

AAU3911

Hardware Description

Issue 02

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About This Document

Overview

This document provides reference for planning and deploying an Active Antenna Unit 3911 (AAU3911, which is shortened to AAU in this document). It describes the exteriors, functional modules, combinations, engineering specifications, and cable types of the AAU.

The exteriors of components or cables in this document are for reference only. The actual exteriors may be different.

Product Version

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

Product Name	Solution Version	Product Version
DBS3900	<ul style="list-style-type: none">● SRAN9.0 and later versions● GBSS16.0 and later versions● RAN16.0 and later versions● eRAN7.0 and later versions	V100R009C00 and later

Intended Audience

- System personnel
- Installation personnel
- Maintenance engineer

Organization

[1 Changes in AAU3911 Hardware Description](#)

This chapter describes the changes in *AAU3911 Hardware Description*.

2 AAU Introduction

This chapter describes the exterior, function modules, combinations, RET system, technical specifications of the AAU, and engineering specifications of the RU.






3 AAU Cables

This chapter describes the cables connected to an AAU, including the AU PGND cable, RU power cable, RF jumper, CPRI fiber optic cable, AISG multi-wire cable, and RU alarm cable (optional).

Conventions

Symbol Conventions

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

Symbol	Description
 DANGER	Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.
 WARNING	Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.
 CAUTION	Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.
 NOTICE	Indicates a potentially hazardous situation which, if not avoided, could result in equipment damage, data loss, performance deterioration, or unanticipated results. NOTICE is used to address practices not related to personal injury.
 NOTE	Calls attention to important information, best practices and tips. NOTE is used to address information not related to personal injury, equipment damage, and environment deterioration.

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 .

Convention	Description
<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> .
[]	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.

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1 Changes in AAU3911 Hardware Description

This chapter describes the changes in *AAU3911 Hardware Description*.

02 (2015-01-30)

This is the second commercial release.

Compared with the issues 01 (2015-01-15), this issue includes the following new topics.

- [RU3952m](#)
- [AU11Ic](#)

Compared with the issues 01 (2015-01-15), this issue includes the following change.

Topic	Change Description
2.1 AAU Exterior	Added the AU11Ic in the components section.
<ul style="list-style-type: none">● 2.3 AAU Combinations● 2.4 RET System of an AAU● 2.5 Engineering Specifications of an AAU	Added the information of AU11Ic.
3.4 RF Jumpers	Added an RU RF jumper with a length of 1100 mm (43.31 in.)

Compared with the issues 01 (2015-01-15), this issue does not include any new topics or exclude any topics.

01 (2015-01-15)

This is the first commercial release.

Compared with the issues Draft A (2014-10-30), this issue does not include any new topics or exclude any topics.

Compared with the issues Draft A (2014-10-30), this issue includes the following change.

Topic	Change Description
The whole document	Included some editing modification.

Draft A (2014-10-30)

This is a draft.

2 AAU Introduction

About This Chapter

This chapter describes the exterior, function modules, combinations, RET system, technical specifications of the AAU, and engineering specifications of the RU.

[2.1 AAU Exterior](#)

This section describes the exterior, dimensions, and components of an AAU.

[2.2 Functional Modules of an AAU](#)

This chapter describes functional modules in an AAU, including the RUs and AU.

[2.3 AAU Combinations](#)

An AAU is an active antenna unit that can be connected to RRUs or RFUs in the live network.

[2.4 RET System of an AAU](#)

The remote electrical tilt (RET) system of an AAU consists of the remote control unit (RCU), motor, gearing, and phase shifter. In the RET system, the RCU is used to remotely adjust the downtilts of the antenna array.

[2.5 Engineering Specifications of an AAU](#)

This section describes the engineering specifications of an AAU, including input power and equipment specifications.

[2.6 Optical Modules](#)

An optical module transmits optical signals between an optical port and a fiber optic cable.

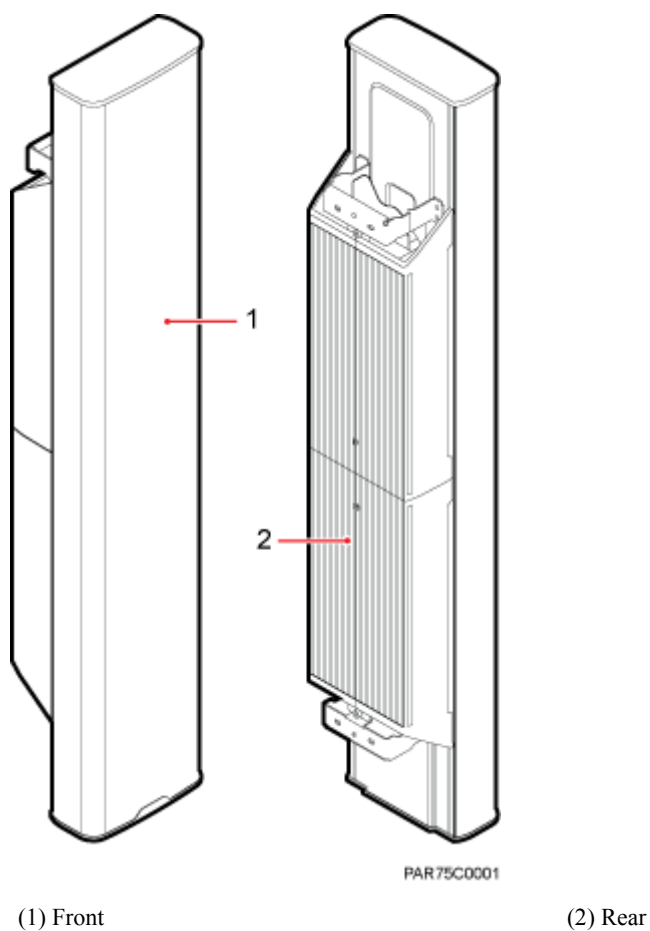
2.1 AAU Exterior

This section describes the exterior, dimensions, and components of an AAU.

Exterior

The following figure shows the exterior of an AAU.

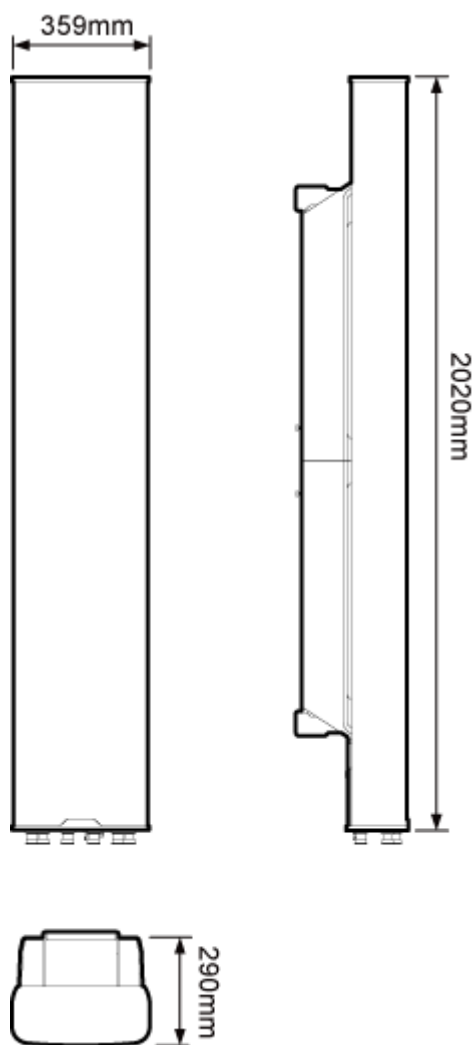
Figure 2-1 Exterior of an AAU



Dimensions

The following figure shows the dimensions of an AAU.

Figure 2-2 Dimensions of an AAU



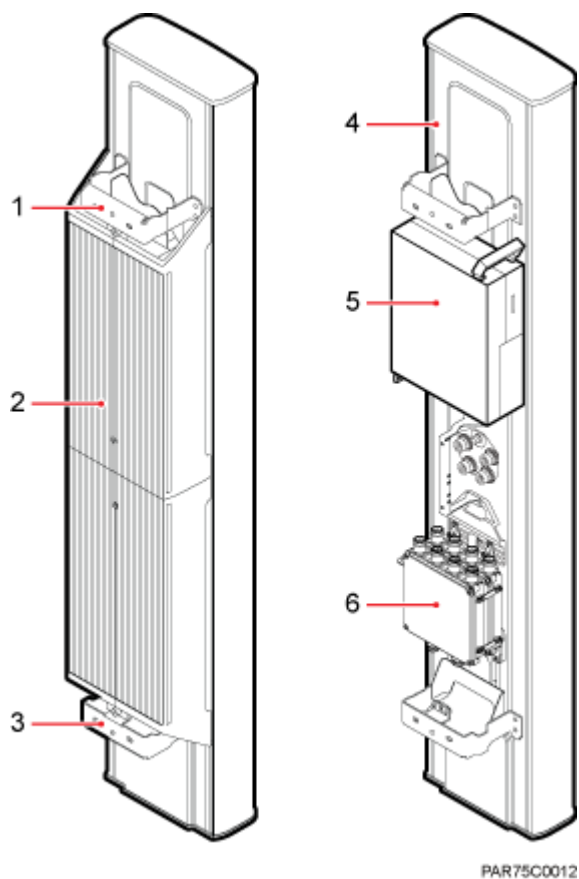
PAR75C0018

Components

An AAU consists of the radio unit (RU) and antenna unit (AU).

The following figure shows the components of AAUs, the left indicates an AAU with the plastic housing, and the right indicates an AAU without the plastic housing.

Figure 2-3 Components of an AAU



The following table describes the components in an AAU.

Table 2-1 Components in an AAU

No.	Component	Optional or Mandatory	Maximum Quantity in an AAU	Description
(1)	Upper handle	Mandatory	1	The upper handle is the base for installing antennas.
(2)	Plastic housing	Mandatory	1	The housing makes the RUs and AU into a whole.
(3)	Lower handle	Mandatory	1	The lower handle is the base for installing antennas.
(4)	2.2.2 AU	Mandatory	1	The AU is the main bearing part in an AAU. There are three types of AUs: AU11Ia, AU11Ib, and AU11Ic.

No.	Component	Optional or Mandatory	Maximum Quantity in an AAU	Description
(5)	RU	Mandatory	2	<ul style="list-style-type: none">● The RU is the RF unit of an AAU.● The installation slots of RUs are determined based on AAU configurations.
(6)	2.2.3 Combiner	Optional	1	<ul style="list-style-type: none">● A combiner combines signals of RF units operating in different frequency bands and is optional for an AU111b or an AU111c.● Combiners are classified into two types: single-layer combiner and dual-layer combiner.

2.2 Functional Modules of an AAU

This chapter describes functional modules in an AAU, including the RUs and AU.

2.2.1 RU

A radio unit (RU) converts and forwards signals between the BBU and the antenna system.

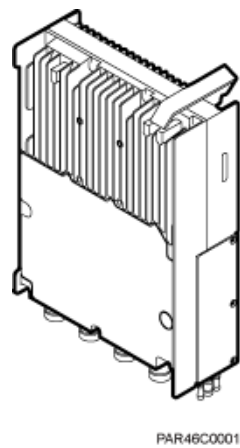
RU3832/RU3260

This section describes the exterior, dimensions, and function of the RU3832/RU3260 as well as the ports and indicators on this type of RU.

Exterior

The following figure shows an RU.

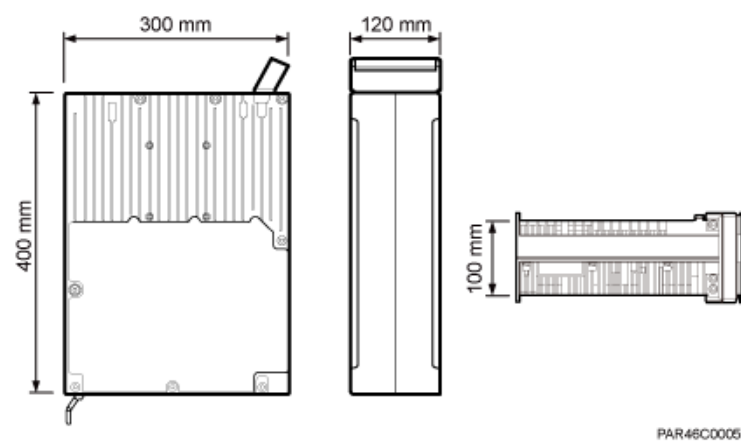
Figure 2-4 Exterior of an RU



Dimensions

The following figure shows the dimensions of an RU.

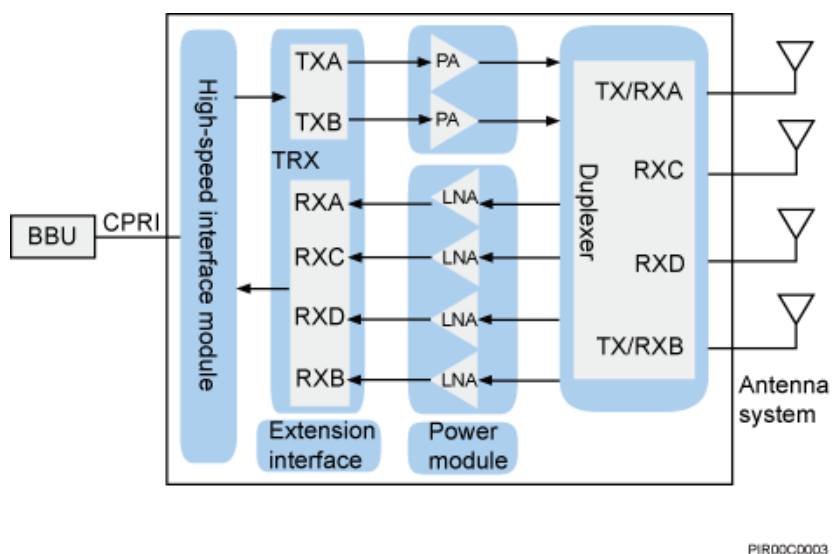
Figure 2-5 RU dimensions



Functions

An RU consists of a high-speed interface module, a signal processing unit, a power amplifier, and a duplexer. The following figure shows the logical structure of an RU.

