UC-8600A Series Hardware User Manual

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www.moxa.com/products

UC-8600A Series Hardware User Manual

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Technical Support Contact Information

www.moxa.com/support

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1. Introduction

The UC-8600A Series Arm-based box-type computing platform is designed for embedded data-acquisition and edge-computing applications. The computers come with four 10/100/1000 Ethernet ports, eight RS-232/422/485 serial ports, four DI/DO channels, and two CAN ports. The UC-8600A provides robust connectivity for a wide variety of field devices. A wireless expansion slot supporting Wi-Fi 6 and cellular enables reliable wireless communication for remote applications. The system also supports storage expansion via an M.2 M-key socket for SSD and a MicroSD card slot. These versatile communication and expansion capabilities allow users to efficiently deploy the UC-8600A Series in diverse industrial environments.

Package Checklist

Before installing a UC-8600A computer, verify that the package contains the following items:

- 1 x UC-8600A Series embedded computer
- 1 x Quick installation guide (printed)
- 1 x Warranty card (printed)

NOTE

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

Product Features

- Arm Cortex-A72 dual-core 1.5 GHz processor
- 4 auto-sensing 10/100/1000 Mbps Ethernet ports
- 8 RS-232/422/485 serial ports
- 2 CAN ports (CAN 2.0A/CAN 2.0B) with 3 kV isolation protection
- M.2 M key SSD slot and Micro SD socket for storage expansion
- Supports cellular and Wi-Fi 6E via an expansion slot
- Moxa Industrial Linux with 10-year superior long-term support
- EN 18031-1 compliant wireless cybersecurity
- Compliance with IEC 62443-4-2 Security Level 2 requirements
- -40 to 75°C operating temperature range (-40 to 70°C with cellular module enabled)

Product Specifications

NOTE

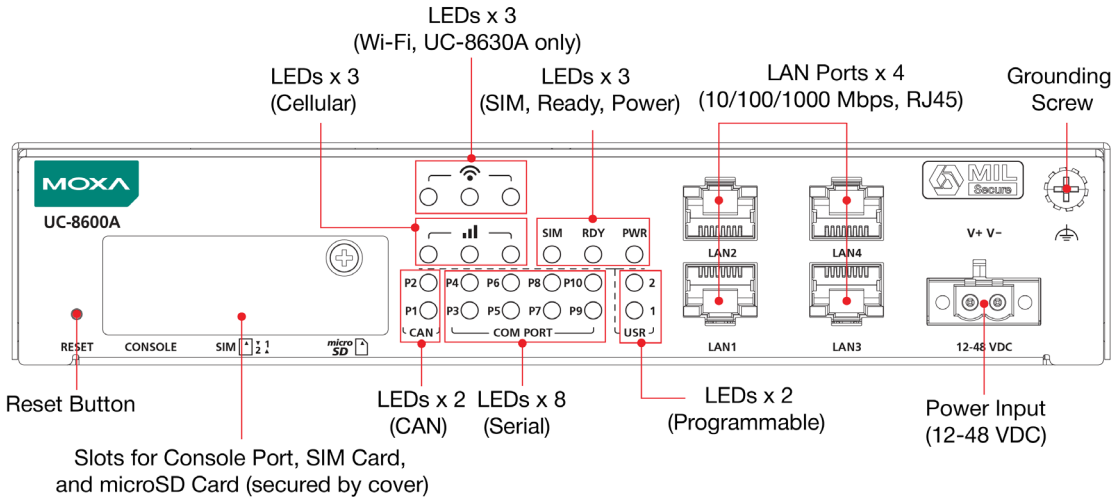
The latest specifications for Moxa's products can be found at https://www.moxa.com.

2. Hardware Introduction

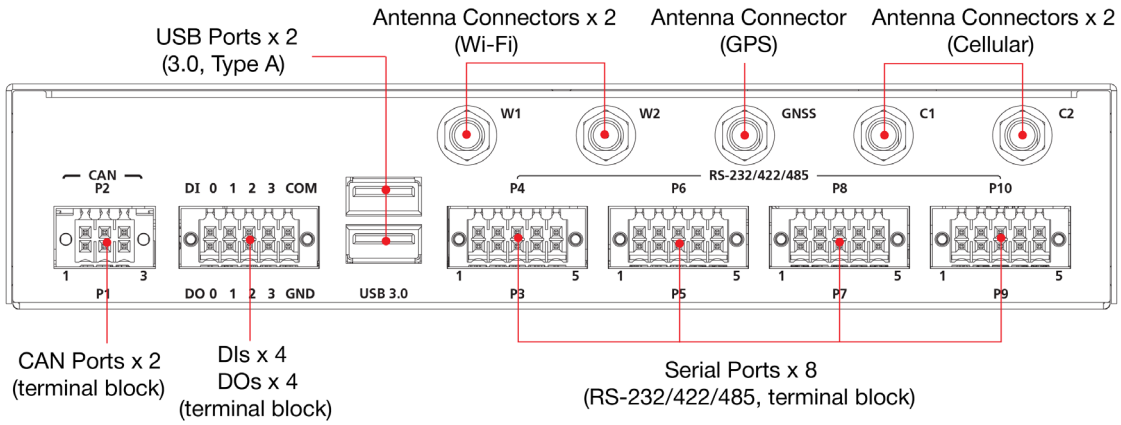
The UC-8600A embedded computers are compact and rugged, making them suitable for industrial applications. The LED indicators allow you to monitor device performance and quickly identify issues, and the multiple ports can be used to connect a variety of devices. The UC-8600A Series comes with a reliable 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 embedded computer's hardware and its various components.

Appearance

Front View

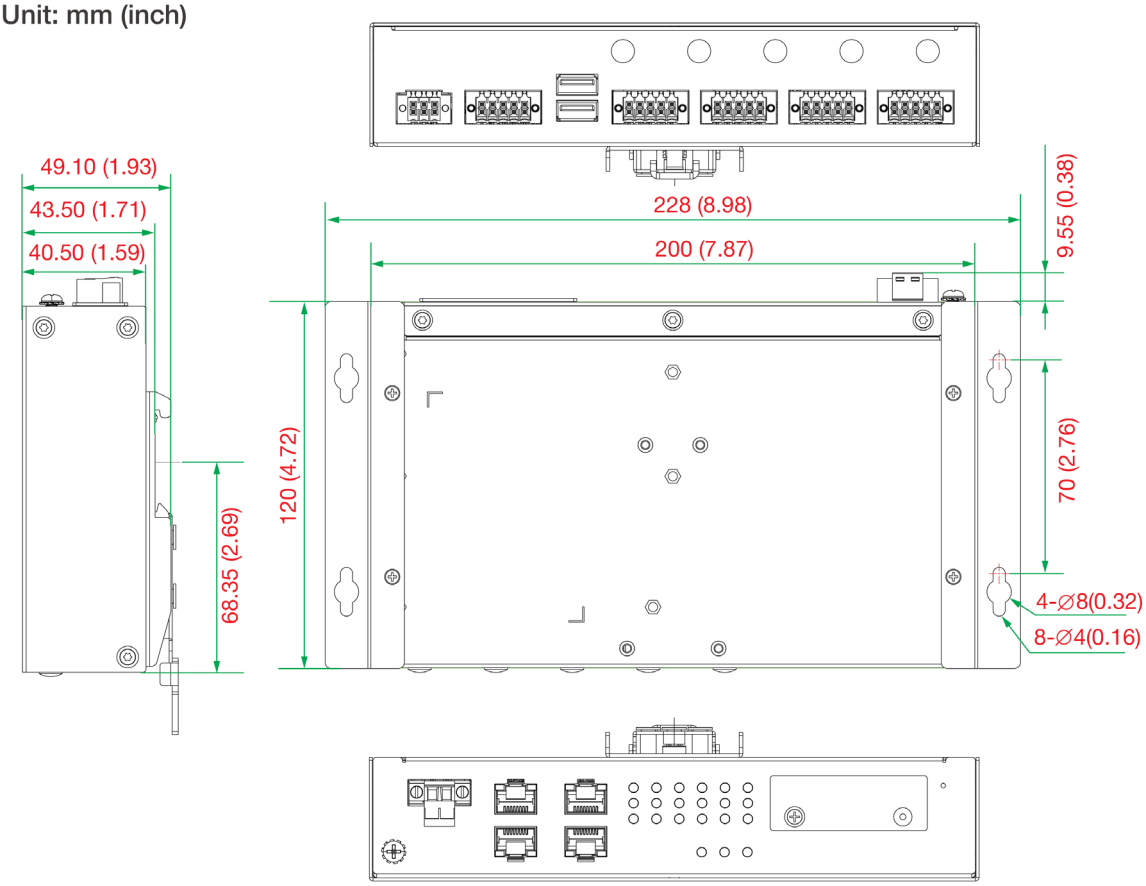


Rear View



Dimensions

Unit: mm (inch)



