RRU3804

V200

User Guide

Issue 08

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About This Document

Purpose

This document describes the RRU hardware and provides instructions in hardware installation, cable connections, hardware installation check, and hardware maintenance. This document is applicable to RRU3804.

Product Version

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

Product Name	Product Version
RRU3804	V100R009
	V100R010
	V200R010
	V200R011

Intended Audience

This document is intended for:

- NodeB installers
- System engineers
- Site maintenance engineers

Change History

For changes in the document, refer to **1 Changes in the RRU3804 User Guide**.

Organization

1 Changes in the RRU3804 User Guide

This describes the changes in the *RRU3804 User Guide* .

2 DBS3900 Hardware Configuration

This describes the Typical Configurations of the DBS3900, 4-Way RX Diversity Configuration, TX Diversity Configuration and 2 × 2 MIMO Configuration.

3 RRU Hardware

This describes the RRU equipment related cables.

4 Maintaining the Hardware of the RRU

This describes how to maintain the hardware of the RRU. After the NodeB is deployed, accepted, and put into use, routine maintenance is performed to ensure the functionality of the RRU.

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**.
Italic	Book titles are in *italics*.
`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**.
Italic	Command arguments are in *italics*.
[ ]	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.
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 RRU3804 User Guide

This describes the changes in the *RRU3804 User Guide* .

07 (2009-06-30)

This is the fifth commercial release.

Compared with issue 06 (2009-03-20),the following parts are modified:

Part	Modification
2 DBS3900 Hardware Configuration	The number of WMPT/WBBP are modified.

06 (2009-03-20)

This is the fifth commercial release.

Compared with issue 05 (2008-12-30), the following parts are modified:

2 DBS3900 Hardware Configuration is added.

05 (2008-12-30)

This is the fourth commercial release.

Compared with issue 04 (2008-07-30), the following parts are modified:

Part	Modification
AISG Multi-Wire Cable of the RRU	The pin assignment of AISG Multi-Wire cable is modified.

04 (2008-07-30)

This is the third commercial release.

Compared with issue 03 (2008-03-30), the following parts are deleted:

The SRXU-related contents are deleted.

Compared with issue 03 (2008-03-30), the following parts are modified:

The RRU3804 Installation Guide is replaced with the RRU3804 Quick Installation Guide.

03 (2008-03-30)

This is the second commercial release.

Compared with version 02 (2008-02-29), some parts are changed. The following table describes the changes in each part.

Part	Modification
RRU3804 User Guide	All the RRU3804s in this document are changed to RRUs. This release is also applicable to the RRU3801E.
Opening and Closing the Cover Plate of the RRU Cabling Cavity	The organization of this paragraph is modified.
Opening and Closing the Cover Plate of the SRXU Cabling Cavity	The organization of this paragraph is modified.

02 (2008-02-29)

This is the initial formal release.

01 (2008-01-12)

This is the initial field trial release.

2 DBS3900 Hardware Configuration

About This Chapter

This describes the Typical Configurations of the DBS3900, 4-Way RX Diversity Configuration, TX Diversity Configuration and 2 × 2 MIMO Configuration.

2.1 Typical Configurations of the DBS3900

The capacity of the DBS3900 can be expanded through addition of modules or license upgrade. When license upgrade is required, the capacity can be expanded by 16 cells at a time. In the early phase of network construction, you can choose a small-capacity configuration (such as 3 x 1 configuration). When the number of subscribers increases, you can smoothly expand the small-capacity configuration to a large-capacity configuration (such as 3 x 2 or 3 x 4 configuration).

The WBBP can support 3 cells and 6 cells. **Table 2-1** show the typical configurations of the DBS3900.

Table 2-1 Typical configurations of the DBS3900

Configuration	WBBP Quantity (Supporting 3 Cells)	WBBP Quantity (Supporting 6 Cells)	WMPT Quantity	RRU3804 Quantity (No TX Diversity)
3 x 1	1	1	1	3
3 x 2	2	1	1	3
3 x 3	3	2	1	3
3 x 4	4	2	1	3

NOTE

N x M = sector x carrier. For example, 3 x 1 indicates that each of the three sectors has one carrier.

The description of the cable connections of the DBS3900 in type configuration is based on 3 x 1 and 3 x 4 configurations. Where the WBBP supporting 6 cells is taken as an example.

Figure 2-1 shows the cable connections of the DBS3900 in type 3 x 1 configuration.

Figure 2-1 Cable connections of the DBS3900 in type 3 x 1 configuration

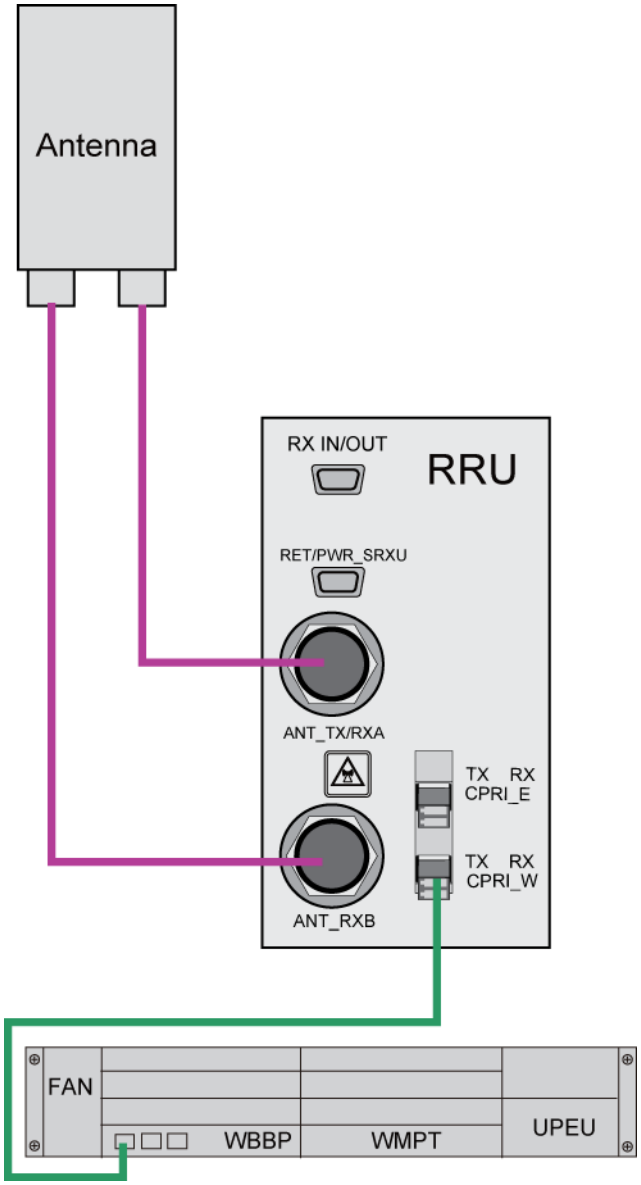
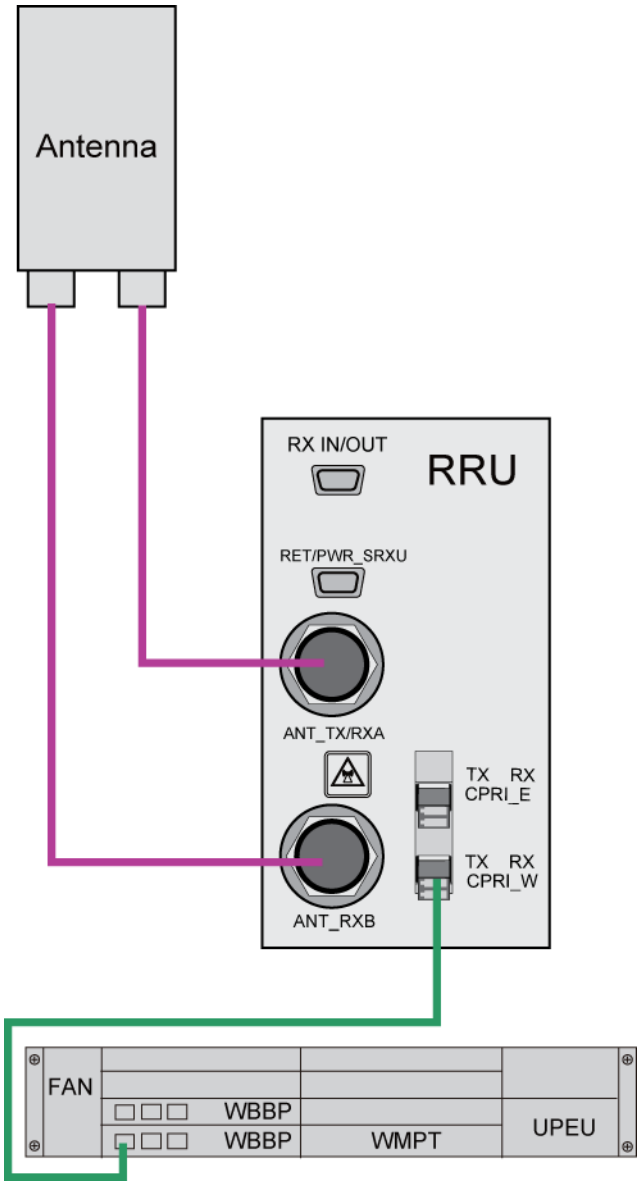


