

UC-8580 Series

Preliminary

Vehicle-to-ground computing platform with multiple WWAN ports



- > 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



Overview

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

The UC-8580 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.

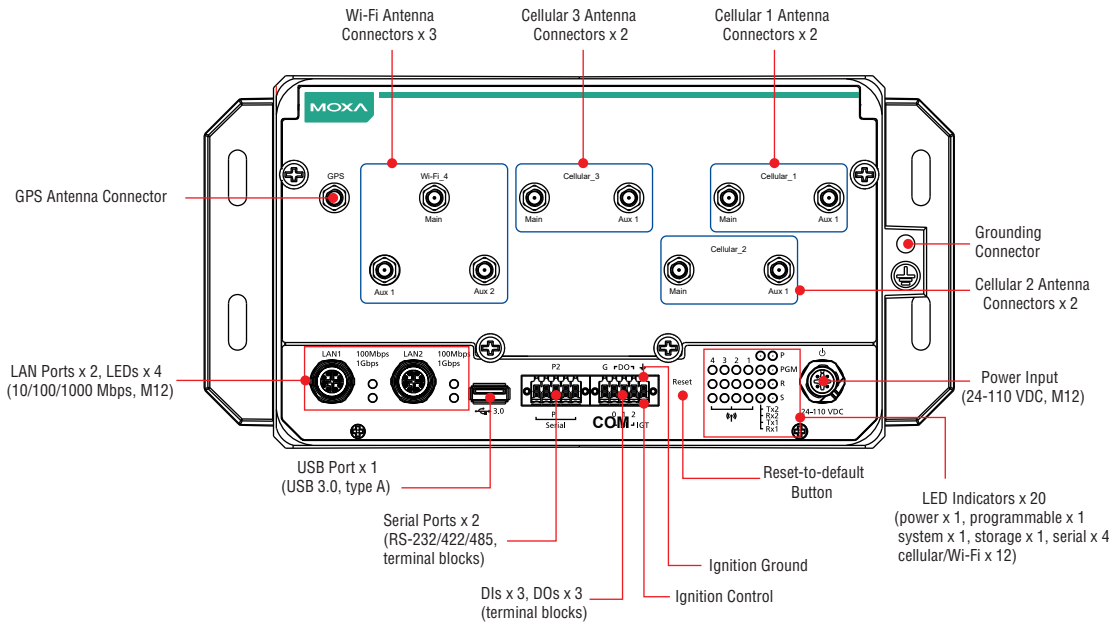
The UC-8580's single-sided I/O design is ideal for vehicle applications, which typically do not have a lot of room for installing communications devices. The UC-8580 also has an access panel on the front side, allowing users to install or change wireless modules, SIM cards, or mSATA cards without needing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

*Wireless modules must be purchased separately. Please contact a Moxa sales representative for details.

Appearance



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-PCIe 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-PCIe 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 L1C/A
- QZSS L1C/A
- GLONASS L10F
- BeiDou B1

| 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 (F)

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: EN 50155 Class T1, -25 to 55°C (-13 to 131°F)
- UC-8580-T-LX/UC-8580-T-CT-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/s² @ EN 50155 random wave, 5-150 Hz, 5 hrs per axis

Anti-Shock: 50 m/s² @ 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

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:

