

# UC-8580 Series

## Vehicle-to-ground computing platform with multiple WWAN ports

### SMA Model

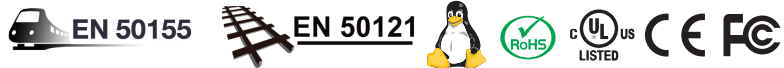


### QMA Model



- > Complies with all EN 50155 mandatory test items\*
- > Supports up to 3 WWAN connections and 2 SIM card slots per cellular module
- > Supports 1 WLAN (IEEE 802.11b/g/n/ac) connection
- > Single-panel I/O design for reduced installation space and easier maintenance
- > Front-side access panel for easy maintenance
- > Isolated 24 to 110 VDC power input with power-ignition function suitable for vehicle applications
- > EN 50155 Tx (-40 to 70°C) operating temperature for harsh environments
- > 5-year warranty

\*This product is suitable for rolling stock railway applications, as defined by the EN 50155 standard. For a more detailed statement, click here: [www.moxa.com/doc/specs/EN\\_50155\\_Compliance.pdf](http://www.moxa.com/doc/specs/EN_50155_Compliance.pdf)



## Overview

Moxa's UC-8580 is an innovative computing platform designed specifically for transportation applications.

The UC-8580 is available with one of two different types of antenna connector. The SMA model supports all SMA type connectors. The QMA model supports TNC connectors for GPS and QMA connectors for Wi-Fi/cellular modules, and has four slots for installing wireless modules\*. Three slots support 3G/LTE modules, and one slot supports a Wi-Fi module. Each 3G/LTE module has two SIM card slots, which can be used to enable redundant cellular network communications or geo-fencing SIM card selection by leveraging the built-in Wireless Manager, a Moxa software utility for cellular and Wi-Fi management.

The UC-8580 uses an open platform based on Debian 8 with Linux Kernel 4.1, allowing solution providers to manage software packages via Debian's APT (Advanced Packaging Tools), or develop software applications with Moxa's API Library and GNU C Library.

\*Wireless modules are sold separately. Please contact a Moxa sales representative for details.

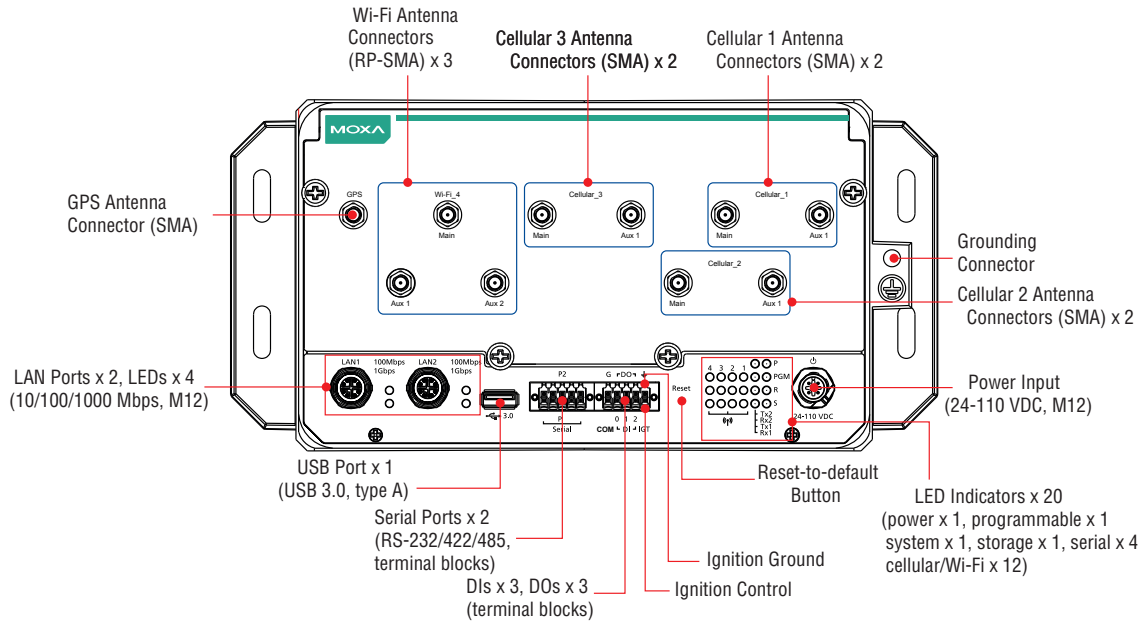
The UC-8580's single-sided I/O design is ideal for vehicle applications, which typically do not have a lot of room for installing communications devices. The UC-8580 also has an access panel on the front side, allowing users to install or change wireless modules, SIM cards, or mSATA cards without removing the entire unit from the wall after being mounted.

