

**Indoor RRU**  
**IronRAN-RU5 PI GenA**  
**(3550MHz - 3700MHz)**  
**User Manual**



Version: 1.0

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All the illustrations in this guide are for reference only and are subject to change without prior notice.

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# Conventions

Several different typographic conventions are used throughout this manual. Refer to the following examples for common usage.

**Bold** type face denotes menu items, buttons and application names.

*Italic* type face denotes references to other sections, and the names of the folders, menus, programs, and files.



## **WARNING!**

Warning information appears before the text it references and should not be ignored as the content may prevent damage to the device.



## **CAUTION!**

Cautions appear before the text it references, similar to notes and warnings. cautions, however, appear in capital letters and contain vital health and safety information.

## **Note:**

Highlights general or useful information and tips.

# IronRAN-RU5 PI GenA Precautionary Measures

Read all caution and safety statements in this document before performing any of the instructions. To reduce the risk of bodily injury, electrical shock, fire, and equipment damage, read and observe all warnings and precautions in this chapter before installing or maintaining your system. To avoid personal injury or property damage, before you begin installing the product, read, observe, and adhere to all of the following instructions and information. The following symbols may be used throughout this guide and may be marked on the product and / or the product packaging.

## Safety Instructions about your system

In the event of a conflict between the information in this guide and information provided with the product or on the website for a particular product, the product documentation takes precedence.

Your system should be integrated and serviced only by technically qualified persons.

You must adhere to the guidelines in this guide and the assembly instructions in related chapters to ensure and maintain compliance with existing product certifications and approvals. Use only the described, regulated components specified in this guide. Use of other products / components will void other regulatory approvals of the product, and may result in noncompliance with product regulations in the region(s) in which the product is sold.

Table 0-1: Warning and Cautions






CAUTION	Indicates the presence of a hazard that may cause minor personal injury or property damage if the CAUTION is ignored.
WARNING	Indicates the presence of a hazard that may result in serious personal injury if the WARNING is ignored.
	Indicates potential hazard if indicated information is ignored.
	Indicates shock hazards that result in serious injury or death if safety instructions are not followed.
	Indicates hot components or surfaces.
	Indicates do not touch fan blades, may result in injury.

Table 0-1: Warning and Cautions (Continued)

	<p><b>Restricted Access Location:</b> The system is intended for installation only in a Server Room or Computer Room where both these conditions apply:</p> <ul style="list-style-type: none"> <li>• access can only be gained by SERVICE PERSONS or by USERS who have been instructed about the reasons for the restrictions applied to the location and about any precautions that shall be taken; and</li> <li>• access is through the use of a TOOL or lock and key, or other means of security, and is controlled by the authority responsible for the location.</li> </ul>
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## Intended Application Uses

This product was evaluated as Information Technology Equipment (ITE), which may be installed in offices, schools, computer rooms, and similar commercial type locations. The suitability of this product for other product categories and environments (such as medical, industrial, residential, alarm systems, and test equipment), other than an ITE application, may require further evaluation.

## Suitability

Suitable for installation in Information Technology Rooms in accordance with Article 645 of the National Electrical Code and NFPA 75.

Peut être installé dans des salles de matériel de traitement de l'information conformément à l'article 645 du National Electrical Code et à la NFPA 75.

## Site Selection

Choose a site that is:

- Clean, dry, and free of airborne particles (other than normal room dust).
- Well-ventilated and away from sources of heat including direct sunlight and radiators.
- Away from sources of vibration or physical shock.
- Isolated from strong electromagnetic fields produced by electrical devices.
- Provided with a properly grounded wall outlet.
- Provided with sufficient space to access the power system.

## Equipment Handling Practices

Reduce the risk of personal injury or equipment damage:

- Conform to local occupational health and safety requirements when moving and lifting equipment.
- Use mechanical assistance or other suitable assistance when moving and lifting equipment.
- To reduce the weight for easier handling, remove any easily detachable components.
- Never lift or move your system solely by the handle on the component.
- The power supply cord(s) must be plugged into the socket-outlet(s) that is / are provided with a suitable earth ground.
- User certified Optical Fiber Transceiver Class 1 (I) Laser Products or similar.

## Power and Electrical Warnings



### CAUTION!

Make sure the system is removed from the ceiling or wall before servicing any components.



### CAUTION!

To avoid risk of electric shock, disconnect all cabling from the system and remove the system from the ceiling or wall.

## System Access Warnings



### CAUTION!

To avoid personal injury or property damage, the following safety instructions apply whenever accessing the inside of the product:

- Disconnect from the power source by removing the system from the ceiling or wall.
- Disconnect all cabling running into the system.
- Retain all screws or other fasteners when servicing. Upon completion servicing, secure with original screws or fasteners.



### CAUTION!

If the system has been running, any installed components may be hot.

**CAUTION!**

Unless you are adding or removing a hot-plug component, allow the system to cool before servicing.

**CAUTION!**

To avoid injury do not contact moving fan blades. If your system is supplied with a guard over the fan, do not operate the system without the fan guard in place.

