

# UC-8100A-ME-T Series Hardware User's Manual

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# UC-8100A-ME-T Series Hardware User's Manual

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## Introduction

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The UC-8100A-ME-T computing platform is designed for embedded data acquisition applications. The UC-8100A-ME-T platform comes with two RS-232/422/485 serial ports and dual 10/100 Mbps Ethernet LAN ports, as well as a Mini PCIe socket to support cellular modules. These versatile communication capabilities let users efficiently adapt the UC-8100A-ME-T to a variety of complex communications solutions.

The following topics are covered in this chapter:

- ❑ **Model Descriptions**
- ❑ **Package Checklist**
- ❑ **Product Features**
- ❑ **Hardware Specifications**

# Model Descriptions

The UC-8100A-ME-T Series includes the following models:

- **UC-8112A-ME-T-LX**: Industrial computing platform with 2 serial ports, 2 Ethernet ports, SD socket, -40 to 85°C operating temperature range
- **UC-8112A-ME-T-LX-US**: Industrial computing platform with 2 serial ports, 2 Ethernet ports, SD socket, US region LTE built-in, -40 to 70°C operating temperature range
- **UC-8112A-ME-T-LX-EU**: Industrial computing platform with 2 serial ports, 2 Ethernet ports, SD socket, Europe region LTE built-in, -40 to 70°C operating temperature range
- **UC-8112A-ME-T-LX-AP**: Industrial computing platform with 2 serial ports, 2 Ethernet ports, SD socket, APAC region LTE built-in, -40 to 70°C operating temperature range

# Package Checklist

Before installing a UC-8100A-ME-T computer, verify that the package contains the following items:

- UC-8100A-ME-T Series computer
- Console cable
- Power jack
- Quick Installation Guide (printed)
- Warranty card

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

**NOTE** The console cable and power jack can be found beneath the molded pulp cushioning inside the product box.

# Product Features

- Armv7 Cortex-A8 1 GHz processor
- 2 auto-sensing 10/100 Mbps Ethernet ports
- SD socket for storage expansion
- Programmable LEDs and a programmable button for easy installation and maintenance
- Mini PCIe socket for cellular module
- Debian 9 open platform
- -40 to 70°C wide temperature range with LTE enabled

