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
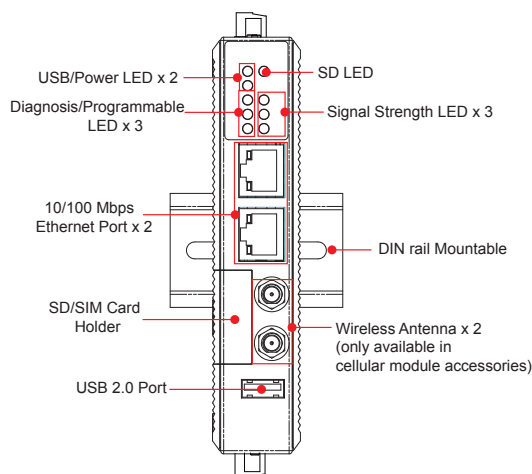> Cyber security

UC-8110

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.
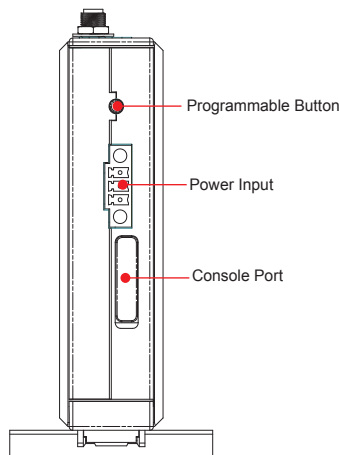
The UC-8100 is built around an Cortex-A8 RISC processor that has been optimized for use in energy monitoring systems, but is widely applicable to a variety of industrial solutions. With flexible interfacing options, this tiny embedded computer is a reliable and secure gateway for data acquisition and processing at field sites as well as a useful communication platform for many other large-scale deployments.

Appearance

Front View

USB/Power LED x 2
Diagnosis/Programmable LED x 3
SD LED
Signal Strength LED x 3
10/100 Mbps Ethernet Port x 2
DIN rail Mountable
SD/SIM Card Holder
Wireless Antenna x 2 (only available in cellular module accessories)
USB 2.0 Port

Top View

Programmable Button
Power Input
Console Port

Bottom View

Serial Port 1 (RS-232/422/485)
Serial Port 2 (RS-232/422/485)

Dimensions

Unit: mm (inch)

9 (0.35)

128 (5.04)

27 (1.06)

101 (3.98)
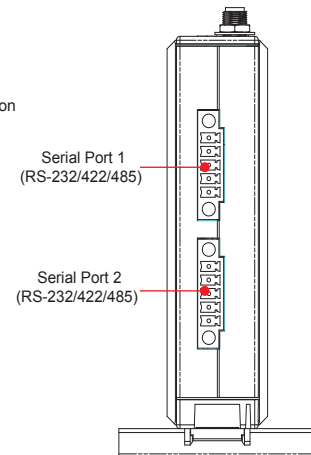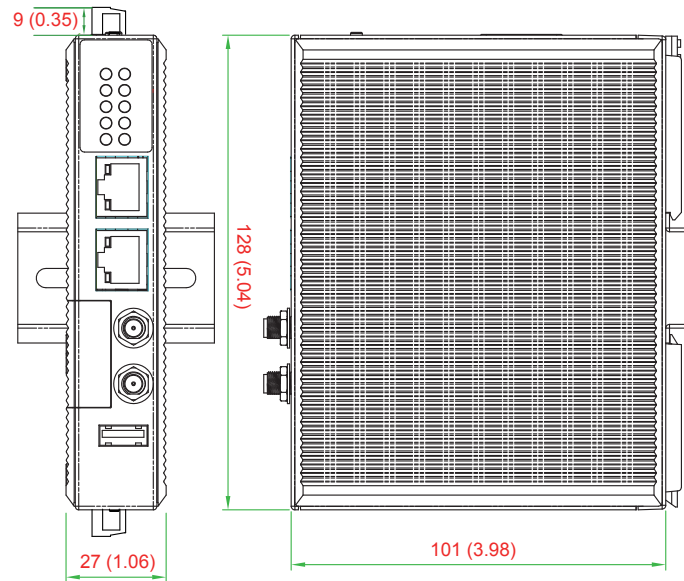
⁞ Hardware Specifications

Computer
CPU: ARMv7 Cortex-A8 300/600/1000 MHz
OS (pre-installed): Debian ARM 7 (Kernel 3.2)
DRAM: 256 MB DDR3 SDRAM (512 MB max.)
USB: USB 2.0 host x 1 (type A connector)