Figure 2-2 shows the cable connections of the DBS3900 in type 3 x 4 configuration.

Figure 2-2 Cable connections of the DBS3900 in type 3 x 4 configuration



2.2 4-Way RX Diversity Configuration

The DBS3900 supports 4-way RX diversity configuration.

In 4-way RX diversity configuration, the DBS3900 consists of the WMPT, WBBP, and RRU3804s. The WMPT and WBBP are installed in the BBU3900. The WBBP supports configurations of three cells and six cells. The following description is based on the WBBP supporting six cells.

Number of Modules and Installation Positions

Table 2-2 lists the number of modules in the DBS3900 in 4-way RX diversity configuration.

Table 2-2 Number of modules in the DBS3900 in 4-way RX diversity configuration

Configuration	WMPT Quantity	WBBP (Supporting Six Cells) Quantity	RRU3804 Quantity
3 x 1	1	1	6
3 x 2	1	2	6

NOTE

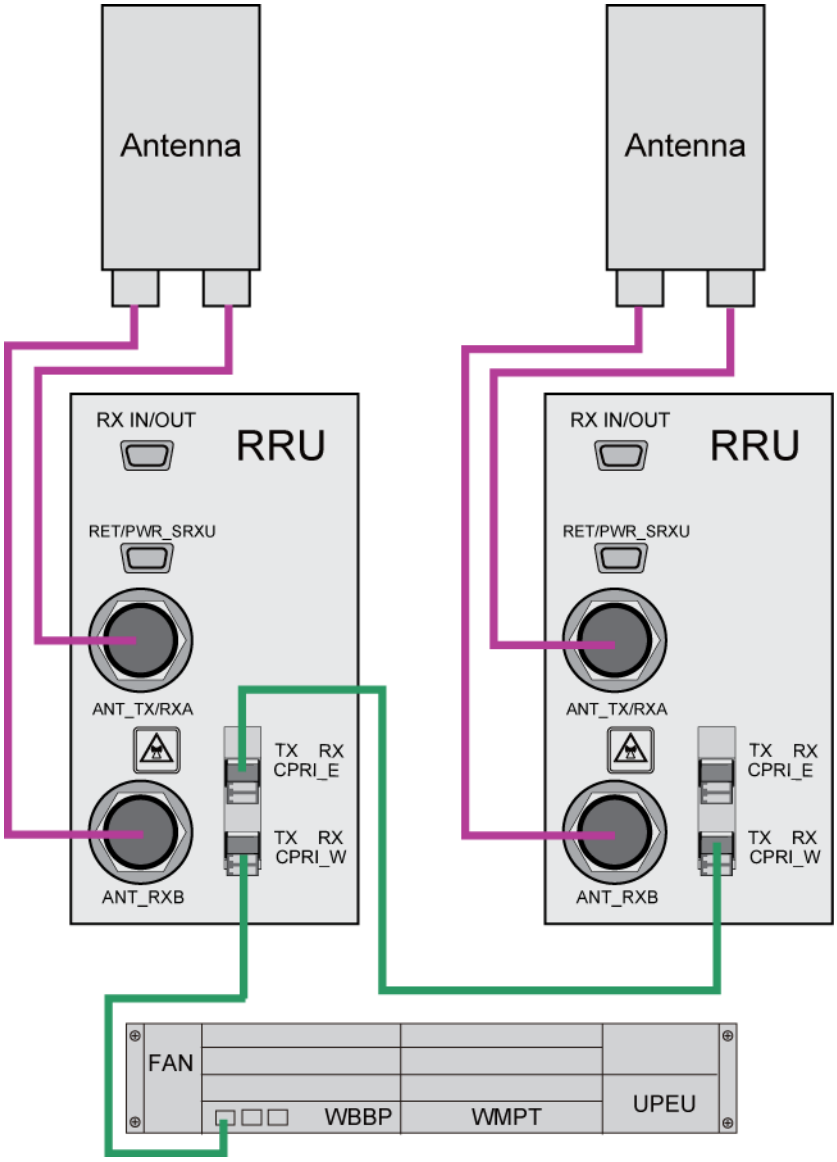
In 4-way RX diversity configuration, the number of cells supported by the WBBP supporting six cells is 3, and the number of cells supported by the WBBP supporting three cells is also 3.

Cable Connections

The description of the cable connections of the DBS3900 in 4-way RX diversity configuration is based on 3 x 1 configuration.

Figure 2-3 shows the cable connections of the DBS3900 in 4-way RX diversity configuration.

Figure 2-3 Cable connections of the DBS3900 in 4-way RX diversity configuration



2.3 TX Diversity Configuration

The DBS3900 supports TX diversity configuration.

