Manuals+ — User Manuals Simplified.

MOXA AIG-300 Series Arm-Based Computers User Manual

Contents

MOXA AIG-300 Series Arm-Based Computers

www.moxa.com/product

AIG-300 Series Hardware User's Manual
The software described in this manual is furnished under a license agreement and may be used only in accordance with the terms of that agreement.

Technical Support Contact Information

Moxa Americas Toll-free: 1-888-669-2872 Tel: +1-714-528-6777 Fax: +1-714-528-6778
Moxa Europe Tel: +49-89-3 70 03 99-0 Fax: +49-89-3 70 03 99-99
Moxa India Tel: +91-80-4172-9088 Fax: +91-80-4132-1045
Moxa China (Shanghai office) Toll-free: 800-820-5036 Tel: +86-21-5258-9955 Fax: +86-21-5258-5505
Moxa Asia-Pacific Tel: +886-2-8919-1230 Fax: +886-2-8919-1231

The AIG-300 Series advanced IIoT gateways are designed for Industrial IoT applications, especially for distributed and unmanned sites in harsh operating environments. ThingsPro Edge and Azure IoT Edge software are preloaded and seamlessly integrated with the AIG-300 Series to enable easy, reliable, yet secure sensor-to-cloud connectivity for data acquisition and device management using the Azure Cloud solution. With the use of the ThingsPro Proxy utility, the device provisioning process is easier than ever. Thanks to the robust OTA function, you never have to worry about system failure during software upgrades. With the secure boot function enabled, you can enable the booting process of AIG-300 Series to prevent malicious software injection.

The following topics are covered in this chapter:

- Model Descriptions
- Package Checklist
- Product Features
- Product Specifications

Model Descriptions

The AIG-300 Series includes the following models:

- AIG-301-T-AZU-LX: Advanced IIoT gateway with Arm® Cortex™-A7 dual-core 1 GHz processor, 1 CAN port, 4 DIs, 4 DOs, ThingsPro Edge and Azure IoT Edge software, -40 to 85°C operating temperature
- AIG-301-T-US-AZU-LX: Advanced IIoT gateway with Arm® Cortex™-A7 dual-core 1 GHz processor, 1 CAN port, 4 DIs, 4 DOs, USA LTE band support, ThingsPro Edge and Azure IoT Edge software, -40 to 70°C operating temperature
- AIG-301-T-EU-AZU-LX: Advanced IIoT gateway with Arm® Cortex™-A7 dual-core 1 GHz processor, 1 CAN port, 4 DIs, 4 DOs, Europe LTE band, ThingsPro Edge and Azure IoT Edge software, -40 to 70°C operating temperature
- AIG-301-T-AP-AZU-LX: Advanced IIoT gateway with Arm® Cortex™-A7 dual-core 1 GHz processor, 1 CAN port, 4 DIs, 4 DOs, Asia Pacific LTE band, ThingsPro Edge and Azure IoT Edge software, -40 to 70°C operating temperature
- AIG-301-T-CN-AZU-LX: Advanced IIoT gateway with Arm® Cortex™-A7 dual-core 1 GHz processor, 1 CAN port, 4 DIs, 4 DOs, ThingsPro Edge and Azure IoT Edge software, -40 to 70°C operating temperature
- AIG-301-AZU-LX: Advanced IIoT gateway with Arm® Cortex™-A7 dual-core 1 GHz processor, 1 CAN port, 4 DIs, 4 DOs, ThingsPro Edge and Azure IoT Edge software, -20 to 85°C operating temperature
- AIG-301-US-AZU-LX: Advanced IIoT gateway with Arm® Cortex™-A7 dual-core 1 GHz processor, 1 CAN port, 4 DIs, 4 DOs, USA LTE band support, ThingsPro Edge and Azure IoT Edge software, -20 to 70°C operating temperature
- AIG-301-EU-AZU-LX: Advanced IIoT gateway with Arm® Cortex™-A7 dual-core 1 GHz processor, 1 CAN port, 4 DIs, 4 DOs, Europe LTE band, ThingsPro Edge and Azure IoT Edge software, -20 to 70°C operating temperature
- AIG-301-AP-AZU-LX: Advanced IIoT gateway with Arm® Cortex™-A7 dual-core 1 GHz processor, 1 CAN port,

4 DIs, 4 DOs, Asia Pacific LTE band, ThingsPro Edge and Azure IoT Edge software, -20 to 70°C operating temperature

- AIG-301-CN-AZU-LX: Advanced IIoT gateway with Arm® Cortex™-A7 dual-core 1 GHz processor, 1 CAN port, 4 DIs, 4 DOs, ThingsPro Edge and Azure IoT Edge software, -20 to 70°C operating temperature

NOTE: The CN model does not come with the LTE module preinstalled. We have tested the model with the Quectel EC20 R2.1 LTE module and recommend operating the LTE module in the -20 to 65°C temperature range. Contact Moxa's distributor in China for more information.

Package Checklist

The package contains the following items:

- AIG-300 Series advanced IIoT gateway
- Power jack
- DIN-rail mounting kit
- Quick installation guide (printed)
- Warranty card

NOTE

- Notify your sales representative if any of the above items are missing or damaged.
- The console cable is not included in the package; you need to purchase it separately.

Product Features

- Simplifies data acquisition and device management via the ThingsPro Edge software.
- Seamless integration with ThingsPro Edge and Azure IoT Edge enables easy, reliable, yet secure cloud connectivity.
- Supports easy device-provisioning with the ThingsPro Proxy utility.
- Provides robust OTA function to prevent system failure during software upgrades.
- Equipped with secure boot to prevent malicious software-injection attacks.

Product Specifications

NOTE: The latest specifications for Moxa's products can be found at **https://www.moxa.com**

Hardware Introduction

The AIG-300 Series devices are compact and rugged, making them suitable for industrial applications. The LED indicators allow you to monitor device performance and quickly identify issues, and the multiple ports can be used to connect a variety of devices. The AIG-300 Series comes with a reliable and stable hardware platform that lets you devote the bulk of your time to application development. In this chapter, we provide basic information about the device's hardware and its various components.