LED Indicators

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

LED Name	Status	Function
PWR	Green	Power is on
	Off	No power
READY	Green	Steady on: The device has successfully booted and all services are initialized
		Blinking: Device is in the process of booting up
	Red	Device boot failure, which occurs if any service fails to initialize
	Off	The device remains in the bootloader stage and has not yet booted into the kernel
SIM	Green	Steady on: SIM2 is the active slot, with a functional SIM card inserted
	Yellow	Steady on: SIM1 is the active slot, with a functional SIM card inserted
USR1/USR2	Green/Yellow	Steady on/blinking off: User programmable
(Cellular Signal Strength)	Green	Three LEDs steady on: Good or excellent Two LEDs steady on: Fair One LED steady on: Poor One LED blinking: Very poor
	Off	Disconnected
(Wi-Fi Signal Strength, UC-8630A only)	Green	Three LEDs steady on: Good, RSSI ≥ -70 dBm Two LEDs steady on: Fair, -70 dBm > RSSI ≥ -90 dBm One LED steady on: Poor, RSSI < -90 dBm One LED blinking: Signal is very poor
	Off	Disconnected
LAN1 to LAN4 (RJ45 connector)	Green	Steady ON: 10M/100M link established Blinking: Receiving or transmitting data
	Yellow	Steady ON: 1000M link established Blinking: Receiving or transmitting data
	Off	No Ethernet connection
P1/P2 (CAN Port)	Light Yellow	Blinking: CAN port is transmitting data
	Yellow	Blinking: Serial port is receiving data
	Off	Serial port is not transmitting or receiving data
P3 to P10 (Serial ports)	Green	Blinking: Serial port is transmitting data
	Yellow	Blinking: Serial port is receiving data
	Off	Serial port is not transmitting or receiving data

Real-time Clock

The UC-8600A's real time clock is powered by a lithium 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

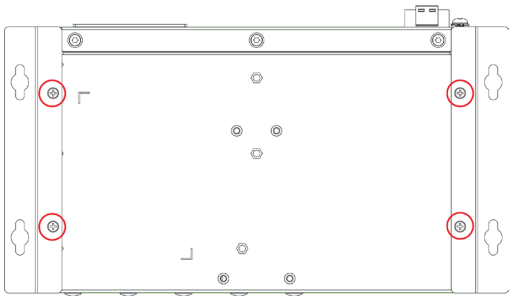
There is a risk of explosion if the battery is replaced with an incorrect type. Replace only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instruction.

Installation Options

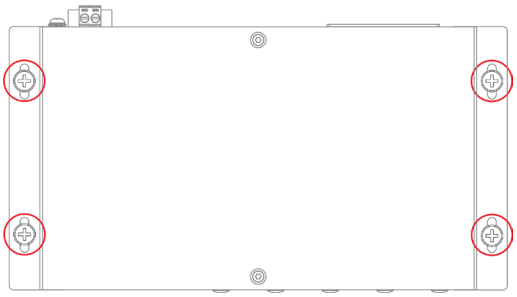
Wall Mounting

The UC-8600A Series comes with a wall-mounting kit in the product package. To install the computer on to a wall or a cabinet, do the following:

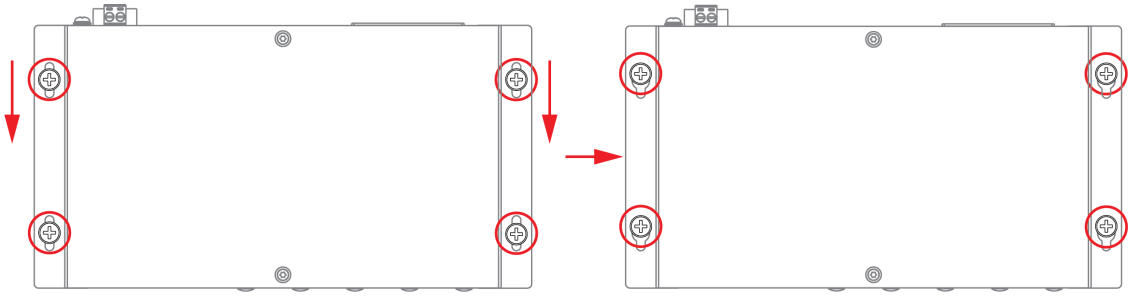
Step 1
Use the four screws (M3 x 5 mm) in the package to attach the wall-mounting brackets to the bottom of the computer.



Step 2
Use another four screws (M3 x 6 mm), not included in the package) to mount the computer on to a wall or in a cabinet.



Step 3
Pull the mounted computer downwards to ensure the computer has been securely mounted.



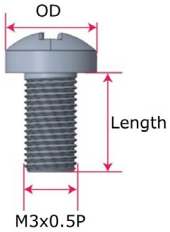
Recommended Fastening Torque: 4.5 ± 0.5 kgf-cm.

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.

The additional four screws (M3 x 6 mm) are not included in the wall-mounting kit package and must be purchased separately. The specifications of the additional screws required are as follows:

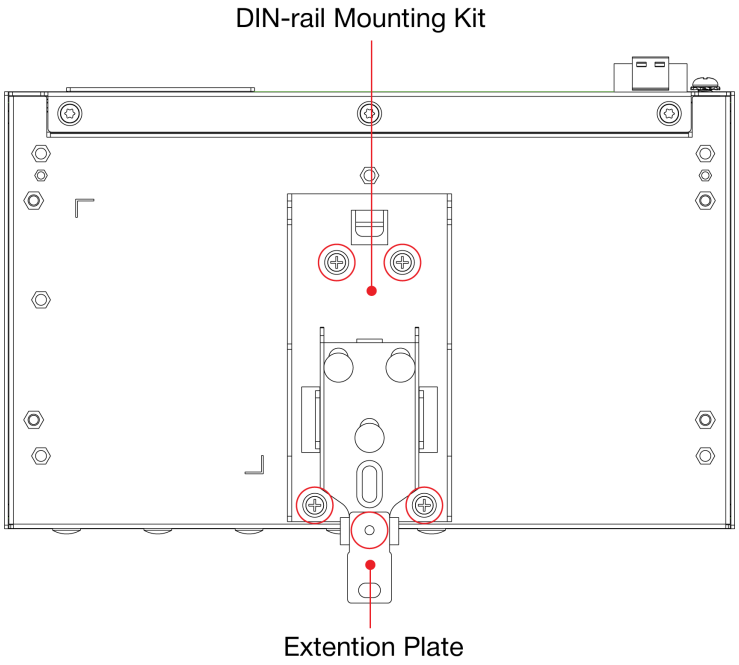
Head Type: Pan/Doom
Head Diameter 5.2 mm < OD < 7.0 mm
Length > 6 mm
Thread Size: M3 x 0.5P



DIN-rail Mounting (optional)

The UC-8600A also provides an optional DIN-rail mounting kit that needs to be purchased separately. Contact Moxa's sales representative for details.

