

UC-8100 Series

Communication-centric RISC computing platform



- > ARMv7 Cortex-A8 300/600/1000 MHz processor
- > Dual auto-sensing 10/100 Mbps Ethernet ports
- > SD socket for storage expansion and OS installation
- > Rich programmable LEDs and a programmable button for easy installation and maintenance
- > Mini PCIe socket for cellular module
- > Debian 8 open platform
- > Cybersecurity functions



Introduction

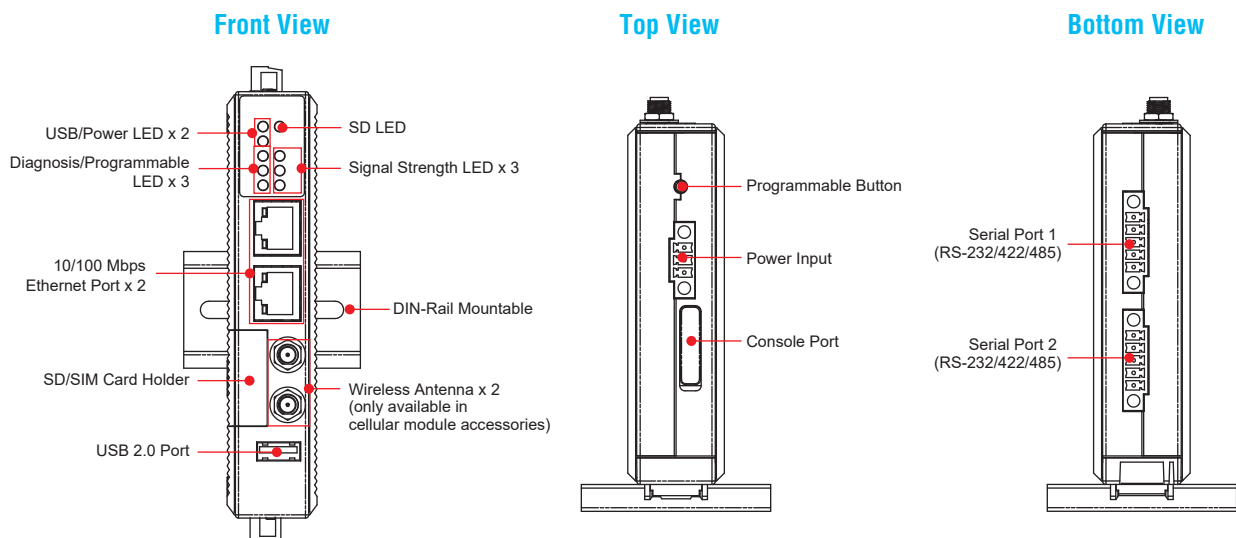
The UC-8100 computing platform is designed for embedded data-acquisition applications. The computer comes with one or two RS-232/422/485 serial ports and dual 10/100 Mbps Ethernet LAN ports, as well as a Mini PCIe socket to support cellular modules. These versatile communication capabilities let users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

The UC-8100 is built around a Cortex-A8 RISC processor that has been optimized for use in energy monitoring systems, but is widely

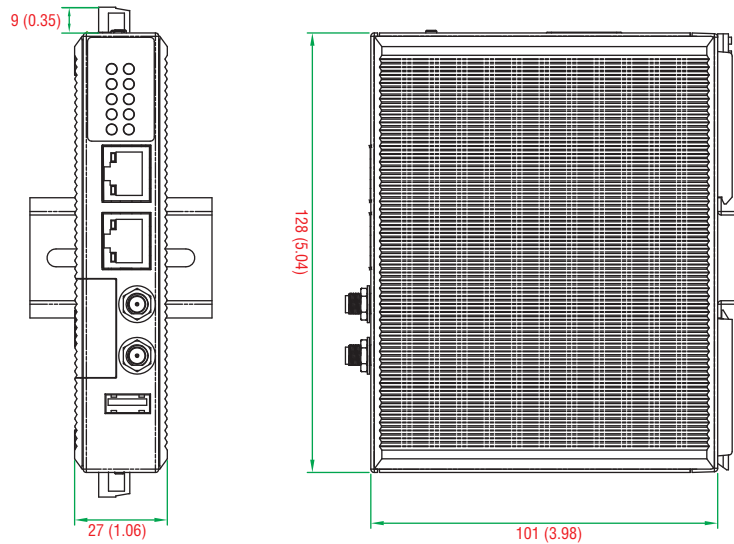
applicable to a variety of industrial solutions. With flexible interfacing options, this tiny embedded computer is a reliable and secure gateway for data acquisition and processing at field sites as well as a useful communication platform for many other large-scale deployments.

All units are thoroughly tested in a testing chamber, guaranteeing that the computing platforms are suitable for wide-temperature applications.