Figure 2-6 Logical structure of the RU



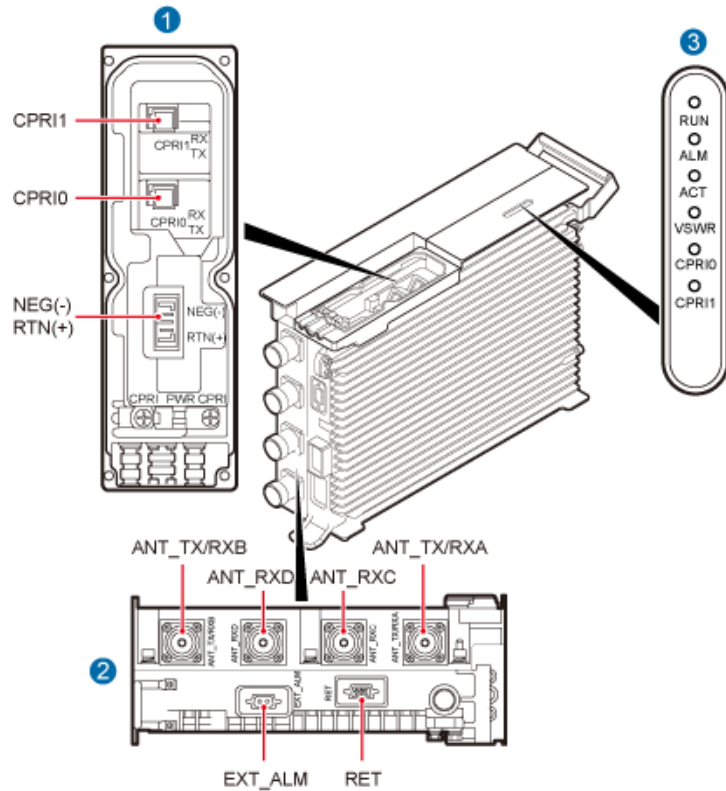
An RU performs the following functions:

- Receives downlink baseband data from the BBU and sends uplink baseband data for the communication between the BBU and the RRU.
- Receives RF signals from the antenna system, down-converts the received signals to IF signals, amplifies the IF signals, and performs analog-to-digital conversion. The TX channel filters downlink signals, performs digital-to-analog conversion, and up-converts RF signals to the TX band.
- Multiplexes RX and TX signals, which enables these signals to share the same antenna path. It also filters the RX and TX signals.

Ports

The following figure shows all the ports on an RU.

Figure 2-7 Ports on the RU



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The following table describes all the ports on an RU.

Table 2-2 Ports on an RU

Item	Silkscreen	Description
(1) Ports in the cabling cavity	RTN(+)	Power supply port
	NEG(-)	
	CPR10	Optical/electrical port 0
	CPR11	Optical/electrical port 1
(2) Ports at the bottom	ANT_TX/RXA	TX/RX port A
	ANT_RXC	RX port C
	ANT_RXD Port	RX port D
	ANT_TX/RXB	TX/RX port B
	EXT_ALM	Alarm port
	RET	Communication port for the RET antenna, supporting RET signal transmission

Indicators

The following table describes the indicators on an RU.

Table 2-3 Indicators on an RU

Item	Silkscreen	Color	Status	Meaning
(3) Indicator s	RUN	Green	Steady on	There is power supply, but the module is faulty.
			Steady off	There is no power supply, or the module is faulty.
			Blinking (on for 1s and off for 1s)	The board is functioning properly.
			Blinking (on for 0.125s and off for 0.125s)	Software is being loaded to the module, or the module is not started.
	ALM	Red	Steady on	Alarms are generated, and the module must be replaced.
			Blinking (on for 1s and off for 1s)	Alarms are generated. The alarms may be caused by the faults on the related boards or ports. Therefore, you need to locate the faults before deciding whether to replace the module.
			Steady off	No alarm is generated.
	ACT	Green	Steady on	The module is running properly with TX channels enabled or the software is being loaded without RU running.
			Blinking (on for 1s and off for 1s)	The module is running properly with TX channels disabled.
	VSWR	Red	Steady off	No Voltage Standing Wave Ratio (VSWR) alarm is generated.
			Blinking (on for 1s and off for 1s)	VSWR alarms are generated on the ANT_TX/RXB port.
			Steady on	VSWR alarms are generated on the ANT_TX/RXA port.

Item	Silkscreen	Color	Status	Meaning
			Blinking (on for 0.125s and off for 0.125s)	VSWR alarms are generated on the ANT_TX/RXA and ANT_TX/RXB ports.
	CPRI0	Red or green	Steady green	The CPRI link is functioning properly.
			Steady red	An optical module fails to receive signals because the optical module is faulty or the fiber optic cable is broken.
			Blinking red (on for 1s and off for 1s)	The CPRI link is out of lock because of a failure in clock lock between two modes or mismatched data rates over CPRI ports.
			Steady off	The optical module cannot be detected, or the CPRI cable is not connected properly.
	CPRI1	Red or green	Steady green	The CPRI link is functioning properly.
			Steady red	An optical module fails to receive signals because the optical module is faulty or the fiber optic cable is broken.
			Blinking red (on for 1s and off for 1s)	The CPRI link is out of lock because of a failure in clock lock between two modes or mismatched data rates over CPRI ports.
			Steady off	The optical module cannot be detected, or the optical module is powered off.

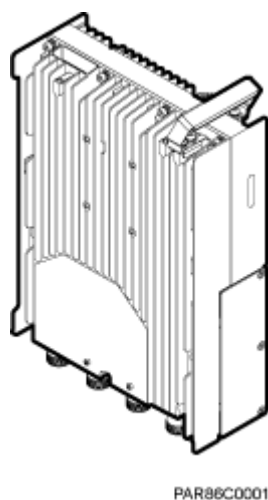
RU3952m

This section describes the exterior, dimensions, and function of the RU3952m as well as the ports and indicators on this type of RU.

Exterior

The following figure shows the exterior of an RU.

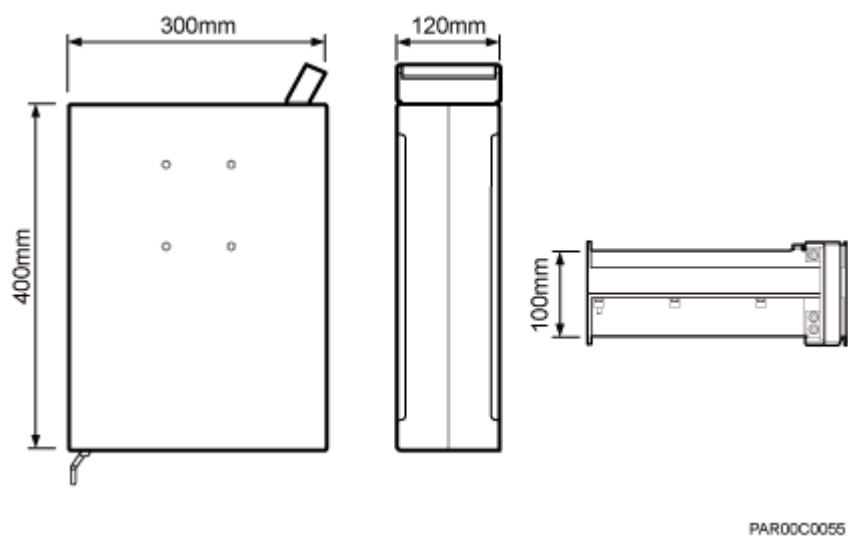
Figure 2-8 Exterior of an RU



Dimensions

The following figure shows the dimensions of an RU.

Figure 2-9 Dimensions of an RU



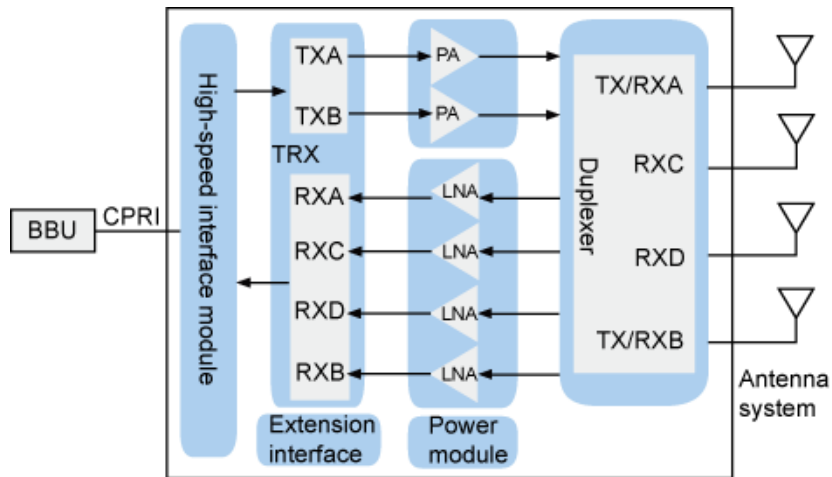
Function

An RU consists of the high-speed interface unit, signal processing unit, power amplifier, and duplexer.

An RU consists of a high-speed interface module, a signal processing unit, a power amplifier, and a duplexer.

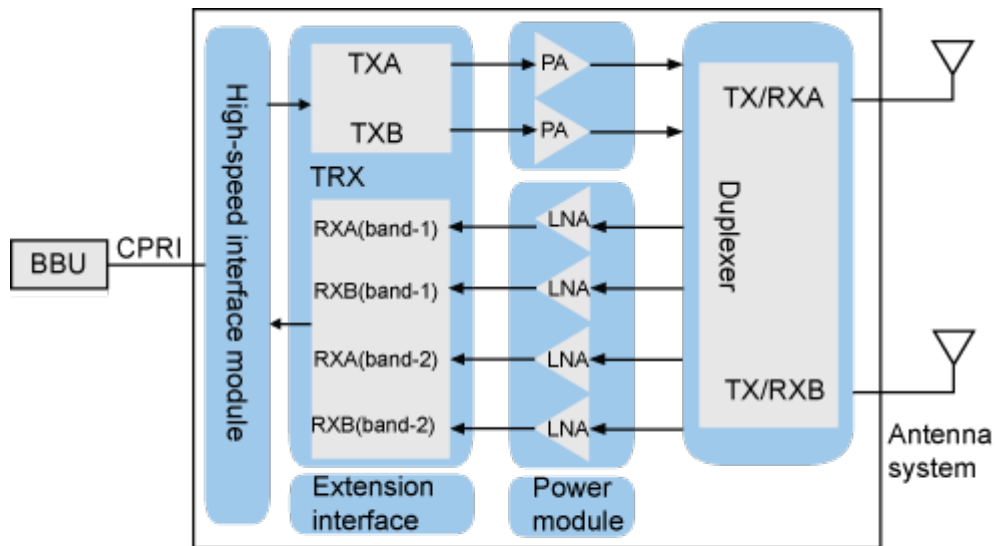
An RU can work in 2T4R single-band mode or 2T2R+2R' dual-band mode. **Figure 2-10** shows the logical structure of an RU working in 2T4R single-band mode. **Figure 2-11** shows the logical structure of an RU working in 2T2R+2R' dual-band mode.

Figure 2-10 Logical structure of an RU (2T4R single-band mode)



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Figure 2-11 Logical structure of an RU (2T2R+2R' dual-band mode)



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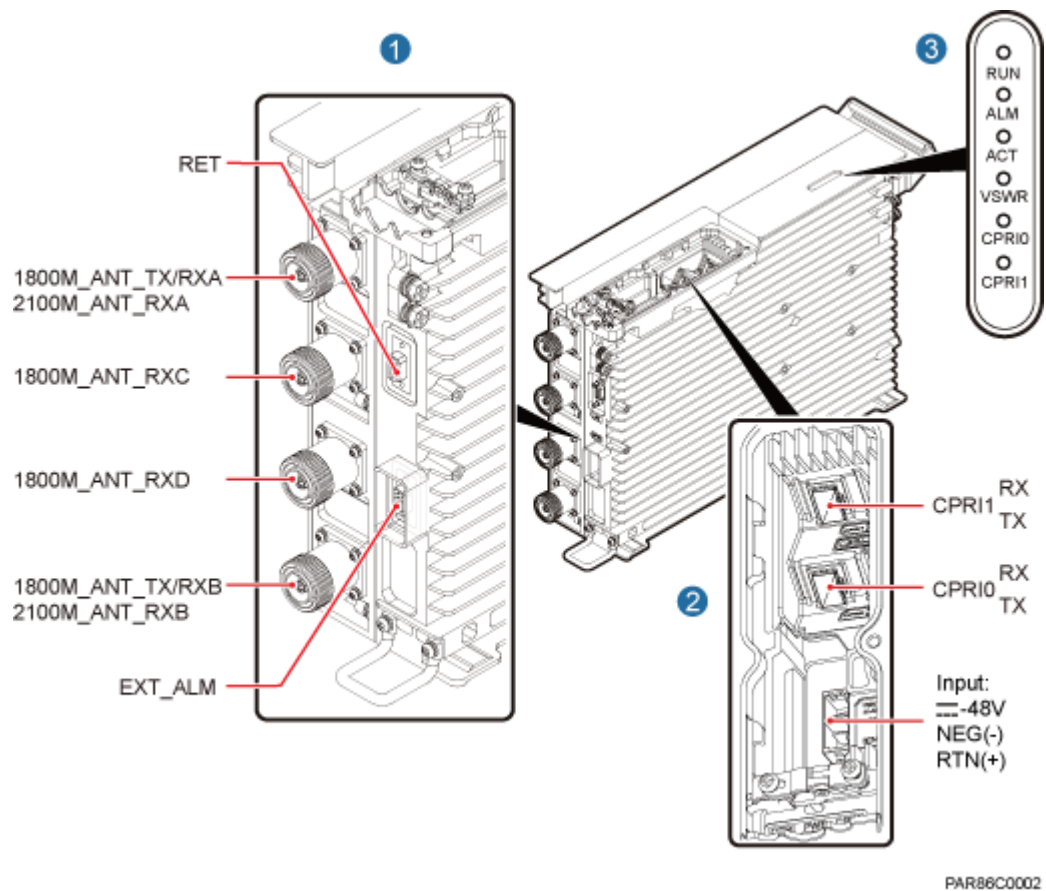
An RU performs the following functions:

- Receives downlink baseband data from the BBU and sends uplink baseband data for the communication between the BBU and the RRU.
- Receives RF signals through the feeder, down-converts the received signals into IF signals, amplifies them, and performs ADC. At the TX channels, the RRU filters signals, performs DAC, and then up-converts the RF signals to the TX band.
- Multiplexes RX and TX signals, which enables these signals to share the same antenna path. It also filters the RX and TX signals.

Ports

The following figure shows all the ports on an RU.

Figure 2-12 Ports on an RU



The following table describes the ports on an RU.

