the connection of the optical cable to the optical module, and the time elapsed for the restoration of the CPRI links.



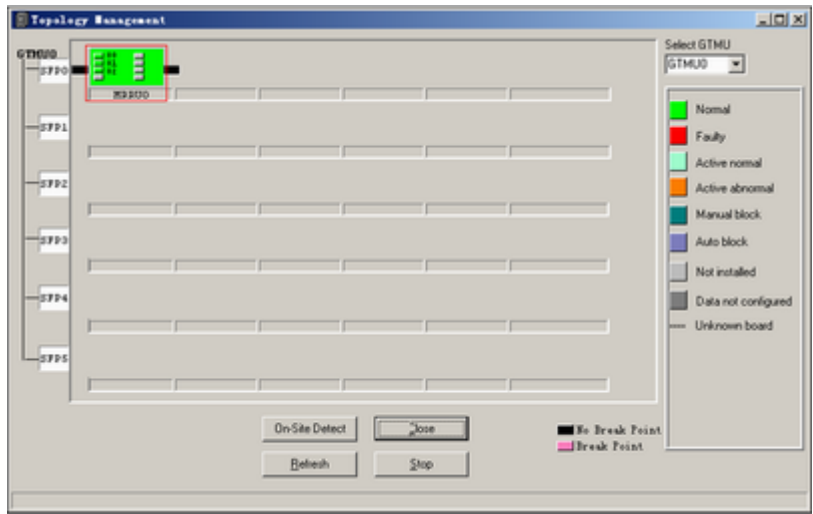
CAUTION

- Take proper ESD protection measures, for example, wear an ESD wrist strap or a pair of ESD gloves, to prevent electrostatic damage to the board, module, or electrical parts.
 - Do not look directly at the optical module after removing the connector of the optical cable from the optical module.
-

Procedure

- Step 1** Press the bulge on the optical cable connector, and then remove the connector from the faulty optical module.
- Step 2** Turn the puller on the faulty optical module outward. Then, hold the puller and take the faulty optical module out of the port to remove the module from the RRU.
- Step 3** Install the new optical module to the RRU.
- Step 4** Remove the dustproof caps from the optical connector and from the optical module. Then insert the connector into the new module.
- Step 5** Double-click the GTMU in the **Board Management** window on the Site Maintenance Terminal System. In the displayed **Topology Management** window, check whether the transmission of the CPRI signals is resumed by viewing the status of the RRU to which the replaced optical module is connected, as shown in [Figure 3-6](#).

Figure 3-6 Checking whether the CPRI signal transmission is resumed



If...	Then...
The RRU module icon is green	The CPRI signal transmission is resumed. The replacement of the optical cable is successful.
The RRU module icon is not green	The CPRI signal transmission is abnormal. Check the optical cable connection and ensure that the connections are secure.

----End

Postrequisite

Contact the local Huawei office to handle the faulty optical module.

4 Auxiliary Device of the RRU

About This Chapter

The auxiliary device of the RRU refers to the AC power surge protection box used for the AC RRU in outdoor applications.

[4.1 AC Power Surge Protection Box](#)

The AC power surge protection box is used to provide surge protection for AC power.

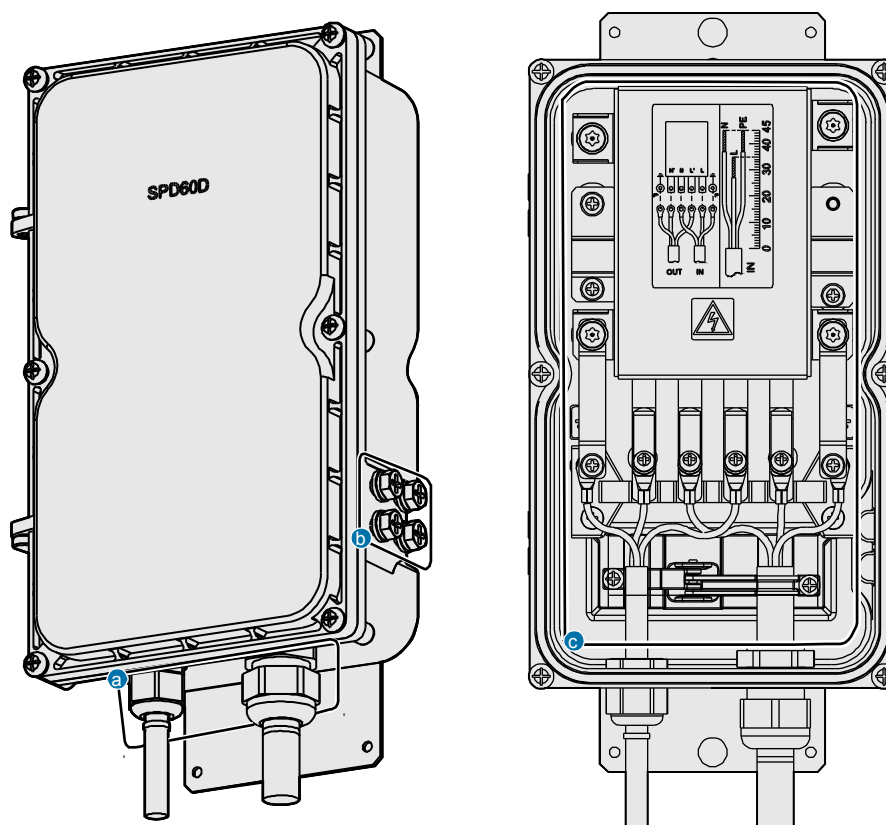
4.1 AC Power Surge Protection Box

The AC power surge protection box is used to provide surge protection for AC power.

Appearance

Figure 4-1 shows the AC power surge protection box.

Figure 4-1 AC power surge protection box



Specifications

Table 4-1 describes the specifications of the AC power surge protection box.

Table 4-1 Specifications of the AC power surge protection box

Item	Description
Depth (mm) x width (mm) x height (mm)	200 x 110 x 75
Installation mode	On the pole, on the wall, and assembled installation
Surge protection class	Differential mode/common mode (10/350 us) : 15 kA

Port

Table 4-2 describes the ports on the AC power surge protection box.

Table 4-2 Ports on the AC power surge protection box

Item	Label	Description
(a) Bottom panel	IN	AC power supply socket
	OUT	Port for protection power outputs
(b) Side panel	-	Port for connection to the external PGND cable
	-	Port for the RRU PGND cable
(c) Cabling cavity panel	L/L'	Wiring post
	N/N'	
	GND	