The following topics are covered in this chapter:
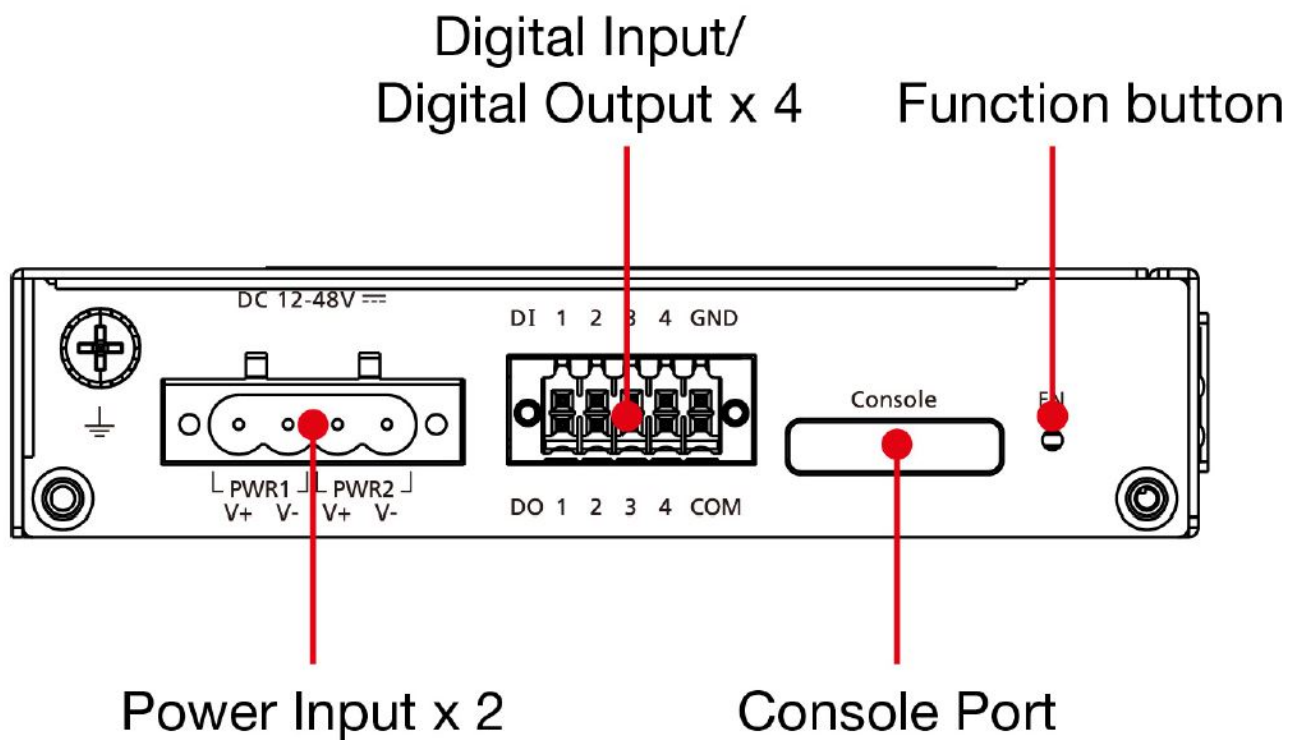
- Appearance
    - AIG-301-AZU-LX
    - AIG-301 US, EU, AP, and CN Models
- Dimensions
    - AIG-301-AZU-LX
        AIG-301 US, EU, AP, and CN Models
- LED Indicators
- Reboot
- Reset to Default
- Real-time Clock
- Installation Options
    - DIN-rail Mounting
    - Wall Mounting (optional)

Appearance

AIG-301-AZU-LX

Top Panel View

Front Panel View

Power LEDs x 2

Reserved for US, EU, AP, and CN Models

User LED

Reserved for US, EU, AP, and CN Models

10/100/1000 Mbps Ethernet Ports x 2

Micro SD card slot

USB 2.0 Port

Bottom Panel View

Serial Port 1   Serial Port 2   CAN Port
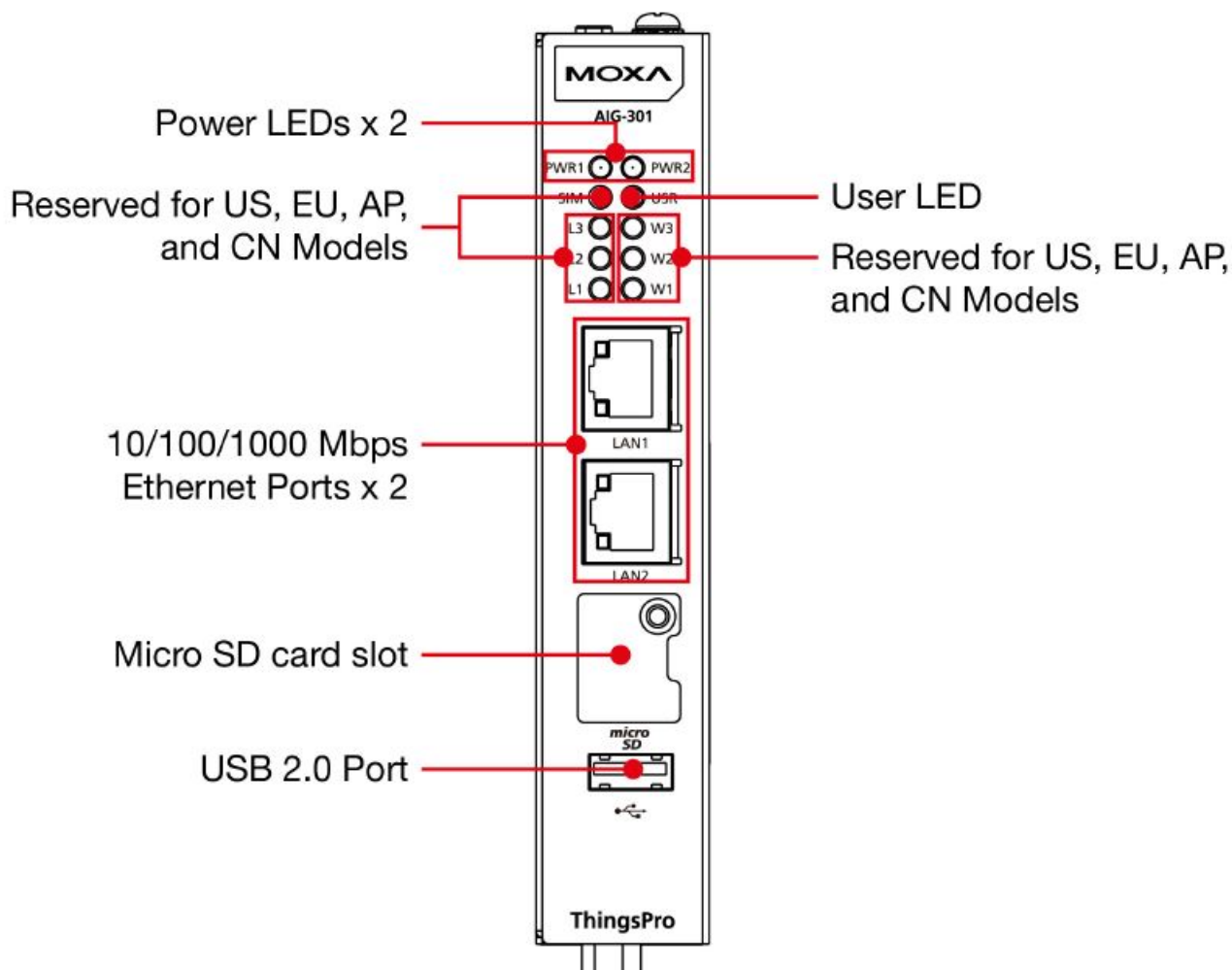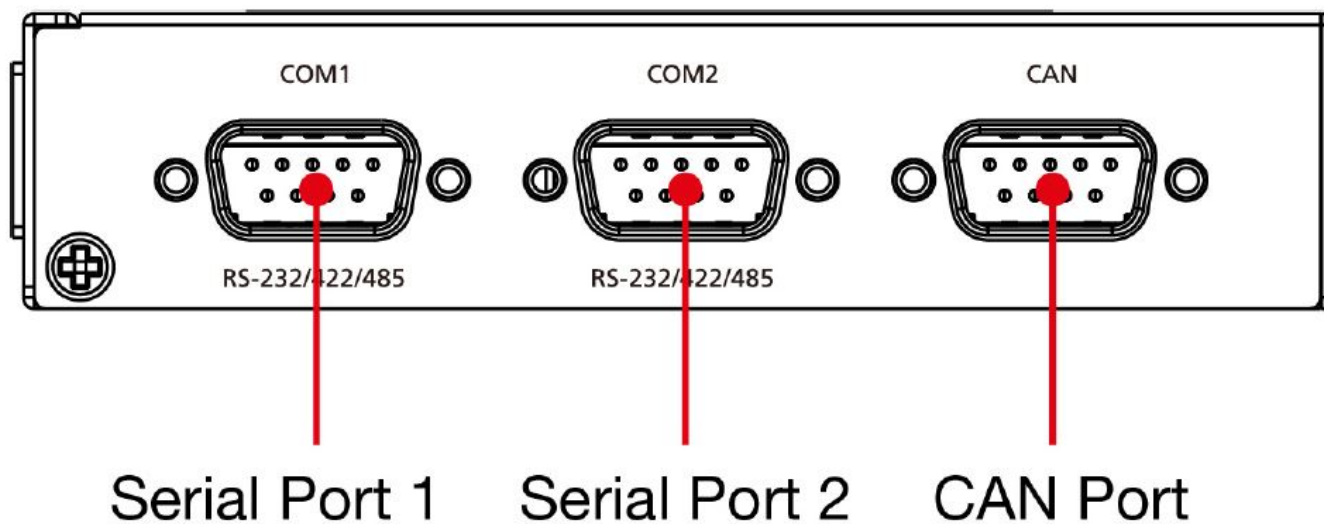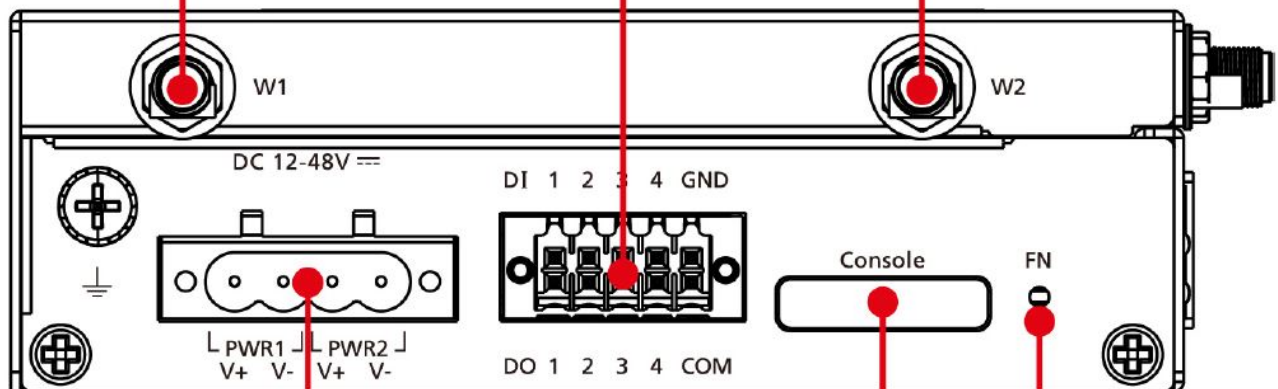
AIG-301 US, EU, AP, and CN Models