## Electrostatic Discharge (ESD)

**CAUTION!**

ESD can damage drives, boards, and other parts. We recommend that you perform all procedures at an ESD workstation. If one is not available, provide some ESD protection by wearing an anti-static wrist strap attached to chassis ground -- any unpainted metal surface -- on your device when handling parts.

Always handle boards carefully. They can be extremely sensitive to ESD. Hold boards only by their edges without any component and pin touching. After removing a board from its protective wrapper or from the system, place the board component side up on a grounded, static free surface. Use a conductive foam pad if available but not the board wrapper. Do not slide board over any surface.

## Cooling and Airflow

**CAUTION!**

Carefully route cables as directed to minimize airflow blockage and cooling problems. For proper cooling and airflow, operate the system only with the chassis covers\* / air duct\* installed. Operating the system without the covers / air duct\* in place can damage system parts. To install the covers\* / air duct\*:

- Check first to make sure you have not left loose tools or parts inside the system.
- Check that cables, add-in cards, and other components are properly installed.

Attach the covers\* / air duct\* to the chassis according to the product instructions.

\* May not apply to all systems.

Please be aware that slots and openings on the front and rear side of the chassis are designed for ventilation; to make sure reliable operation of your system and to protect it from overheating, these openings must not be covered or blocked. The openings should never be covered or blocked by placing the product on a bed, sofa, rug, or other similar surface. This product should never be placed near or over a radiator or heat register, or in a built-in installation unless proper ventilation is provided.



**Heed safety instructions:** Before working with the system, whether using this manual or any other resource as a reference, pay close attention to the safety instructions. Adhere to the assembly instructions in this manual to ensure and maintain compliance with existing product certifications and approvals. Use only the described, regulated components specified in this manual. Use of other products / components will void other safety regulatory approvals of the product and will most likely result in non-compliance with product regulations in the region(s) in which the product is sold.

**System power on/off:** To remove power from system, you must remove the system from the ceiling or wall. Make sure the system is removed from the ceiling or wall before opening the chassis, adding, or removing any non hot-plug components.

**Hazardous conditions, devices and cables:** Hazardous electrical conditions may be present on power, telephone, and communication cables. Turn off the system and disconnect the cables attached to the system before servicing. Otherwise, personal injury or equipment damage can result.

**Electrostatic discharge (ESD) and ESD protection:** ESD can damage drives, boards, and other parts. We recommend that you perform all procedures in this chapter only at an ESD workstation. If one is not available, provide some ESD protection by wearing a nonconductive wrist strap attached to chassis ground (any unpainted metal surface on the device) when handling parts.

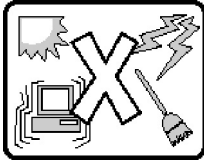
**ESD and handling boards:** Always handle boards carefully. They can be extremely sensitive to electrostatic discharge (ESD). Hold boards only by their edges. After removing a board from its protective wrapper or from the system, place the board component side up on a grounded, static free surface. Use a conductive foam pad if available but not the board wrapper. Do not slide board over any surface.

## General Information

Before servicing this system, it is recommend to read this guide completely to be aware of any safety issues or requirements involved in the servicing of this system.

## Assembly Safety Guidelines

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Choose a site that is:

- Clean and free of airborne particles (other than normal room dust).
  - Well ventilated and away from sources of heat including direct sunlight.
  - Away from sources of vibration or physical shock.
  - Isolated from strong electromagnetic fields produced by electrical devices.
  - In regions that are susceptible to electrical storms, we recommend you plug your system into a surge suppressor and disconnect telecommunication lines to your modem during an electrical storm.
  - Provided with a properly grounded wall outlet.
  - Provided with sufficient space to access the power system, because they serve as the product's main power disconnect.
-

# About the System

## Chapter 1

This section introduces the system, its different configuration(s) and the main features.

# 1.1 Introduction

## Specifications

Table 1-1: Specifications

SPECIFICATIONS	DESCRIPTION
Processor	Xilinx Zynq-7000 SoC
Dimension	205 x 259 x 72 mm (W x L x H), includes installed bracket
Memory	2GB DDR3
Frequency band	n48 (3550MHz ~3700MHz) for U.S. CBRS n77/n78 (3550MHz ~3700MHz)
Power supply	19V DC adapter for indoor electricity use or 90W+54V power supply by FHGW
System rating	19/54Vdc, 4.21/1.48A
Front IO	(1) SFP+ port for FHGW (1) Management port (1) Micro HDMI Console port (1) Power button (1) DC in
Indicators	(1) Power (1) Status (1) SFP+
Fan	(1) 60 x 60 x 14 mm
Weight	1.34 kg
Noise	<40dB at 25°C
Operating temperature	-5°C ~ +45°C
Operating humidity	5% ~ 95%

\* All specifications and figures are subject to change without prior notice.