# Hardware Specifications

## Computer

**CPU:** Armv7 Cortex-A8 1 GHz

**OS (preinstalled):** Moxa Industrial Linux (Based on Debian 9, Linux Kernel 4.4)

**USB:** USB 2.0 host x 1 (type A connector)

**DRAM:** 1 GB DDR3 SDRAM

## Storage

**Storage Expansion:**• SDHC/SDXC socket for storage expansion

- 8 GB eMMC flash with OS preinstalled

## Ethernet Interface

**LAN:** 2 auto-sensing 10/100 Mbps ports (RJ45)

**Magnetic Isolation Protection:** 1.5 kV built-in

## Cellular Interface

**Standard:** LTE (FDD) 3GPP Rel.9 compliant

**Regional Variants:**• US Model: UC-8112A-ME-T-LX-US

LTE Bands: 2, 4, 5, 13, 17

UMTS Bands: 850/1900 MHz

- Europe Model: UC-8112A-ME-T-LX-EU

LTE Bands: 1, 3, 5, 7, 8, 20

UMTS Bands: 850/900/1900/2100 MHz

- APAC Model: UC-8112A-ME-T-LX-AP

LTE Bands: 1, 3, 5, 7, 8, 28

UMTS Bands: 850/900/1900/2100 MHz

## Serial Interface

**Serial Standards:** 2 RS-232/422/485 ports, software-selectable (5-pin terminal block connector)

**Console Port:** RS-232 (TxD, RxD, GND), 4-pin pin header output (115200, n, 8, 1)

## Serial Communication Parameters

**Data Bits:** 5, 6, 7, 8

**Stop Bits:** 1, 1.5, 2

**Parity:** None, Even, Odd, Space, Mark

**Flow Control:** XON/XOFF, ADDC® (automatic data direction control) for RS-485

**Baudrate:** 921600 bps (max.)

## Serial Signals

**RS-232:** TxD, RxD, RTS, CTS, GND

**RS-422:** TxD+, TxD-, RxD+, RxD-, GND

**RS-485-4w:** TxD+, TxD-, RxD+, RxD-, GND

**RS-485-2w:** Data+, Data-, GND

## LEDs

**System:** Power x 1, USB x 1, SD x 1, signal strength x 3

**LAN:** 10M/100M on connector

**Programmable:** Diagnostic x 3

## Switches and Buttons

**Push Button:** Initially configured to return a diagnostic report, and to reset the device to factory defaults

## Physical Characteristics

**Housing:** SECC + AI 5052

**Weight:** 550 g (1.22 lb)

**Dimensions:** 141.5 x 120 x 33 mm (5.57 x 4.72 x 1.30 in)

**Mounting:** DIN-rail (Default), Wall mounting (Optional by accessories)

### Environmental Limits

**Operating Temperature:**

Without LTE Module preinstalled: -40 to 85°C (-40 to 185°F)

With LTE Module preinstalled: -40 to 70°C (-40 to 158°F)

**Storage Temperature:** -40 to 85°C (-40 to 185°F)**Ambient Relative Humidity:** 5 to 95% (non-condensing)**Anti-Vibration:** 2 Grms @ IEC 60068-2-64, random wave, 5-500 Hz, 1 hr per axis (without any USB devices attached)**Anti-Shock:** 20 g @ IEC 60068-2-27, half sine wave, 30 ms

### Power Requirements

**Input Voltage:** 12 to 36 VDC (3-pin terminal block, V+, V-, SG)**Input Current:** 500 mA @ 12 VDC**Power Consumption:** 6 W (without cellular module and external USB device attached)

### Standards and Certifications

**Safety:** UL 60950-1**Hazardous Location:** C1D2, IECEX, ATEX**EMC:** EN 55032/24, KC, BSMI, RCM, EAC**EMI:** CISPR 32, FCC Part 15B Class A**EMS:** IEC 61000-4-2 ESD: Contact: 8 kV; Air: 15 kV

IEC 61000-4-3 RS: 80 MHz to 1 GHz, 20 V/m

IEC 61000-4-4 EFT: Power: 4 kV; Signal: 4 kV

IEC 61000-4-5 Surge: DC Power: 1 kV; Signal: 1 kV

IEC 61000-4-6 CS: 10 V

IEC 61000-4-8 PFMF: 300 A/m, 60 s

**Green Product:** RoHS, CRoHS, WEEE**RF Regulatory:** FCC, PTCRB, IC, CE RED (EN 301489, EN 301511, EN 301908), NCC, RCM**Carrier Approval:** Verizon, Telus, AT&T

### Reliability

**Alert Tools:** External RTC (real-time clock)**Automatic Reboot Trigger:** External WDT (watchdog timer)

### Warranty

**Warranty Period:** 5 years**Details:** See [www.moxa.com/warranty](http://www.moxa.com/warranty)

## Hardware Introduction

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The UC-8100A-ME-T embedded computers are compact and rugged, making them suitable for industrial applications. The LED indicators allow you to monitor performance and identify trouble spots quickly, and the multiple ports can be used to connect a variety of devices. The UC-8100A-ME-T 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.