NOTE: The CN model does not come with the LTE module preinstalled. Contact Moxa's distributor in China for more information.

Top Panel View

Digital Input/
Digital Output x 4

Wi-Fi Main antenna

Wi-Fi aux antenna

W1

W2

DC 12-48V ⎓

DI 1 2 3 4 GND

Console

FN

PWR1 PWR2
V+ V- V+ V-

DO 1 2 3 4 COM

Power Input x 2

Console Port

Function button

Front Panel View

MOXA

AIG-301

Power LEDs x 2

PWR1   PWR2

LTE main antenna connector

SIM card indicator LED

SIM   USR

C1

User LED

LTE signal strength LEDs x 3

L3   W3
L2   W2
L1   W1

Wi-Fi signal strength LEDs x 3

LAN1

10/100/1000 Mbps
Ethernet Ports x 2

LAN2

GPS

GPS antenna connector

Micro SD card slot

micro
SD

USB 2.0 Port

C2

LTE aux antenna connector

ThingsPro
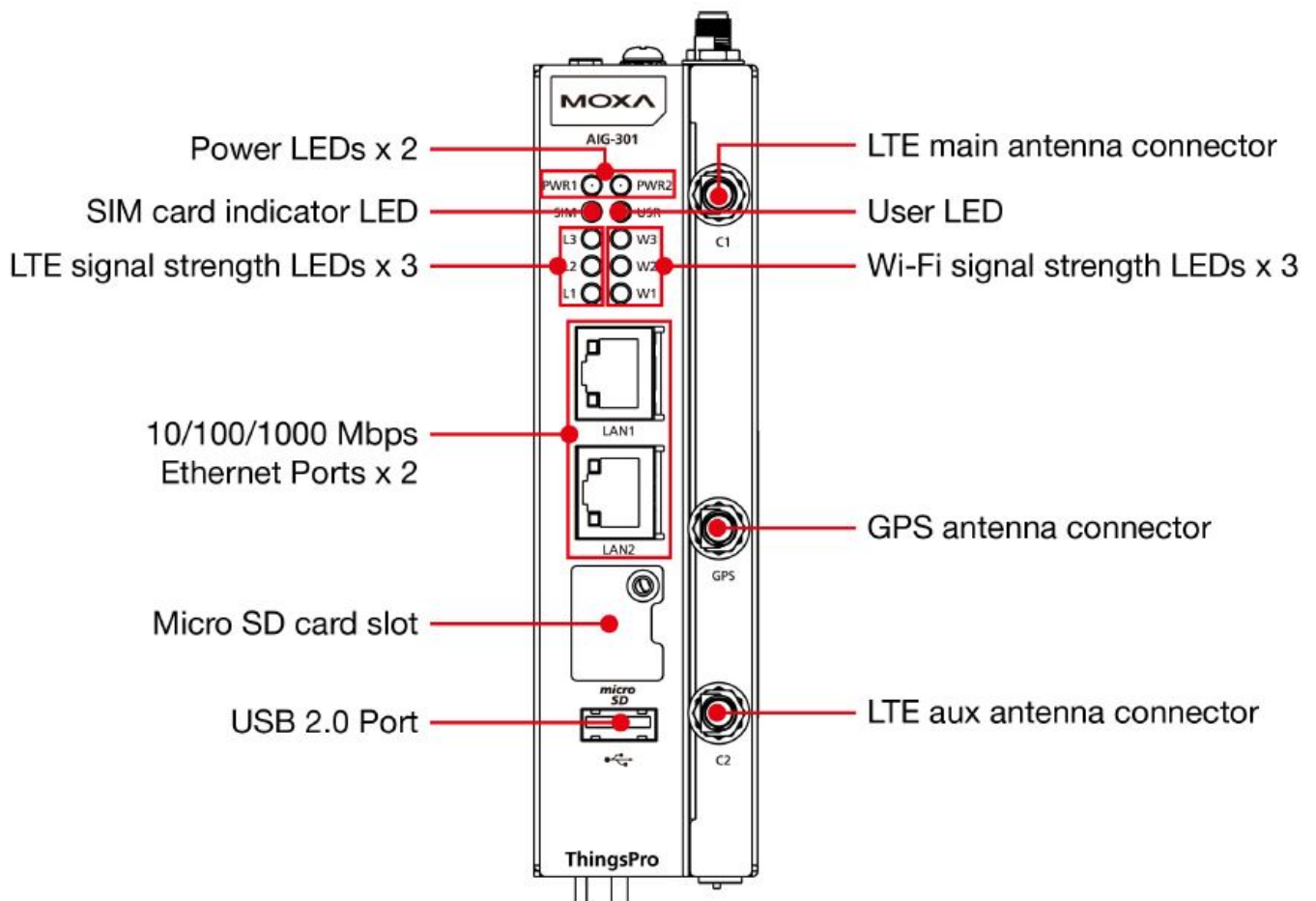
Bottom Panel View

Nano SIM slot x 2

SIM1 SIM2

COM1   COM2   CAN

RS-232/422/485   RS-232/422/485

Serial Port 1   Serial Port 2   CAN Port
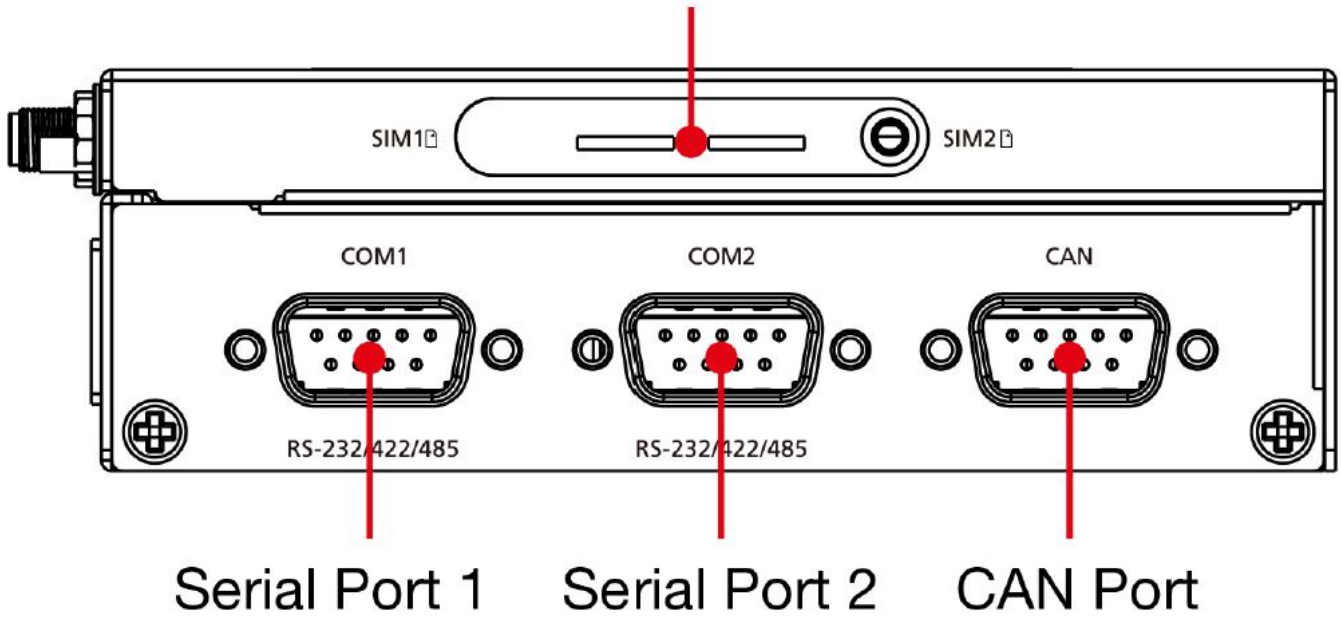
Dimensions
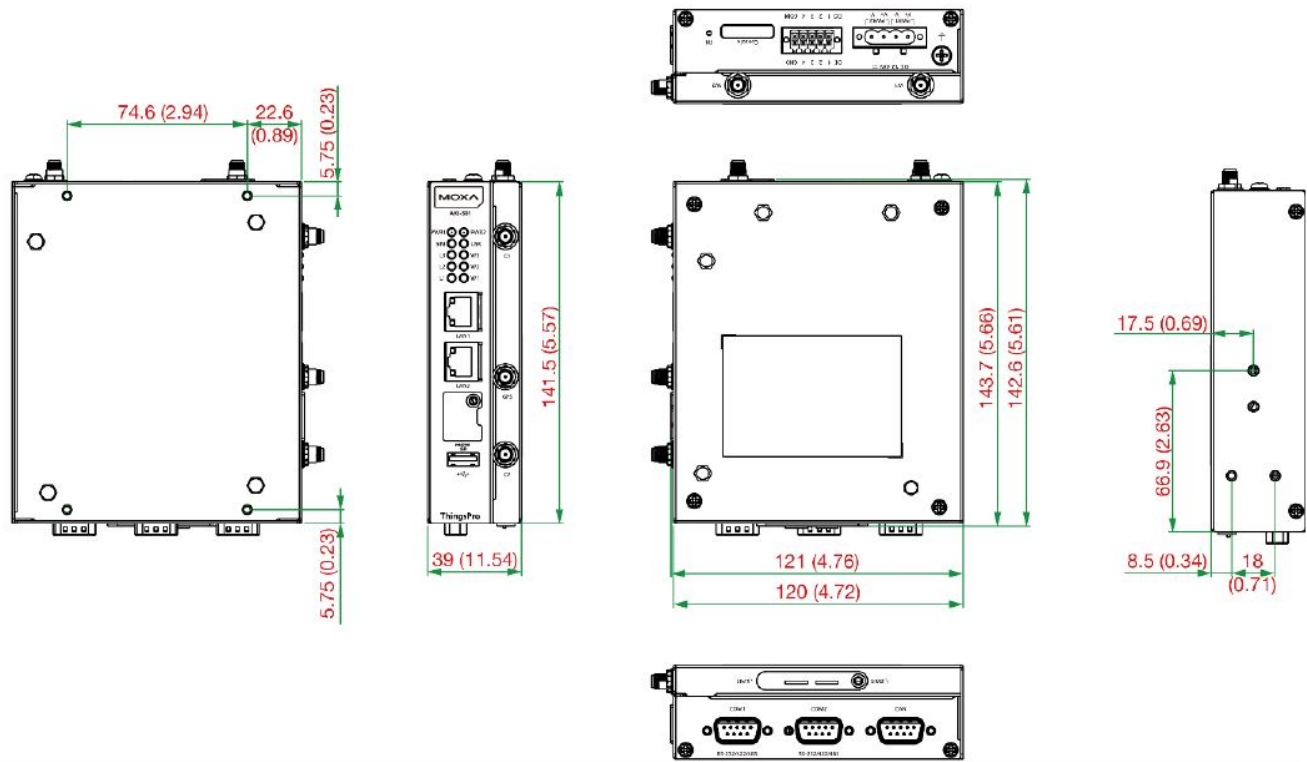
AIG-301-AZU-LX
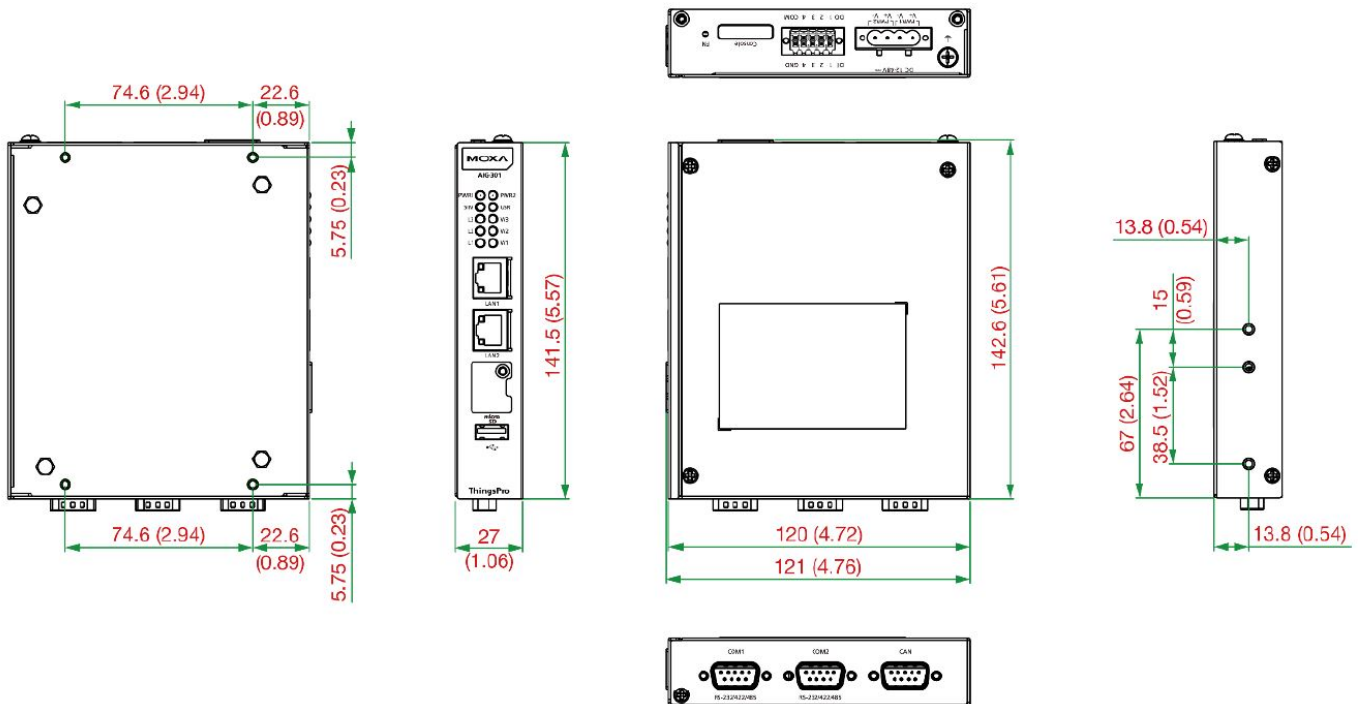
AIG-301 US, EU, AP, and CN Models