# Shipping Package

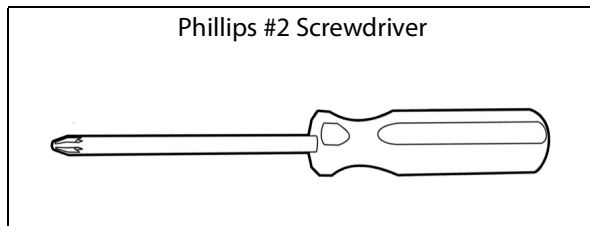
**Table 1-2: IronRAN-RU5 PI GenA Shipping Package**

ITEM	DESCRIPTION	QUANTITY
RRU	IronRAN-RU5 PI GenA	1
Power	Adapter	1
	Power cord	1
Mounting kit	Mounting bracket A	1
	Mounting bracket B	1
	Screw M3	3
	Screw M4	4
Accessory	10G single mode transceiver	2

## Required Tools

The following sections provides a reference for the tools to be prepared before installation.

**Table 1-3: Required Tools**



# 1.2 A Tour of the System

## System Overview

This section is intended to showcase the system views.



Figure 1-1. System Overview

## Front View

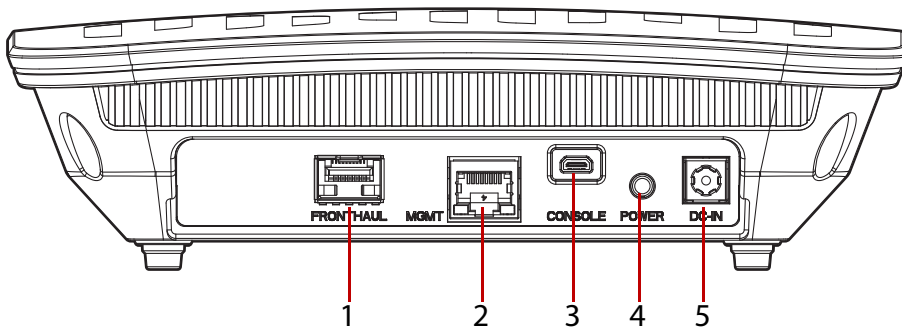


Figure 1-2. Front View

Table 1-4: Front View

No.	IO NAME / PORT
1.	SFP+ port for FHGW
2.	Management port*
3.	Micro HDMI console port *
4.	Power button
5.	DC in

\*Unavailable for normal operations. For debugging by manufacturer only.

## Top View

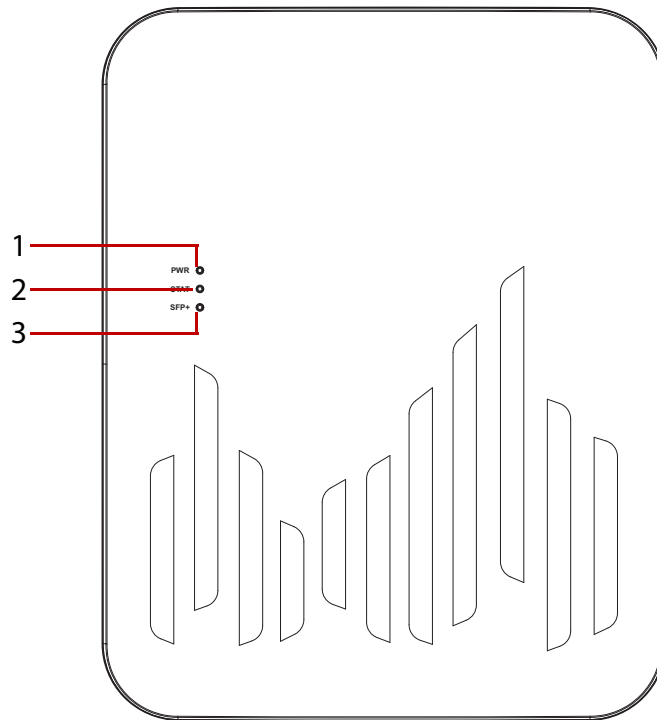


Figure 1-3. Top View

## Indicators

Table 1-5: Top View

NO.	ITEM	COLOR	DESCRIPTION
1.	PWR	Green, solid	Power on
2.	STAT	Green, flashing 1Hz	Status, normal operation
		Amber, solid	Status, boot up
		Red, solid	Status, alarm
3.	SFP+	Green, flashing 1Hz	Optical port indicator, normal operation
		Green, solid	Optical port indicator, installation successful