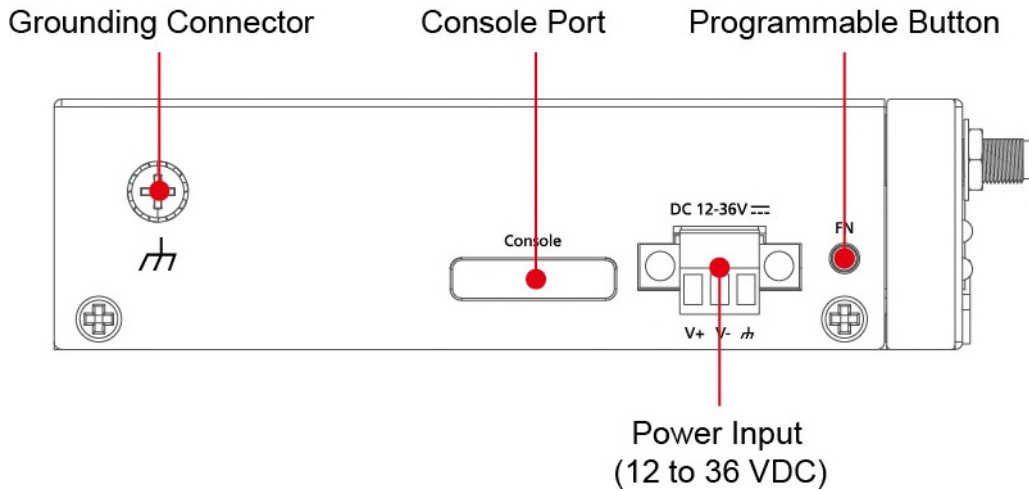
The following topics are covered in this chapter:

- ❑ **Appearance**
- ❑ **LED Indicators**
- ❑ **Reboot**
- ❑ **Reset to Default**
- ❑ **Real Time Clock**
- ❑ **Installation Options**
  - DIN-Rail Mounting
  - Optional Wall Mounting