Unit: mm (inch)

LED Indicators

The function of each LED is described in the table below:

LED Name	Status	Function	
PWR1/PWR2	Green	Power is on	
	Off	No power	
SIM	Green	SIM2 is in use	
	Yellow	SIM1 is in use	
USR	Green/Yellow	Green: System is operating normally Yellow: System is initializing and running initial boot-up process	
L1/L2/L3	Yellow	Cellular signal strength	
		L1+L2+L3: Strong L2+L3: Normal L3: Weak	
W1/W2/W3	Yellow	WLAN signal strength	
		W1+W2+W3: Strong W2+W3: Normal W3: Weak	
LAN1/LAN 2 (RJ45 connector)	Green	Steady on	100 Mbps Ethernet link
		Blinking	Data is being transmitted or received
	Yellow	Steady on	1000 Mbps Ethernet link
		Blinking	Data is being transmitted or received
	Off	No Ethernet connection or 10 Mbps Ethernet link	

Reboot
To reboot the device, press the function (FN) button for 1 second.

Reset to Default
Press and hold the function (FN) button between 7 to 9 seconds to reset the device to the factory default settings. When the reset button is held down, the USR LED will blink once every second and become steady after 7 to 9 seconds. Release the button within this period to load the factory default settings.

Real-time Clock

The real-time clock is powered by a non-chargeable battery. We strongly recommend that you do not replace the lithium battery without help from a qualified Moxa support engineer. If you need to change the battery, contact the Moxa RMA service team.

WARNING There is a risk of explosion if the battery is replaced with an incorrect type.

Installation Options

DIN-rail Mounting

The aluminum DIN-rail attachment plate is already attached to the product's casing. To mount the device on to a DIN rail, make sure that the stiff metal spring is facing upwards and follow these steps.