Table 2-4 Ports on an RU

Item	Silkscreen	Description
(1) Ports at the bottom	1800M_ANT_TX/ RXA 2100M_ANT_RX A	TX/RX port A, supporting RET signal transmission
	1800M_ANT_TX/ RXB 2100M_ANT_RX B	TX/RX port B
	1800M_ANT_RX C	RX port C
	1800M_ANT_RX D	RX port D
	EXT_ALM	Alarm monitoring port
	RET	Communication port for the RET antenna, supporting RET signal transmission
(2) Ports in the cabling cavity	RTN(+)	Power supply socket
	NEG(-)	
	CPRI0	Optical/electrical port 0
	CPRI1	Optical/electrical port 1

Indicators

The following table describes the indicators on an RU.

Table 2-5 Indicators on an RU

Item	Silkscreen	Color	Status	Meaning
(3) Indicators	RUN	Green	Steady on	There is power supply, but the module is faulty.
			Steady off	There is no power supply, or the module is faulty.
			Blinking (on for 1s and off for 1s)	The board is functioning properly.

Item	Silkscreen	Color	Status	Meaning
			Blinking (on for 0.125s and off for 0.125s)	Software is being loaded to the module, or the module is not started.
	ALM	Red	Steady on	Alarms are generated, and the module must be replaced.
			Blinking (on for 1s and off for 1s)	Alarms are generated. The alarms may be caused by the faults on the related boards or ports. Therefore, you need to locate the faults before deciding whether to replace the module.
			Steady off	No alarm is generated.
	ACT	Green	Steady on	The module is running properly with TX channels enabled or the software is being loaded without RU running.
			Blinking (on for 1s and off for 1s)	The module is running properly with TX channels disabled.
	VSWR	Red	Steady off	No Voltage Standing Wave Ratio (VSWR) alarm is generated.
			Blinking (on for 1s and off for 1s)	VSWR alarms are generated on the ANT_TX/RXB port.
			Steady on	VSWR alarms are generated on the ANT_TX/RXA port.
			Blinking (on for 0.125s and off for 0.125s)	VSWR alarms are generated on the ANT_TX/RXA and ANT_TX/RXB ports.
	CPRI0	Red or green	Steady green	The CPRI link is functioning properly.
			Steady red	An optical module fails to receive signals because the optical module is faulty or the fiber optic cable is broken.
			Blinking red (on for 1s and off for 1s)	The CPRI link is out of lock because of a failure in clock lock between two modes or mismatched data rates over CPRI ports.
			Steady off	The optical module cannot be detected, or the CPRI cable is not connected properly.

Item	Silkscreen	Color	Status	Meaning
	CPRI1	Red or green	Steady green	The CPRI link is functioning properly.
			Steady red	An optical module fails to receive signals because the optical module is faulty or the fiber optic cable is broken.
			Blinking red (on for 1s and off for 1s)	The CPRI link is out of lock because of a failure in clock lock between two modes or mismatched data rates over CPRI ports.
			Steady off	The optical module cannot be detected, or the optical module is powered off.

2.2.2 AU

An AU is an antenna unit, which is the main bearing part in an AAU. The AU performs the antenna function and RET function and provides ports and installation slots. The AU111a and AU111b modules are applicable to the AAU3911.

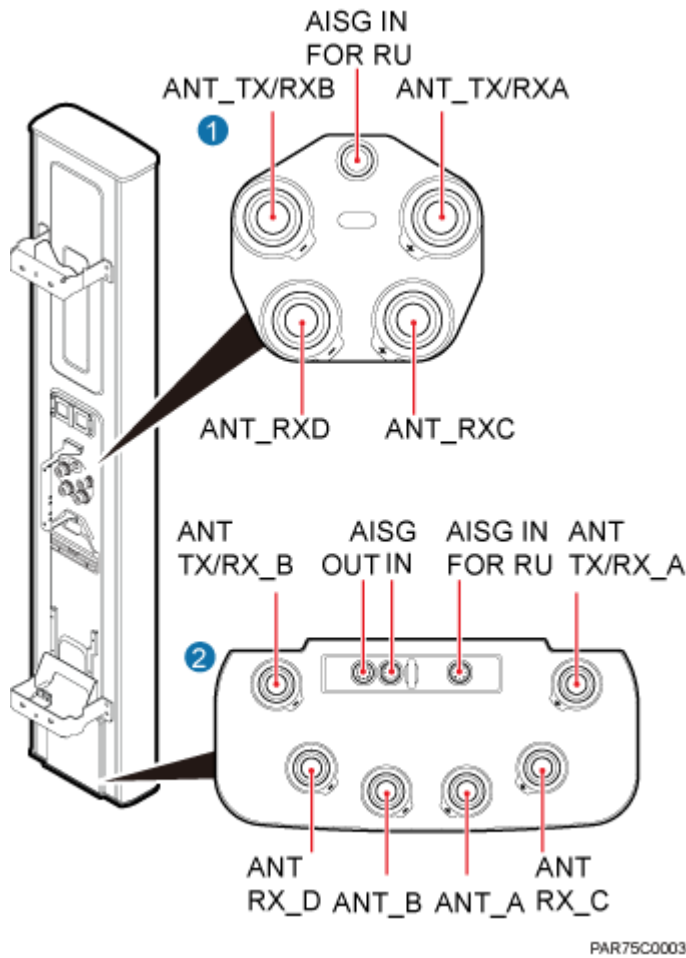
AU111a

This section describes the exterior, ports, functions, and cable connections of an AU111a.

Exterior and Ports

The following figure shows the exterior and ports of an AU111a.

Figure 2-13 Exterior and ports of an AU11a



(1) Ports on the DIN port plate

(2) Ports at the bottom of the AU

The following table describes the ports on an AU11a.

Table 2-6 Ports on an AU11a

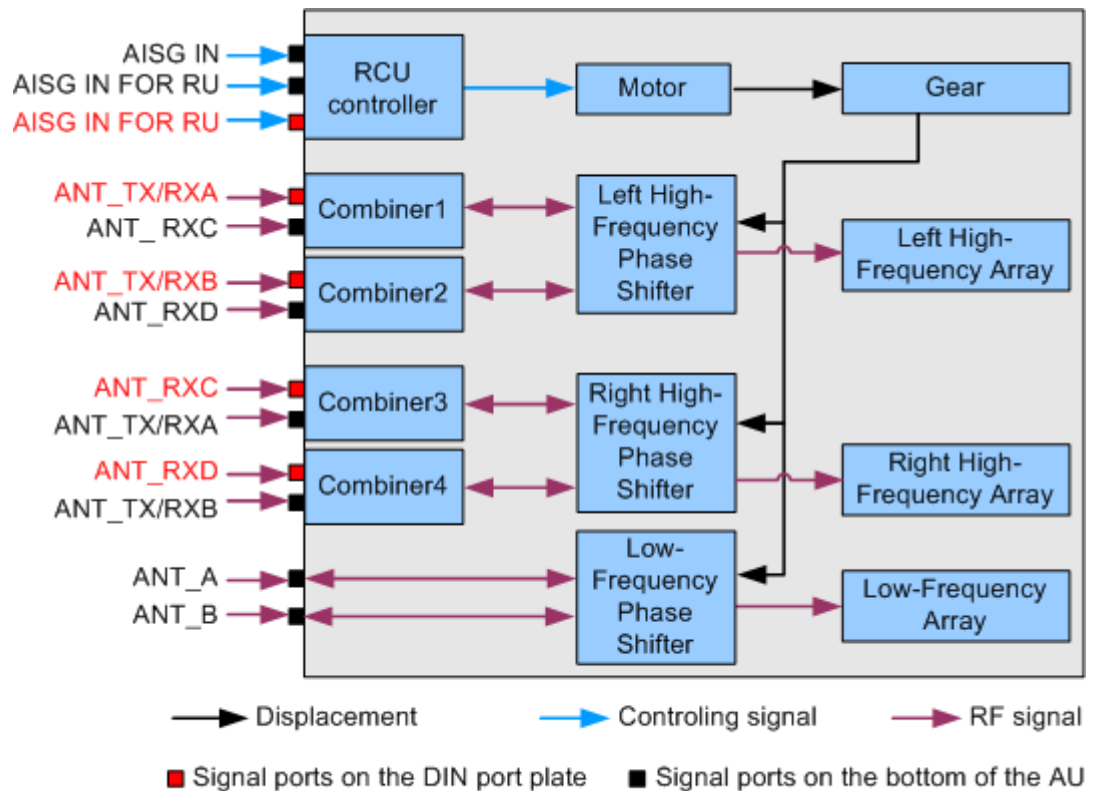
Item	Silkscreen	Description
(1) Ports on the DIN port plate	ANT_TX/RXA	RF port connected to the ANT port on the RU in the upper slot
	ANT_TX/RXB	
	ANT_RXC	
	ANT_RXD	
	AISG IN FOR RU	RET antenna port connected to the RET port on the RU in the upper slot
(2) Ports at the bottom of the AU	ANT_TX/RXA	RF port connected to the ANT port on the RU in the lower slot or to the ANT port on a passive high-frequency module
	ANT_TX/RXB	

Item	Silkscreen	Description
	ANT_RXC	
	ANT_RXD	
	ANT_A	RF port connected to the ANT port on a passive low-frequency module
	ANT_B	
	AISG IN FOR RU	RET antenna port connected to the RET port on the RU in the lower slot
	AISG IN	RET antenna port connected to the RET port on a passive module
	AISG OUT	RET antenna cascading port connected to the RET antenna port on an external RET antenna so that the passive module can adjust downtilts of cascaded antennas

Function

The following figure shows the function process of an AU11Ia.

Figure 2-14 Function process of an AU11Ia



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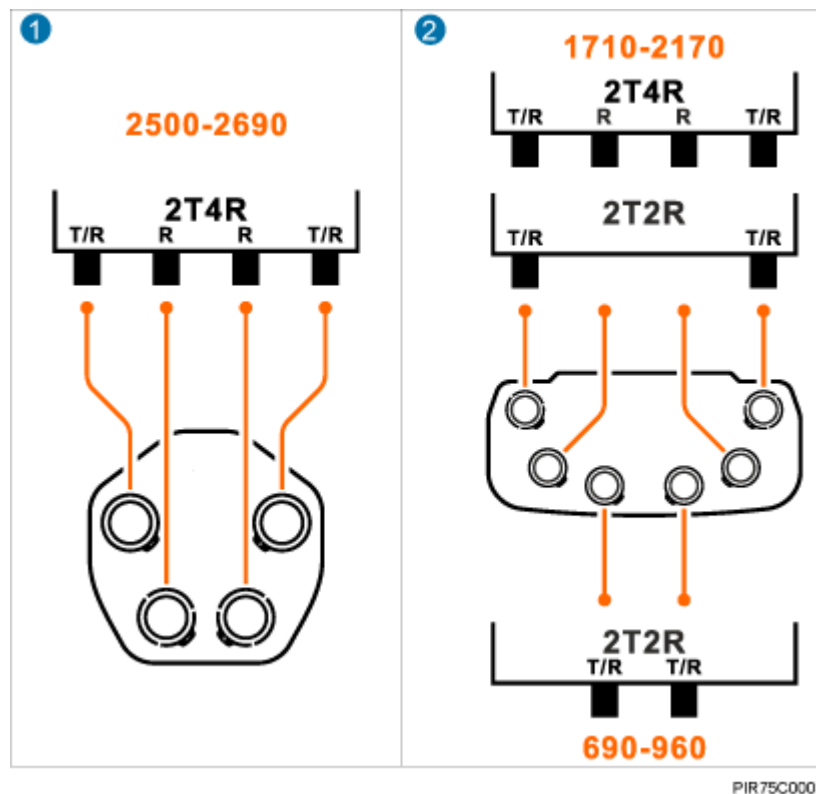
The AU performs the following functions:

- Remotely adjusts the downtilts: The remote control unit (RCU) receives RS485 signals, converts the received RS485 signals, and sends the converted signals to the motor; the motor converts received signals into phase shift and drives the phase shifter using a gear, enabling the downtilt adjustment of the antenna arrays.
- Combines signals: The combiner combines RF signals of different frequency bands and then sends these signals to the antenna array through the feeder power network.
- Receives and transmits signals: The antenna array receives and transmits RF signals.
- Reports information: The RCU reports the AU basic information and RU slot information.
- Provides ports for RU mounting kits and AAU mounting kits.

Cable Connections of Ports

The following figure shows cable connections of ports on an AU11Ia.

Figure 2-15 Cable connections of ports on an AU11Ia



(1) Cable connections of ports on the DIN port plate of the AU11Ia (2) Cable connections of ports at the bottom of the AU11Ia

The cable connection label sticks on the AU and includes the following information:

- Frequency band information of ports. For example, in the cable connections of ports on the DIN port plate of the AU11Ia shown by illustration 1 in the preceding figure, "2500-2690" indicates that the ports on the DIN port plate can be connected to RUs operating in the frequency band from 2500 MHz to 2690 MHz.

- Information about RF ports on an AU that are to be connected to the RF modules in 2T2R or 2T4R mode

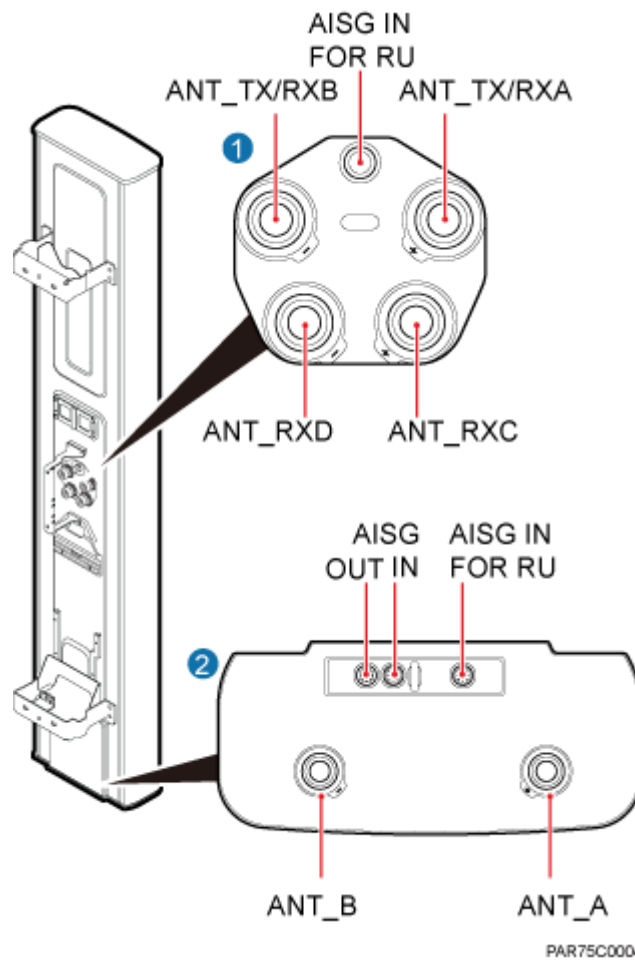
AAU11b

This section describes the exterior, ports, functions, and cable connections of an AAU11b.