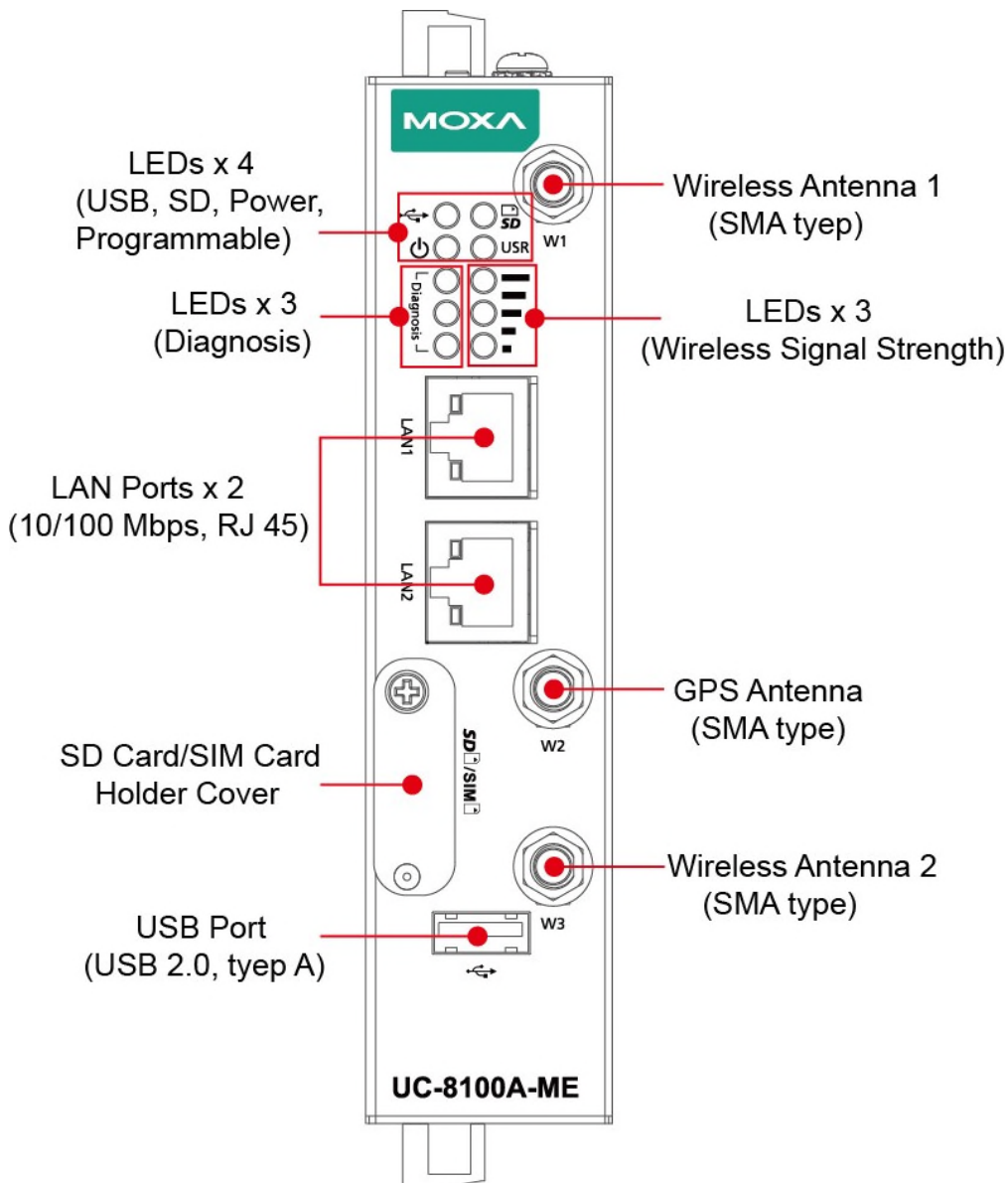


# Appearance

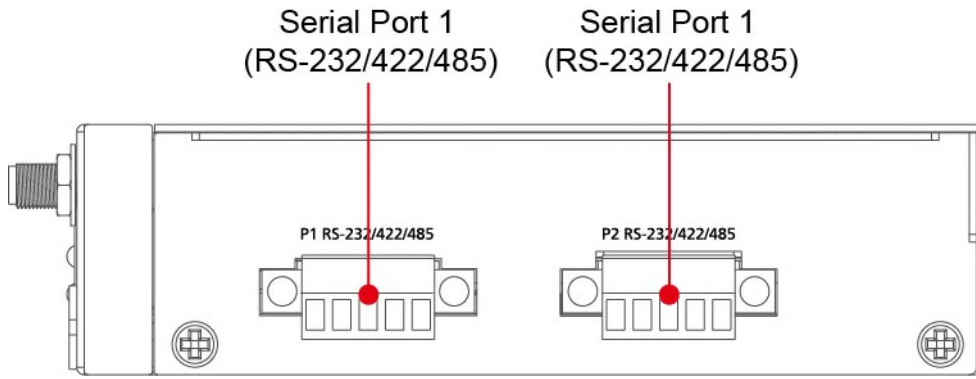
## Top View



## Front View

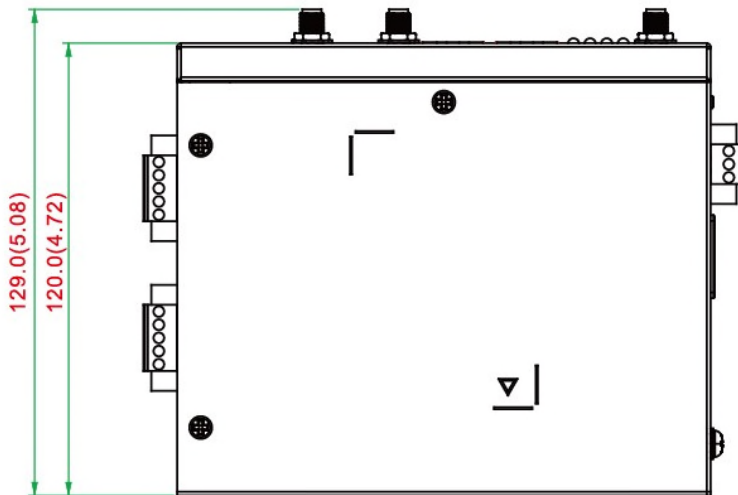
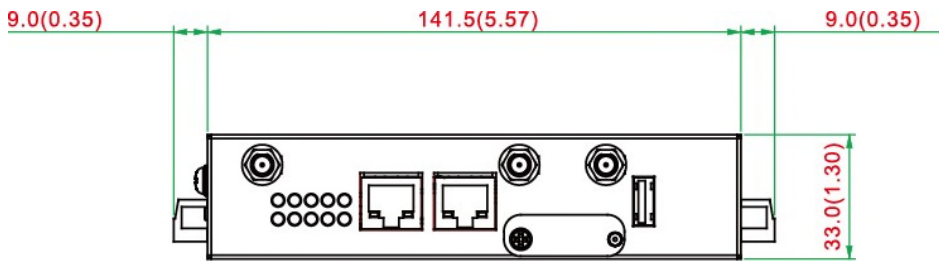