The UC-8580 can be used as a communication-centric computing platform for the following applications:

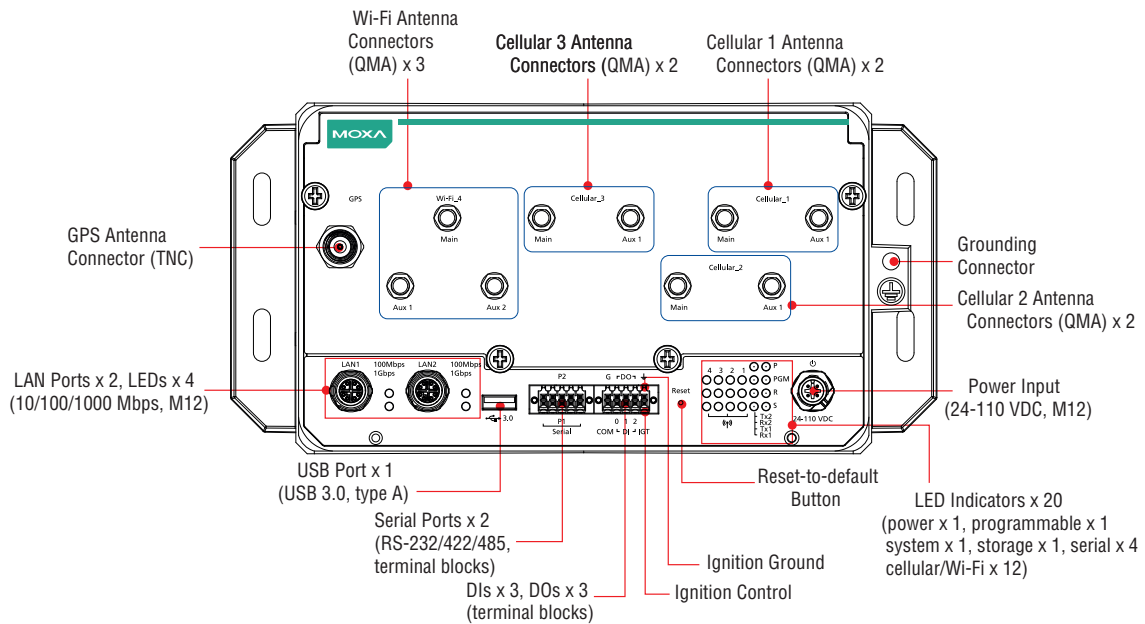
- Vehicle-to-ground communication gateway
- TCMS T2G (train-to-ground) gateway
- Mobile condition monitoring unit
- Ethernet Consist Network T2G gateway
- Onboard wireless automated fare collection unit

Appearance

SMA Model



QMA Model



Hardware Specifications

Computer

**CPU:** ARMv7 Cortex-A7 dual-core 1 GHz processor  
**OS (pre-installed):** Debian 8 (Linux Kernel v4.1)  
**USB:** USB 2.0/3.0 hosts x 1 (Type A connector)  
**DRAM:** 1 GB DDR3L SDRAM

Wireless-Enabled Mini-PCle Slots

**Number of Slots:** 4  
**Slots 1 to 3:** USB signal for cellular modules  
**Slot 4:** PCIe signal for Wi-Fi module  
**SIM Card Slots:** 2 SIM card slots per Mini-PCle slot for cellular modules  
*Note: Wireless modules must be purchased separately.*

## Storage

**Main Storage:** 4 GB eMMC for OS storage

**Storage Expansion:** mSATA slots x 1

## Ethernet Interface

**LAN:** Auto-sensing 10/100/1000 Mbps Ethernet ports x 2 (M12 X-coded, 8-pin)

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

## GPS Module

### Receiver Types:

- 72-channel u-blox M8 engine
- GPS L1C/A
- SBAS WAAS, EGNOS, and MSAS
- QZSS L1C/A
- GLONASS L10F
- BeiDou B1