In TX diversity configuration, the DBS3900 consists of the WMPT, WBBP, and RRU3804s. The WMPT and WBBP are installed in the BBU3900. The WBBP supports configurations of three cells and six cells. The following description is based on the WBBP supporting six cells.

Number of Modules and Installation Positions

Table 2-3 lists the number of modules in the DBS3900 in TX diversity configuration.

Table 2-3 Number of modules in the DBS3900 in TX diversity configuration

Configuration	WMPT Quantity	WBBP (Supporting Six Cells) Quantity	RRU3804 Quantity
3 x 1	1	1	6
3 x 2	1	2	6

NOTE

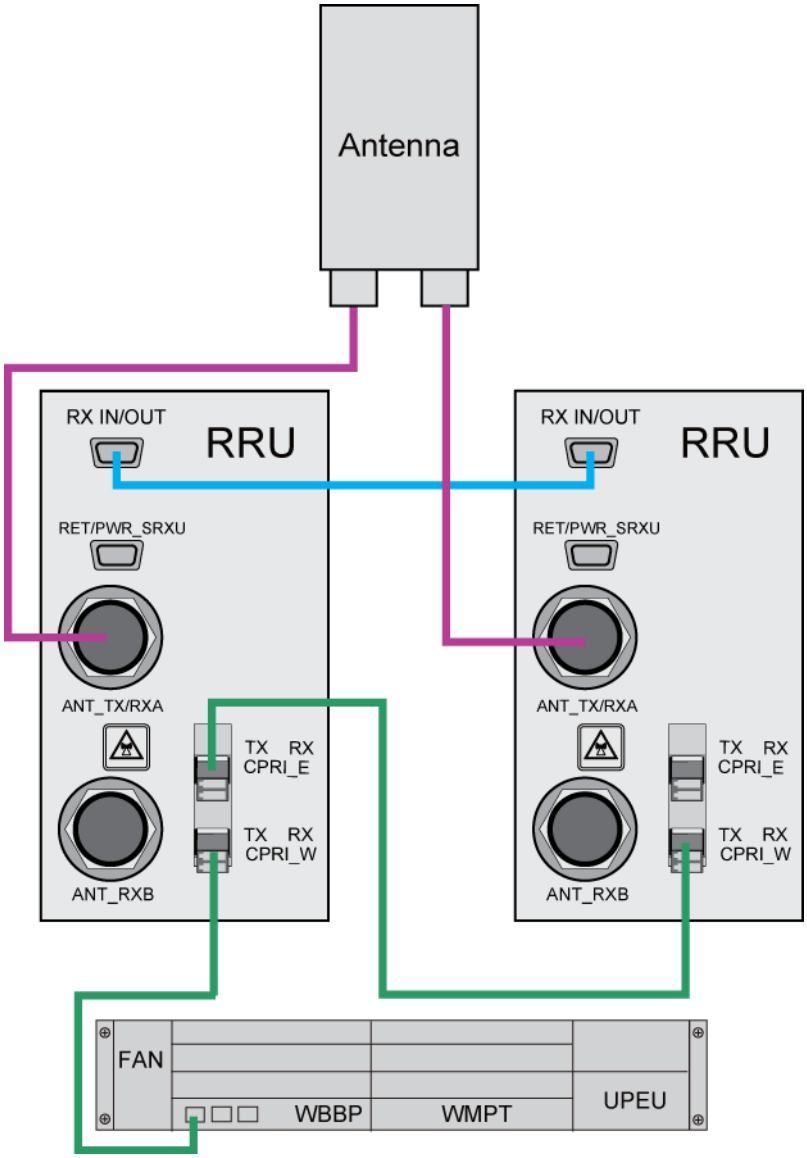
In TX diversity configuration, the number of cells supported by the WBBP supporting six cells is 3, and the number of cells supported by the WBBP supporting three cells is also 3.

Cable Connections

The description of the cable connections of the DBS3900 in TX diversity configuration is based on 3 x 1 configuration.

Figure 2-4 shows the cable connections of the DBS3900 in TX diversity configuration.

Figure 2-4 Cable connections of the DBS3900 in TX diversity configuration



2.4 2 x 2 MIMO Configuration

The DBS3900 supports 2 x 2 MIMO configuration.

In 2 x 2 MIMO configuration, the DBS3900 consists of the WMPT, WBBP, and RRU3804s. The WMPT and WBBP are installed in the BBU3900. The WBBP supports configurations of three cells and six cells. The following description is based on the WBBP supporting six cells.

Number of Modules and Installation Positions

Table 2-4 lists the number of modules in the DBS3900 in 2 x 2 MIMO configuration.

Table 2-4 Number of modules in the DBS3900 in 2 x 2 MIMO configuration

Configuration	WMPT Quantity	WBBP (Supporting Six Cells) Quantity	RRU3804 Quantity
3 x 1	1	1	6
3 x 2	1	2	6

NOTE

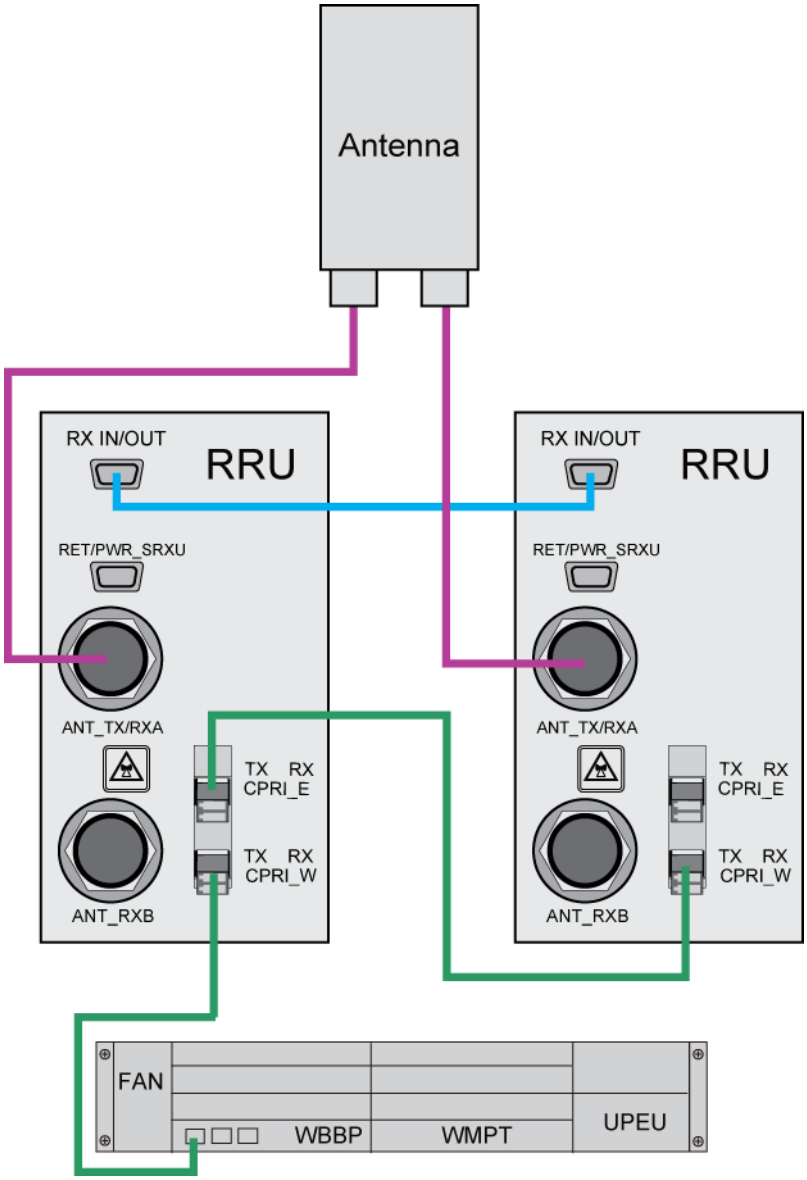
In 2 x 2 MIMO diversity, the number of cells supported by the WBBP supporting six cells is 3, and the number of cells supported by the WBBP supporting three cells is also 3.