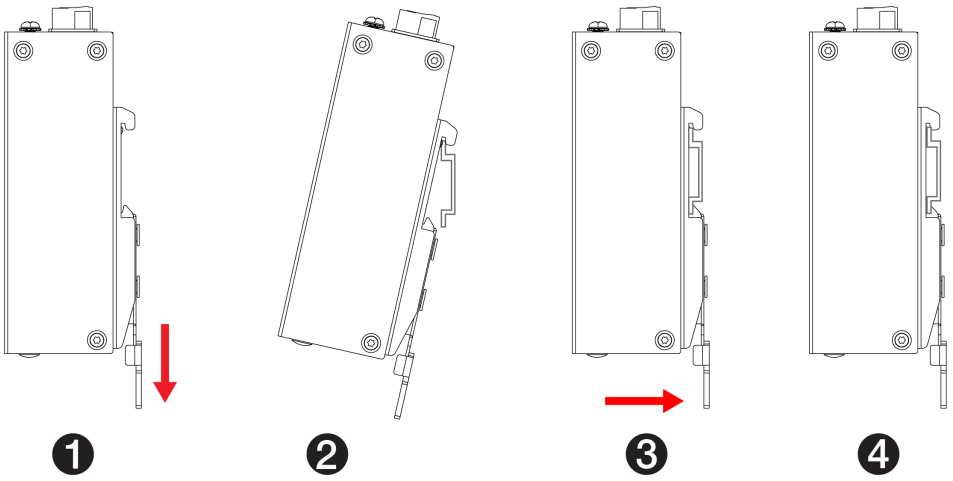
To install the DIN-rail mounting kit, place the DIN-rail mounting kit at the center of the bottom part of the computer and secure it with the four screws included in the package. Additionally, fasten the screw on the extension plate.



To mount the UC-8600A Series on to a DIN rail, ensure that the stiff metal spring of the mounting kit is facing upwards and follow these steps.

1. Pull down the slider of the DIN-rail mounting kit.
2. Insert the top of the DIN rail into the slot just below the upper hook of the DIN-rail mounting kit.
3. Push the unit to latch it firmly on to the DIN rail as shown in the following illustrations.

Once the computer is mounted properly, you will hear a click and the slider will rebound back into place automatically.



3. Hardware Connection Description

In this chapter, we describe how to connect the UC-8600A to a network and various devices.

Wiring Requirements

In this section, we describe how to connect various devices to the embedded computer. 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!

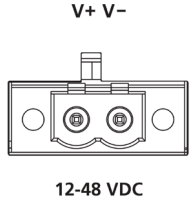
Calculate the maximum possible current in each power wire and common wire. Observe all electrical codes dictating the maximum current allowable for each wire size.

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 UC-8600A Series' DC terminal block (located on the front panel), and then connect the power adapter. It takes about 10 to 30 seconds for the system to boot up. Once the system is ready, the Power LED will light up.

WARNING

The wiring for the input terminal block should be installed by a skilled person. The wire type should be copper (Cu), wire size should be 14 AWG to 28 AWG, and a torque of 0.5 n-m should be used for V+, V-, and GND connections. The wire size of the power input and earthing conductor should be the same.

WARNING

This product is intended to be supplied by a UL Listed Power Unit marked **LPS** (Limited Power Source). The ratings for the different models in the series are as follows:

- UC-8630A-T: 1.58 A @ 12 VDC = 16 W, 0.43 A @ 48 VDC = 17 W
- UC-8620A-T: 1.34 A @ 12 VDC = 13 W, 0.38 A @ 48 VDC = 15 W

Minimum Tma = 75°C

If you need further information or assistance, contact a Moxa representative.

ATTENTION

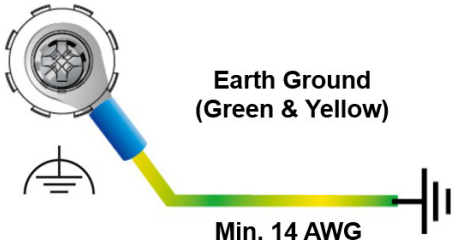
Altitude Requirement

This product and the listed power supply (LPS) adapter(s) used with it are UL-certified for operation at 2,000 meters. Although the product is tested at 5,000 meters, it is not UL-certified for this altitude. For reliable performance of the product in high- altitude installations of over 2,000 meters (e.g., 5,000 meters), use a suitable adapter that is tested and certified at the altitude (i.e.,5,000 meters).

Grounding the Unit

There is a grounding connector located on the top panel of the computer. Grounding and wire routing help limit the effects of noise due to electromagnetic interference (EMI). Note that this product is intended to be mounted on a well-grounded mounting surface, such as a metal panel.

The power cord adapter should be connected to a socket outlet with an earthing connection.

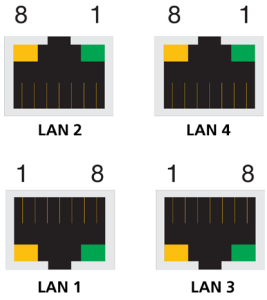


ATTENTION

This product is intended to be mounted on to a well-grounded mounting surface such as a metal panel. Use the green-and- yellow cable type minimum with American Wire Gauge (AWG) 14 (2.5 mm2) for grounding.

Connecting the Network

The four Ethernet ports are located on the front panel of the UC-8600A computers. The pin assignments for the Ethernet port 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.



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 a USB Device

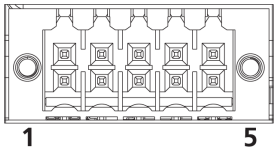
The two USB ports are type-A USB 3.0 and can be used to connect USB storage devices or type-A USB compatible devices. Both ports are located on the rear panel of the computer.

NOTE

The peripheral devices installed are recommended to be placed at least 25 mm from the UC-8600A.

Connecting Serial Ports

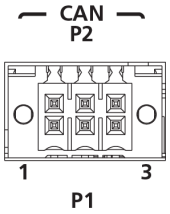
The eight serial ports (P1, P2, P4, P5) use terminal-block interfaces. Each port can be configured by software for RS-232, RS-422, or RS-485. The pin assignments for the ports are shown in the following table:



Pin	RS-232	RS-422/RS-485 4w	RS-485 2w
1	TXD	TDP	–
2	RXD	TDN	–
3	RTS	RDP	DP
4	CTS	RDN	DN
5	GND	GND	GND

Connecting a CAN Port

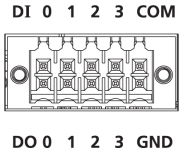
Two (P1, P2) CAN ports with terminal-block interfaces are located on the rear panel. The pin diagram and details are shown in the following table:



Pin	Definition
1	CAN_H
2	CAN_L
3	GND

Connecting the Digital Inputs and Digital Outputs

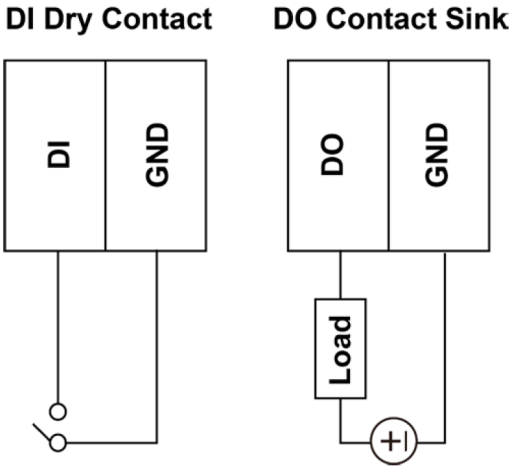
The four DI/DO channels are located on the bottom panel of the computer and use terminal-block interfaces. The pin diagram and details are listed in the following table:



Digital Inputs
Dry Contact:
Logic 0: Close to GND
Logic 1: Open

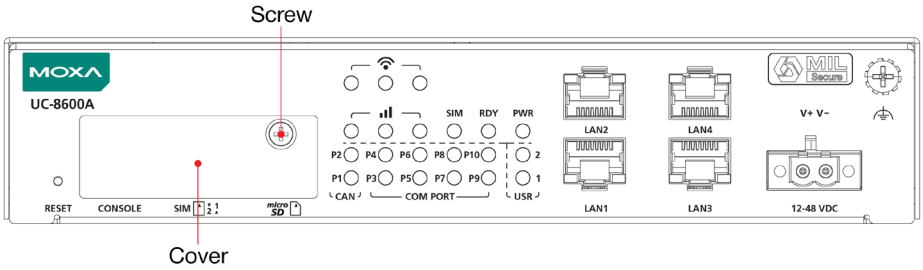
Digital Outputs
Current Rating:
200 mA per channel
Voltage:
0 to 30 VDC

Refer to the following diagram for the wiring method.