**Bottom View**









**Dimension**

Unit: mm (in)



# LED Indicators

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

LED Name	Color	Function		
	USB	Green	Steady On USB device is connected and working normally.	
		Off	USB device is not connected.	
	SD	Green	Steady On SD Card inserted and working normally.	
		Off	SD card is not detected.	
	Power	Green	Power is on and the computer is working normally.	
		Off	Power is off.	
	LAN1/ LAN 2 (RJ45 connector)	Green	Steady On	100 Mbps Ethernet link
			Blinking	Data transmission in progress
		Yellow	Steady On	10 Mbps Ethernet link
			Blinking	Data transmission in progress
	Wireless Signal Strength	Green Yellow Red	The number of glowing LEDs indicates the signal strength. 3 (Green + Yellow + Red): Excellent 2 (Yellow + Red): Good 1 (Red): Poor	
		Off	Wireless module is not detected.	
<b>USR</b>	User-defined	Green	This LED can be defined by users. For details, refer to <i>Hardware User's Manual</i> .	
	Programmable diagnostic LEDs	Green Yellow Red	These three LEDs are programmable. For details, refer to the "Default Programmable Button Operation" section in the <i>Hardware User's Manual</i> .	

## Reboot

To reboot the computer, press the programmable button for 1 second.

## Reset to Default

The UC-8100A-ME-T is also provided with a **Reset to Default** function which can reset the operating system back to the factory default status. Press and hold the **programmable** button between 7 to 9 seconds to reset the computer to the factory default settings. When the reset button is held down, the **Ready** LED will blink once every second. The **Ready** LED will become steady when you hold the button continuously for 7 to 9 seconds. Release the button within this period to load the factory default settings.

# Real Time Clock

The UC-8100A-ME-T's 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

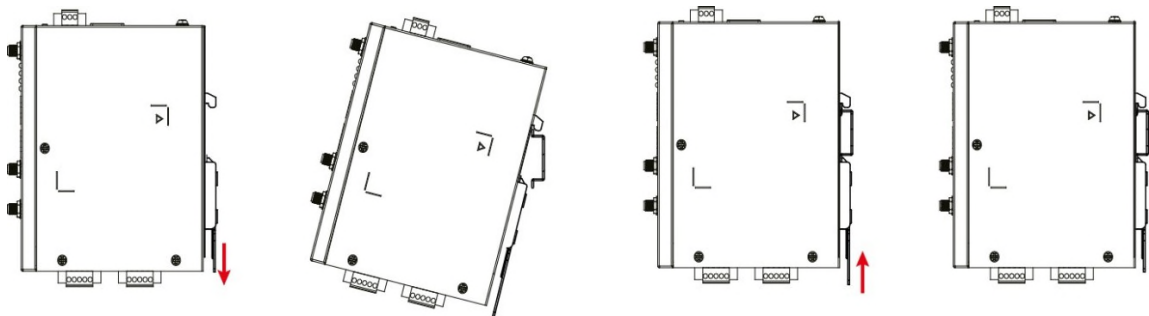
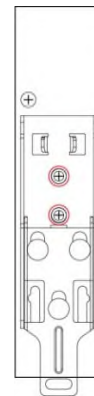
There is a risk of explosion if the battery is replaced with an incorrect type.