### Protocols:

Protocol	Types
NMEA 0183, version 4.0 (V2.3 or V4.1 configurable)	Input/output, ASCII
UBX	Input/output, binary, u-blox proprietary
RTCM	Input message, 1, 2, 3, 9

**Time Pulse:** 0.25 Hz to 10 MHz (configurable)

**Velocity Accuracy:** 0.05 m/s

**Heading Accuracy:** 0.3 degrees

**Assisted GNSS (A-GNSS):** Supports AssistNow Online and AssistNow Offline A-GNSS services, supports AssistNow Autonomous, and is OMA SUPL compliant

### Operational Limits (assuming Airborne < 4 g platform):

- Dynamics: 4 g
- Altitude: 50,000 m
- Velocity: 500 m/s

**Antenna Type:** Passive/Active

**Connector Type:** SMA/TNC

## Serial Interface

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

**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:** 115200 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

## Digital Input/Output

**Digital Inputs:** 3 (terminal block)

**Digital Input Default Value:** High

**Input Voltage:** 0 to 30 VDC at 25 Hz

**Digital Input Levels for Dry Contacts:**

Logic level 0: Close to GND

Logic level 1: Open

**Digital Input Levels for Wet Contacts:**

Logic level 0: +3 V max.

Logic level 1: +10 V to +30 V (COM to DI)

**Digital Outputs:** 3 (terminal block)

**DO Default Value:** High-Z

**DO IO Type:** Open drain

**Output Current:** Max. 200 mA per channel

**On-State Voltage:** 24 VDC nominal, open collector to 30 VDC

**Isolation:** 3 kV optical isolation

**Connector:** 10-pin terminal blocks with CAGE CLAMP® connection (4 inputs, COM, GND, 4 outputs)

## LEDs

**System:** Power x 1, System Ready x 1

**LAN:** 100/1000M x 4

**Serial:** Tx x 2, Rx x 2

**Programmable:** Diagnostics x 1

**Wireless Signal Strength:** Cellular/Wi-Fi x 12

## Buttons

**Reset to Default:** Resets the device to factory default values

## Physical Characteristics

**Housing:** AI 5052 + ADC 12

**Weight:** 2.2 kg (4.86 lb)

### Dimensions:

- 220 x 134 x 88 mm (8.66 x 5.28 x 3.46 in) without wallmount ears
- 270 x 134 x 88 mm (10.63 x 5.28 x 3.46 in) with wallmount ears

**Mounting:** Wall

## Environmental Limits

### Operating Temperature:

- UC-8580-LX, UC-8580-Q-LX:  
EN 50155 Class T1, -25 to 55°C (-13 to 131°F)
- UC-8580-T-LX, UC-8580-T-Q-LX, UC-8580-T-CT-LX,  
UC-8580-T-CT-Q-LX (with LTE module):  
EN 50155 Class Tx, -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:

- 7.9 m/s<sup>2</sup> @ EN 50155 random wave, 5-150 Hz, 5 hrs per axis
- 1.01 m/s<sup>2</sup> @ EN 50155 random wave, 5-150 Hz, 20 mins per axis

**Anti-Shock:** 50 m/s<sup>2</sup> @ EN 50155, half sine wave, 30 ms

**Conformal Coating:** EN 50155 Tx

## Power Requirements

**Input Voltage:** 24 to 110 VDC

(EN 50155 nominal input voltages: 24/48/72/96/110 V)

**Input Current:** 1.66 A @ 24 VDC; 0.36 A @ 110 VDC

**Power Consumption:** Less than 40 W

(with external loading on USB port and Mini-PCIe module)

**Power-to-Chassis Isolation:** 1400 VDC

(EN 50155 power interruption class S2)

**Connector:** M12 4-pin A-coded (2-pin M12, V+, V-)

## Standards and Certifications

**Safety:** UL 60950-1, CSA C22.2 No. 60950-1-03, EN 60950-1

**EMC:** EN 55032 Class A, EN 61000-4-2, EN 61000-4-3, EN 61000-4-4, FCC Part 15 Subpart B Class A

**Green Product:** RoHS, CRoHS, WEEE

**Rail Traffic:** EN 50155, EN 50121-4, EN 45545, NFPA 130

## Reliability

**Alert Tools:** Built-in buzzer and RTC (real-time clock)

**Automatic Reboot Trigger:** Built-in WDT (watchdog timer)

## Warranty

**Warranty Period:** 5 years

**Details:** See [www.moxa.com/warranty](http://www.moxa.com/warranty)

**Note:** The Hardware Specifications apply to the embedded computer unit itself, but not to accessories. In particular, the wide temperature specification does not apply to accessories such as the power adapter and cables.

