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 ARM 7 open platform
- Cybersecurity

Overview

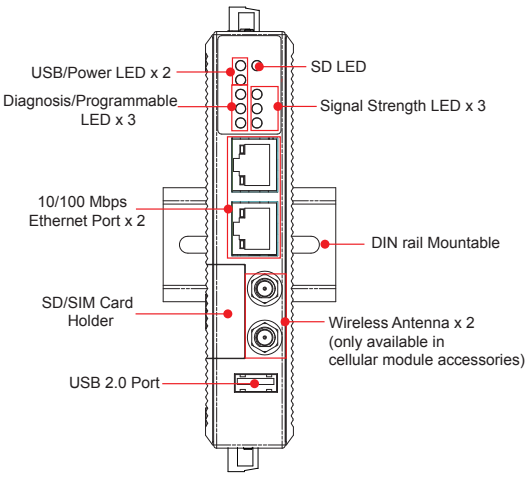
The UC-8100 computing platform is designed for embedded data acquisition applications. The computer comes with one or two RS-232/422/485 serial ports and dual 10/100 Mbps Ethernet LAN ports, as well as a Mini PCIe socket to support cellular modules. These versatile communication capabilities let users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

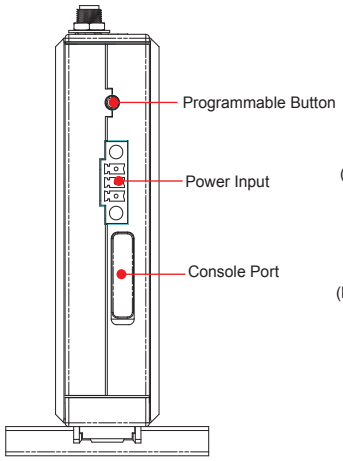
Wide temperature (T) models* are also available for extended temperature applications. All units are thoroughly tested in a testing chamber, guaranteeing that the computing platforms are suitable for wide temperature applications.

Appearance

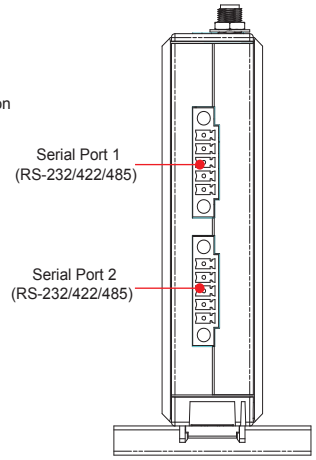
Front View



Top View

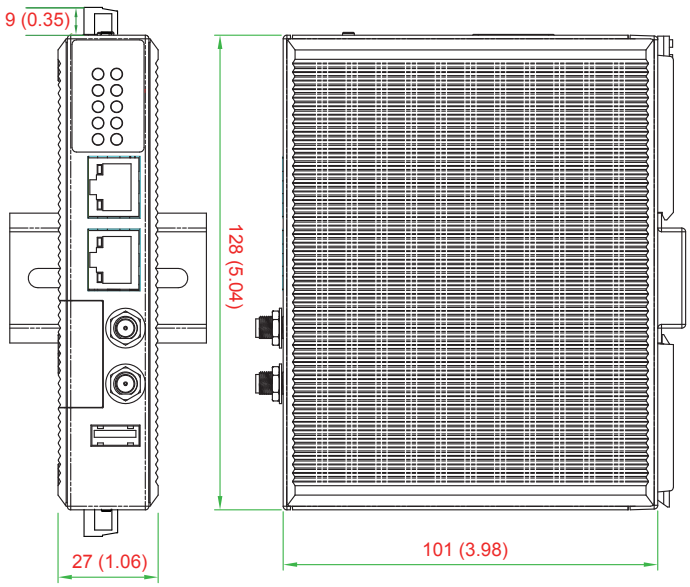


Bottom View



Dimensions

Unit: mm (inch)



Hardware Specifications

Computer
CPU: ARMv7 Cortex-A8 300/600/1000 MHz
USB: USB 2.0 host x 1 (type A connector)
DRAM: 256 MB DDR3 SDRAM
OS (pre-installed): Debian ARM 7 (Kernel 3.2)