# Rear View

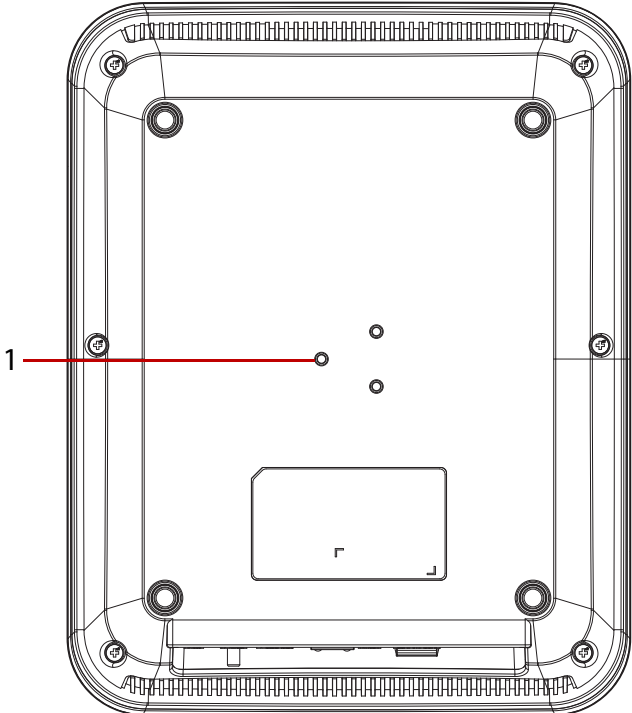


Figure 1-4. Rear View

Table 1-6: Rear View

No.	ITEM
1.	Wall / ceiling mounting screw holes



# System Dimensions

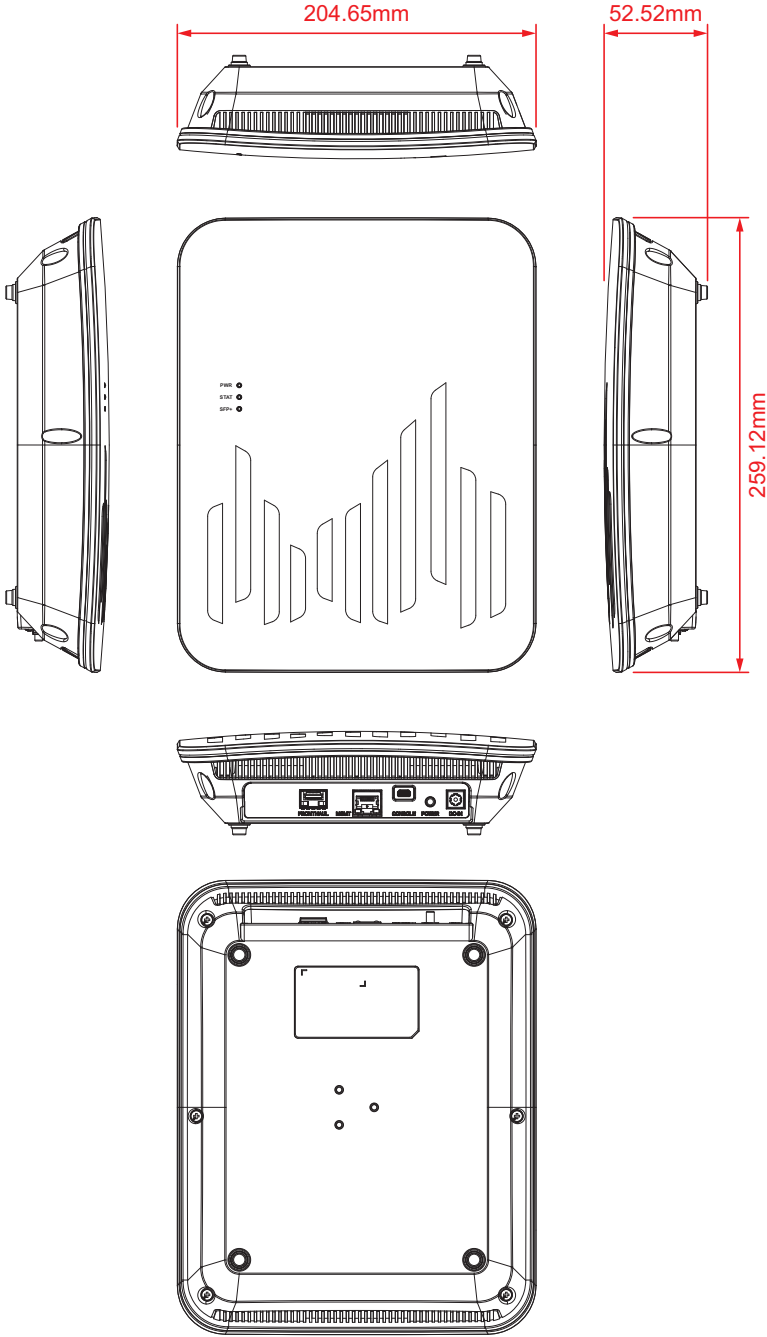


Figure 1-5. System Dimensions

# Installing Hardware

## Chapter 2

This section provides guidance information to properly service components in the system.

## 2.1 Introduction

The following section provides information for the setup and installation of the system.

### Safety Instructions

**CAUTION!**

Many repairs may only be performed by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in the product documentation. Damage due to servicing that is not authorized may not be covered by your warranty. Read and follow the safety instructions that came with the product.

**Note:**

It is recommended that you always use an anti static mat and strap while performing maintenance on the system.

## 2.2 Hardware Installation

The device can be either wall or ceiling mounted by design.



### **CAUTION!**

Only trained service personnel should service this equipment.