Cable Connections

The description of the cable connections of the DBS3900 in 2 x 2 MIMO configuration is based on 3 x 1 configuration.

Figure 2-5 shows the cable connections of the DBS3900 in 2 x 2 MIMO configuration.

Figure 2-5 Cable connections of the DBS3900 in 2 x 2 MIMO configuration



3 RRU Hardware

About This Chapter

This describes the RRU equipment related cables.

3.1 RRU Equipment

The RRU is a remote radio unit.

The RRU has the following functions:

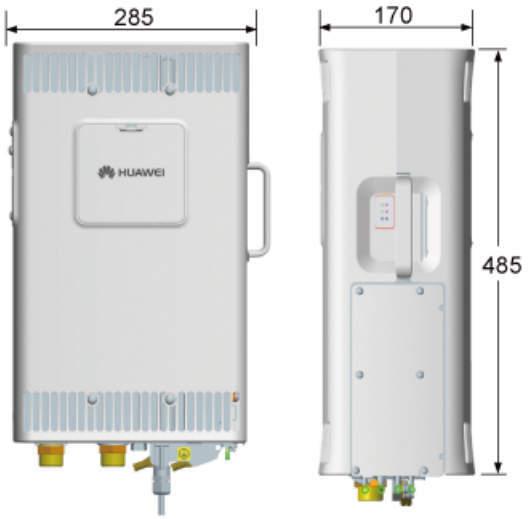
- The RRU receives RF signals from the antenna system, down-converts the signals to IF signals, and then transmits them to the BBU or the macro NodeB after amplification, analog-to-digital conversion, digital down-conversion, matched filtering, and Digital Automatic Gain Control (DAGC).
- The RRU receives downlink baseband signals from the BBU or the macro NodeB, forwards data received from its cascaded RRU, performs filtering and digital-to-analog conversion, and up-converts RF signals to the transmitting frequency band.
- The RRU multiplexes RX and TX signals over RF channels and filters the RX signals and TX signals. This enables the RX signals and TX signals to share the same antenna path.

3.1.1 Appearance of the RRU3804

This describes the appearance of the RRU3804 that features a modular design.

Appearance of the RRU3804 is shown in **Figure 3-1**.

Figure 3-1 Appearance of the RRU3804



3.1.2 Panels of the RRU3804

The RRU3804 has a bottom panel, a cabling cavity panel, and an LED panel.

Figure 3-2 shows the panels of the RRU3804.

Figure 3-2 Panels of the RRU3804

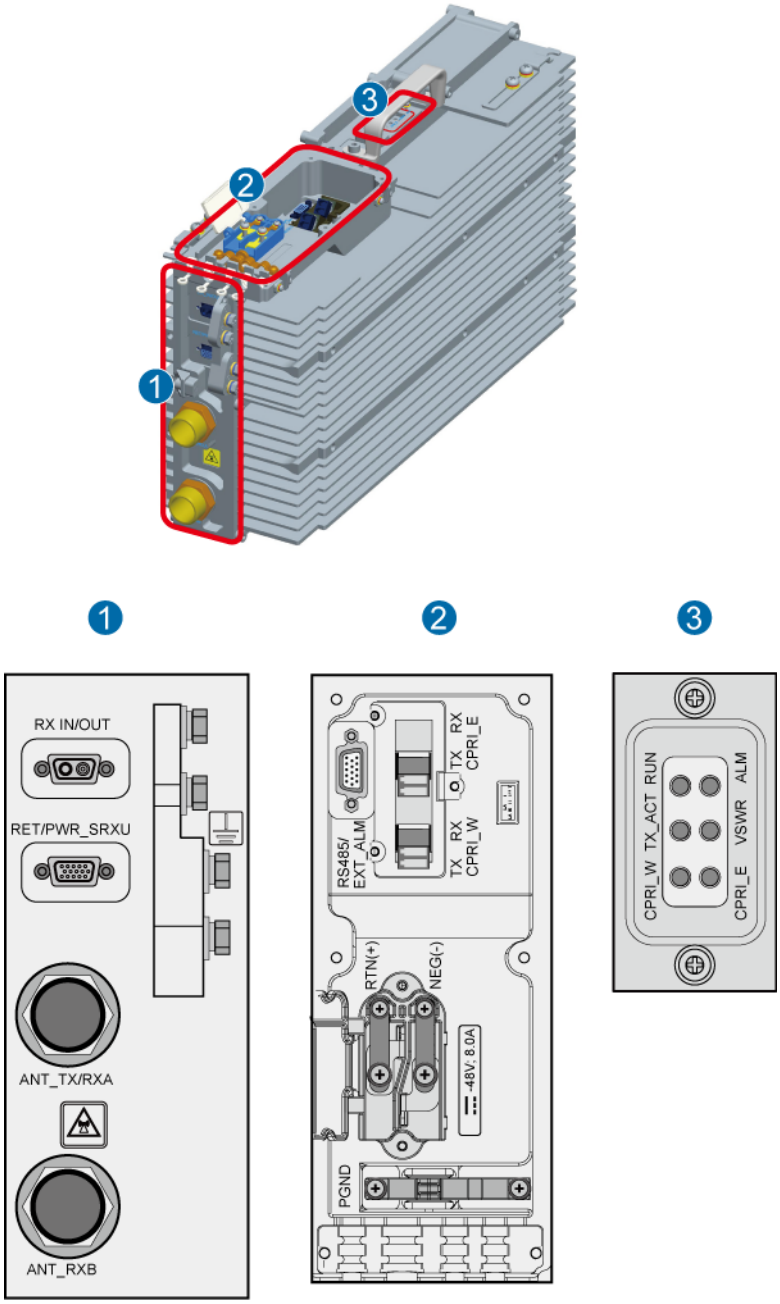


Table 3-1 describes the ports and LEDs on the panels of the RRU3804.