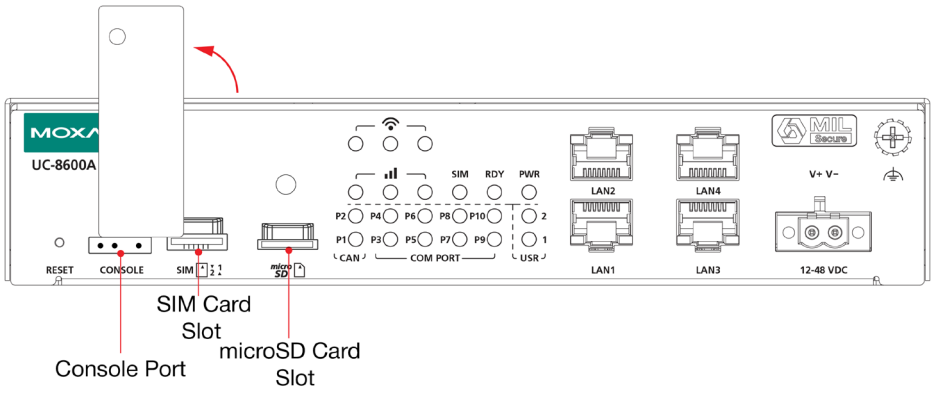


Inserting the SIM Card

The UC-8600A comes with a console port, a SIM card tray that can install two SIM cards, and a microSD socket all located on the front panel and secured by a cover.



Access to these interfaces is through a slot cover. First unfasten the screw securing the cover and pull up the cover to the upright position.



To install the SIM card, do the following:

Step 1
Push in the SIM card tray inwards and then release it to eject the tray. Pull out the tray.

Step 2
Install the SIM cards and insert the tray back into the socket. The SIM card tray can hold two SIM cards, one on each side. Install the first SIM card on the front side, and the second SIM card on the rear side.

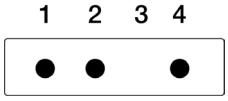
To remove the SIM card tray, press the tray inwards, then release it to eject the tray. You can then pull out the tray.

Installing a MicroSD Card

The UC-8600A comes with a microSD socket for storage expansion. Insert a microSD card into the socket to get started. You will hear a click when the card is in place. To remove the card, push the card in before releasing it.

Connecting the Console Port

The console port is an RS-232 port located on the left under the cover. To install the card, remove the screw and the protection cover to access the console port. You can connect a 4-pin pin header cable and use the port for debugging issues or system image upgrades.

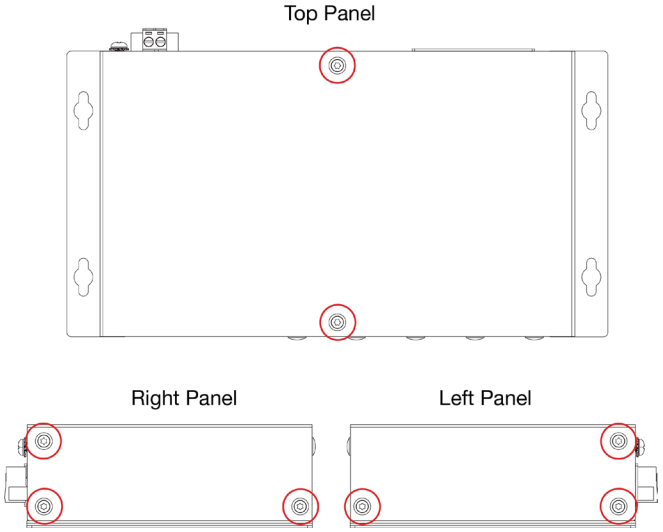


Pin	Signal
1	TxD
2	RxD
3	NC
4	GND

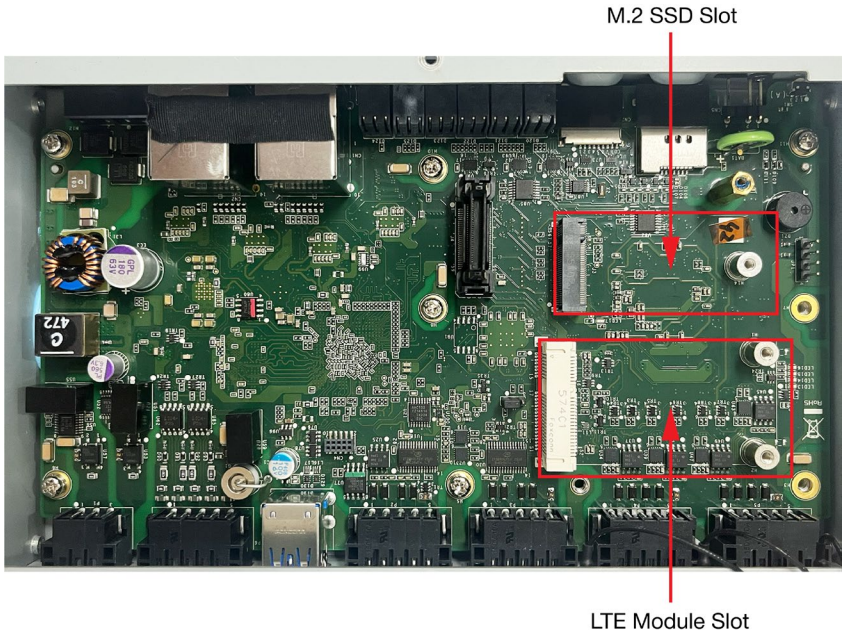
Installing Internal Modules

UC-8620A Models

1. Unfasten the two screws on the top panel, three screws on the left panel and three screws on the right panel. Take off the cover.

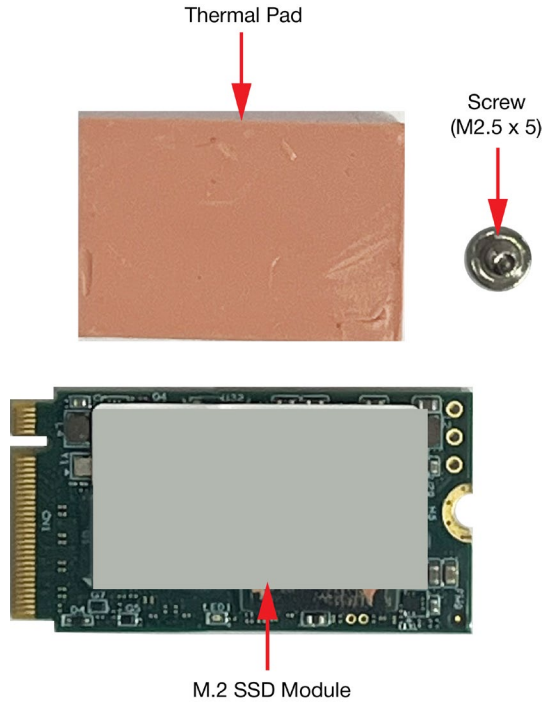


2. Find the locations of the internal module slots inside the UC-8620Amputer.

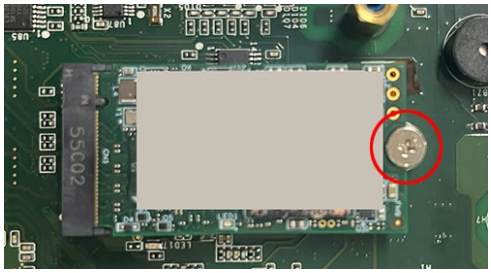


Installing the M.2 SSD Module

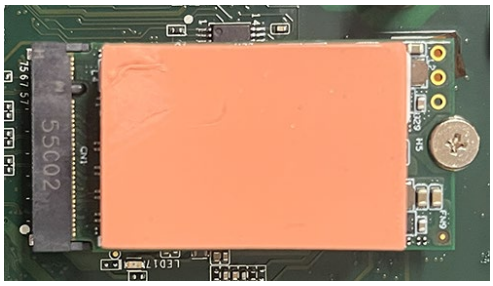
1. Check the M.2 SSD module package of the UC-8620A Series.