### ESD Precautions

When performing the following maintenance action, the following electrostatic discharge (ESD) precautions are recommended:

- Remove all plastic, vinyl, and foam material from the work area.
- Do not remove a component from its nonconductive protective bag until you are ready to install it.
- Wear a nonconductive wrist strap at all times when handling any component.
- Before handling any component, discharge any static electricity by touching a grounded surface.

### Installing the RRU on a Wall



### **CAUTION!**

Ensure all power is disconnected from the system before proceeding.

Before you begin any procedure make sure the necessary components and tools are prepared. All screws must be tightened by using a Phillips #2 screwdriver.

1. Place the auxiliary bracket (Bracket B) in the installation position against the wall. Make sure it is level before marking the the anchor points.
2. Remove the bracket and drill holes at the anchor points.
3. Place the bracket against the wall making sure the keyhole slots on the bracket are facing up.
4. Install the screws (M4) to secure the bracket on the wall.

Screws: M4  
Bracket: B

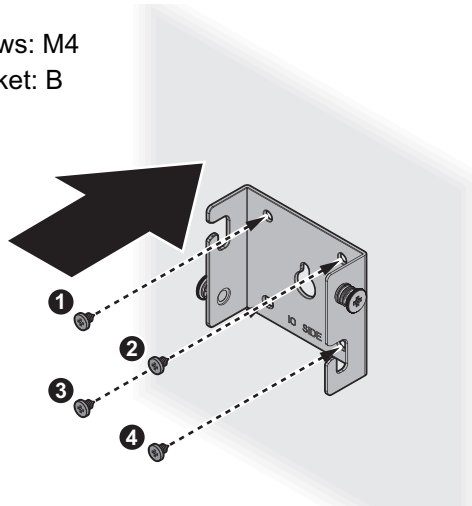
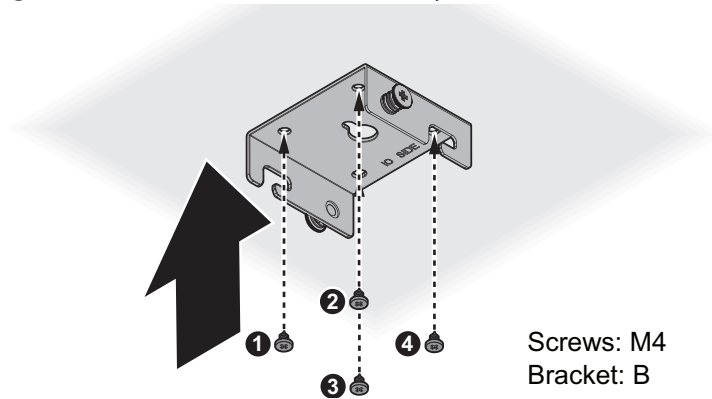


Figure 2-1. Installing an Auxiliary Bracket (B)

**Note:**

The following is an illustration of the auxiliary bracket installation on a ceiling.



Screws: M4  
Bracket: B



**CAUTION!**

During installation, place a foam pad or cardboard under the RRU device to protect the housing from damage.

5. Place the RRU device on a clean work surface facing down so the mounting area is accessible.
6. Align the bracket by positioning the screw holes on the bracket with the screw holes on the back of the device. Ensure they are aligned to correctly position the bracket.
7. Use a screw driver to install the securing screws (M3) to secure the bracket on the RRU device.

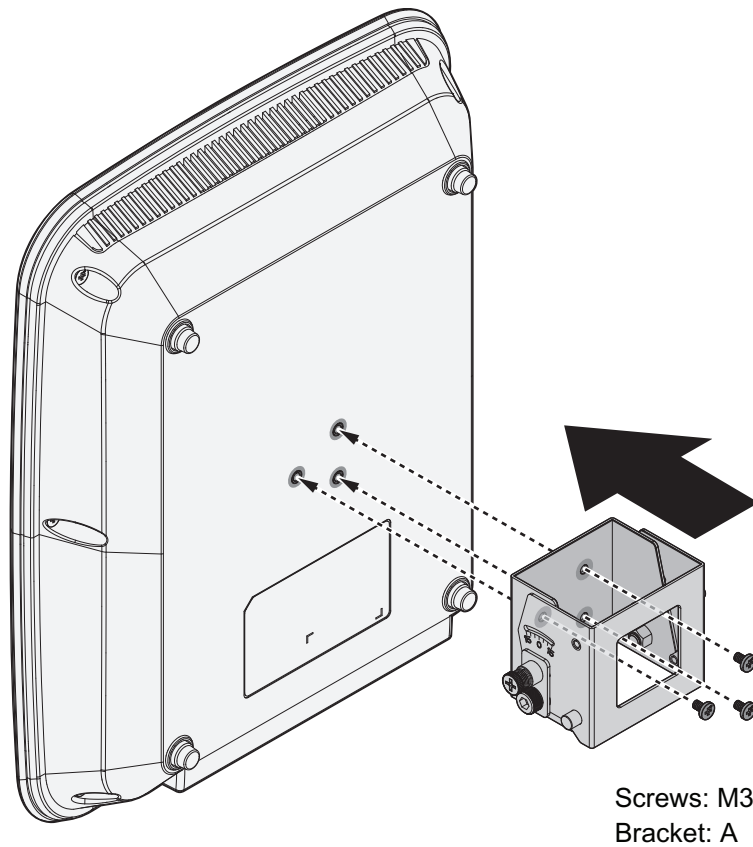


Figure 2-2. Installing a Main Bracket (A)

8. Align the guide pins on the main bracket (Bracket A) with the guide wells on the installed Bracket B.
9. Insert the guide pins in the guide wells and lower the device in place.