Table 3-1 Ports and LEDs on the panels of the RRU3804

No.	Item	Label	Remarks
1	Ports at the bottom	RX_IN/OUT	Port for interconnection between combined cabinets
		RET/PWR_SRXU	Port for the RET antenna
		ANT_TX/RXA	Port for main TX/RX diversity
		ANT_RXB	Port for RX diversity
2	Ports on the cabling cavity	RS485/EXT_ALM	Port for alarms
		CPRI_E	Optical ports
		CPRI_W	
		RTN(+)	Ports for power supply
		NEG(-)	
		PGND	Grounding clip for Shielding layer of power cable
3	LED	RUN	For details, refer to **3.1.3 LEDs on the RRU3804**.
		ALM	
		TX_ACT	
		VSWR	
		CPRI_W	
		CPRI_E	

3.1.3 LEDs on the RRU3804

The LEDs, on the LED panel of the RRU, indicate the running status of the RRU3804.

For the positions of the LEDs on the RRU3804, refer to **3.1.2 Panels of the RRU3804**.

Table 3-2 describes the LEDs and their status.

Table 3-2 LEDs on the RRU3804

Label	Color	Status	Description
RUN	Green	ON	The module has power input, yet the module is faulty.
		OFF	The module has no power input or is reporting alarms.
		1s ON, 1s OFF	The module is operational.

Label	Color	Status	Description
		0.5s ON, 0.5s OFF	Software is being loaded to the module.
ALM	Red	ON	The RRU is reporting alarms (excluding VSWR-related alarms).
		OFF	The module is operational.
TX_ACT	Green	ON	The module is operational (the transmit channel is enabled).
		1s ON, 1s OFF	The module is not operational (the transmit channel is not enabled).
VSWR	Red	ON	VSWR-related alarms are reported.
		OFF	No VSWR-related alarm is reported.
CPRI_W	Red/Green	ON (green)	The CPRI link is normal.
		ON (red)	The optical module receives local alarms related to LOS.
		0.5s ON, 0.5s OFF (red)	The CPRI link is out of lock.
		OFF	The optical module is not in position or is powered off.
CPRI_E	Red/Green	ON (green)	The CPRI link is normal.
		ON (red)	The optical module receives local alarms related to LOS.
		0.5s ON, 0.5s OFF (red)	The CPRI link is out of lock.
		OFF	The optical module is not in position or is powered off.

3.2 RRU Cables

The RRU cables include the PGND cable, power cable, AISG multi-wire cable, AISG extension cable, CPRI optical cable, RF jumper, and alarm cable.

3.2.1 RRU3804 Cable List

This describes the RRU cables. The cables are the PGND cable, power cable, CPRI optical cable, AISG multi-wire cable, AISG extension cable, antenna jumper, interconnect jumper, alarm cable.

3.2.2 PGND Cable of the RRU
The PGND cable ensures the grounding of the RRU.

3.2.3 Power Cable of the RRU
The RRU uses a shielded -48 V DC power cable. The cable feeds external -48 V DC power to the RRU.

3.2.4 CPRI Optical Cable
The CPRI optical cable is used to transmit CPRI signals between the BBU and RRU or between RRUs.

3.2.5 AISG Multi-Wire Cable of the RRU
This describes the AISG multi-wire cable of the RRU, which is 5 m long and connects the RRU to the Remote Control Unit (RCU). This cable is optional.

3.2.6 AISG Extension Cable of the RRU
This describes the AISG extension cable of the RRU. If the distance between the RRU and the RCU is longer than 5 m, you can use the AISG extension cable to extend the AISG multi-wire cable. The AISG extension cable is 15 m long.

3.2.7 RF Jumper of the RRU
This describes the RF jumper of the RRU, which is classified into two types: antenna jumper and interconnect jumper. The interconnect jumper is optional, depending on the site configuration.

3.2.8 Alarm Cable of the RRU
The cable transmits the 2-channel Boolean alarm signals and 1-channel RS485 signals from external devices to the RRU. Thus, the external signals are monitored.

3.2.1 RRU3804 Cable List

This describes the RRU cables. The cables are the PGND cable, power cable, CPRI optical cable, AISG multi-wire cable, AISG extension cable, antenna jumper, interconnect jumper, alarm cable.

Table 3-3 describes the RRU3804 cables.

Table 3-3 RRU3804 cable list

Cable	Connector Type	Installation Position
3.2.2 PGND Cable of the RRU	OT or 2-hole terminal OT or 2-hole terminal	Grounding bolt on the RRU Grounding bar
3.2.3 Power Cable of the RRU	Two OT terminals Bare wire	Sockets labeled NEG(-) and RTN(+) in the RRU cabling cavity External power supply
3.2.4 CPRI Optical Cable	DLC connector DLC connector	Port labeled CPRI_W or CPRI_E in the RRU cabling cavity Port labeled CPRI0, CPRI1, or CPRI2 on the BBU

Cable	Connector Type	Installation Position
3.2.5 AISG Multi-Wire Cable of the RRU	Waterproof DB9 connector Standard AISG female connector	Port labeled RET/ PWR_SRXU at the bottom of the RRU AISG extension cable or RCU
3.2.6 AISG Extension Cable of the RRU	Standard AISG male connector Standard AISG female connector	Standard AISG female connector of the AISG multi-wire cable Standard AISG male connector of the RCU
3.2.7.1 Antenna Jumper of the RRU	DIN connector DIN connector	Ports labeled ANT_TX/ RXA and ANT_RXB at the bottom of the RRU Feeder or antenna
3.2.7.2 Interconnect Jumper of the RRU	2W2 connector 2W2 connector	Port labeled RX_IN/OUT at the bottom of the RRU Port labeled RX_IN/OUT at the bottom of the RRU
3.2.8 Alarm Cable of the RRU	DB15 male connector Eight cord end terminals	Port labeled RS485/ EXT_ALM in the RRU cabling cavity External device

3.2.2 PGND Cable of the RRU

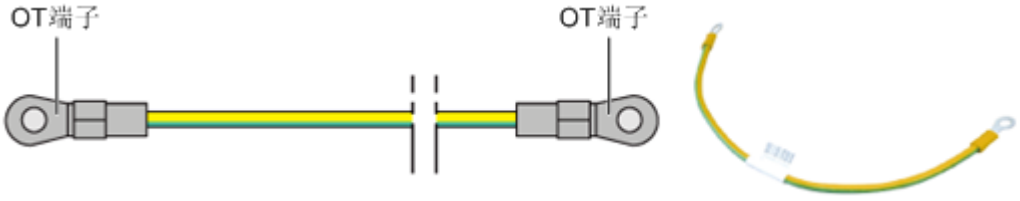
The PGND cable ensures the grounding of the RRU.

Appearance

The green and yellow PGND cable is a single cable with a cross-sectional area of 16 mm^2. Both ends of the cable are OT terminals. If you prepare the cable by yourself, it is recommended to use a copper-based cable with a minimum cross-sectional area of 16 mm^2.

Figure 3-3 shows the PGND cable.

Figure 3-3 PGND cable



OT terminals need to be added on site. You can determine the color of the cable and whether to use 2-hole terminals according to local standards.

Figure 3-4 shows the 2-hole terminal.