2. Insert the M.2 SSD module into the slot.
3. Fasten the screw (M2.5 x 5) at the end of the module.



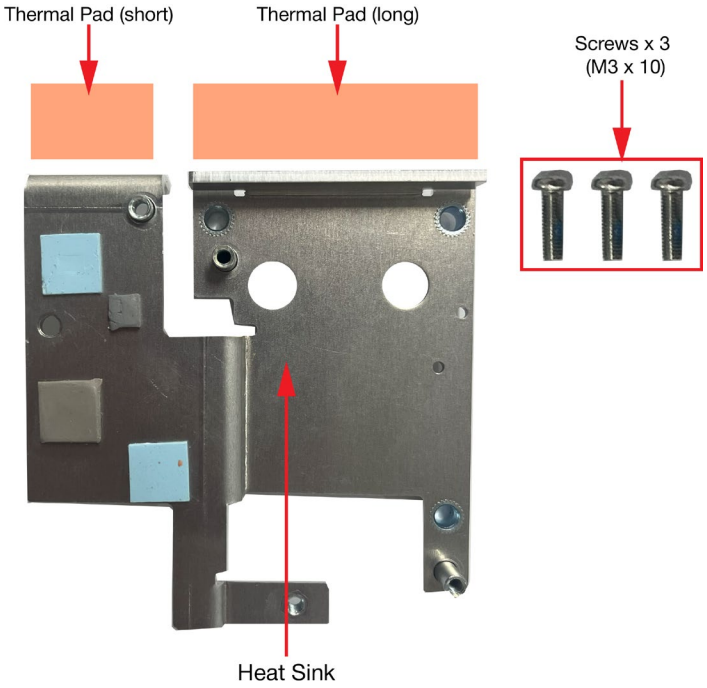
4. Place the thermal pad on the module.