1. Pull down the bottom slider of the DIN-rail bracket located at the back of the unit
2. Insert the top of the DIN rail into the slot just below the upper hook of the DIN-rail bracket.
3. Latch the unit firmly on to the DIN rail as shown in the illustrations below.
4. Push the slider back into place.
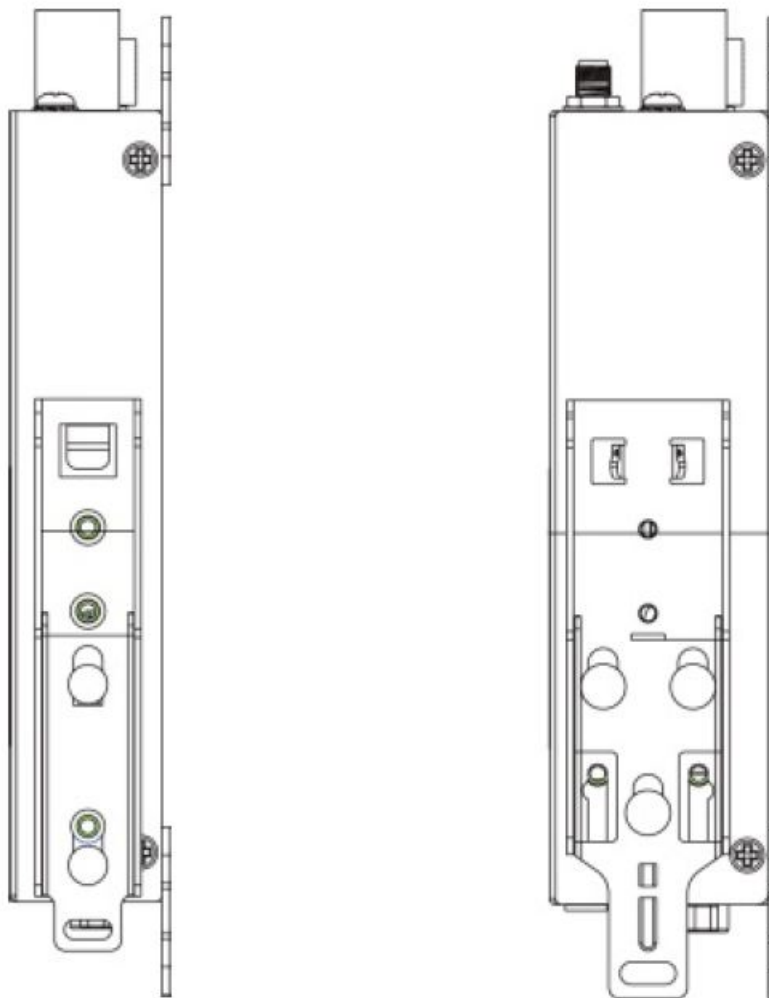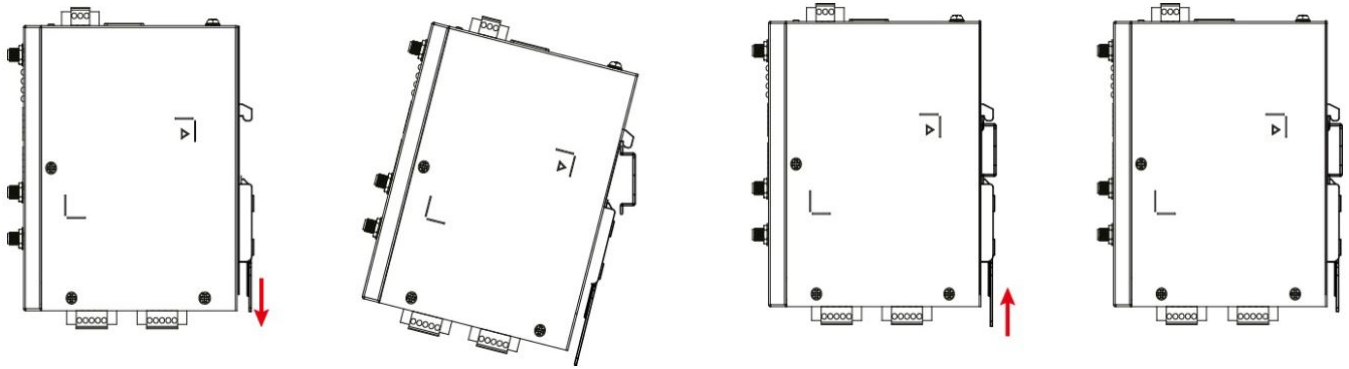
Wall Mounting (optional)

The device can be mounted on to a wall using a wall-mounting kit as shown in the following illustrations. The optional wall-mounting kit is not included in the product package and should be purchased separately.

Follow these steps to mount the device onto a wall:

Step 1 Use four screws to fasten the wall-mounting brackets on the left panel of the device.
Step 2 Use another four screws to mount the device on a wall or a cabinet.
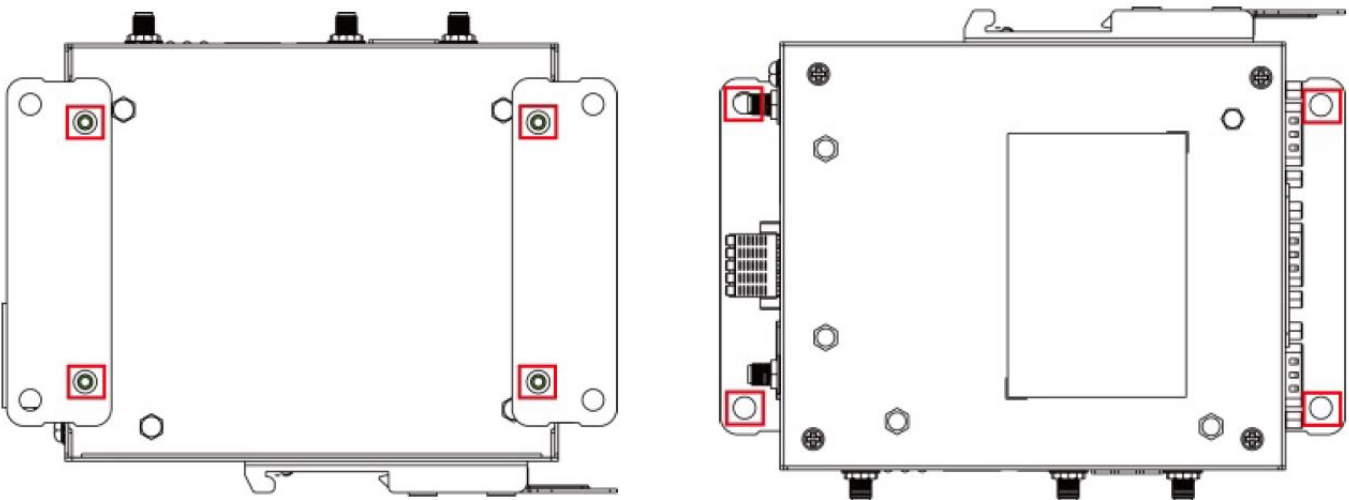
IMPORTANT!
The diameter of the screw heads should be greater than 7 mm and less than 14 mm; the diameter of the shafts should be less than 3 mm. The length of the screws should be greater than 6 mm.

NOTE

- Test the screw head and shank size by inserting the screws into one of the keyhole shaped apertures of the wall-mounting plates before attaching the plate to the wall.
- Do not drive the screws in all the way—leave a space of about 2 mm to allow room for sliding the wall mount panel between the wall and the screws.

Hardware Connection Description

In this chapter, we describe how to connect the AIG-300 to a network and other devices.

The following topics are covered in this chapter:

- Wiring Requirements
    - Connecting the Power
    - Grounding the Unit
- Connecting to the Network
- Connecting to a USB Device
- Connecting to Serial Ports
- Inserting the microSD Card
- Connecting to the Console Port
- Connecting the CAN Port
- Connecting the Digital Inputs and Digital Outputs
- Inserting the SIM Card
- Installing the Wi-Fi Module (US, EU, AP, and CN models only)
- Connecting the Antennas

Wiring Requirements

In this section, we describe how to connect various devices to the AIG-300. Be sure to read and follow these common safety precautions before proceeding with the installation of any electronic device:
• Use separate paths to route wiring for power and devices. If power wiring and device wiring paths must cross, make sure the wires are perpendicular at the intersection point.

NOTE: Do not run signal or communication wiring and power wiring in the same wire conduit. To avoid interference, wires with different signal characteristics should be routed separately.

- You can use the type of signal transmitted through a wire to determine which wires should be kept separate.
  The rule of thumb is that wiring that shares similar electrical characteristics can be bundled together.
- Keep input wiring and output wiring separate.
- When necessary, it is strongly advised that you label wiring to all devices in the system.

ATTENTION

Safety First!
Be sure to disconnect the power cord before doing installations and/or wiring.