Figure 3-4 2-hole terminal

3.2.3 Power Cable of the RRU

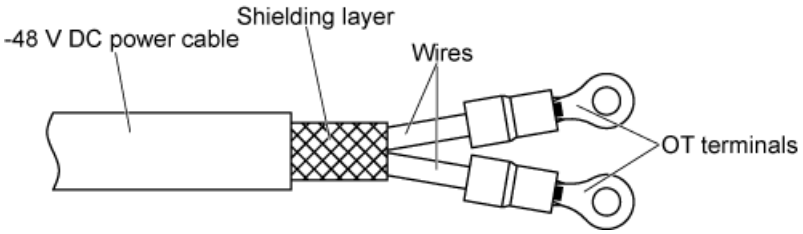
The RRU uses a shielded -48 V DC power cable. The cable feeds external -48 V DC power to the RRU.

Appearance

The cable has two OT terminals at one end and bare wire at the other end, as shown in **Figure 3-5**.

The OT terminals need to be added on site.

Figure 3-5 –48 V DC power cable



Pin Assignment

The -48 V DC power cable is a 2-wire cable. **Table 3-4** and **Table 3-5** describes the pin assignment for the wires of the -48 V DC power cable.

Table 3-4 Pin assignment for the wires of the –48 V DC power cable (North American Standard)

Wire Type	Wire Color
NEG	Blue
RTN	Black

Table 3-5 Pin assignment for the wires of the –48 V DC power cable (European Standard)

Wire Type	Wire Color
NEG	Blue
RTN	Brown

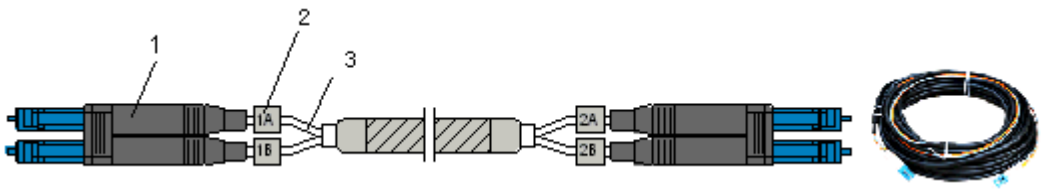
3.2.4 CPRI Optical Cable

The CPRI optical cable is used to transmit CPRI signals between the BBU and RRU or between RRUs.

Appearance

The CPRI optical cable is a multi-mode 2-wire cable with a DLC connector at each end. **Figure 3-6** shows the CPRI optical cable.

Figure 3-6 CPRI optical cable



(1) DLC connector (2) Label on the fiber tail

(3) Fiber tail

When the CPRI optical cable is used for connection between the BBU and RRU, the fiber tails at the BBU side and RRU side are 0.35 m and 0.05 m respectively. When the CPRI optical cable is used for connection between RRUs, the fiber tails at both RRU sides are 0.05 m.

Pin Assignment

Table 3-6 and **Table 3-7** describes the pin assignment for the fiber tails of the CPRI optical cable between the BBU and RRU and the CPRI optical cable between RRUs respectively.

Table 3-6 Pin assignment for the fiber tails of the CPRI optical cable between the BBU and RRU

Label	Color	Connects to...
1A	Orange	CPRI_W RX port on the RRU
1B	Gray	CPRI_W TX port on the RRU
2A	Orange	TX port on the BBU

Label	Color	Connects to...
2B	Gray	RX port on the BBU

Table 3-7 Pin assignment for the fiber tails of the CPRI optical cable between RRUs

Label	Color	Connects to...
1A	Orange	CPRI_W RX port on the RRU 1
1B	Gray	CPRI_W TX port on the RRU 1
2A	Orange	CPRI_E TX port on the RRU 0
2B	Gray	CPRI_E RX port on the RRU 0

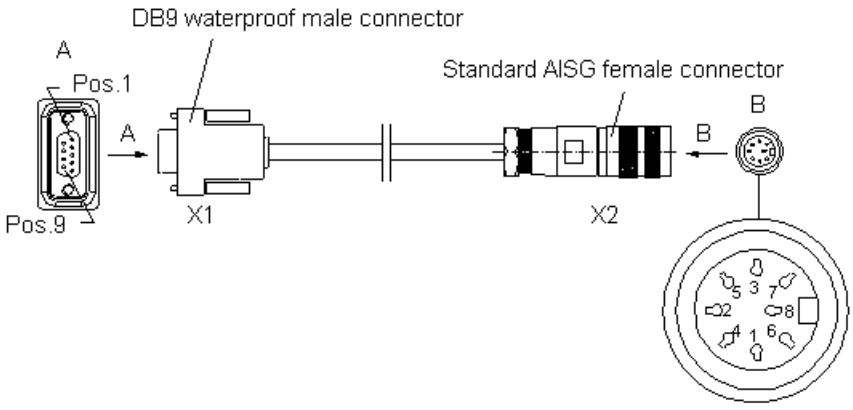
3.2.5 AISG Multi-Wire Cable of the RRU

This describes the AISG multi-wire cable of the RRU, which is 5 m long and connects the RRU to the Remote Control Unit (RCU). This cable is optional.

Appearance

One end of the AISG multi-wire cable is a waterproof DB9 connector, and the other end is a standard AISG female connector, as shown in **Figure 3-7**.

Figure 3-7 AISG multi-wire cable



Pin Assignment

Table 3-8 describes the pin assignment for the wires of the AISG multi-wire cable.

Table 3-8 Pin assignment for the wires of the AISG multi-wire cable

X1 End	X2 End	Remarks
X1.1	X2.1	+12 V
X1.4	X2.4	DC-GND
X1.9		OOK_Switch
X1.3	X2.3	AISG RS485B / PSU RS485B_RX
X1.5	X2.5	AISG RS485A / PSU RS485A_RX

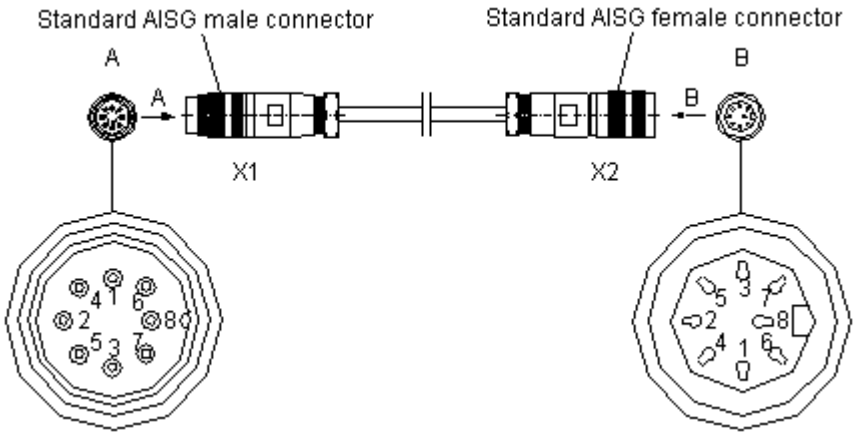
3.2.6 AISG Extension Cable of the RRU

This describes the AISG extension cable of the RRU. If the distance between the RRU and the RCU is longer than 5 m, you can use the AISG extension cable to extend the AISG multi-wire cable. The AISG extension cable is 15 m long.