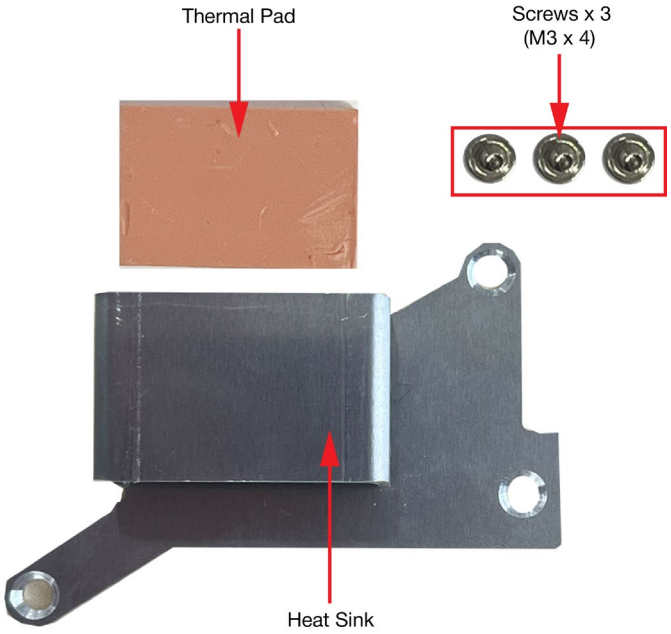
Installing the Heat Sink

1. There are two sets of the heat sink for the UC-8620A Series.

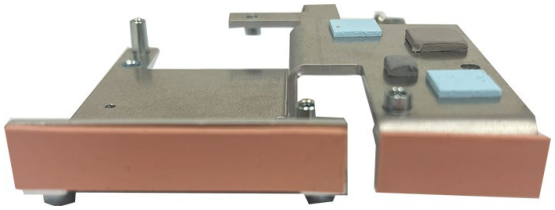
   First Set of the Heat Sink



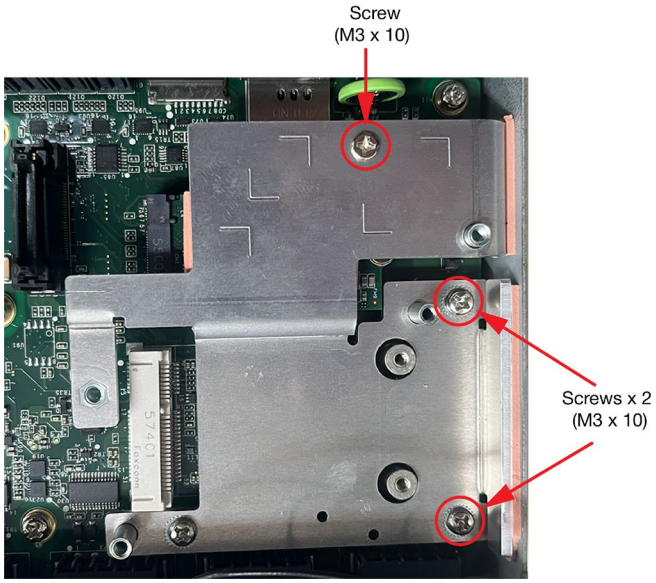
   Second Set of the Heat Sink



2. Place the thermal pads on the side of the first set of the heat sink.

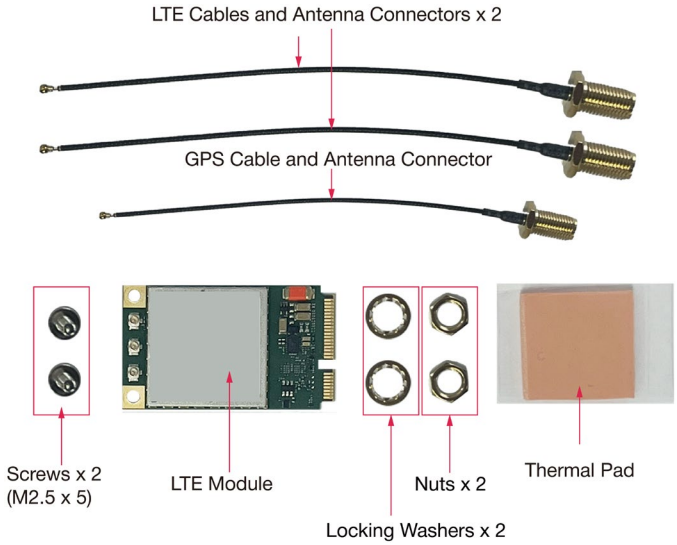


3. Place the first heat sink on the M.2 SSD module and fasten the three screws.

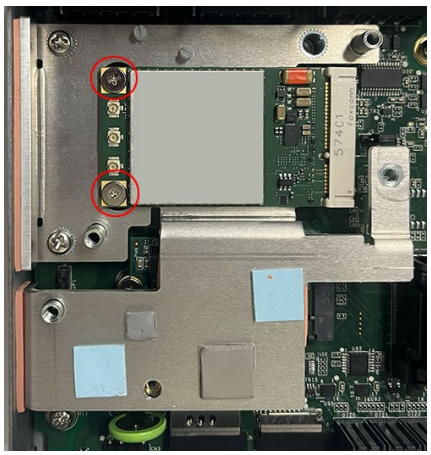


Installing the LTE Module

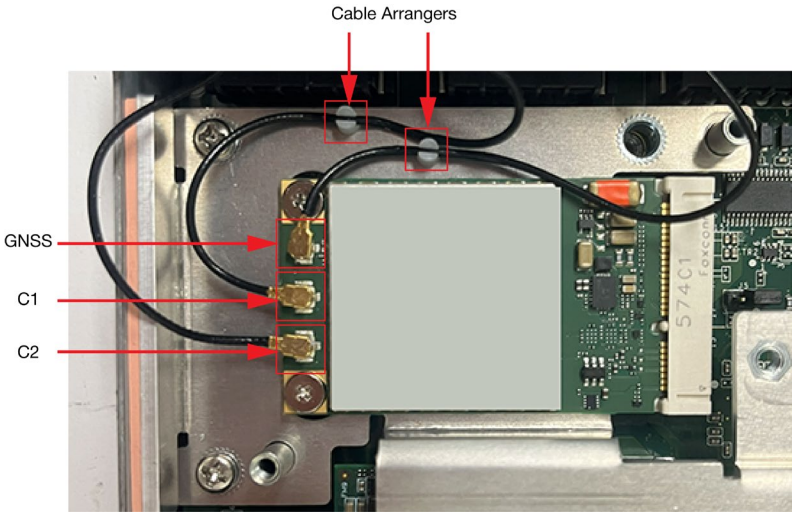
1. Check the LTE module package.



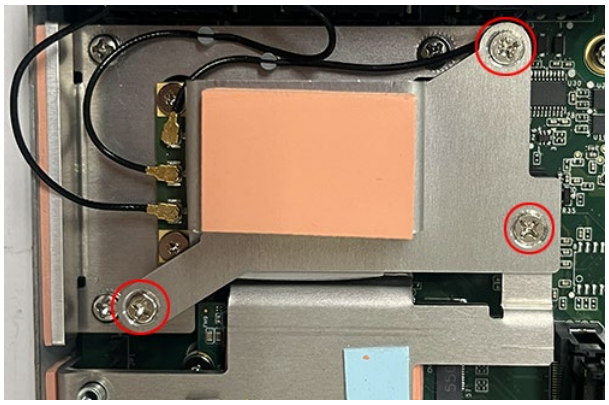
2. Insert the LTE module into the slot and fasten the screws (M2.5 x 5) on the end of the module.



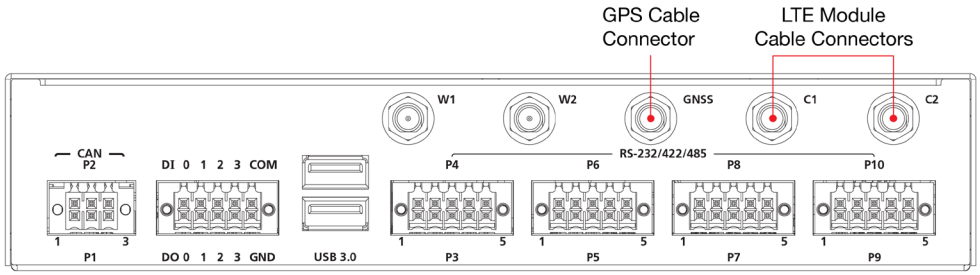
3. Connect the cables on the connectors. Each cable should be connected to the specific connectors on the front panel. Two cables are suggested to pass through the cable arrangers to fix the cables. Make sure you have connected the cables on the correct connectors. Refer to the following figure.



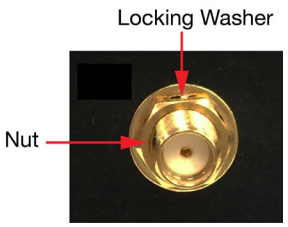
4. Place the thermal pad on the LTE module and then place the second set of the heat sink on the module. Fasten the three screws.



5. Place the other end of the cable connector on the connector hole on the rear panel of the computer. Make sure you have connected to the correct connector holes. Refer to the following diagram.



6. On the rear panel, pass the antenna mount's threaded connection ring through the mounting hole, hold the locking washer against the rear panel and secure the antenna connector by tightening the nut onto the threaded protection ring.



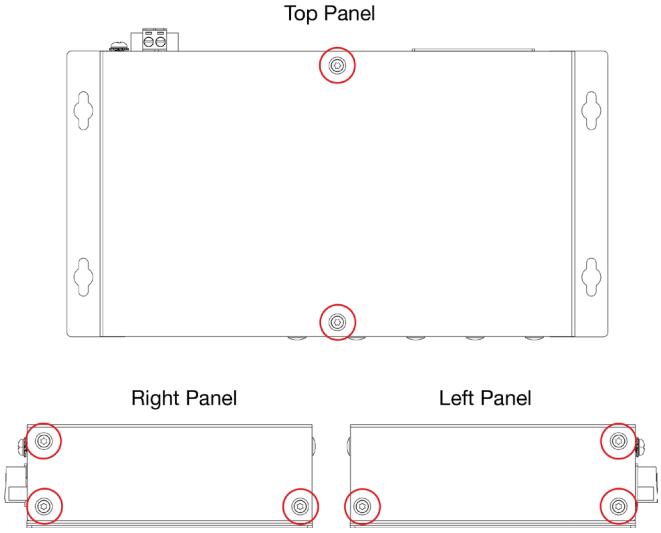
7. Connect the antenna on the connector, place the cover and fasten all eight screws.

NOTE

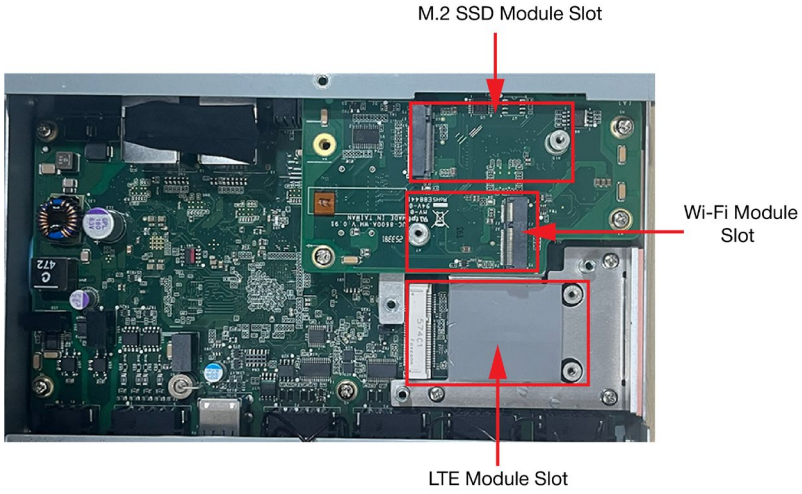
To achieve optimal thermal performance during wireless operation, install the UC-8600A on a metallic mounting surface.

UC-8630A Models

1. Unfasten the two screws on the top panel, three screws on the left panel and three screws on the right panel. Take off the cover.