Appearance



Dimensions



Unit: mm (inch)

Hardware Specifications

Computer

CPU: ARMv7 Cortex-A8 300/600/1000 MHz

OS (pre-installed): Debian 8 (Kernel 4.1)

USB: USB 2.0 hosts x 1, Type A connector

DRAM: DDR3 SDRAM:

UC-8112-LX/LX1: 512 MB

UC-8162-LX: 512 MB

UC-8132-LX: 256 MB

UC-8131-LX: 256 MB

Storage

Main Storage:

- 1 GB SD card with OS pre-installed (UC-8131/8132/8162 only)
- 2 GB micro SD card with OS pre-installed (UC-8112-LX/LX1 only)

Storage Expansion: SD socket for storage expansion (UC-8112 only)

Ethernet Interface

LAN: Auto-sensing 10/100 Mbps ports (RJ45) x 2

Magnetic Isolation Protection: 1.5 kV built-in

Serial Interface

Serial Standards: RS-232/422/485 ports, software-selectable (5-pin terminal block connector) x 1 or 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: Max. 921600 bps

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 (UC-8112/8162/8132 with cellular module)

LAN: 10M/100M on connector

Programmable: Diagnosis 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: Polycarbonate plastic

Weight: 224 g (0.50 lb)

Dimensions: 101 x 27 x 128 mm (3.98 x 1.06 x 5.04 in)

Mounting: DIN-rail, wall (with optional kit)

Environmental Limits

Operating Temperature: -10 to 60°C (14 to 140°F)

Storage Temperature: -20 to 80°C (-4 to 176°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 24 VDC (3-pin terminal block, V+, V-, SG)

Input Current:

- 450 mA @ 12 VDC
- 225 mA @ 24 VDC

Power Consumption: 5.4 W (without cellular module and external USB device attached)

Standards and Certifications

Safety: UL 60950-1

EMC: EC 55032/24

EMI: CISPR 32, FCC Part 15B Class A

EMS:

IEC 61000-4-2 ESD: Contact: 4 kV; Air: 8 kV

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

IEC 61000-4-4 EFT: Power: 1 kV; Signal: 0.5 kV

IEC 61000-4-5 Surge: DC Power: 0.5 kV

IEC 61000-4-6 CS: 3 V

IEC 61000-4-8 PFMF: 1 A/m, 60 s

Green Product: RoHS, CRoHS, WEEE

Reliability

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

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

MTBF (mean time between failures)

Time:

- UC-8162-T-LX: 301,648 hrs
- UC-8132-T-LX: 302,648 hrs
- UC-8131-T-LX: 315,063 hrs
- UC-8112-T-LX: 1,181,598 hrs
- UC-8162-LX/UC-8132-LX: 1,195,173 hrs
- UC-8131-LX: 1,465,546 hrs
- UC-8112-LX: 1,149,242 hrs

Standard: Telcordia (Bellcore) Standard TR/SR

Warranty

Warranty Period: 5 years

Details: See www.moxa.com/warranty

Software Specifications

Linux

OS: Debian 8

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

Terminal Server (SSH): Provides secure encrypted communications between two un-trusted hosts over an insecure network

Kernel: GNU/Linux 4.1

System Shell: DASH (default), BASH

Text Editor: vim, nano

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 Suite: OpenVPN, iptables

Cryptographic Hardware Accelerators: AES, SHA, OpenSSL

Self Diagnosis: Check status of system and hardware component via software method

Linux Board Support Packages (BSP):

- GCC C/C++ cross development tool chain
- Bootloader/ Kernel/ filesystem

Cellular Networking: (UC-8132-LX, UC-8162-LX, UC-8112-LX only)

- WVDIAL: Point-to-Point Protocol dialer that dials a modem and starts pppd 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.

• **MODBUS:** Software library to send/receive data according to the Modbus protocol. This library is written in C and supports RTU (serial) and TCP (Ethernet) communications.

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

Cybersecurity:

• **Secure Boot:** A novel authentication algorithm proposed to secure platform integration. Only trusted Linux kernel and bootloader should be executed (Patent Pending).

• **SUDO Mechanism:** Sudo (sometimes considered short for Super-user Do) is a program designed to let system administrators allow some users to execute some commands as root (or another user). The basic philosophy is to give as few privileges as possible but still allow people to get their work done, and the Root account is disabled by default.

• **Security Update of existing software packages:** All packages in the UC-8100 could be updated for security purposes via Debian or Moxa's Advanced Packaging Tool (APT) server.

• **USB Protection:** Provides a mechanism for disabling USB function to avoid USB stick malware attacks.

• **SD Write Protection:** Provides a mechanism for disabling SD write permission both in the filesystem SD and extended storage SD. (Note: Extended storage SD is only supported by the UC-8112-LX).