Storage
Storage Expansion:
• SDHC/SDXC socket for storing OS and storage expansion
• 1 GB SD card with OS pre-installed
• MicroSD socket for storage expansion (UC-8112-LX only)
• 2 GB MicroSD cards with OS pre-installed (UC-8112-LX only)

Ethernet Interface
LAN: 2 auto-sensing 10/100 Mbps ports (RJ45)
Magnetic Isolation Protection: 1.5 kV built-in

Serial Interface
Serial Standards: 1 or 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: 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
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:
Standard Models: -10 to 60°C (14 to 140°F)
Wide Temp. Models*: -40 to 75°C (-40 to 167°F)
Note: Available by request.
Storage Temperature: -40 to 80°C (-40 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)
Power Consumption: 5.4 W (without cellular module and external USB device attached)
• 450 mA @ 12 VDC
• 225 mA @ 24 VDC

Standards and Certifications
Safety: UL 60950-1, EN 60950-1, CCC (GB9254, GB17625.1)
EMC: EN55022 Class B, EN 55024-4-2, EN 55024-4-3, EN 55024-4-4, FCC Part 15 Subpart B Class A
Green Product: RoHS, CRoHS, WEEE

Reliability
Alert Tools: Built-in RTC (real-time clock)
Automatic Reboot Trigger: Built-in WDT (watchdog timer)

Warranty
Warranty Period: 5 years
Details: See www.moxa.com/warranty

Software Specifications

Linux

OS: Debian ARM 7
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 3.2
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).
• TPM (Trusted Platform Module, Version 1.2): Dedicated microprocessor designed to secure hardware by integrating cryptographic keys into devices (only supported by the UC-8112-LX).

Ordering Information

Model	CPU	Serial	Ethernet	Mini PCIe Socket for Cellular Module	TPM	Micro SD Socket
UC-8131-LX	300 MHz	1	2	–	–	–
UC-8132-LX	300 MHz	2	2	✓	–	–
UC-8162-LX	600 MHz	2	2	✓	–	–
UC-8112-LX	1 GHz	2	2	✓	✓	✓

Package Checklist (computer)

- UC-8100 embedded computer
- Power jack
- 3-pin terminal block for power
- 5-pin terminal block for UART x 2

Optional Accessories

Power Adapters & Cords, Console Cable		
Adapter	PWR-24250-DT-S1	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
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
Wireless		
Cellular Package	CELLULAR-LTE-US	LTE module mounting package: • Cellular module x 1 • i-PEX MHF to SMA adapter with cable x 1 • Mini PCI/e mount screw sets x 2
Cellular Package	CELLULAR-LTE-EU	LTE module mounting package: • Cellular module x 1 • i-PEX MHF to SMA adapter with cable x 1 • Mini PCI/e mount screw sets x 2
Cellular Package	CELLULAR-3G-EVDO-HSPA+	3G module mounting package: • Cellular module x 1 • i-PEX MHF to SMA adapter with cable x 1 • Mini PCI/e mount screw sets x 2
WiFi Package	WiFi-BGN	WiFi module mounting package: • WiFi module x 1 • i-PEX MHF to RP-SMA adapter with cable x 1 • Mini PCI/e mount screw sets x 2
GPS Antenna	ANT-GPS-OSM-05-3M	GPS antenna package: • 26 dBi, 1572 MHz, L1 band antenna for GPS
3G Antenna	ANT-3G-SMA	SMA male antenna for cellular, support bands: 850/900/1800/1900/2100 MHz
WiFi Antenna	ANT-WDB-ARM-02	RP-SMA male antenna for WiFi, support bands: 2.4 Ghz
Cellular antenna cable	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 or second cellular antenna.
WiFi antenna cable	CRF-MHF/SMA(M)-14.2	i-PEX MHF (male, on cellular module) to RP-SMA (female, on top cover) adapter with cable. For when you need to install a second WiFi antenna.