## Software Specifications

### Linux

**OS:** Debian 8

**Web Server (Apache):** Allows you to create and manage web sites; supports PHP and XML

**Terminal Server (SSH):** SSH allows remote logins to a secure encrypted console from any connected network

**Kernel:** GNU/Linux 4.1

System Shell: dash, bash

Text Editor: vim, nano

**File System:** Ext2, Ext3, Ext4

**Internet Protocol Suite:** TCP, UDP, IPv4, IPv6, SNMPv2, ICMP, ARP, HTTP, CHAP, PAP, DHCP, NTP, NFS, SSH, PPP, SFTP, RSYNC, SSL

**Programming Language Support:** PHP, Perl, Python

**Internet Security:** OpenVPN, iptables

**Cryptographic Hardware Accelerators:** AES, SHA, OpenSSL

**Self Diagnosis:** Check the status of system and hardware components via software

**Linux Board Support Packages (BSP):** GCC C/C++ cross development tool chain: Bootloader/Kernel/filesystem

### Cellular Networking:

- **WVDIAL:** Point-to-Point Protocol dialer that dials a modem and starts pppd service to connect to the Internet

- **QMI (Qualcomm MSM Interface):** Glib-based library for talking to WWAN modems and devices that speak the Qualcomm MSM Interface (QMI) protocol

- **Watchdog:** Features a hardware function to trigger system reset in a user-specified time interval (Linux standard provided)

### Application Development Software:

- Moxa API Library (Watchdog timer, Moxa serial I/O control, Moxa DI/DO API)

- GNU C/C++ cross-compiler

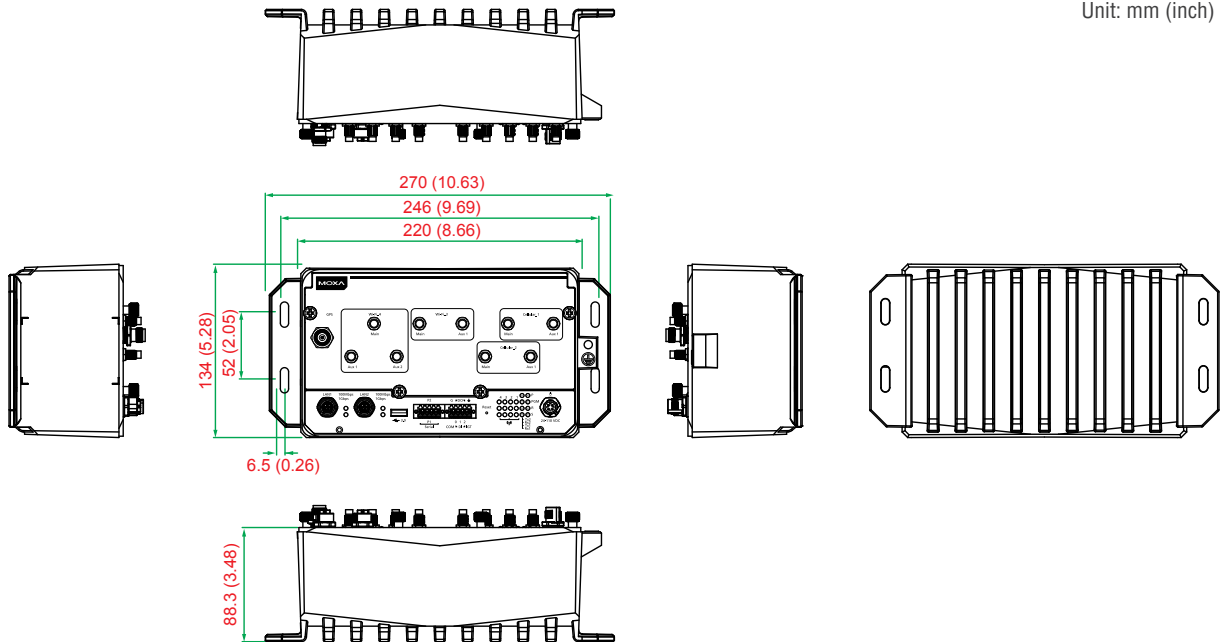
- GNU C library

- GDB source-level debugging server

- **Software Protection:** Encryption tool for user executable files (based on patented Moxa technology)