Electrical Current Caution!
Calculate the maximum possible current in each power wire and common wire. Observe all electrical codes dictating the maximum current allowable for each wire size.
If the current goes above the maximum ratings, the wiring could overheat, causing serious damage to your equipment.

Temperature Caution!
Be careful when handling the unit. When the unit is plugged in, the internal components generate heat, and consequently the outer casing may feel hot to the touch.

Connecting the Power
Connect the power jack (in the package) to the DC terminal block (located on the top panel), and then connect the power adapter. It takes about 3 minutes for the system to boot up. Once the system is ready, the power LEDs will light up. Both models support dual power inputs for redundancy.

DC 12-48V ⎓

⌐ PWR1 ¬ ⌐ PWR2 ¬
V+   V-   V+   V-
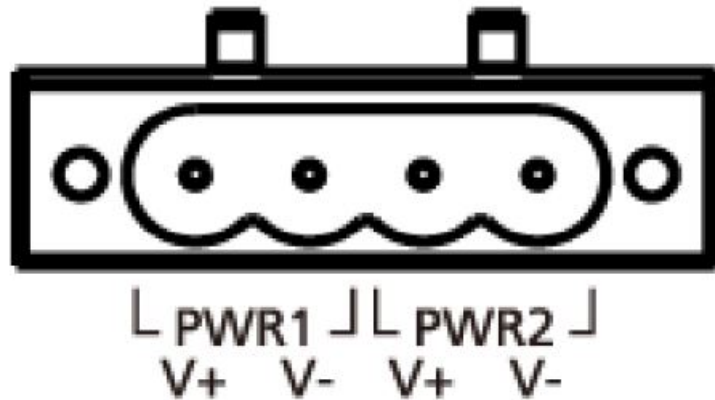
WARNING

- This product is intended to be supplied by a UL Listed Power Adapter or DC power source marked "L.P.S." (or "Limited Power Source") rated 12 to 48 VDC, 1 A (minimum), and TMA = 85°C (minimum).
- The power adapter should be connected to a socket outlet with an earthing connection.
- If you need further information or assistance, contact a Moxa representative.

Grounding the Unit

There is a grounding connector on the top panel of the device. Use this connector to connect a well-grounded mounting surface, such as a metal panel. Grounding and wire routing help limit the effects of noise due to electromagnetic interference (EMI).

ATTENTION

A shielded power cord is required to meet the FCC emission limits and to prevent interference with nearby radio and television reception. It is essential that only the supplied power cord be used.
You are cautioned that changes or modifications not expressly approved by the party responsible for compliance could void your authority to operate the equipment.

Connecting to the Network

The Ethernet ports are located on the front panel of the device. The pin assignments for the Ethernet ports are shown in the following figure. If you are using your own cable, make sure that the pin assignments on the Ethernet cable connector match the pin assignments on the Ethernet port.


1   8
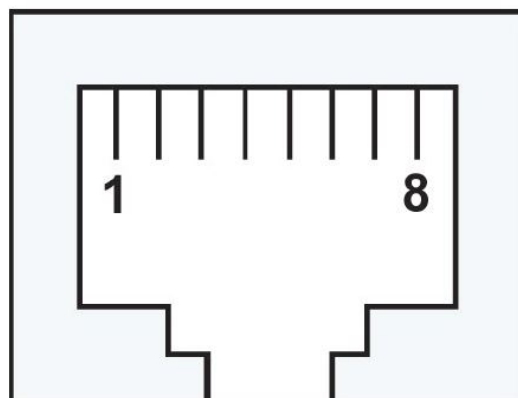
Pin	10/100 Mbps	1000 Mbps
1	Tx+	TRD(0)+
2	Tx-	TRD(0)-
3	Rx+	TRD(1)+
4	–	TRD(2)+
5	–	TRD(2)-
6	Rx-	TRD(1)-
7	–	TRD(3)+
8	–	TRD(3)-

Connecting to a USB Device

The device comes with a USB port located on the lower part of the front panel, allowing users to connect to a device with an USB interface. The USB port uses a type-A connector.

Connecting to Serial Ports

The serial ports can be configured by software for RS-232, RS-422, or RS-485. The pin assignments for the ports are shown in the following table:
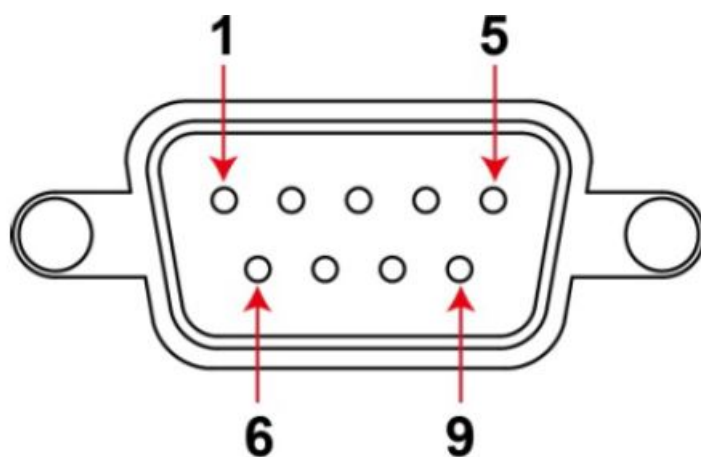
| Pin	RS-232	RS-422/RS-485 4w	RS-485 2w
1	–	TxD-(A)	–
2	RxD	TxD+(B)	–
3	TxD	RxD+(B)	Data+(B)
4	DTR	RxD-(A)	Data-(A)
5	GND	GND	GND
6	DSR	–	–
7	RTS	–	–
8	CTS	–	–

Inserting the microSD Card

The device comes with a microSD socket for storage expansion. The microSD socket is located on the lower part of the front panel. To install the card, remove the screw and the protection cover to access the socket, and then insert the microSD card into the socket directly. You will hear a click when the card is in place. To remove the card, push the card in before releasing it.



Connecting to the Console Port

The console port is an RS-232 port located on the top panel and can be connected to a 4-pin pin header cable. You can use this port for debugging or firmware upgrade.
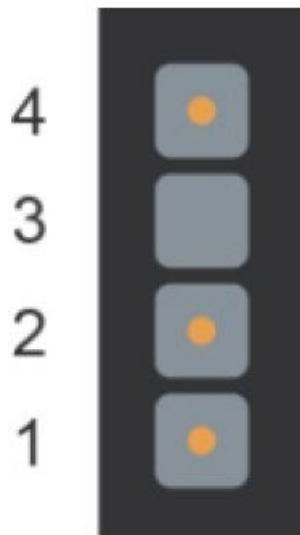
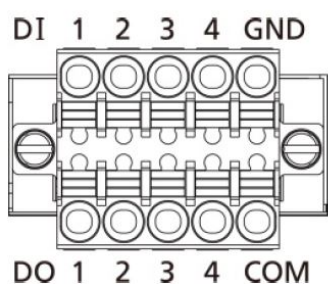| Pin	Signal
1	TxD
2	RxD
3	NC
4	GND