Exterior and Ports

The following figure shows the exterior and ports of an AAU11b.

Figure 2-16 Exterior and ports of an AAU11b



(1) Ports on the DIN port plate

(2) Ports at the bottom of the AAU

The following table describes the ports on an AAU11b.

Table 2-7 Ports on an AAU11b

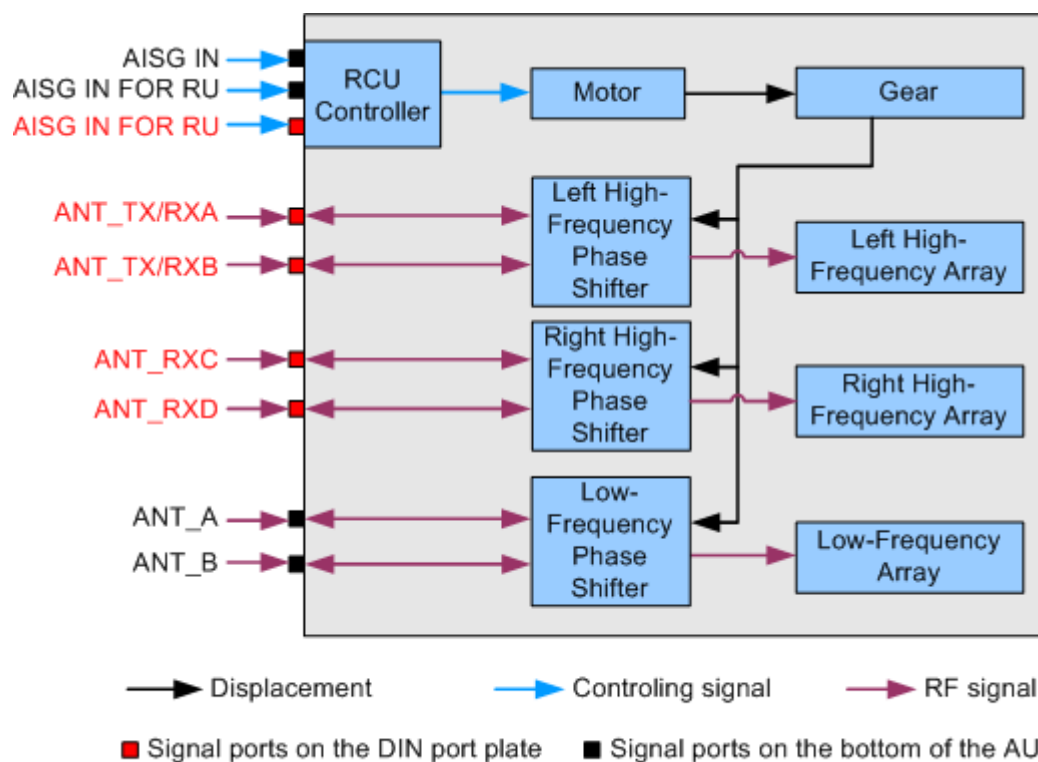
Item	Silkscreen	Description
(1) Ports on the DIN port plate	ANT_TX/RXA	RF port connected to the ANT port on the RU in the upper slot or on the combiner

Item	Silkscreen	Description
	ANT_TX/RXB	
	ANT_RXC	
	ANT_RXD	
	AISG IN FOR RU	RET antenna port connected to the RET port on the RU in the upper slot
(2) Ports at the bottom of the AU	ANT_A	RF port connected to the ANT port on a passive low-frequency module
	ANT_B	
	AISG IN FOR RU	RET antenna port connected to the RET port on the RU in the lower slot
	AISG IN	RET antenna port connected to the RET port on a passive module
	AISG OUT	RET antenna cascading port connected to the RET antenna port on an external RET antenna so that the passive module can adjust downtilts of cascaded antennas

Function

The following figure shows the function process of an AU11b.

Figure 2-17 Function process of an AU11b



PIR75C0001

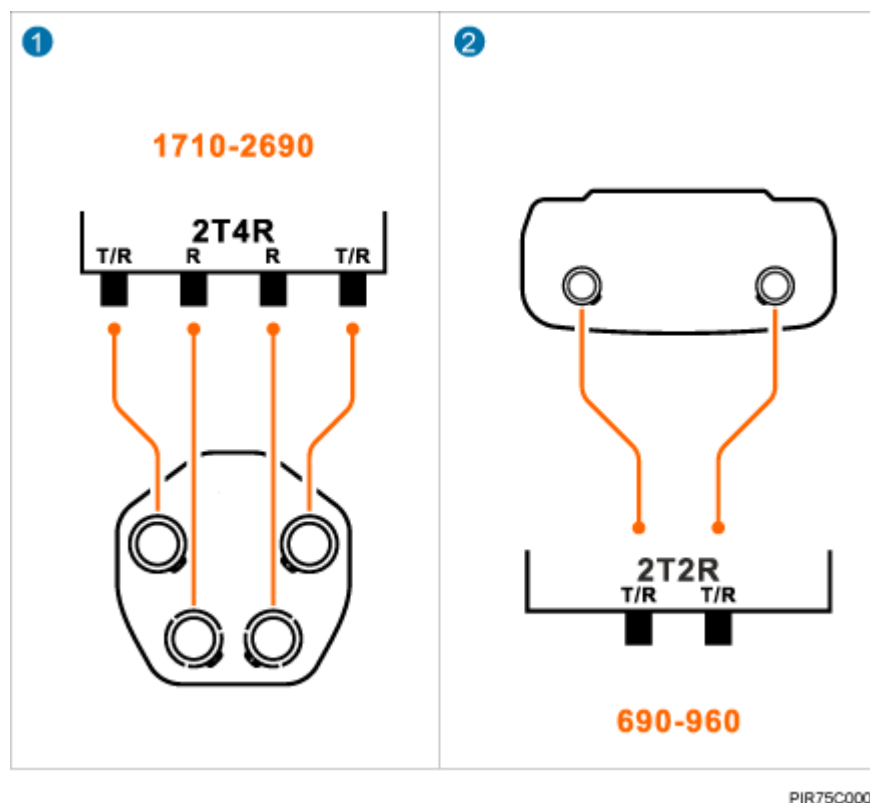
The AU performs the following functions:

- Remotely adjusts the downtilts: The remote control unit (RCU) receives RS485 signals, converts the received RS485 signals, and sends the converted signals to the motor; the motor converts received signals into phase shift and drives the phase shifter using a gear, enabling the downtilt adjustment of the antenna arrays.
- Combines signals: The combiner combines RF signals of different frequency bands and then sends these signals to the antenna array through the feeder power network.
- Receives and transmits signals: The antenna array receives and transmits RF signals.
- Reports information: The RCU reports the AU basic information and RU slot information.
- Provides ports for RU mounting kits and AAU mounting kits.

Cable Connections of Ports

The following figure shows cable connections of ports on an AU11b.

Figure 2-18 Cable connections of ports on an AU111b



(1) Cable connections of ports on the DIN port plate of the AU111b (2) Cable connections of ports at the bottom of the AU111b

The cable connection label sticks on the AU and includes the following information:

- Frequency band information of ports. For example, in the cable connections of ports on the DIN port plate of the AU111b shown by illustration 1 in the preceding figure, "1710-2690" indicates that the ports on the DIN port plate can be connected to RUs operating in the frequency band from 1710 MHz to 2690 MHz.
- Information about RF ports on an AU that are to be connected to the RF modules in 2T2R or 2T4R mode

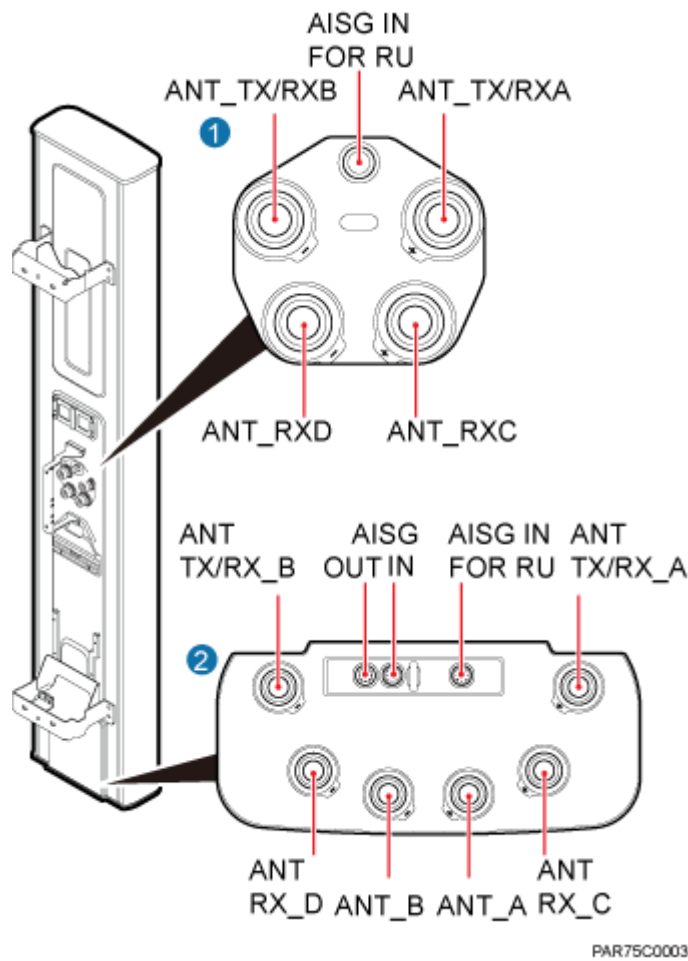
AU111c

This section describes the exterior, ports, functions, and cable connections of an AU111c.

Exterior and Ports

The following figure shows the exterior and ports of an AU111c.

Figure 2-19 Exterior and ports of an AU11c



(1) Ports on the DIN port plate

(2) Ports at the bottom of the AU

The following table describes the ports on an AU11c.

Table 2-8 Ports on an AU11c

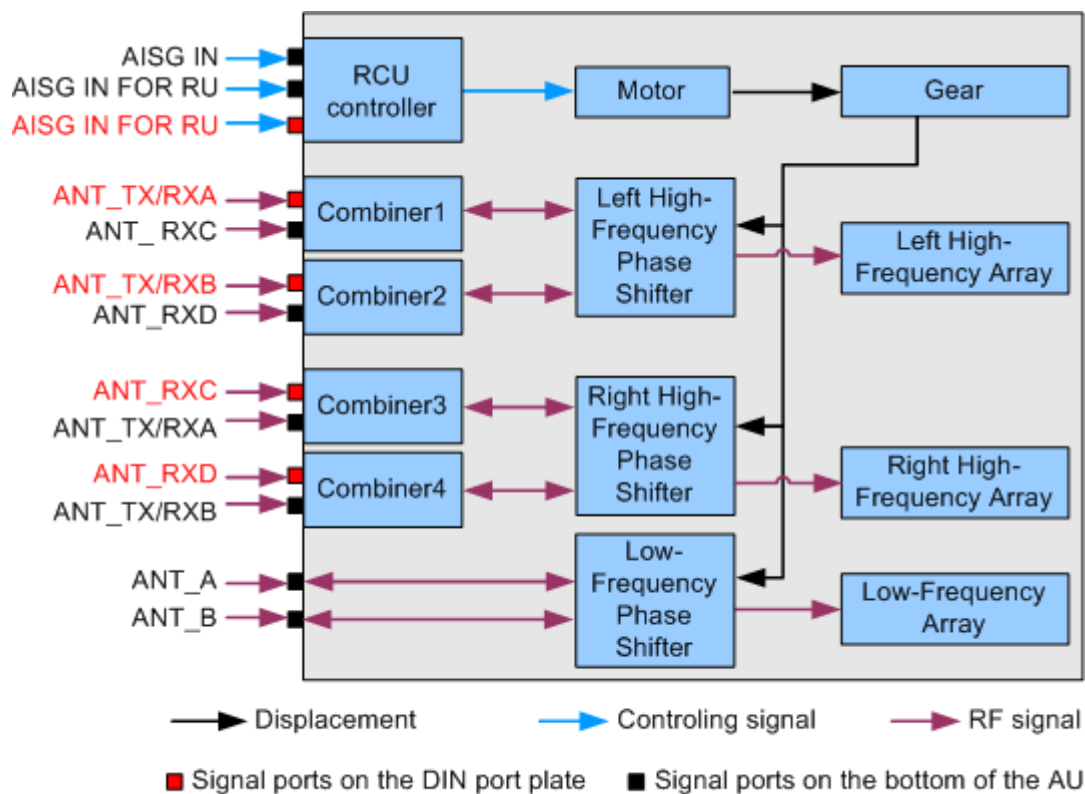
Item	Silkscreen	Description
(1) Ports on the DIN port plate	ANT_TX/RXA	RF port connected to the ANT port on the RU in the upper slot or on the combiner
	ANT_TX/RXB	
	ANT_RXC	
	ANT_RXD	
	AISG IN FOR RU	RET antenna port connected to the RET port on the RU in the upper slot

Item	Silkscreen	Description
(2) Ports at the bottom of the AU	ANT_TX/RXA	RF port connected to the ANT port on the RU in the lower slot or to the ANT port on a passive high-frequency module
	ANT_TX/RXB	
	ANT_RXC	
	ANT_RXD	
	ANT_A	RF port connected to the ANT port on a passive low-frequency module
	ANT_B	
	AISG IN FOR RU	RET antenna port connected to the RET port on the RU in the lower slot
	AISG IN	RET antenna port connected to the RET port on a passive module
	AISG OUT	RET antenna cascading port connected to the RET antenna port on an external RET antenna so that the passive module can adjust downtilts of cascaded antennas

Function

The following figure shows the function process of an AU11Ic.