- **Wireless Communication Management Tool:** SW utility and SDK for the management of wireless interfaces; supports the management of dual-SIM-on-single-modem

## Dimensions



## Ordering Information

Type	Available Models	Operating Temperature	Conformal Coating
SMA Models	UC-8580-LX	-25 to 55°C (-13 to 131°F)	–
	UC-8580-T-LX	-40 to 70°C (-40 to 158°F)	–
	UC-8580-T-CT-LX	-40 to 70°C (-40 to 158°F)	✓
QMA Models	UC-8580-Q-LX	-25 to 55°C (-13 to 131°F)	–
	UC-8580-T-Q-LX	-40 to 70°C (-40 to 158°F)	–
	UC-8580-T-CT-Q-LX	-40 to 70°C (-40 to 158°F)	✓







### Package Checklist

- UC-8580 Series computer
- CBL-4PINDB9F-100: 4-pin pin header to DB9 female console port cable, 100 cm
- Quick installation guide (printed)
- Warranty card

**Optional Accessories (can be purchased separately)**

Type	Model Name	Description
<b>Power</b>		
	Cable CBL-M12FF4POPEN-150 IP67	Phoenix Contact 4-pin female A-coded M12-Open power cable, 1.5 meters, IP67-rated
	Cable CBL-M12FF4POPEN-300 IP67	Phoenix Contact 4-pin female A-coded M12-Open power cable, 3 meters, IP67-rated
	Connector M12A-4PFF-IP67	Phoenix Contact 4-pin female A-coded connector
	Connector M12A-4PMM-IP67	Phoenix Contact 4-pin male A-coded connector
	Adapter PWR-24270-DT-S1	Power adapter, input voltage 90 to 264 VAC, output voltage 24 VAC with a 2.7 A DC load
	Power Cord PWC-C7US-2B-183	Power cord with 2-pin connector, USA plug
	Power Cord PWC-C7EU-2B-183	Power cord with 2-pin connector, Euro plug
	Power Cord PWC-C7UK-2B-183	Power cord with 2-pin connector, British plug
	Power Cord PWC-C7AU-2B-183	Power cord with 2-pin connector, Australia plug
	Power Cord PWC-C7CN-2B-183	Power cord with 2-pin connector, China plug
	Console Cable CBL-F9DPF1x4-BK-100	Console cable with 4-pin connector
<b>Ethernet</b>		
	Cable & Connector CBL-M12XMM8PRJ45- BK-100-IP67	Phoenix Contact 8-pin male X-coded M12-to-RJ45 Cat.5e UTP gigabit Ethernet cable, 1 meter, IP67-rated
	Cable & Connector CBL-M12XMM8PRJ45- BK-200-IP67	Phoenix Contact 8-pin male X-coded M12-to-RJ45 Cat.5e UTP gigabit Ethernet cable, 2 meters, IP67-rated
	Connector M12X-8PMM-IP65	Phoenix Contact 8-pin male X-coded connector

**Optional Accessories (can be purchased separately)**

Type	Model Name	Description
<b>LTE</b>		
	Mini-PCIe Card UC-8580-4GCat6-NAMEU	LTE Cat. 6 module for North America and Europe, 2 SMA connectors with cable
	Mini-PCIe Card UC-8580-4GCat6-Q-NAMEU	LTE Cat. 6 module for North America and Europe, 2 QMA connectors with cable
	Mini-PCIe Card UC-8580-4GCat4-CN	LTE Cat. 4 module for China, 2 SMA connectors with cable
	Mini-PCIe Card UC-8580-4GCat4-Q-CN	LTE Cat. 4 module for China, 2 QMA connectors with cable
<b>Wi-Fi</b>		
	Mini-PCIe Card UC-8580-WLAN33-AC	3x3 802.11ac/a/b/g/n module, 3 SMA connectors with cable
	Mini-PCIe Card UC-8580-WLAN33-Q-AC	3x3 802.11 ac/a/b/g/n module, 3 QMA connectors with cable