# Installation Options

## DIN-Rail Mounting

The aluminum DIN-rail attachment plate is already attached to the product's casing. To mount the UC-8100A-ME-T 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.

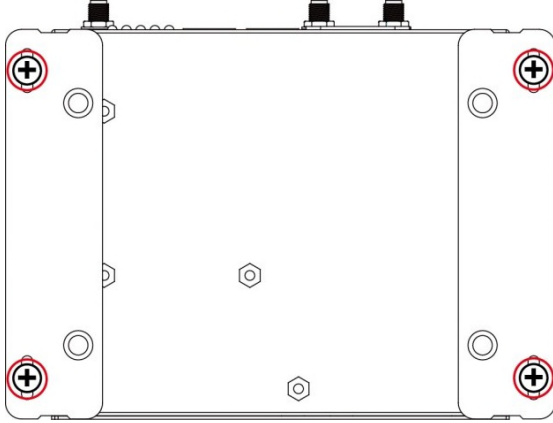


## Optional Wall Mounting

The UC-8100A-ME-T can be mounted with an optional wall-mounting kit. Follow these steps:

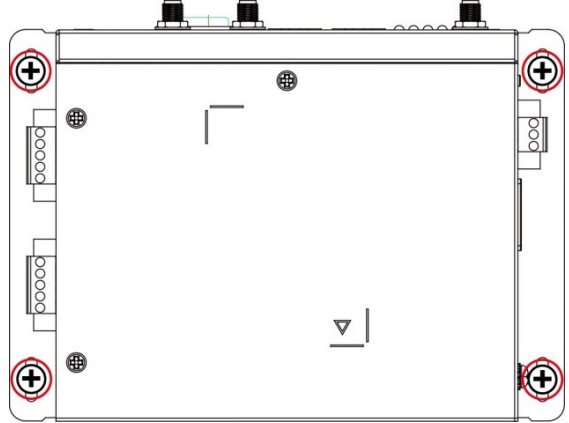
### **Step 1**

Use four screws to fasten the wall-mounting brackets on the left panel of the computer.



### **Step 2**

Use another four screws to mount the computer on a wall or a cabinet.



The optional wall-mounting kit should be purchased separately.

# Hardware Connection Description

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In this chapter, we describe how to connect the UC-8100A-ME-T to a network and various devices for first time testing purposes.

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 SD Card and SIM Card**
- **Connecting to the Console Port**
- **Connecting the Antennas**

# 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.

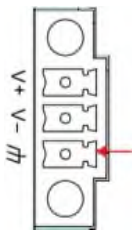
If the current goes above the maximum ratings, the wiring could overheat, causing serious damage to your equipment.

### 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

### Terminal Block



Connect the 12 to 36 VDC power line to the terminal block, which is connector to the UC-8100A-ME-T Series computer. If the power is supplied properly, the "Power" LED will glow a solid green light. The power input location and pin definition are shown in the adjacent diagram.

**SG:** The Shielded Ground (sometimes called Protected Ground) contact is the top contact of the 3-pin power terminal block connector when viewed from the angle shown here. Connect the SG wire to an appropriate grounded metal surface.

## Grounding the Unit

There is another grounding connector on the top panel of the computer. Use this connector to connect a well-grounded mounting surface, such as a metal panel



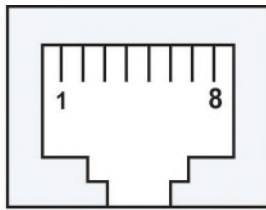
## ATTENTION

A shielded power cord is required to meet FCC emission limits and also 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 UC-8100A-ME-T 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.



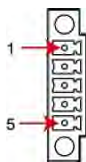
Pin	Signal
1	Tx+
2	Tx-
3	Rx+
4	-
5	-
6	Rx-
7	-
8	-

## Connecting to a USB Device

The UC-8100A-ME-T Series computers come with a USB port located at the lower part of the front panel, allowing users to connect to a device with a USB interface. The USB port uses a type A connector. By default, the USB storage is mounted at `/mnt/usbstorage`.