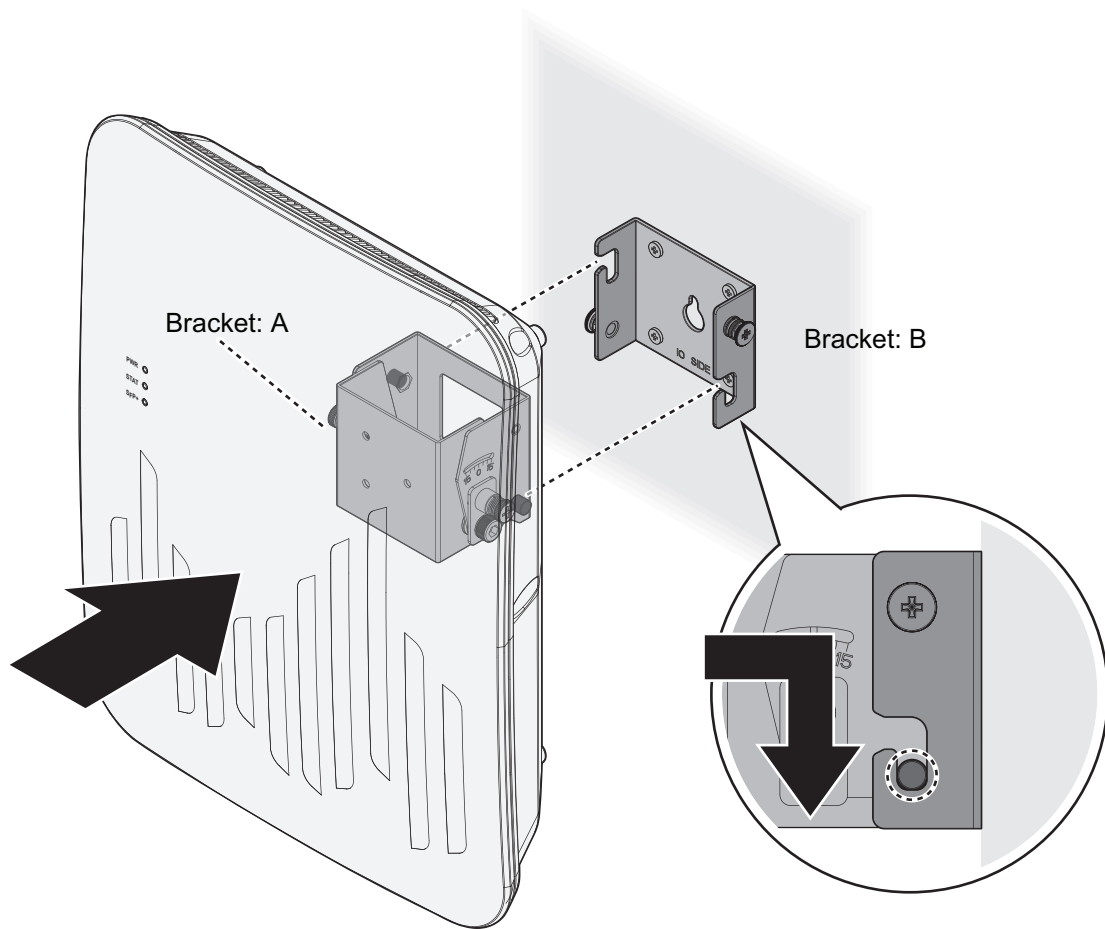


Figure 2-3. Inserting Bracket A in Bracket B

10. Use a screw driver to tighten the opposing bolts and secure the mounting brackets.

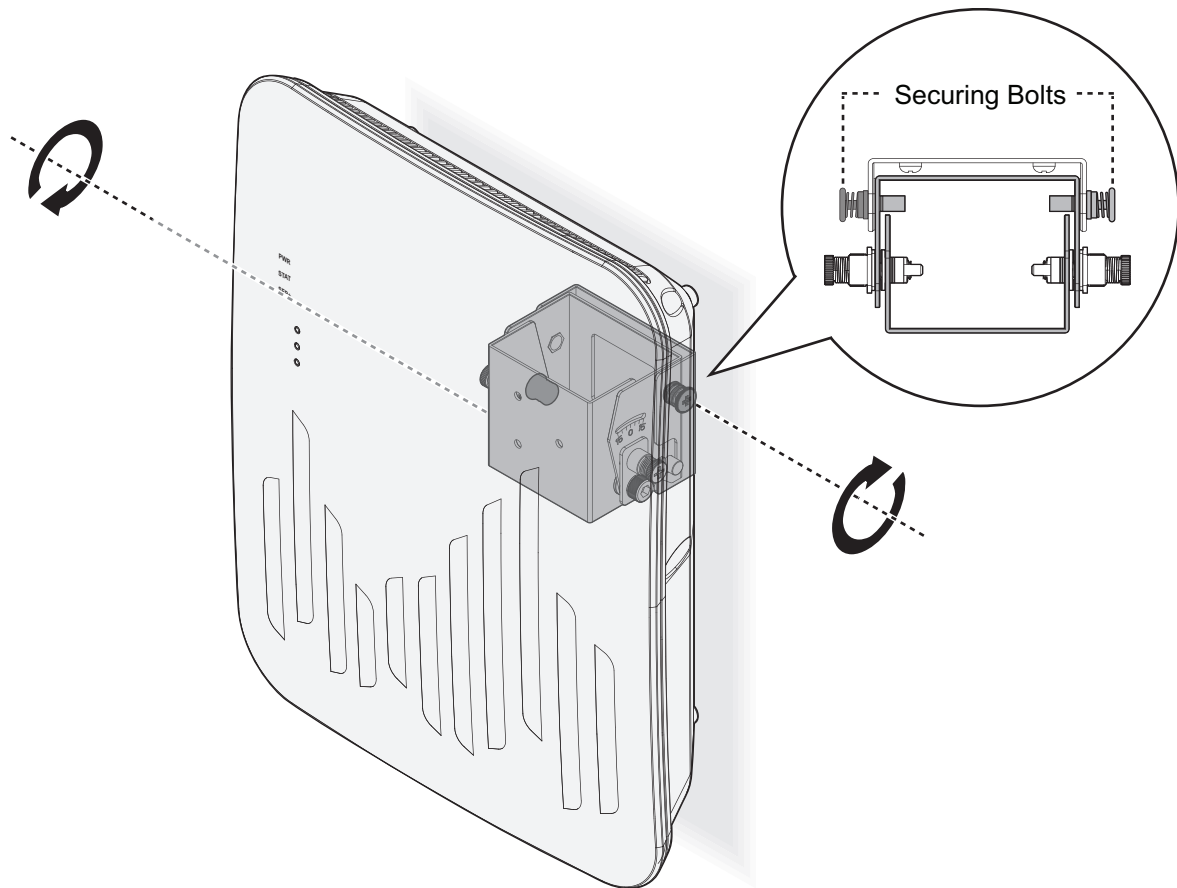


Figure 2-4. Securing Mounting Brackets

11. Locate the inclination angle bolts and using a screw driver loosen them. Loosen the bolts 3~5 revolutions to make the bracket easy to rotate.