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 3-8**.

Figure 3-8 AISG extension cable



Pin Assignment

Table 3-9 describes the pin assignment for the wires of the AISG extension cable.

Table 3-9 Pin assignment for the wires of the AISG extension cable

X1 End	X2 End	Wire Color	Wire Type	Remarks
X1.1	X2.1	White and blue	Twisted pair	+12 V
		Blue		
X1.7	X2.7	White and orange	Twisted pair	DC Return A
		Orange		
X1.3	X2.3	White and green	Twisted pair	RS485 B
X1.5	X2.5	Green		RS485 A
X1.6	X2.6	White and brown	Twisted pair	+24 V
		Brown		

3.2.7 RF Jumper of the RRU

This describes the RF jumper of the RRU, which is classified into two types: antenna jumper and interconnect jumper. The interconnect jumper is optional, depending on the site configuration.

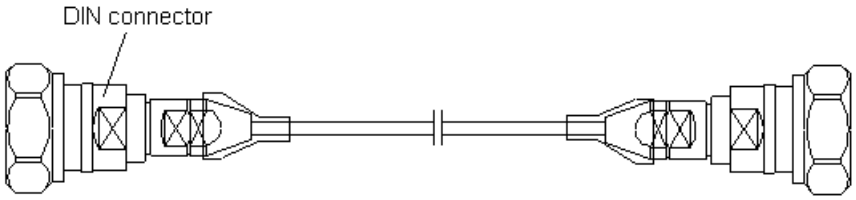
Antenna Jumper of the RRU

This describes the antenna jumper of the RRU, which transmits the RF signals to and from the antenna system.

Appearance

Each end of the antenna jumper is a DIN male connector, as shown in **Figure 3-9**.

Figure 3-9 Antenna jumper



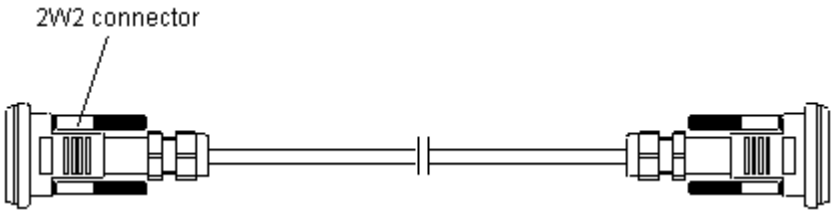
Interconnect Jumper of the RRU

The interconnect jumper is used to transmit RF signals between two RRUs. It is used in a network topology with multiple RRUs, for example, active and standby RRUs are interconnected, or multiple RRUs support the transmit diversity configuration.

Appearance

The length of the interconnect jumper is 2 m. Each end of the interconnect jumper is a 2W2 connector, as shown in **Figure 3-10**.

Figure 3-10 Interconnect jumper



RF Jumper Connections of the RRU

One end of the RF jumper is connected to the RF ports on the RRU and the other end to the feeder. Which RF port to use depends on the networking modes.

Table 3-10 describes the connections of the RF jumpers in different RRU networking modes.

Table 3-10 RF jumper connections of the RRU

Typical Networking Mode	Antenna Type and Quantity of RRUs	Cable Connection
1 x 1 in no TX diversity mode 1 x 2 in no TX diversity mode	• One RRU • One dual polarization antenna	• Two antenna jumpers • The DIN connectors of the two feeder jumpers link to the ANT_TX/RXA and ANT_RXB ports at the bottom of the RRU.
2 x 1 in no TX diversity mode 2 x 2 in no TX diversity mode	• Two RRUs • Two dual polarization antennas	• Four antenna jumpers • The DIN connectors of the four antenna jumpers are linked to the ANT_TX/RXA and ANT_RXB ports on RRU 0 and RRU 1.
1 x 1 in TX diversity mode 1 x 2 in TX diversity mode	• Two RRUs • One dual polarization antenna	• Two feeder jumpers and one interconnect jumper • The DIN connectors of the two feeder jumpers are linked to the ANT_TX/RXA ports on RRU 0 and RRU 1. • The interconnect jumper is connected to the RX_IN/OUT ports on RRU 0 and RRU 1 that are combined.
3 x 1 in no TX diversity mode	• Three RRUs	• Six antenna jumpers

Typical Networking Mode	Antenna Type and Quantity of RRUs	Cable Connection
3 x 2 in no TX diversity mode	• Three dual polarization antennas	• The DIN connectors of the six antenna jumpers are linked to the ANT_TX/RXA and ANT_RXB ports on RRU 0, RRU 1, and RRU 2.
Active/standby RRU	• Two RRUs • Two dual-polarized antennas	• Four feeder jumpers and one interconnect jumper are used. • The DIN male connectors at one end of the four feeder jumpers are linked to the ANT_TX/RXA ports and ANT_RXB ports on RRU 0 and RRU 1 respectively. • The interconnect jumper is connected to the RX_IN/OUT ports on RRU 0 and RRU 1. • RRU 0 is connected to the BBU through a CPRI optical cable. RRU 1 is connected to the BBU or RRU 0 based on the actual condition.
	• Two RRUs • Four dual-polarized antenna	• Four feeder jumpers are used. • The DIN male connectors at one end of the four feeder jumpers are linked to the ANT_TX/RXA ports and ANT_RXB ports on RRU 0 and RRU 1 respectively. • RRU 0 is connected to the BBU through a CPRI optical cable. RRU 1 is connected to the BBU or RRU 0 based on the actual condition.

3.2.8 Alarm Cable of the RRU

The cable transmits the 2-channel Boolean alarm signals and 1-channel RS485 signals from external devices to the RRU. Thus, the external signals are monitored.

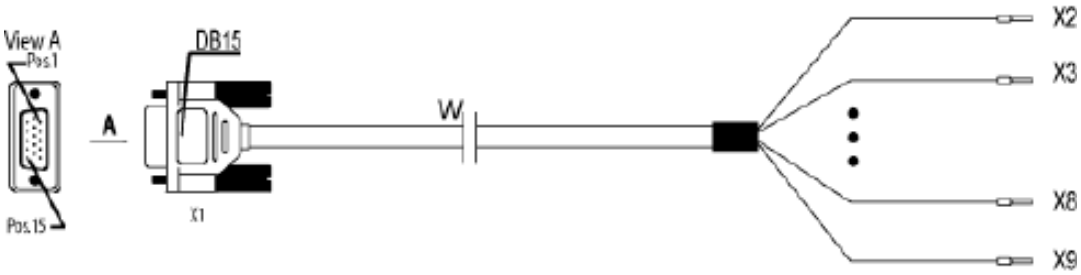
Appearance

The cable has a DB15 male connector at one end and eight cord end terminals at the other end, as shown in **Figure 3-11**.