Ordering Information

Model	CPU	RAM	Serial	Ethernet	Mini PCIe Socket for Wireless Module	Micro SD Socket	SD Socket
UC-8112-LX	1 Ghz	512 MB	2	2	✓	✓ (2 GB MicroSD card with OS pre-installed)	✓ (SD card not attached)
UC-8112-LX1	1 Ghz	512 MB	2	2	✓	✓ (2 GB MicroSD card with OS pre-installed)	✓ (1 GB SD card)
UC-8162-LX	600 Mhz	512 MB	2	2	✓	–	✓ (1 GB SD card with OS pre-installed)
UC-8132-LX	300 Mhz	256 MB	2	2	✓	–	✓ (1 GB SD card with OS pre-installed)
UC-8131-LX	300 Mhz	256 MB	1	2	–	–	✓ (1 GB SD card with OS pre-installed)

Package Checklist (computer)

- UC-8100 embedded computer
- Power jack
- Quick installation guide (printed)
- Warranty card

Optional Accessories

Power Adapters, Power Cords, Console Cables

Model Name	Package Contents	Description
PWR-24270-DT-S1	Adapter x 1	Power adapter with input: 100-240 VAC, 50-60 Hz, 1.5 A Output: 24 VDC, 2.5 A, 60 W for test and system development in the office under ambient temperature
PWC-C7US-2B-183	Power Cord x 1	Power cord with 2-pin connector, USA plug
PWC-C7EU-2B-183	Power Cord x 1	Power cord with 2-pin connector, Euro plug
PWC-C7UK-2B-183	Power Cord x 1	Power cord with 2-pin connector, British plug
PWC-C7AU-2B-183	Power Cord x 1	Power cord with 2-pin connector, Australia plug
PWC-C7CN-2B-183	Power Cord x 1	Power cord with 2-pin connector, China plug
CBL-F9DPF1x4-BK-100	Console Cable x 1	Console cable with 4-pin connector

Wireless Package

Model Name	Package Contents	Description
CELLULAR-LTE-US	<ul style="list-style-type: none"> Cellular module x 1 i-PEX MHF to SMA adapter with cable x 2 Screw sets x 1 	LTE regions: North America (compatible with LTE/US, HSPA, GPRS/ GSM, and GPS) LTE: B2, B4, B5, B13, B17, B25 UMTS/HSPA+: B1, B2, B4, B5, B8 GNSS (GPS+Glonass)
CELLULAR-LTE-EU	<ul style="list-style-type: none"> Cellular module x 1 i-PEX MHF to SMA adapter with cable x 2 Screw set x 1 	LTE regions: Asia, Europe, Australia, New Zealand (compatible with LTE/EU, HSPA+, GPRS/GSM, and GPS) LTE: B1, B3, B7, B8, B20 UMTS/HSPA+: B1, B2, B5, B6, B8 GNSS (GPS+Glonass)
WiFi-BGN	<ul style="list-style-type: none"> WiFi module x 1 i-PEX MHF to RP-SMA adapter with cable x 2 Screw set x 1 ANT-WDB-ARM-02 WiFi antenna x 1 	WiFi Package

Antennas and Internal Antenna Cables

Model Name	Package Contents	Description
ANT-GPS-OSM-05-3M	Active GPS antenna, 26 dBi, 1572 MHz, L1 band antenna for GPS	GPS Antenna
ANT-3G-SMA	SMA male antenna for cellular, support bands: 850/900/1800/1900/2100 MHz	3G Antenna
ANT-LTE-OSM-03-3m BK	Multi-band antenna that covers 700-2700 MHz. Specially designed for 2G, 3G, and 4G applications. Magnetic mounting is available.	4G Antenna
ANT-LTE-ASM-04 BK	LTE Stick antenna that covers 704-960/1710-2620 MHz providing omnidirectional radiation with a gain of 4.5 dBi.	4G Antenna
ANT-LTE-ASM-05 BK	LTE stick antenna that covers 704-960/1710-2620 MHz with a gain of 5 dBi.	4G Antenna
ANT-LTE-OSM-06-3m BK MIMO	Multi-band antenna that covers 700-2700/2400-2500/5150-5850 MHz frequencies. Screw-fastened mounting and full IP67 waterproofing are available.	4G Antenna
ANT-WDB-ARM-02	RP-SMA male antenna for WiFi; supports the 2.4 GHz band.	WiFi Antenna
A-CRF-MHFSF	i-PEX MHF (male, on cellular module) to SMA (female, on top cover) adapter with cable. For when you need to install a GPS antenna.	Cellular antenna cable
CRF-MHF/SMA(M)-14.2	i-PEX MHF (male, on Wi-Fi module) to RP-SMA (female, on top cover) adapter with cable.	WiFi antenna cable

Mounting Kits

Model Name	Package Contents	Description
WALLMOUNT-8100-01	Wall-mounting kit with screws	Wall-mounting Kit