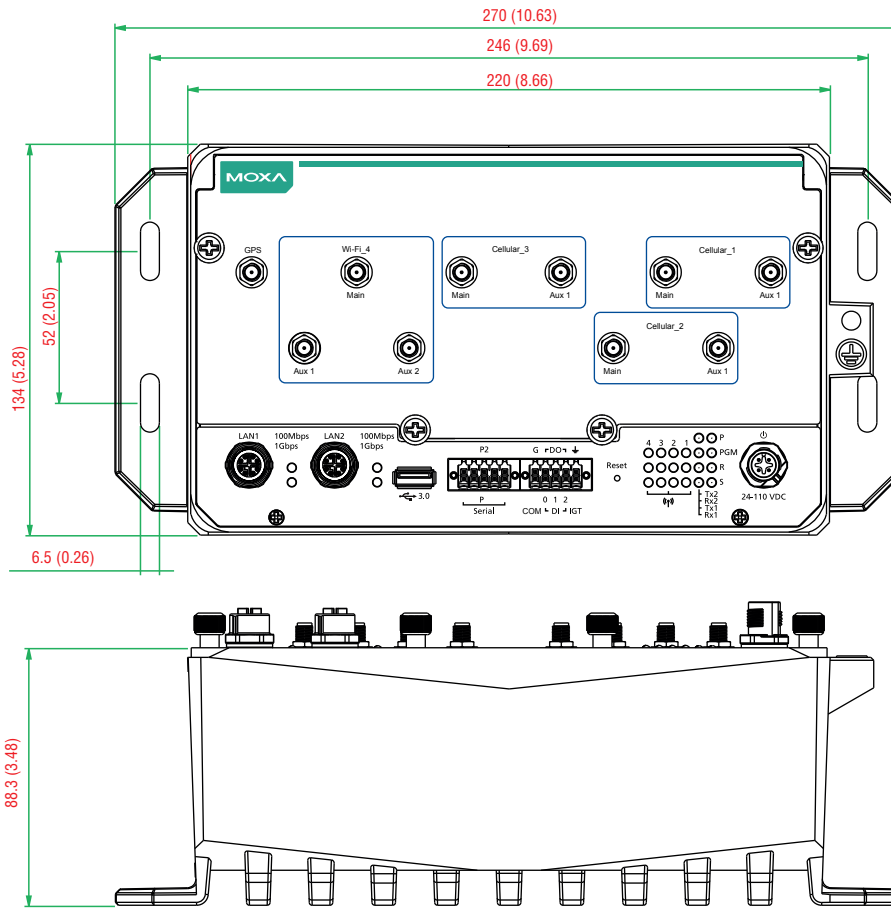
- Moxa API Library (Watchdog timer, Moxa serial I/O control, Moxa DI/DO API)
- GNU C/C++ cross-compiler
- GNU C library
- GDB source-level debugging server

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

Unit: mm (inch)



Ordering Information

| Available Models | Operating Temperature | Conformal Coating |
|------------------|----------------------------|-------------------|
| 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) | ✓ |


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 | |
|---|-------------------|------------------------------|--|
| Power | | | |
|  | Cable | CBL-M12(FF5P)/Open-150 IP67 | Phoenix Contact 4-pin female A-coded M12-Open power cable, 1.5 meters, IP67-rated |
|  | Cable | CBL-M12(FF5P)/Open-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 |
| Ethernet | | | |
|  | 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 |
|---|------------------|---|
| LTE | | |
|  | Mini-PCIe Card | UC-8580-4GCat3-US LTE Cat. 3 module for North America, 2 SMA connectors with cable, 2 screws |
| | Mini-PCIe Card | UC-8580-4GCat3-EU LTE Cat. 3 module for Europe, 2 SMA connectors with cable, 2 screws |
| | Mini-PCIe Card | UC-8580-4GCat3-CN LTE Cat. 3 module for China, 2 SMA connectors with cable, 2 screws |
| | External Antenna | ANT-LTEUS-ASM-01 LTE-US external antenna with SMA connector |
| | External Antenna | ANT-LTE-ASM-02 LTE-EU external antenna with SMA connector |
| Wi-Fi | | |
|  | Mini-PCIe Card | UC-8580-WLAN33-AC 3x3 802.11ac/a/b/g/n module, 3 SMA connectors with cable |
| | External Antenna | ANT-WDB-ARM-02 Wi-Fi external antenna with SMA connector |
| GPS | | |
|  | External Antenna | ANT-GPS-OSM-05-3M BK 26 dBi, 1,572 MHz, L1 band SMA antenna |