NOTE

If the cord end terminals of the cable do no match the ports on the external devices, cut off the cord end terminals and make proper terminals on site.

Figure 3-11 Alarm cable



Pin Assignment

The cable can transmit 2-channel Boolean alarm signals and 1-channel RS485 signals. **Table 3-11** describes the pin assignment for the wires of the alarm cable.

Table 3-11 Pin assignment for the wires of the alarm cable

X1 End	Cord End Terminal	Wire Color	Wire Type	Label
X1.2	X2	White and blue	Twisted pair	SWITCH_INPUT0+
X1.3	X3	Blue		GND
X1.6	X4	White and orange	Twisted pair	SWITCH_INPUT1+
X1.7	X5	Orange		GND
X1.10	X6	White and green	Twisted pair	APM RX-
X1.11	X7	Green		APM RX+
X1.13	X8	White and brown	Twisted pair	APM TX-
X1.14	X9	Brown		APM TX+

4 Maintaining the Hardware of the RRU

About This Chapter

This describes how to maintain the hardware of the RRU. After the NodeB is deployed, accepted, and put into use, routine maintenance is performed to ensure the functionality of the RRU.

4.1 Maintenance Items of the RRU

This describes the maintenance items of the RRU. The maintenance items of the RRU involves checking the equipment surface, equipment cleanliness, and LEDs.

Maintenance items of the RRU

Table 4-1 describes the maintenance items of the RRU.

Table 4-1 Maintenance items of the RRU

Item	Frequency	Guidelines	Reference Standards
Checking the equipment surface	Every month or every quarter	Check whether there are dents, cracks, holes, or corrosion on the surface of the equipment and whether the label on each equipment is legible.	-
Checking the equipment cleanliness	Every month or every quarter	Check whether the equipment is clean.	The surface of the equipment is clean and no dust accumulates inside the cabinet.
Checking the LEDs	Every month or every quarter	Check whether the LEDs on the equipment work properly.	For detailed description of the LEDs, refer to **3.1.3 LEDs on the RRU3804**.

4.2 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.

4.2.1 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 RRU is within the range of -36 V DC to -57 V DC.

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 Set the corresponding MCB on the auxiliary power device for the RRU to **ON** to 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 **Table 3-2**.

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

4.2.2 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.
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

4.3 Replacing the RRU

This describes how to replace an RRU. The RRU, a remote radio unit, forms a complete distributed base station system with the BBU. Replacing an RRU disrupts all the services carried by the RRU.

Prerequisite

- The quantity of the RRUs to be replaced are checked, and new RRUs are ready.
- The installation positions of the RRUs are recorded.
- The mapping between each cable and the port on the RRU is recorded.
- The tool kit is ready.

Context

CAUTION

Take proper ESD prevention measures, for example, wearing an ESD wrist strap or a pair of ESD gloves, to prevent electrostatic hazard to the board, module, or electrical parts.

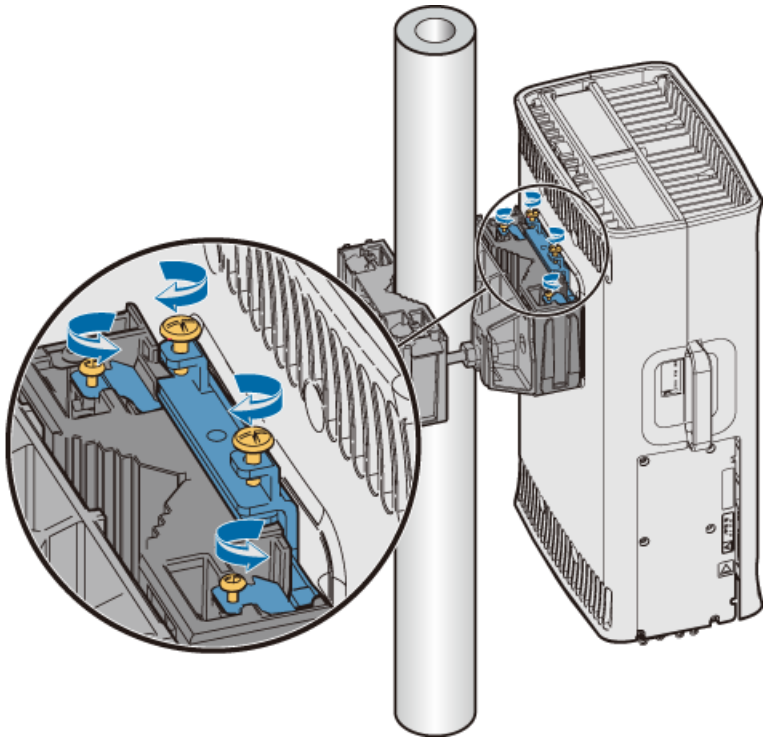
Procedure

Step 1 Power off the RRU. For details, see **4.2.2 Powering Off the RRU**.

Step 2 Remove all the cables that are connected to the RRU and insulate the cables.

Step 3 Loosen the two captive screws on the contact pieces of the main fixture. Then, tighten the two screws on the attachment plate of the RRU, as shown in **Figure 4-1**.

Figure 4-1 Removing an RRU



Step 4 Hold the bottom of the RRU with both hands and lift the RRU to remove it.

Step 5 Install the new RRU.

Step 6 Connect all the cables to the RRU.

Step 7 Power on the RRU. For details, see **4.2.1 Powering On the RRU**.

----End

Postrequisite

After replacing the RRU, check the following items:

- The RRU is installed properly.
- The mapping between each cable and the port on the RRU is correct.
- The positions of the screws on the RRU are correct, and the screws are tightened.
- The RRU runs properly after it is powered on.

Contact the local Huawei office to handle the faulty RRU.

4.4 Replacing an Optical Module

This describes how to replace an optical module. The optical module provides an interface for optical-electrical conversion, thus enabling transmission through optical fibers between the RRU and other devices. You need to remove the optical cable before replacing an optical module, which disrupts the transmission of the CPRI signals.

Prerequisite

- The quantity of the optical modules to be replaced are checked, and new optical modules are ready.
- 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 installed on the CPRI_W or CPRI_E port of the RRU.

The optical module is hot swappable.

It takes about five minutes to replace the optical module of the RRU. The time covers the activities of disconnecting the optical cable, removing the faulty optical module, inserting the new optical module, connecting the optical cable to the new optical module, and waiting for the recovering of the CPRI links.

CAUTION

Take proper ESD prevention measures, for example, wearing an ESD wrist strap or a pair of ESD gloves, to prevent electrostatic hazard to the board, module, or electrical parts.

Procedure

Step 1 Press the latch on the faulty optical cable connector, and then remove the connector from the faulty optical module.

Step 2 Turn the puller on the faulty optical module outwards. 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 new optical module and optical cable connector in turn. Then, insert the connector into the new optical module.

Step 5 Determine whether the transmission of the CPRI signals is normal according to the status of the LEDs on the CPRI_W and CPRI_E ports. For detailed description of the LEDs, refer to **3.1.3 LEDs on the RRU3804**.

----End

Postrequisite

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