## Connecting to Serial Ports

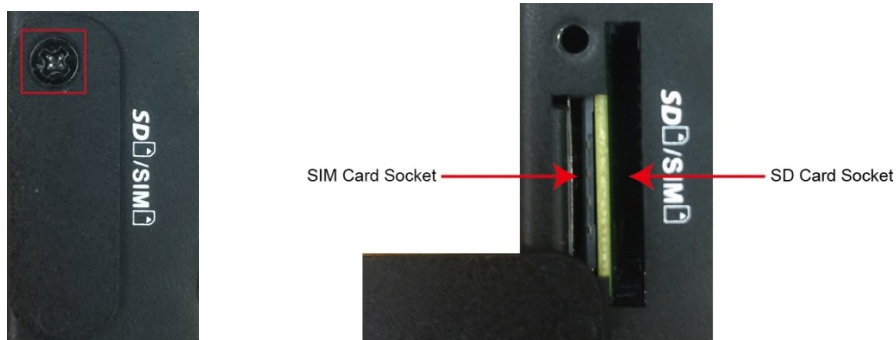
The two serial ports (P1 and P2) use terminal connectors. Each port can be configured by software for RS-232, RS-422, or RS-485. The pin assignments for the ports are shown in the following table:



Pin	RS-232	RS-422	RS-485
1	TXD	TXD+	-
2	RXD	TXD-	-
3	RTS	RXD+	D+
4	CTS	RXD-	D-
5	GND	GND	GND

## Inserting the SD Card and SIM Card

The UC-8100A-ME-T comes with an SD socket for storage expansion, and a SIM card socket for cellular communication. The SD card/SIM card sockets are located at the lower part on the front panel. To install the cards, remove the screw and the protection cover to access the sockets, and then insert the SD card or the SIM card into the sockets directly. You will hear a click when the cards are in place. To remove the cards, push the cards in before releasing them.





## Connecting to the Console Port

The console port is an RS-232 port that can be connected to with a 4-pin pin header cable. You can use this port for debugging or firmware upgrade. Note that the cable is not included in the package.



Pin	Signal
1	TxD
2	RxD
3	NC
4	GND

## Connecting the Antennas



There are three antenna connectors on the front panel of the UC-8100A-ME-T. W1 and W3 are for cellular modules, and W2 is for GPS module; all are SMA type. Connect the antennas on these connectors.

# A

## Regulatory Approval Statements

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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.



**European Community**



### **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.

## **Federal Communications Commission (FCC) Statement**

15.21

You are cautioned that changes or modifications not expressly approved by the part responsible for compliance could void the user's authority to operate the equipment.

FCC RF Radiation Exposure Statement:

1. This Transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.
2. This equipment complies with FCC RF radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 20 centimeters between the radiator and your body.

## **Canada, Industry Canada (IC)**

This device complies with Industry Canada licence-exempt RSS standard(s).

Operation is subject

to the following two conditions:

- (1) this device may not cause interference, and
- (2) this device must accept any interference, including interference that may cause undesired operation of the device

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence.

L'exploitation est autorisée aux deux conditions suivantes:

- (1) l'appareil ne doit pas produire de brouillage, et
- (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

Caution: Exposure to Radio Frequency Radiation.

To comply with RSS 102 RF exposure compliance requirements, a separation distance of at least 20 cm must be maintained between the antenna of this device and all persons.

Pour se conformer aux exigences de conformité CNR 102 RF exposition, une distance de séparation d'au moins 20 cm doit être maintenue entre l'antenne de cet appareil et toutes les personnes.

## Taiwan NCC



Support FDD LTE 850/900/1900/2100 MHz

減少電磁波影響，請妥適使用

『注意：行動電話業務(2G)於106年6月停止提供服務後，本設備2G功能在國內將無法使用。』