Figure 2-20 Function process of an AU11Ic



PIR75C0000

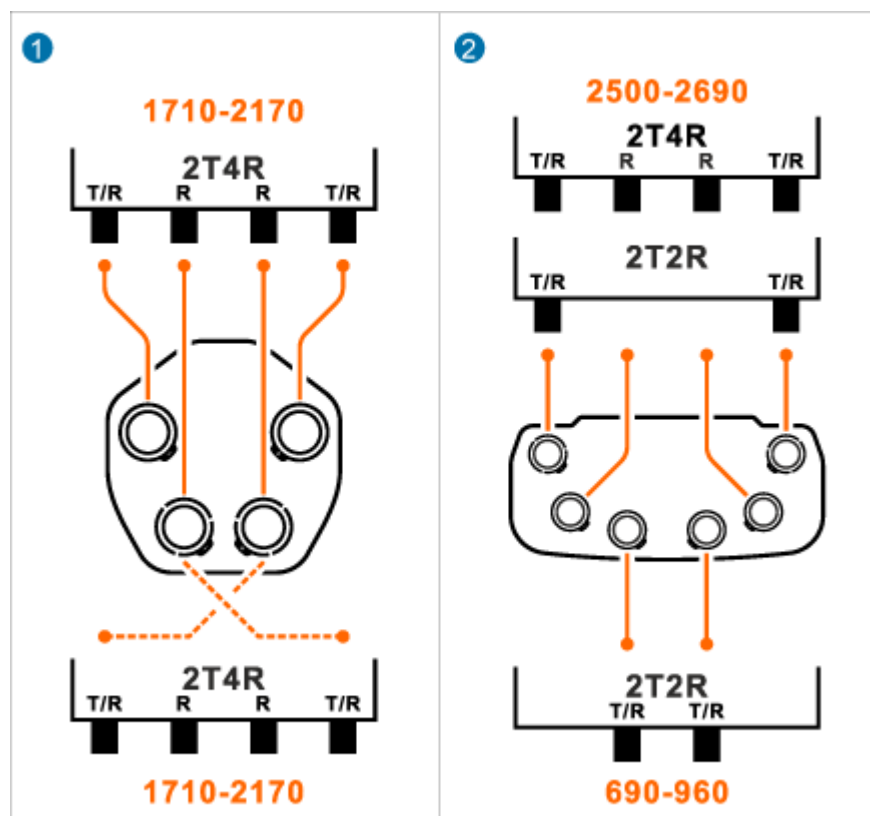
The AU performs the following functions:

- Remotely adjusts the downtilts: The remote control unit (RCU) receives RS485 signals, converts the received RS485 signals, and sends the converted signals to the motor; the motor converts received signals into phase shift and drives the phase shifter using a gear, enabling the downtilt adjustment of the antenna arrays.
- Combines signals: The combiner combines RF signals of different frequency bands and then sends these signals to the antenna array through the feeder power network.
- Receives and transmits signals: The antenna array receives and transmits RF signals.
- Reports information: The RCU reports the AU basic information and RU slot information.
- Provides ports for RU mounting kits and AAU mounting kits.

Cable Connections of Ports

The following figure shows cable connections of ports on an AU11Ic.

Figure 2-21 Cable connections of ports on an AU11Ic



PIR75C0006

(1) Cable connections of ports on the DIN port plate of the AU11Ic
(2) Cable connections of ports at the bottom of the AU11Ic

The cable connection label sticks on the AU and includes the following information:

- Frequency band information of ports. For example, in the cable connections of ports on the DIN port plate of the AU11Ic shown by illustration 1 in the preceding figure, "1710-2170" indicates that the ports on the DIN port plate can be connected to RUs operating in the frequency band from 1710 MHz to 2170 MHz.
- Information about RF ports on an AU that are to be connected to the RF modules in 2T2R or 2T4R mode

2.2.3 Combiner

A combiner is a passive module, combining signals of RF units operating in different frequency bands. Combiners for an AAU fall into two categories: single-layer combiner and dual-layer combiner.

Exterior

Figure 2-22 and **Figure 2-23** show the exteriors of a single-layer combiner and a dual-layer combiner, respectively.

Figure 2-22 Exterior of a single-layer combiner

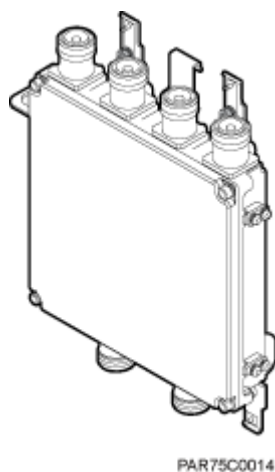
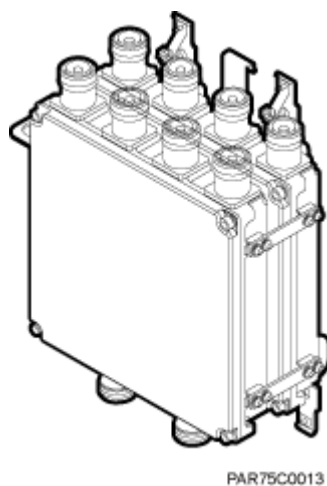


Figure 2-23 Exterior of a dual-layer combiner



Dimensions

Figure 2-24 and **Figure 2-25** show the dimensions of a single-layer combiner and a dual-layer combiner, respectively.

Figure 2-24 Dimensions of a single-layer combiner

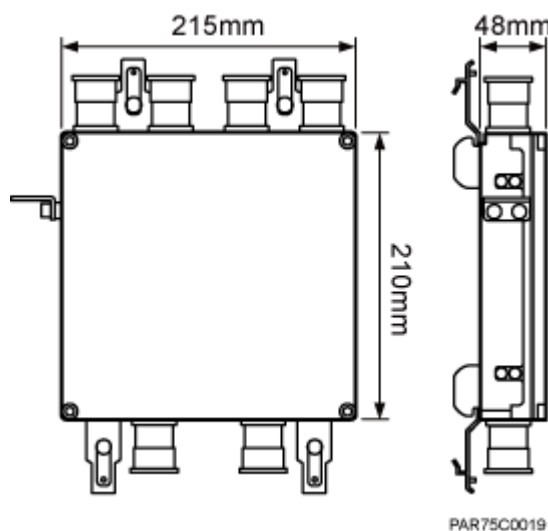
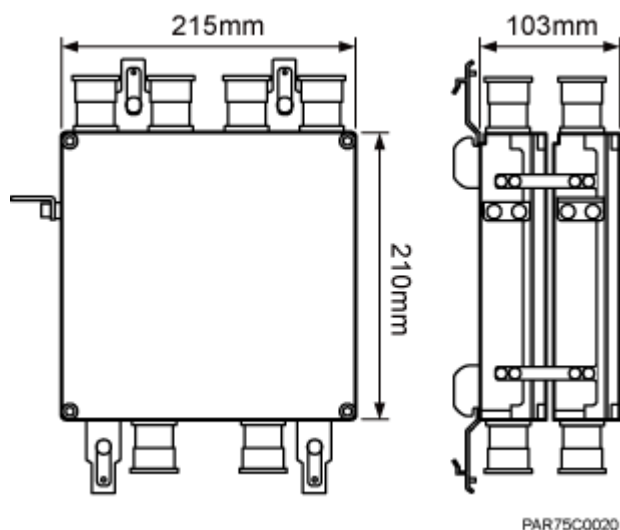


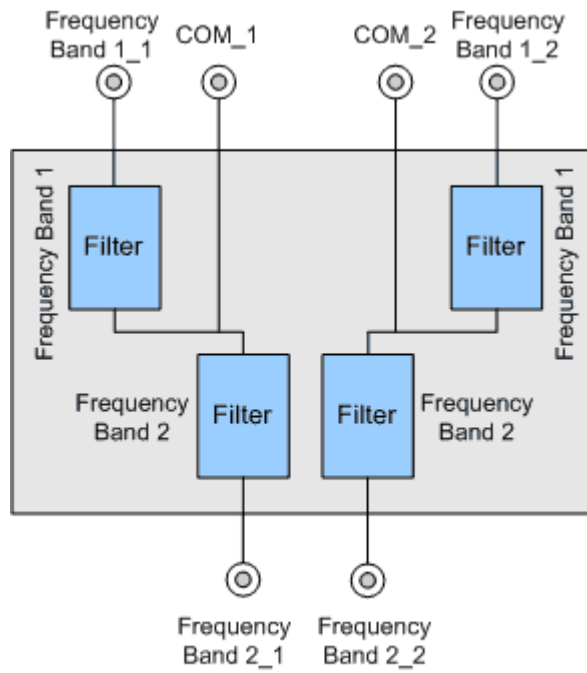
Figure 2-25 Dimensions of a dual-layer combiner



Function

A combiner combines signals of RF units operating in different frequency bands. A single-layer combiner consists of two combining units, each of which combines signals of two frequency bands. A dual-layer combiner is assembled by two single-layer combiners. The number of RF ports on a dual-layer combiner is twice the number of RF ports on a single-layer combiner. The single- and dual-layer combiners have the same working principle. The following figure shows the working principle of a single-layer combiner.

Figure 2-26 Working principle of a single-layer combiner

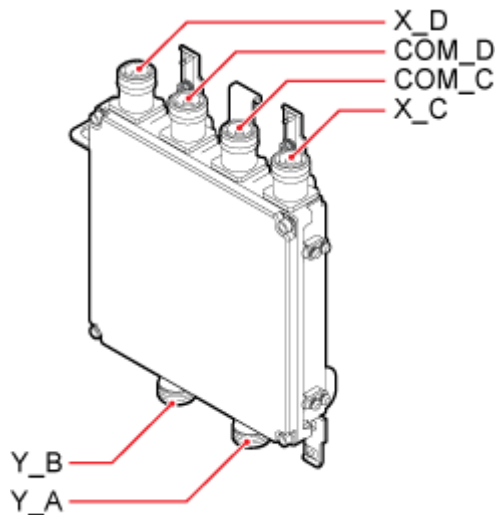


PIR75C0005

Port

The following figure shows the ports on a single-layer combiner.

Figure 2-27 Ports on a single-layer combiner



PAR75C0016

The following table describes the ports on a single-layer combiner.

NOTE

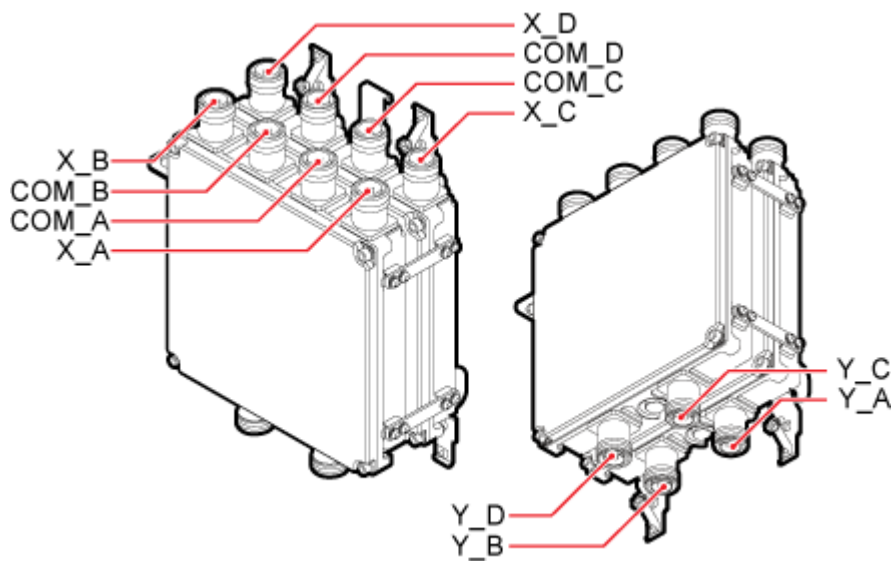
- In **X_D**, **X_C**, **Y_B**, and **Y_A** of the **Port** column, **X** and **Y** indicate the frequency bands supported by the combiner, and **A**, **B**, **C**, and **D** indicate the port numbers of the combiner.
- The combiner for the AAU3911 can combine the following frequency bands: AWS and PCS, 2100 MHz and 1800 MHz.

Table 2-9 Description of ports on a single-layer combiner

Port	Description
Y_A	RF port used for connecting to the ANT port on the RRU operating in the Y frequency band
Y_B	RF port used for connecting to the ANT port on the RRU operating in the Y frequency band
COM_C	RF port used for connecting to the ANT port on the DIN port plate in the middle of the AAU
X_C	RF port used for connecting to the ANT port on the RU operating in the X frequency band in the upper slot
X_D	RF port used for connecting to the ANT port on the RU operating in the X frequency band in the upper slot
COM_D	RF port used for connecting to the ANT port on the DIN port plate in the middle of the AAU

The following figure shows the ports on a dual-layer combiner.

Figure 2-28 Ports on a dual-layer combiner



PAR75C0015

The following table describes the ports on a dual-layer combiner.

 **NOTE**

- In **X_A**, **X_B**, **X_C**, **X_D**, **Y_A**, **Y_B**, **Y_C**, and **Y_D** of the **Port** column, **X** and **Y** indicate the frequency bands supported by the combiner, and **A**, **B**, **C**, and **D** indicate the port numbers of the combiner.
- The combiner for the AAU3911 can combine the following frequency bands: AWS and PCS, and 2100 MHz and 1800 MHz.