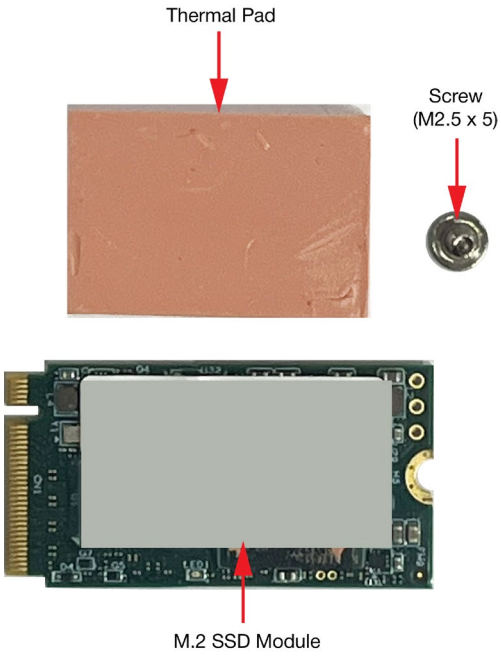


2. Find the locations of the internal module slots inside the UC-8630 computer.

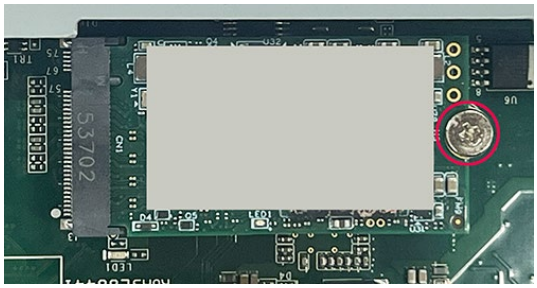


Inserting the M.2 SSD Module

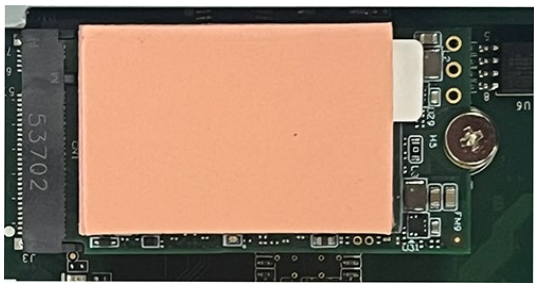
1. Check the M.2 SSD module package of the UC-8630A Series



2. Insert the M.2 SSD module in the slot. Fasten the screw on the end of the screw.

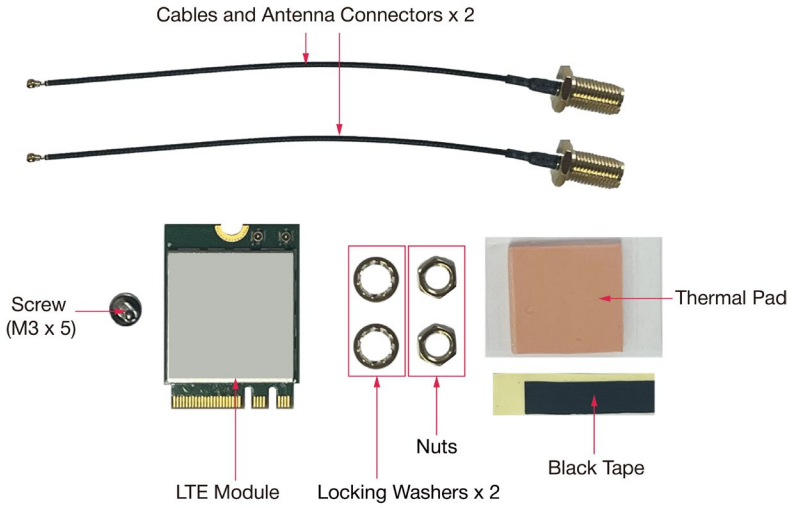


3. Place the thermal pad on the M.2 SSD module.

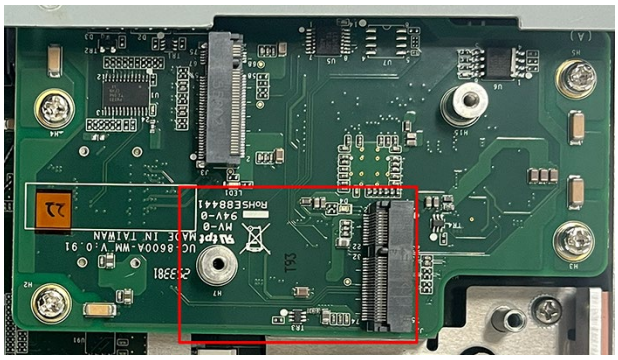


Inserting the Wi-Fi Module

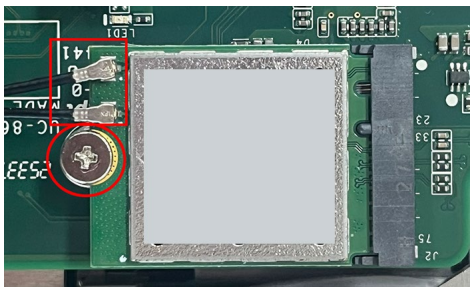
1. Check the Wi-Fi module package of the UC-8630A Series.



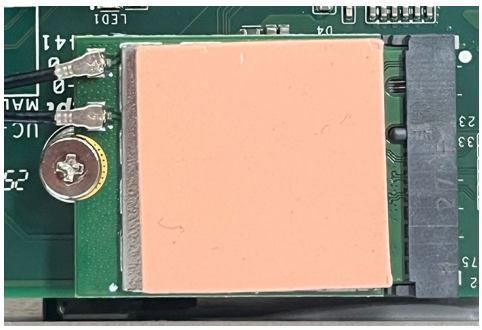
2. The location of the Wi-Fi module slot is shown in the following diagram.



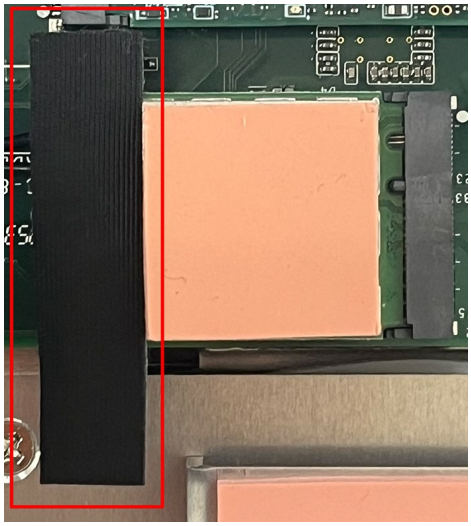
3. Insert the Wi-Fi module into the slot and fasten the screw at the end of the module. Next, connect the two cables on the connectors above the screw.



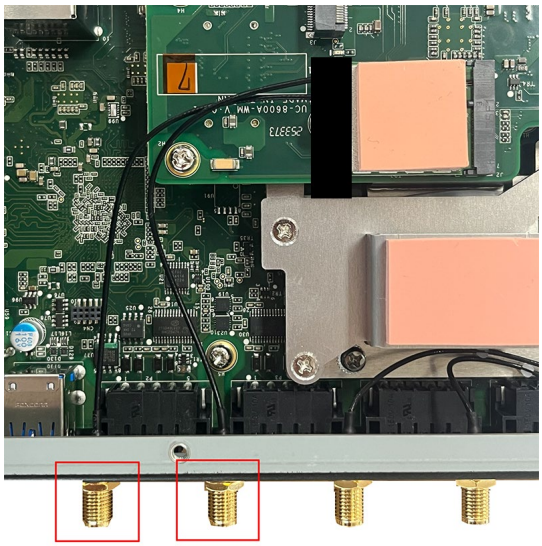
4. Place the thermal pad on the Wi-Fi module.



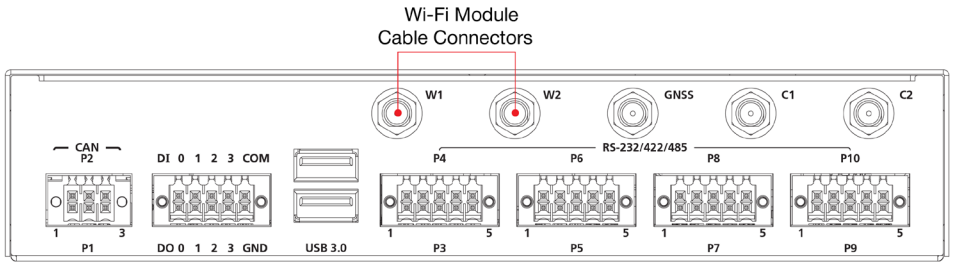
5. Place the black tape on the end of the module to fix the cables.