Connecting the CAN Port
There is a CAN port in DB9 interface, located on the bottom panel. Refer to the figure on the left for detailed pin definitions.
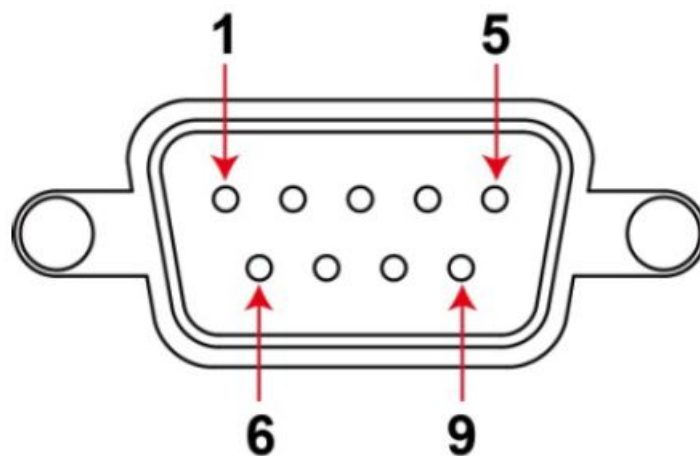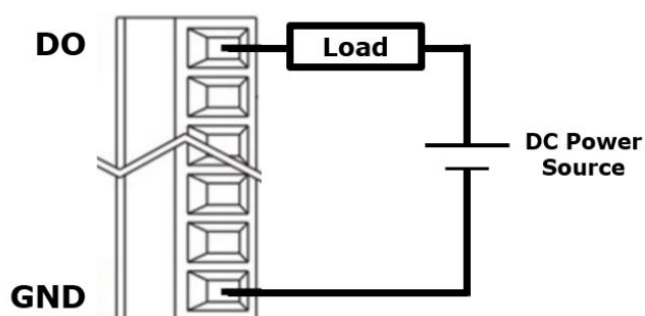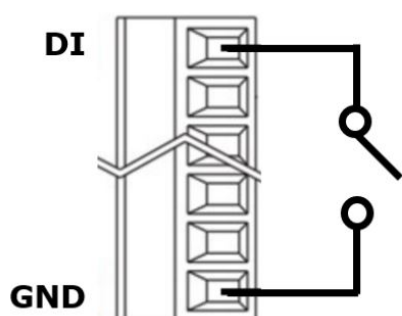
Pin	Definition
1	–
2	CAN_L
3	CAN_GND
4	–
5	(CAN_SHLD)
6	(GND)
7	CAN_H
8	–
9	(CAN_V+)

Connecting the Digital Inputs and Digital Outputs

There are four digital inputs and four digital outputs on the top panel. Refer to the figure on the left for detailed pin definitions.

Inserting the SIM Card

The device comes with a SIM card socket that allows users to install two SIM cards for cellular communication.

Step 1 Remove the screw on the SIM card holder cover located on the bottom panel of the device.
Step 2 Insert the SIM card into the socket. Make sure you insert in the right direction. To remove the SIM card, press the SIM card in to release and then you can pull out the SIM card.

**Installing the Wi-Fi Module (US, EU, AP, and CN models only)**

The optional Wi-Fi wireless module is not included in the product package and should be purchased separately. The Wi-Fi wireless module package contains the following items:

- 1 x Wi-Fi module
- 1 x thermal pad (25 x 10 x 1 mm)
- 2 x black screws (M2.5 x 4 mm)
- 2 x bronze spacers (M/F M3 x 4/M3 x 5 mm)
- 1 x insulation pad
- 1 x heatsink

NOTE: Notify your sales representative if any of the above items are missing or damaged.

Follow these steps to install the Wi-Fi module for the device.

1. Loosen the four screws on the right panel of your computer.
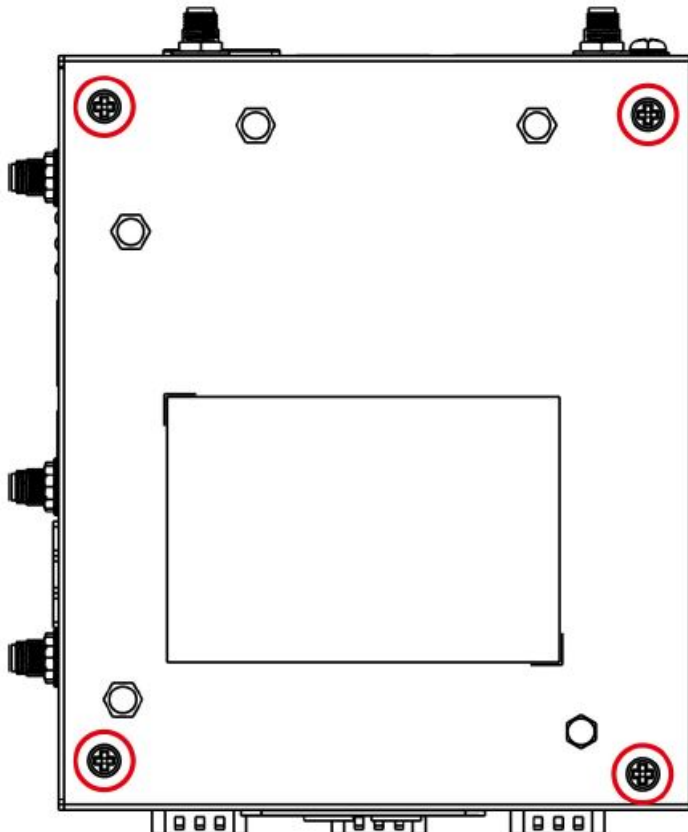
2. Remove the right-side cover to expose the Mini-PCIe socket. The Wi-Fi socket is located beside the cellular module socket.

3. Remove the plastic sheet on the thermal pad and stick the thermal pad on the metal surface as indicated.

4. Insert the wireless module card into the socket at an angle.
5. Push down the wireless module card and secure it by fastening the two black screws (M2.5×4 mm).

6. Remove the plastic protection covers on the antenna connectors.
7. Connect the #W1 SMA cable to the Main connector and the #W2 SMA cable to the Aux connector on the wireless module card installed.

8. Stick the insulation tape on the connectors.

9. Remove the two silver screws (M3x6 mm) and keep them for later use.

10. Fasten the two bronze screws on to the screws on the board.

11. Remove the plastic sheet on the thermal pad of the heat sink, install the heat sink pad on the module, and secure the heat sink with the two silver screws (M3 x 6 mm).

12. Put back the right cover of the computer and secure it with screws.

Connecting the Antennas

There are two cellular antenna connectors (C1 and C2) on the front panel of the device. In addition, a GPS connector is provided for the GPS module. All three connectors are of SMA type. Connect the antennas to these connectors as shown below.

There are two Wi-Fi antenna connectors (W1 and W2) on the top panel of the device. Connect the antennas on the connectors as shown below. Both W1 and W2 connectors are of RP-SMA type.

Regulatory Approval Statements

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.

Class A: FCC Warning! 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 users will be required to correct the interference at their own expense.

WARNING
This is a class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

Documents / Resources

MOXA AIG-300 Series Arm-Based Computers [pdf] User Manual
AIG-300 Series, Arm-Based Computers