Table 2-10 Description of ports on a dual-layer combiner

Port	Description
Y_A	RF port used for connecting to the ANT port on the RRU operating in the Y frequency band
Y_B	RF port used for connecting to the ANT port on the RRU operating in the Y frequency band
Y_C	RF port used for connecting to the ANT port on the RRU operating in the Y frequency band
Y_D	RF port used for connecting to the ANT port on the RRU operating in the Y frequency band
COM_A	RF port used for connecting to the ANT port on the DIN port plate in the middle of the AAU
X_A	RF port used for connecting to the ANT port on the RU operating in the X frequency band in the upper slot
COM_B	RF port used for connecting to the ANT port on the DIN port plate in the middle of the AAU
X_B	RF port used for connecting to the ANT port on the RU operating in the X frequency band in the upper slot
COM_C	RF port used for connecting to the ANT port on the DIN port plate in the middle of the AAU
X_C	RF port used for connecting to the ANT port on the RU operating in the X frequency band in the upper slot
X_D	RF port used for connecting to the ANT port on the RU operating in the X frequency band in the upper slot
COM_D	RF port used for connecting to the ANT port on the DIN port plate in the middle of the AAU

2.3 AAU Combinations

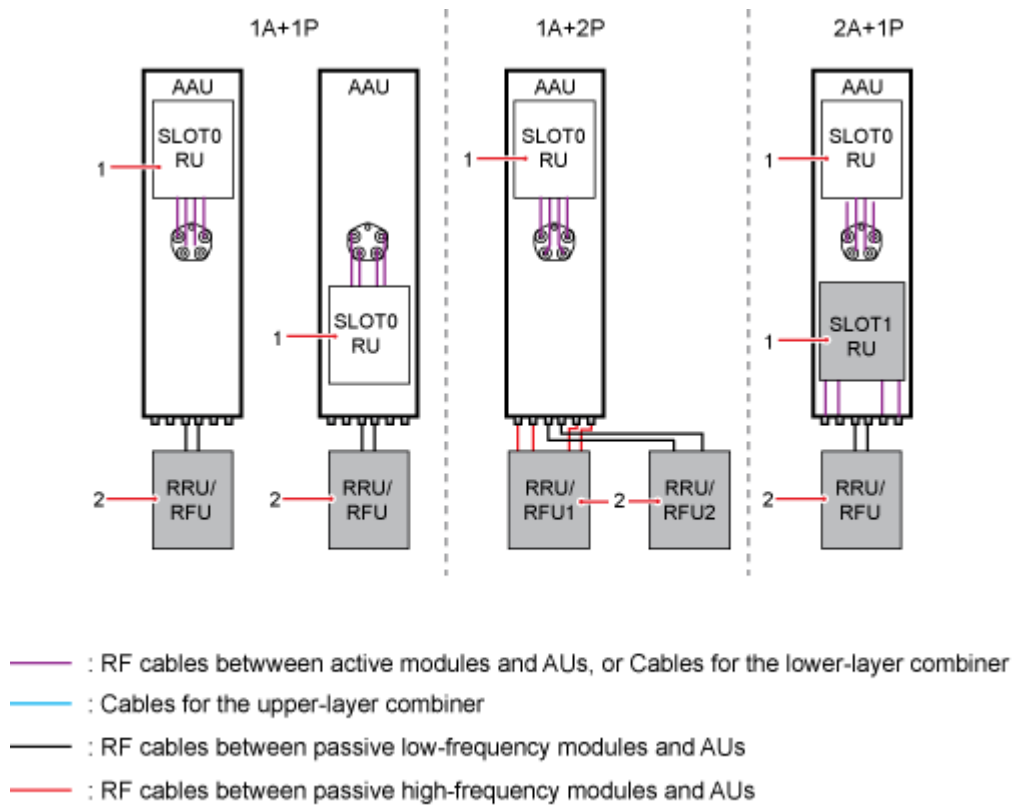
An AAU is an active antenna unit that can be connected to RRUs or RFUs in the live network.

 **NOTE**

- When an RF module is installed in the rear plastic housing of an AAU, it is called an active module, shortened to A.
- When an RF module is not installed in the rear plastic housing of an AAU, it is called a passive module, shortened to P.
- In this section, A is an RU, P can be an RRU or RFU from Huawei or other manufactures.

There are the following types of AAU3911 combinations based on the number of configured As and Ps, as shown in the following figures.

Figure 2-29 AAU3911 combinations (AU111a)



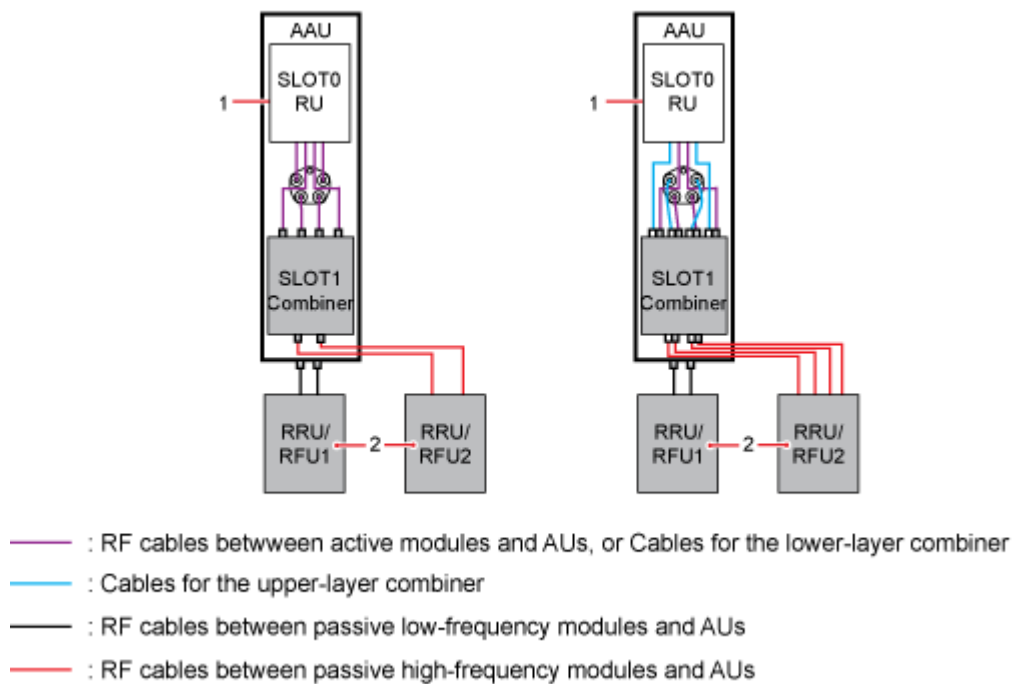
PAR75C0006

(1) Active module (A)

(2) Passive module (P)

Figure 2-30 AAU3911 combinations (AU11Ib)

1A+2P

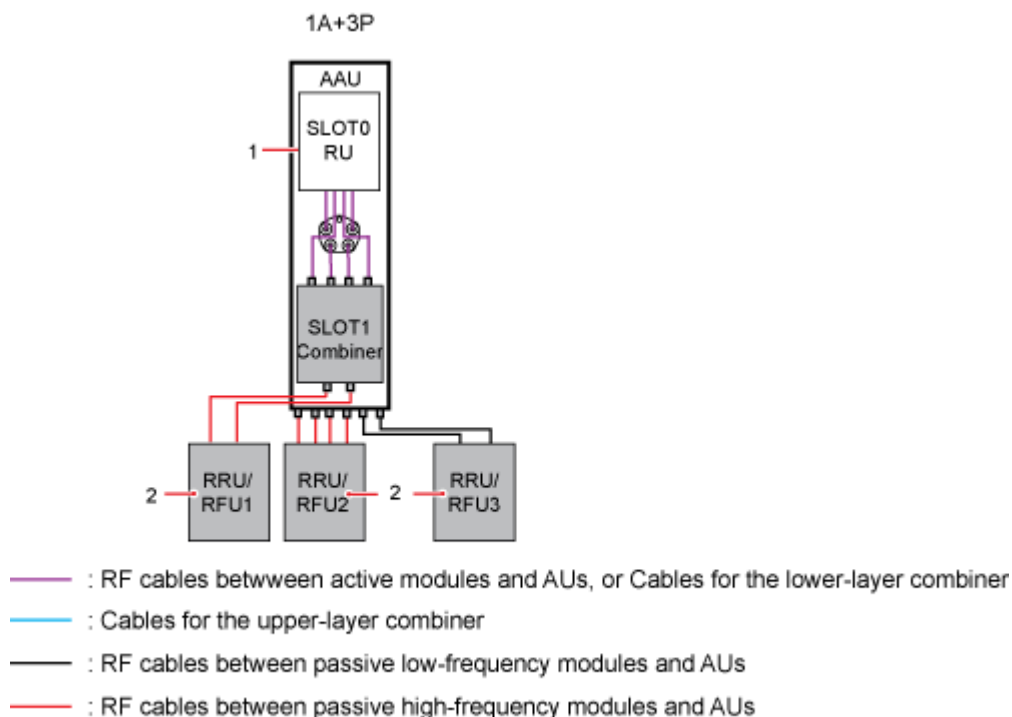


PAR75C0027

(1) Active module (A)

(2) Passive module (P)

Figure 2-31 AAU3911 combinations (AU11Ic)



PAR75C0028

(1) Active module (A)

(2) Passive module (P)

The following table describes the AAU3911 combinations based on the frequency bands of configured As and Ps and the number of RF ports on the RU.

NOTE

- In **xA+yP** in the **AAU Configuration** column, **A** stands for active, **P** stands for passive, **x** indicates the frequency band of the active unit, and **y** indicates the frequency band of the passive unit. For example, 2.1 A+700-900 P means that the frequency band of the active unit is 2100 MHz and the frequency band of the passive unit is 700 MHz to 900 MHz.
- In the **RU Configuration** column, **UP** indicates that the RU is installed in the upper slot of the AAU, and **DOWN** indicates that the RU is installed in the lower slot of the AAU.
- For types and technical specifications of active modules, see AAU3911 Technical Specifications.

Table 2-11 AAU3911 combinations

AAU Configuration	RU Configuration	AU Type	With a Combiner or Not
2.6 A (2T4R 2x40 W)+1.8~2.1 P (4 ports)+700~900 P (2 ports)	RU3260 2600 MHz 2T4R, 2x40 W (UP)	AU11Ia	No

AAU Configuration	RU Configuration	AU Type	With a Combiner or Not
AWS A (2T4R 2x60W) +700~900P (2 Ports)	RU3832 AWS 2T4R, 2x60 W (DOWN)		
2.6 A (2T4R 2x40 W)+AWS A (2T4R 2x60W) +700~900 P (2 ports)	RU3260 2600 MHz 2T4R, 2x40 W (UP) RU3832 AWS 2T4R, 2x60 W (DOWN)		
AWS A (2T4R 2x60 W)+PCS P (4 ports) +700~900 P (2 ports)	RU3832 AWS 2T4R, 2x60 W (UP)	AU11Ib	Yes
2.1 A (2T4R 2x60 W)+1.8 P (4 ports)+700~900 P (2 ports)	RU3832 2100 MHz 2T4R, 2x60 W (UP)		
1.8 A (2T4R 2x60 W)+2.1 P (4 ports)+2.6 P (4 ports)+700~900 P (2 ports)	RU3952m 1800 MHz 2T4R, 2x60 W (UP)	AU11Ic	Yes

2.4 RET System of an AAU

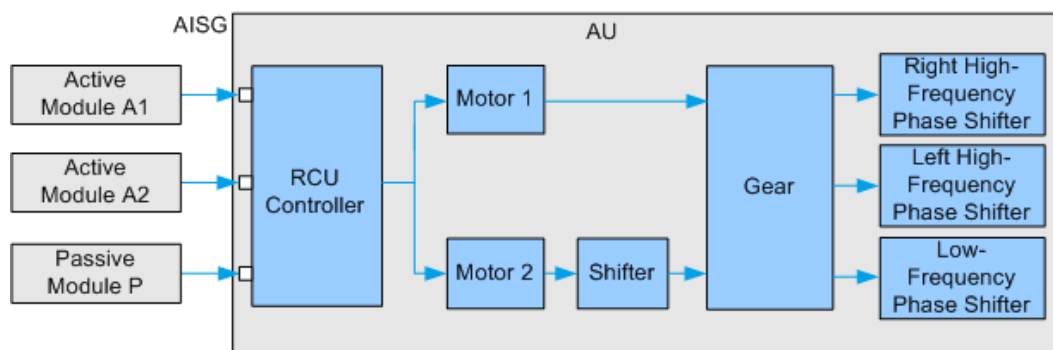
The remote electrical tilt (RET) system of an AAU consists of the remote control unit (RCU), motor, gearing, and phase shifter. In the RET system, the RCU is used to remotely adjust the downtilts of the antenna array.

RET Function

The RCU in the RET system of an AAU receives the control signals from the base station and drives the gearing through the step motor to drive the phase shifter in the antenna, thereby adjusting the downtilt of the AU.

The following figure shows the working principle of the RET system of an AAU.

Figure 2-32 Working principle of the RET system of an AAU



PIR75C0004

RCU Serial Number

An AAU has three RCU serial numbers, which are printed on the AU label and uniquely identify an RCU.

The RCU serial number has 19 characters. The following table describes the encoding scheme of the RCU serial number and the meaning of each field in the RCU serial number.

Field Meaning	Number of Characters	Field Description
Company code	2	Always set to HW
Equipment type	7	Always set to AAU3911
Reserved	2	Generated randomly
Year	1	It represents the year in which the product is produced. One character is used to represent the last two digits of a year. For example, the last two digits of the years 2001 to 2009 are represented by characters 1 to 9, respectively. The 26 letters from A to Z are used to represent the years starting from 2010. The letter A represents 2010 and the subsequent letters represent the years following 2010.
Month	1	It represents the month in which the product is produced. Hexadecimal is adopted. For example, characters 1 to 9 represent January to September, respectively. A represents October, B represents November, and C represents December.
Sequence number	4	It is generated in the production process.

Field Meaning	Number of Characters	Field Description
DIN and array positions	2	<ul style="list-style-type: none"> ● HL: left high-frequency array on the DIN port plate ● HR: right high-frequency array at the bottom ● LR: right low-frequency array at the bottom

RET Configuration Principles

The RET configuration principles are as follows:

- Any RET port can scan for the serial number of an RCU to which a link has not been set up and can control the RCU.
- Links have no priority, and apply the first-come first-served principle. Only one AISG link can be established for an RCU serial number. If a link needs to be switched, you must delete the configuration on the link so that the link can be released.
- After the RCU link is established, the RCU serial number is not displayed in the scanning result of other RET ports.
- An RCU (containing both low- and high-frequency modules) preferentially uses an RU for RET control.
- The left high-frequency array (HL) is preferentially configured for the RU in the upper slot, and the right high-frequency array (HR) is preferentially configured for the RU in the lower slot. The following table lists the mapping between the AU arrays and the TX and RX channels of the RUs.

Table 2-12 Mapping between the AU arrays and the TX and RX channels of the RUs

AU Type	High-frequency RU in the Upper Slot (A)	High-frequency RU in the Lower Slot (A)	External High-frequency/Low-frequency RRU (P)	Array Position (TX and RX Channels)	
				RU in the Upper Slot	RU in the Lower Slot
AU11Ia	2T4R	2T2R or 2T4R	Low-frequency: 2T2R	L (2T2R) R (2R)	R (2T2R) L (2R)
	2T4R	2T2R	High-frequency: 2T2R Low-frequency: 2T2R	L (2T2R) R (2R)	R (2T2R)

AU Type	High-frequency RU in the Upper Slot (A)	High-frequency RU in the Lower Slot (A)	External High-frequency/ Low-frequency RRU (P)	Array Position (TX and RX Channels)	
				RU in the Upper Slot	RU in the Lower Slot
	2T4R	-	High-frequency: 2T4R Low-frequency: 2T2R	L (2T2R) R (2R)	-
AU111b	2T4R	-	High-frequency: 2T4R Low-frequency: 2T2R	L (2T2R) R (2R)	-
AU111c	2T4R	-	High-frequency: 2T4R Low-frequency: 2T2R	L (2T2R +2R')	-

 **NOTE**

The frequency band identification for RF ports on an AU contains the information of array positions, as shown in [Figure 2-33](#), [Figure 2-34](#), and [Figure 2-35](#). In the figures, **L** indicates the left array, and **R** indicates the right array.