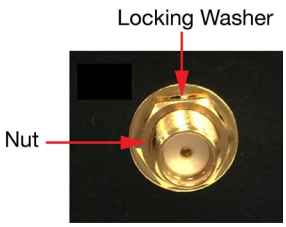
6. Connect the other end of the cable connectors to the connector holes on the rear panel of the computer.



7. Make sure you have connected to the holes marked W1 and W2 on the rear panel.



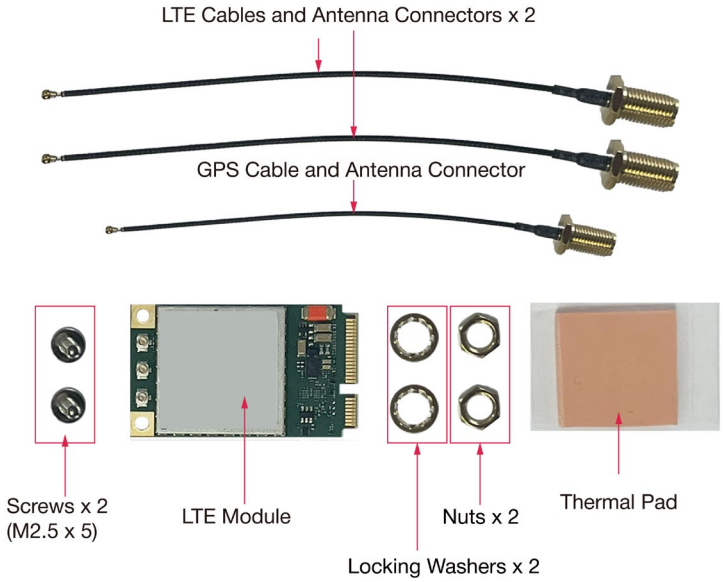
8. On the rear panel, pass the antenna mount's threaded connection ring through the mounting hole, hold the locking washer against the rear panel and secure the antenna connector by tightening the nut onto the threaded protection ring.



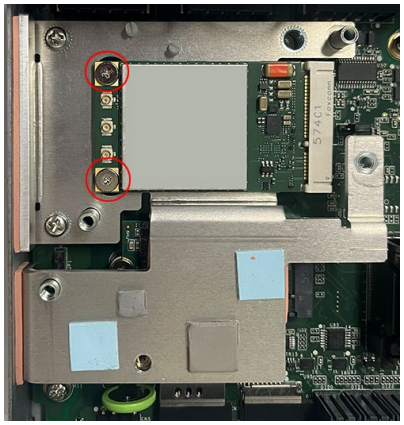
9. Connect the antenna on the connector, place the cover on the computer and fasten all eight screws.

Installing the LTE Module

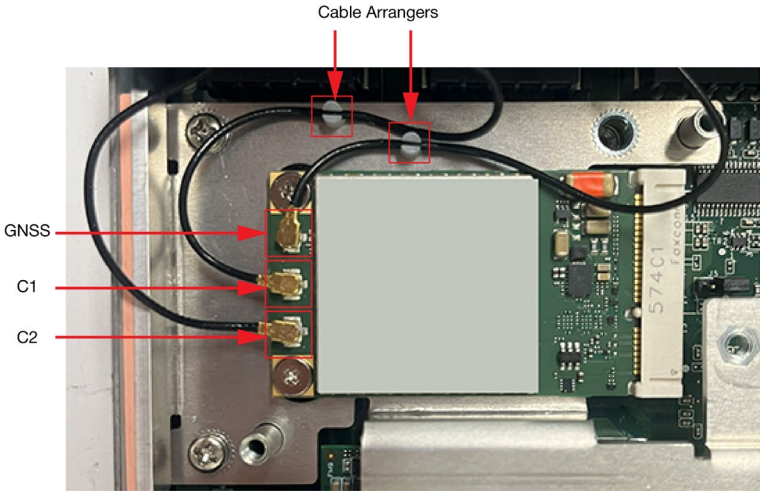
1. Check the LTE module package.



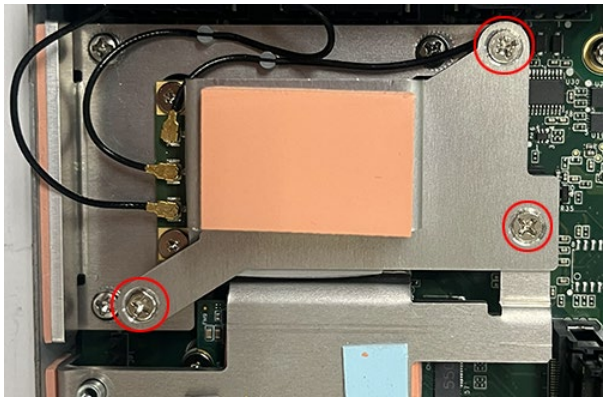
2. Insert the LTE module into the slot and fasten the screws on the end of the module.



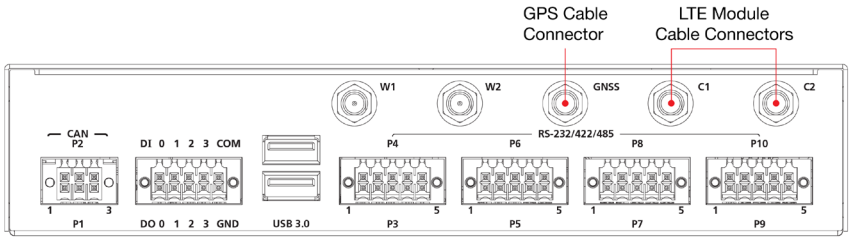
3. Connect the cables on the connectors. Each cable should be connected to the specific connectors on the front panel. Two cables are suggested to pass through the cable arrangers to fix the cables. Make sure you have connected the cables on the correct connectors. Refer to the following figure.



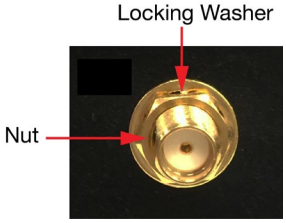
4. Place the thermal pad on the LTE module and then place the second set of heat sink on the module. Fasten the three screws and place another thermal pad on it.



5. Place the other end of the cable connector on the connector hole on the rear panel of the computer. Make sure you have connected to the correct connector holes. Refer to the following diagram.



6. On the rear panel, pass the antenna mount's threaded connection ring through the mounting hole, hold the locking washer against the rear panel and secure the antenna connector by tightening the nut onto the threaded protection ring.



7. Connect the antenna on the connector, place the cover and fasten all eight screws.

NOTE

To achieve optimal thermal performance during wireless operation, install the UC-8600A on a metallic mounting surface.

A. Regulatory Approval Statements

FCC Statement

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.

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

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.

This device and its antenna must not be co located or operating in conjunction with any other antenna or transmitter.

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.

IC Statement

The radiated output power of the Wireless Device is below the Innovation, Science and Economic Development Canada (ISED) radio frequency exposure limits. The Wireless Device should be used in such a manner that the potential for human contact during normal operation is minimized.

This device has also been evaluated and shown compliant with the ISED RF Exposure limits under mobile exposure conditions. (antennas should be more than 20 cm from a person's body).

La puissance de sortie rayonnée du dispositif sans fil est inférieure aux limites d'exposition aux radiofréquences d'Innovation, Sciences et Développement économique Canada (ISED). Le dispositif sans fil doit être utilisé de manière à minimiser le potentiel de contact humain pendant le fonctionnement normal.

Cet appareil a également été évalué et montré conforme aux limites d'exposition RF ISED dans des conditions d'exposition mobiles. (Les antennes sont à plus de 20 cm du corps d'une personne).