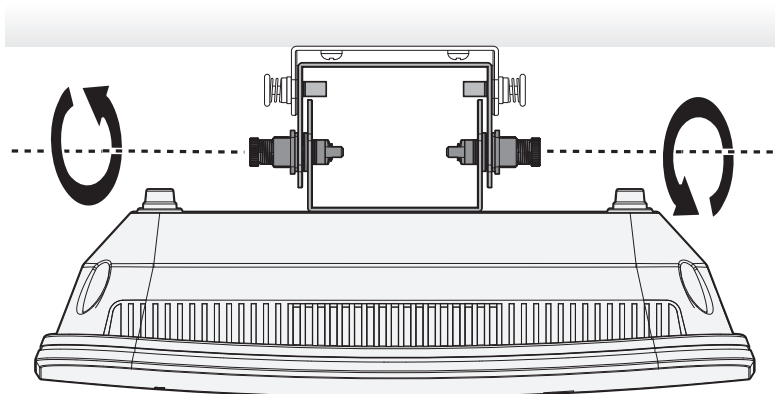


Figure 2-5. Loosening Inclination Screws

12. Grasp the top and bottom of the device and gently adjust the inclination angle.



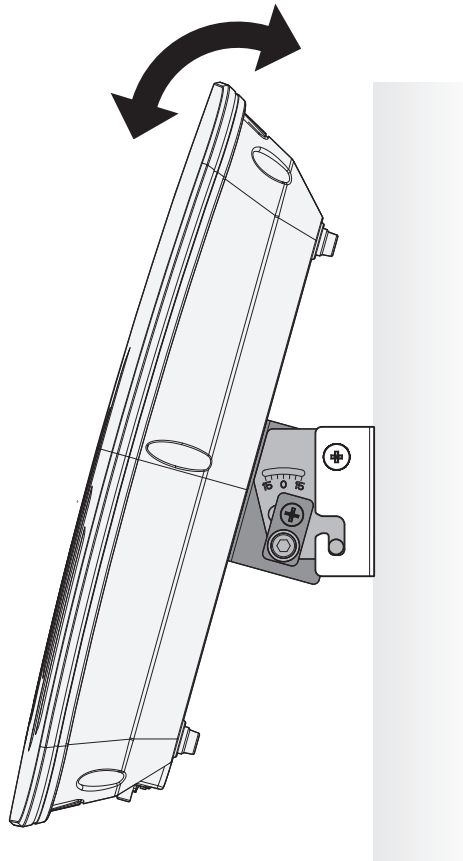


Figure 2-6. Securing Mounting Brackets

13. Once the inclination angle is set, use a screw driver to lock the angle by tightening the inclination bolt.

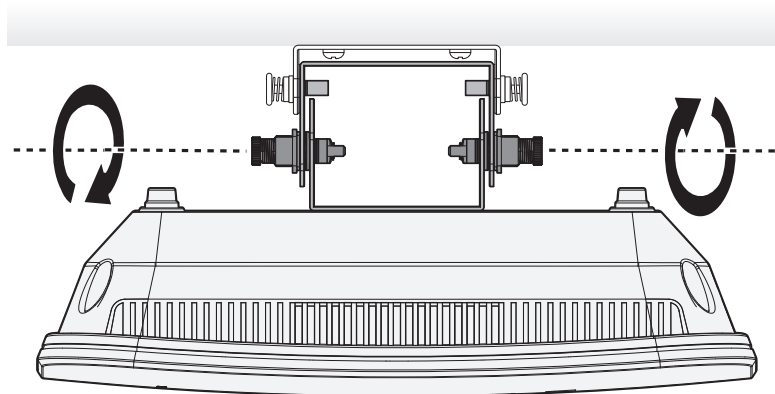


Figure 2-7. Securing Inclination Angle

14. Once installed, connect the cables, see *Cabling Diagram* on page 3-1 for further information.

# Cabling Diagram

## Chapter 3

This section provides guidance information for the position and configuration of connectors and jumpers.

### 3.1 Cabling Diagram

See the following figure and table for information on cable connections.

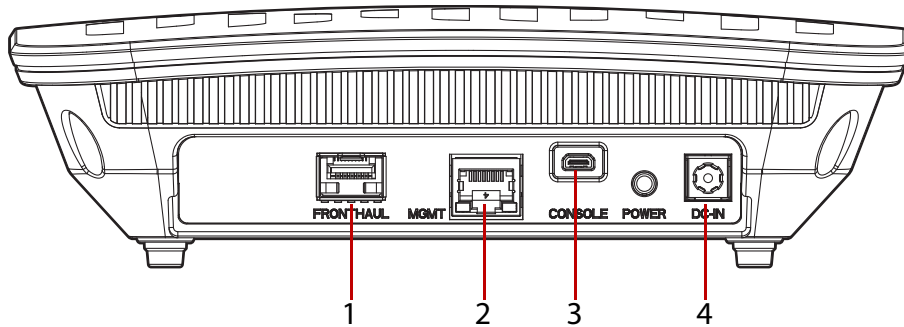


Figure 3-1. Front I/O View

Table 3-1: Cabling Diagram

No.	I/O NAME	DESCRIPTION	CABLE SPECIFICATIONS (EXCLUDING SHIPPING)
1.	SFP+ port for FHGW	Fiber cable support FHGW to RRU up to 2 KM	Fiber cable spec: Single mode fiber
2.	Management port*	N/A	N/A
3.	Console port*	N/A	N/A

No.	I/O NAME	POWER CORD	QPN	SPECIFICATION
4.	DC in	Power Cord (US)	DM333201126	2M 3P 125V UL BLK

\*Unavailable for normal operations. For debugging by manufacturer only.

# Regulatory & Compliance

## Chapter 4

This section provides regulatory and compliance information applicable to this system.

## 4.1 Electromagnetic Compatibility Notices



### **WARNING!**

This is a Class A information technology equipment. When used in a residential environment, it may cause radio frequency disturbance. In this case, the user will be required to take some appropriate countermeasures, in which case the user will be required to correct the interference.

### FCC Verification Statement (USA)

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

#### **RF Exposure Information**

This device has been tested and meets applicable limits for Radio Frequency (RF) exposure.

This equipment should be installed and operated with minimum distance **20 cm** between the radiator & your body.


### End of Life / Product Recycling

Product recycling and end-of-life take-back systems and requirements vary by country. Contact the retailer or distributor of this product for information about product recycling and / or take-back.

# 4.2 Product Regulatory Compliance Markings

This product is marked with the following product certification markings:

Table 4-1: Product Regulatory Compliance Markings

REGULATORY COMPLIANCE	REGION	MARKING
cULus Mark	USA / Canada	
FCC Marking (Class A)	USA	<p>FCC ID: <b>HFS-IRONRAN-RU5PI</b></p> <p>This device complies with Part 15 of the FCC Rules. Operation of this device is subject to the following two conditions:</p> <p>(1) This device may not cause harmful interference, and</p> <p>(2) This device must accept any interference received, including interference that may cause undesired operation.</p>