Figure 2-33 Array positions of the AU11Ia

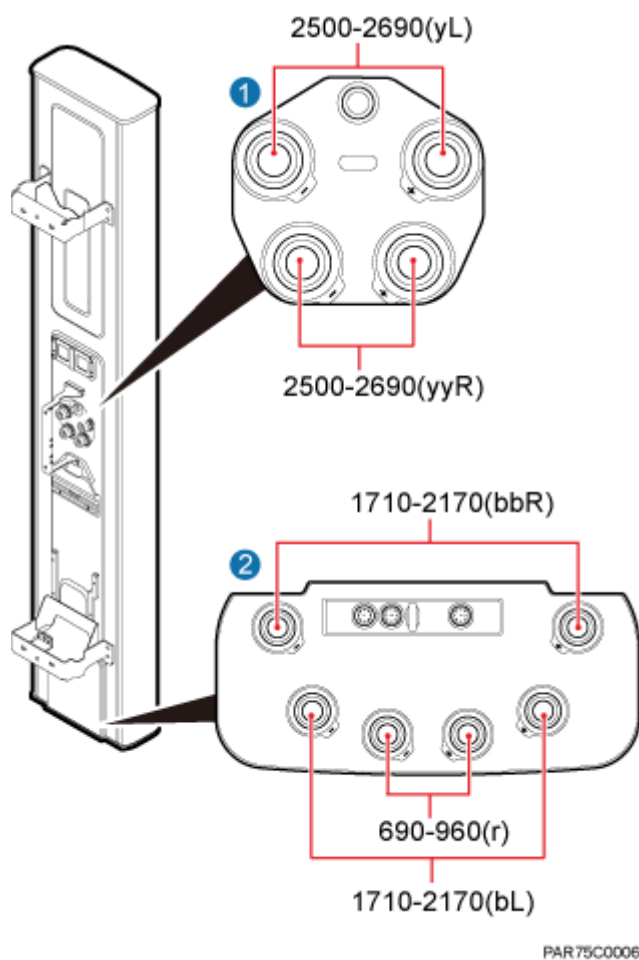


Figure 2-34 Array positions of the AU111b

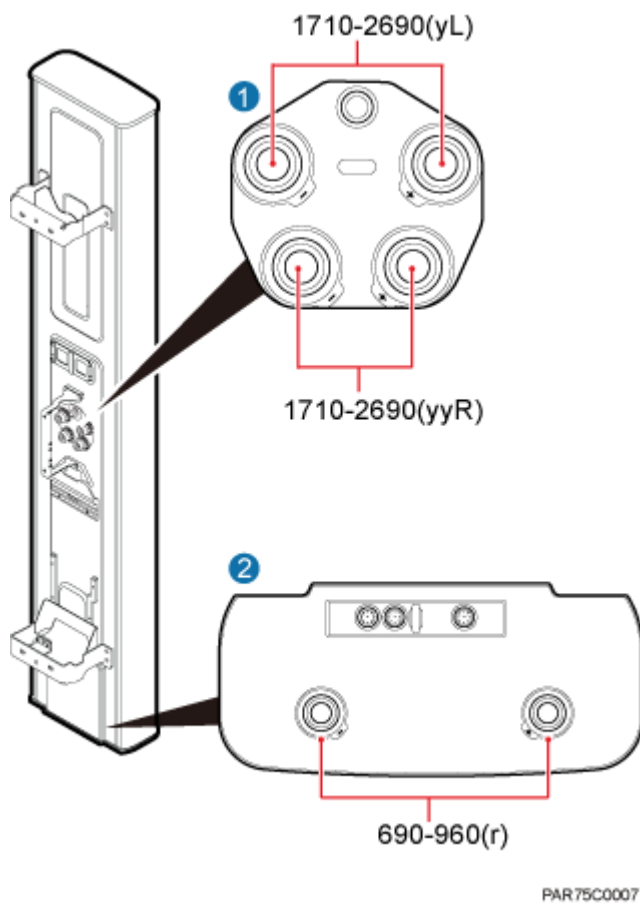
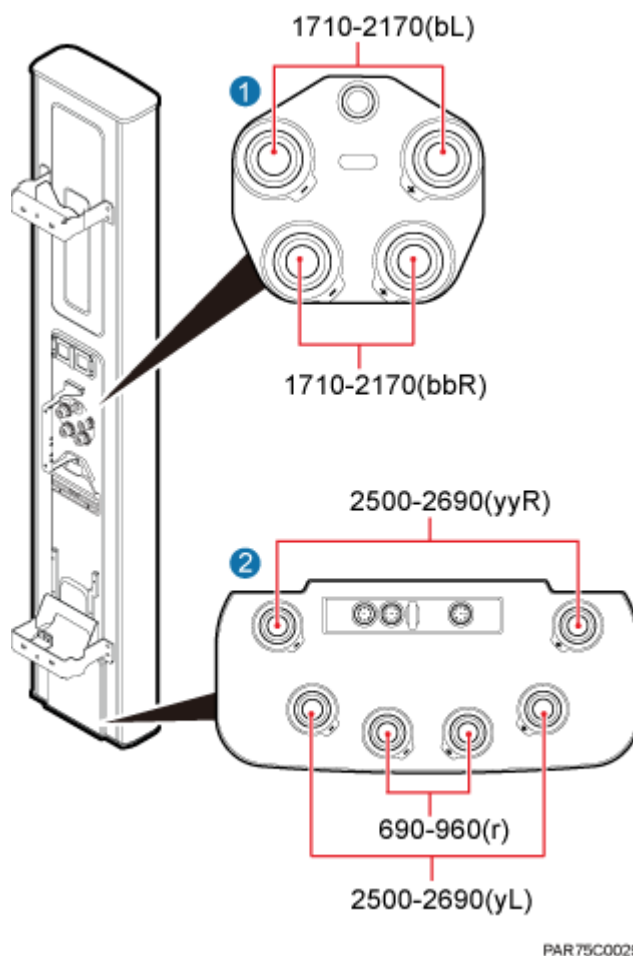


Figure 2-35 Array positions of the AU11Ic



- The mapping between TX and RX channels of passive modules and AU arrays are described in the engineering report. AU arrays can be found through the DIN silkscreens in the site survey table. The following site survey table uses passive modules operating in 850 MHz connected to an AAU as examples.

Table 2-13 Site survey table

RRU Type	AU Type	Site ID	Sector ID	DIN Silkscreen
850	AU11Ia	Recorded according to the actual situation.	Recorded according to the actual situation.	690-960(r)

2.5 Engineering Specifications of an AAU

This section describes the engineering specifications of an AAU, including input power and equipment specifications.

Input Power

The following table lists the input power specifications of an AAU.

Table 2-14 Input power specifications of an AAU

Input Power	Voltage Range
-48 V DC	-36 V DC to -57 V DC

Equipment Specifications

The following table lists the equipment specifications of an AAU.

Table 2-15 Equipment specifications of an AAU

Item	Specifications
Dimensions (H x W x D)	2020 mm x 359 mm x 290 mm (79.53 in. x 14.13 in. x 11.42 in.) (excluding the handles and attachment plate)
Weight	Main module (excluding the handles, and attachment plate): <ul style="list-style-type: none">● 49 kg (108.05 lb) (Configured with one RU)● 57 kg (125.69 lb) (Configured with one RU and one combiner)● 65 kg (143.33 lb) (Configured with two RUs)

NOTE

For details about other engineering specifications of an AAU, see AAU3911 Technical Specifications in *3900 Series Base Station Technical Description*.

2.6 Optical Modules

An optical module transmits optical signals between an optical port and a fiber optic cable.

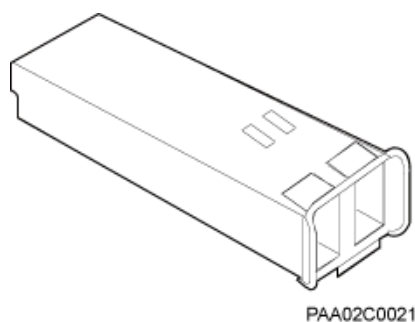
NOTE

- The exteriors of an optical module and the label on an optical module in this section are for reference only. The actual exteriors may be different.
- Boards or RF modules supporting only the 1.25 Gbit/s CPRI rate, for example, the GTMU or RRU3908 V1, cannot use optical modules supporting a 9.8 Gbit/s CPRI rate.

Exterior

The following figure shows the exterior of an optical module.

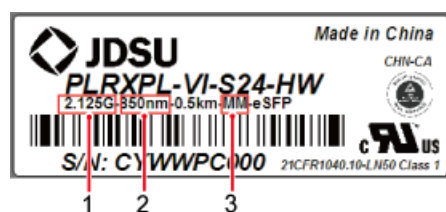
Figure 2-36 Exterior of an optical module



Label on an optical module

There is a label on each optical module, which provides information such as the rate, wavelength, and transmission mode, as shown in the following figure.

Figure 2-37 Label on an optical module



(1) Rate

(2) Wavelength

(3) Transmission mode

Optical Module Type

Optical modules can be divided into single- and multimode optical modules, which can be distinguished as follows:

- The puller of a single-mode optical module is blue and the puller of a multimode optical module is black or gray.
- The transmission mode is displayed as "SM" on the label of a single-mode optical module and "MM" on the label of a multimode optical module.

3 AAU Cables

About This Chapter

This chapter describes the cables connected to an AAU, including the AU PGND cable, RU power cable, RF jumper, CPRI fiber optic cable, AISG multi-wire cable, and RU alarm cable (optional).

[3.1 Cable List](#)

This section describes AAU cable connections.

[3.2 AU PGND Cable](#)

This section describes an AU PGND cable which connects an AU and a ground bar for the proper grounding of an AAU.

[3.3 RU Power Cables](#)

The RU power cable is a -48 V DC shielded cable. It feeds -48 V DC power to an RU. The maximum length of an RU power cable delivered with RUs is 50 m (164.04 ft) by default.

[3.4 RF Jumpers](#)

A radio frequency (RF) jumper forwards and receives RF signals.

[3.5 CPRI Fiber Optic Cables](#)

CPRI fiber optic cables are classified into single-mode fiber optic cables and multi-mode fiber optic cables. CPRI fiber optic cables transmit signals between the BBU and RUs.

[3.6 AISG Multi-Wire Cables](#)

An Antenna Interface Standards Group (AISG) multi-wire cable connects an RU to an AU and transmits RS485 signals.

[3.7 RU Alarm Cables \(Optional\)](#)

The RU alarm cable, a shielded straight-through cable, transmits alarm signals from an external device to an RU so that the base station monitors the operating status of external equipment. The length of an RU alarm cable is 5 m (16.4 ft).

3.1 Cable List

This section describes AAU cable connections.

The following table lists the AAU cables.

Table 3-1 List of AAU cables

Cable	One End		The Other End	
	Connector	Installation Position	Connector	Installation Position
AU PGND Cable	OT terminal (M6)	Ground terminal on the AU	OT terminal (M8)	External ground bar
RU Power Cables	Tool-less female connector (pressfit type)	NEG(-) and RTN(+) ports on the RU	Depending on the power supply equipment	External power equipment
RF Jumpers	RRU RF jumper: DIN male connector	RF ports on the RRU	RRU RF jumper: DIN male connector	RF ports on the AU
	RU RF jumper: DIN male connector	RF ports on the RU	RU RF jumper: QDIN connector	
AISG Multi-Wire Cables	Waterproof DB9 male connector	RET port on the RU	Standard AISG male connector	AISG IN FOR RU port on the AU
CPRI Fiber Optic Cables	DLC connector	<ul style="list-style-type: none"> ● CPRI0 port on the RU in single-mode scenarios ● CPRI0 and CPRI1 ports on the RU in multimode scenarios 	DLC connector	CPRI port on the BBU
RU Alarm Cables (Optional)	Waterproof DB15 male connector	EXT_ALM port on the RU	Cord end terminal	External alarm device

3.2 AU PGND Cable

This section describes an AU PGND cable which connects an AU and a ground bar for the proper grounding of an AAU.

An PGND cable is a green or green and yellow cable. An OT terminal is installed at each end of the cable. The following figure shows the exterior of an PGND cable.

Figure 3-1 Exterior of an PGND cable



(1) OT terminal (16 mm² or 0.025 in.², M6)

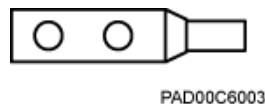
(2) OT terminal (16 mm² or 0.025 in.², M8)

 **NOTE**

- If the customer prepares the PGND cable, a copper-core cable with a cross-sectional area of 16 mm² (0.025 in.²) or larger is recommended.
- One OT terminal must be added to each end of the PGND cable onsite.
- You can determine the color of the cable and whether to use corresponding two-hole OT terminals based on local regulations.

The following figure shows a two-hole OT terminal.

Figure 3-2 Two-hole OT terminal



3.3 RU Power Cables

The RU power cable is a -48 V DC shielded cable. It feeds -48 V DC power to an RU. The maximum length of an RU power cable delivered with RUs is 50 m (164.04 ft) by default.

 **NOTE**

- The maximum length of power supply that an RU power cable supports is 150 m (492.12 ft). Contact Huawei engineers when an RRU power cable greater than 50 m (164.04 ft) is required.
- If a power device provided by the customer is used, the recommended specification of the circuit breaker on this power device is 15 A to 30 A.

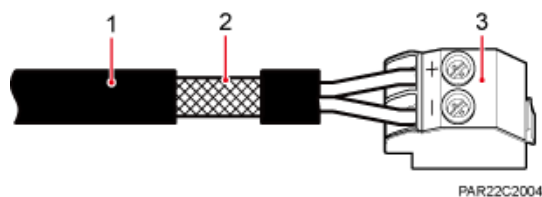
Exterior

There are four types of RU power cables in terms of cross-sectional areas: 3.3 mm² (0.005 in.²) (12 AWG) and 5.3 mm² (0.008 in.²) (10 AWG) complying with North American standards,

and 4 mm² (0.006 in.²) and 6 mm² (0.009 in.²) complying with European standards. The specifications of RU power cables vary depending on the actual RU TX power and the cable length.

The RU power cable has a tool-less female connector (pressfit type) at one end and bare wires at the other end. A corresponding terminal is added to the bare wires based on the requirements of the port on the external power device. The following figure shows the exterior of an RU power cable.

Figure 3-3 Exterior of an RU power cable



(1) -48 V DC power cable

(2) Shield layer

(3) Tool-less female connector (pressfit type)

Cable Description

The following table describes RU power cables.

Table 3-2 RU power cables

Cable	Wire	Wire Color in Most Regions		Wire Color in Other Regions
		North American Standard	European Standard	UK
RU power cable	RTN(+)	Black	Brown	Blue
	NEG(-)	Blue	Blue	Gray

3.4 RF Jumpers

A radio frequency (RF) jumper forwards and receives RF signals.

RRU/RFU RF Jumper

An RRU/RFU RF jumper connects an RRU/RFU to the antenna system.

An RRU/RFU RF jumper is a 1/2" jumper, which has a DIN male connector at one end and a customized connector at the other end.

The following figure shows an RRU/RFU RF jumper with a DIN male connector at each end.

Figure 3-4 Exterior of an RRU/RFU RF jumper



(1) DIN male connector

RU RF Jumper

An RU RF jumper connects an RU to an AU. RU RF jumpers for the AAU fall into the following categories:

- RU RF jumper with a length of 330 mm (12.99 in.), which is used for connecting an RU in the upper slot to an RF port on the DIN port plate in the middle of an AU or connecting an RF port on the DIN port plate in the middle of an AU to an RF port on the combiner.
- RU RF jumper with a length of 450 mm (17.72 in.), which is used for connecting an RU in the upper slot to an RF port on the combiner.
- RU RF jumper with a length of 750 mm (29.53 in.), which is used for connecting an RU in the lower slot to an RF port at the bottom of an AU.
- RU RF jumper with a length of 1100 mm (43.31 in.), which is used for connecting an RU in the lower slot to an RF port on the DIN port plate in the middle of an AU.

An RU RF jumper is a 1/4" jumper. The following figures show an RU RF jumper.

Figure 3-5 Exterior of an RU RF jumper (1)



(1) QDIN connector

(2) DIN male connector

Figure 3-6 Exterior of an RU RF jumper (2)



(1) QDIN connector

3.5 CPRI Fiber Optic Cables

CPRI fiber optic cables are classified into single-mode fiber optic cables and multi-mode fiber optic cables. CPRI fiber optic cables transmit signals between the BBU and RUs.

The maximum length of the multimode fiber optic cable between the BBU and RU is 150 m (492.12 ft).

A single-mode fiber optic cable consists of the single-mode pigtail and trunk single-mode fiber optic cable, and the single-mode pigtail and trunk single-mode fiber optic cable are interconnected using the ODF. The maximum length of the single-mode pigtail is 20 m (65.62 ft) on BBU side and 70 m (229.66 ft) on RU side.

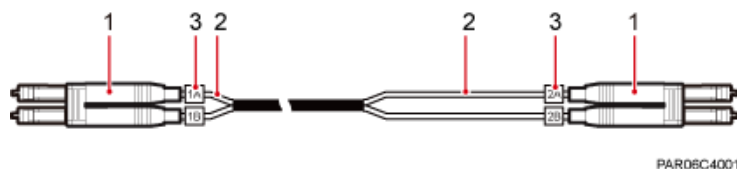
NOTE

- The ODF and trunk single-mode fiber optic cable are provided by the customer and must comply with the ITU-T G.652 standard.
- The ODF is an outdoor transfer box for fiber optic cables, which interconnects the single-mode pigtail and trunk single-mode fiber optic cable.
- A multimode fiber optic cable and a single-mode fiber optic cable are connected to a multimode optical module and a single-mode optical module, respectively.

Exterior

Multimode fiber optic cable: The multimode fiber optic cable has a DLC connector at each end, as shown in the following figure.

Figure 3-7 Multimode fiber optic cable



(1) DLC connector

(2) Breakout cable

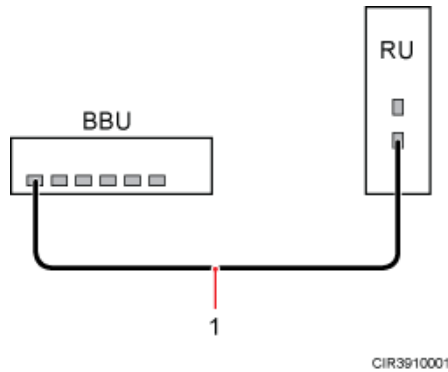
(3) Label on the breakout cable

NOTE

- When a multimode fiber optic cable connects a BBU and an RU, the breakout cable on the BBU side is 0.34 m (1.12 ft) and the breakout cable on the RU side is 0.03 m (0.098 ft).
- When a multimode fiber optic cable connects two RUs, the breakout cable on both sides is 0.03 m (0.098 ft).

The following figure shows the connection of the multimode fiber optic cable between a BBU and an RU.

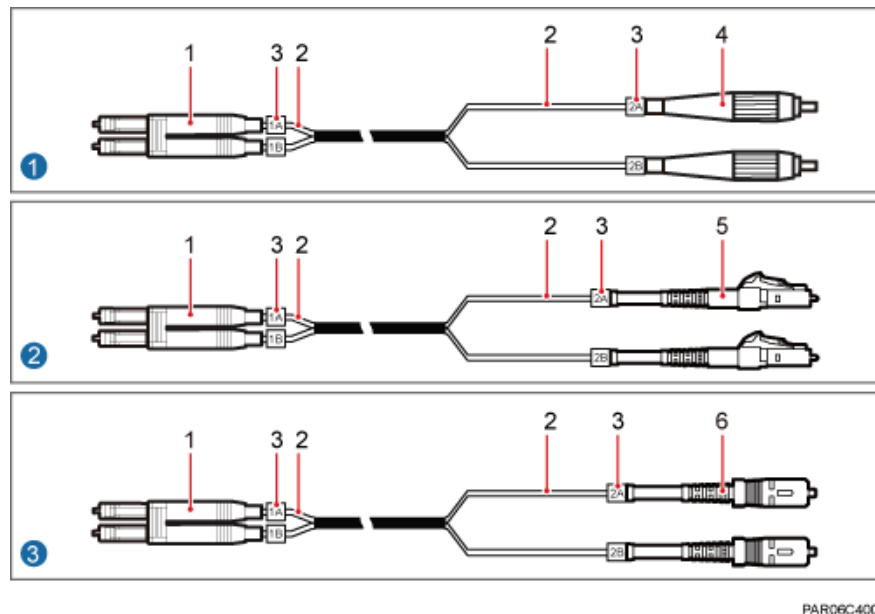
Figure 3-8 Connection of the multimode fiber optic cable between a BBU and an RU



(1) Multimode fiber optic cable between a BBU and an RU

Single-mode pigtail: The single-mode pigtail has a DLC connector at one end and an FC, LC, or SC connector at the other end, as shown in the following figure .

Figure 3-9 Single-mode pigtail



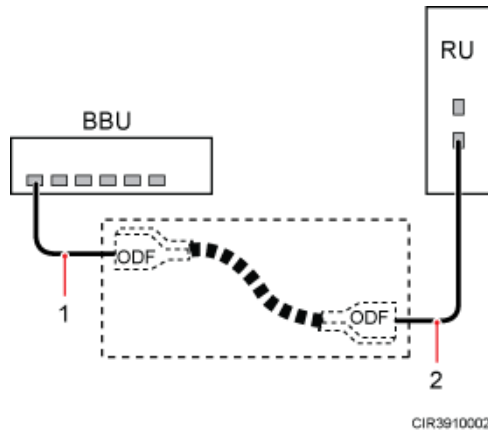
(1) DLC connector (2) Breakout cable (3) Label on the breakout cable (4) FC connector (5) LC connector (6) SC connector

NOTE

- When a single-mode pigtail connects a BBU and an ODF, the breakout cables on the BBU side and ODF side are 0.34 m (1.12 ft) and 0.8 m (2.62 ft), respectively.
- When a single-mode pigtail connects an RU and an ODF, the breakout cables on the RU side and ODF side are 0.03 m (0.098 ft) and 0.8 m (2.62 ft), respectively.

The following figure shows the connection of the single-mode pigtail.

Figure 3-10 Connection of the single-mode pigtail



(1) Single-mode pigtail between a BBU and an ODF (2) Single-mode pigtail between an RU and an ODF

Selection Principles

The following table describes the principles for selecting CPRI fiber optic cables.

Table 3-3 Principles for selecting CPRI fiber optic cables

Remote Distance	Selection Principle	Description
Less than or equal to 100 m (328.08 ft)	Multimode fiber optic cable	Connects the BBU and RU
Greater than 100 m (328.08 ft) and equal to or less than 150 m (492.12 ft)	Multimode fiber optic cable	Connects the BBU and RU
	Recommended: single-mode fiber optic cable (single-mode pigtail and trunk single-mode fiber optic cable)	The single-mode pigtail at the RU or BBU side is connected to the trunk single-mode fiber optic cable using the ODF.
Greater than 150 m (492.12 ft)	Single-mode fiber optic cable (single-mode pigtail and trunk single-mode fiber optic cable)	

Pin Assignment

The following table describes the labels on and recommended connections for the breakout cables of a CPRI fiber optic cable.

Table 3-4 Labels on and recommended connections for the breakout cables of a CPRI fiber optic cable

Label	Multimode Fiber Optic Cable Between a BBU and an RU	Single-Mode Pigtail
1A	CPRI RX port on the RU	RX port on the BBU or CPRI RX port on the RU
1B	CPRI TX port on the RU	TX port on the BBU or CPRI TX port on the RU
2A	TX port on the BBU	ODF
2B	RX port on the BBU	ODF

3.6 AISG Multi-Wire Cables

An Antenna Interface Standards Group (AISG) multi-wire cable connects an RU to an AU and transmits RS485 signals.

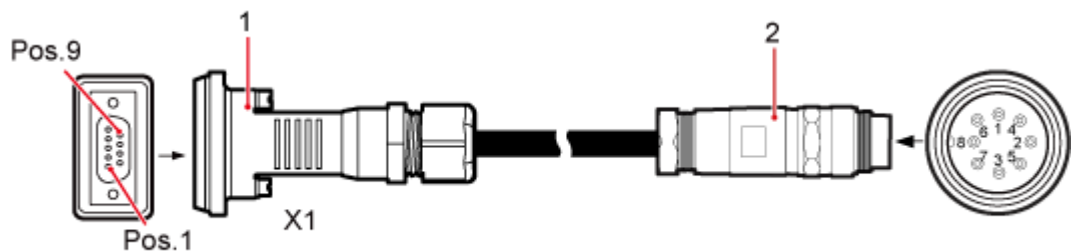
AISG multi-wire cables for the AAU3911 fall into the following categories:

- AISG multi-wire cable with a length of 330 mm (12.99 in.), which is used for connecting an RU in the upper slot to a remote electrical tilt (RET) antenna port on the DIN port plate in the middle of an AU.
- AISG multi-wire cable with a length of 750 mm (29.53 in.), which is used for connecting an RU in the lower slot to an RET antenna port at the bottom of an AU.

Exterior

The following figure shows the exterior of an AISG multi-wire cable.

Figure 3-11 Exterior of an AISG multi-wire cable



(1) Waterproof DB9 male connector

(2) Standard AISG male connector

Description

The following table describes an AISG multi-wire cable.

Table 3-5 AISG multi-wire cable

X1 End (Pin of the Waterproof DB9 Male Connector)	X2 End (Pin of the Standard AISG Male Connector)	Color	Wire Type	Description
X1.1	X2.1	White and blue	Twisted pair	+12 V
		Blue		
X1.3	X2.3	White and orange	Twisted pair	RS485 B
X1.5	X2.5	Orange		RS485 A
X1.4	X2.4	White and green	-	GND
X1.9 and X1.4 are interconnected.	-	-	-	GND
-	X2.1 and X2.6 are interconnected.	-	-	+12 V
-	X2.4 and X2.7 are interconnected.	-	-	GND

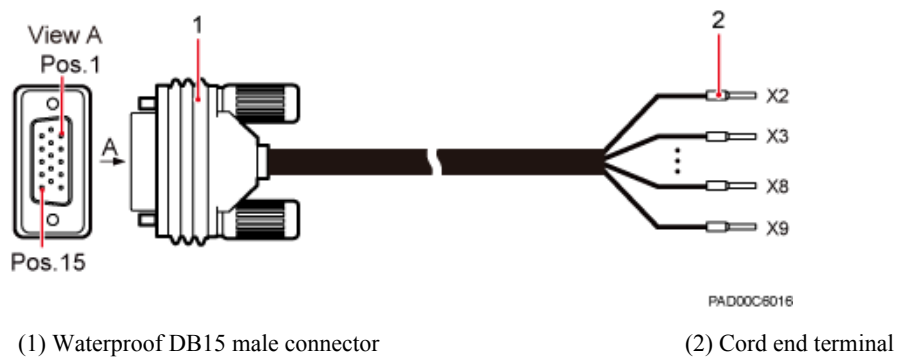
3.7 RU Alarm Cables (Optional)

The RU alarm cable, a shielded straight-through cable, transmits alarm signals from an external device to an RU so that the base station monitors the operating status of external equipment. The length of an RU alarm cable is 5 m (16.4 ft).

Exterior

An RU alarm cable has a waterproof DB15 male connector at one end and eight cord end terminals at the other end, as shown in the following figure.

Figure 3-12 Exterior of an RU alarm cable



Cable Description

The following table describes an RU alarm cable.

Table 3-6 Description of an RU alarm cable

RU Alarm Port	Pin of the Waterpro of DB15 Male Connector	Wire Color	Wire Type	Cord end terminal	Description
Dry contact	X1.2	White and blue	Twisted pair	X2	Boolean input 0+
	X1.3	Blue		X3	Boolean input 0-(GND)
	X1.6	White and orange	Twisted pair	X4	Boolean input 1+
	X1.7	Orange		X5	Boolean input 1-(GND)
RS485	X1.10	White and green	Twisted pair	X6	APM RX-
	X1.11	Green		X7	APM RX+
	X1.13	White and brown	Twisted pair	X8	APM TX-
	X1.14	Brown		X9	APM TX+