Storage
Storage Expansion:
• SDHC/SDXC socket for storing OS and storage expansion
• 1 GB SD card with OS pre-installed available on evaluation models
• MicroSD socket for storage expansion (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. 115200 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: -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 G$_{rms}$ @ 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 3G 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

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: Software Specifications

Linux

OS : Debian ARM 7
Kernel: GNU/Linux 3.2
System Shell: DASH (default), BASH
Text Editor: vim, nano
Internet Protoctol 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
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
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 and UC-8112-LX only)
WVDIAL:
It is a Point-to-Point Protocol dialer which dials a modem and starts pppd to connect to the Internet. (Supported model: Sierra Wireless MC-8090)
QMI (Qualcomm MSM Interface):
It is a glib-based library for talking to WWAN modems and devices

which speak the Qualcomm MSM Interface (QMI) protocol (Supported models: Sierra Wireless MC-7304, MC-7354, MC-9090)
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)
Cyber Security
Secure Boot: A novel authentication algorithm proposed to secure platform integration. Only trusted Linux kernel and bootloader could be executed. (Patent pending)
SUDO Mechanism: Sudo (sometimes considered as 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 in default.
Security Update of existing software packages: All package in the UC-8100 could be updated for security purpose via Debian or MOXA Advanced Packaging Tool (APT) server.
USB Protection: Provides the mechanism to disable USB function to avoid USB stick malware attack .
SD Write Protection: Provides the mechanism to disable SD write permission both in filesystem SD and extend storage SD (Note: Extend storage SD is only supported in the UC-8112-LX).
TPM (Trusted Platform Module Version: 1.2): A dedicated microprocessor designed to secure hardware by integrating cryptographic keys into devices. (Available only for 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	✓	✓	✓

Available Models

UC-8131-LX: RISC-based communication-centric computing platform with 300 MHz CPU, 2 Ethernet, 1 Serial port, 1 GB SD, USB Port and Debian ARM 7
UC-8132-LX: RISC-based communication-centric computing platform with 300 MHz CPU, Mini PCIe socket for cellular, 2 Ethernet, 2 serial ports, 1 GB SD, USB port and Debian ARM 7
UC-8162-LX: RISC-based communication-centric computing platform with 600 MHz CPU, Mini PCIe socket for cellular, 2 Ethernet, 2 serial ports, 1 GB SD, USB port and Debian ARM 7
UC-8112-LX: RISC-based communication-centric computing platform with 1 GHz CPU, Mini PCIe socket for cellular, 2 Ethernet, 2 serial ports, 1 GB SD, USB port, TPM, Micro SD Socket, and Debian ARM 7

Optional Accessories (can be purchased separately)

PWR-24250-DT-S1: Power adapter
PWC-C7US-2B-183: Power cord with 2-pin connector, USA plug
PWC-C7EU-2B-183: Power cord with 2-pin connector, Euro plug
PWC-C7UK-2B-183: Power cord with 2-pin connector, British plug
PWC-C7AU-2B-183: Power cord with 2-pin connector, Australia plug
PWC-C7CN-2B-183: Power cord with 2-pin connector, China plug

Optional Cellular Accessory package

CELLULAR-MC7354: Sierra Wireless MC-7354 module mounting package
CELLULAR-MC7304: Sierra Wireless MC-7304 module mounting package
CELLULAR-MC9090: Sierra Wireless MC-9090 module mounting package
CELLULAR-MC8090: Sierra Wireless MC-8090 module mounting package

Cellular Package Checklist

Cellular module x 1
SMA cellular antenna x 1
Internal RF cable with SMA connector x 1
Mini PCI/e mount screw sets x 2

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Optional Accessories (can be purchased separately)
SD Card/Micro SD Card (OS pre-installed)

Capacity	1 GB (default)	4 GB	16 GB
SD	✓	✓	✓
Micro SD	−	✓	−

Package Checklist

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

Cellular Module(*)

Product	Target Region	Radio Technology	Peak Transmission Rate	Frequency Band			GPS
MC7354	North America (multi operator)	LTE DC HSPA+ HSPA+/GSM/ EDGE/ CDMA EVDO/1x	Downlink: 100 Mbps (Dependent on carrier network support) Uplink: 50 Mbps (Dependent on carrier network support)	LTE: 1900(B2), AWS(B4), 850(B5), 700(B13), 700(B17), 1900(B25)	UMTS/HSPA+: 2100(B1), 1900(B2), AWS(B4), 850(B5), 900(B8) CDMA EVDO/1x: BC0, BC1, BC10	Quad-Band EDGE/GPRS/ GSM	✓
MC7304	Europe, Australia, New Zealand	LTE DC HSPA+ HSPA+/ GSM/EDGE	Downlink: 100 Mbps (Dependent on carrier network support) Uplink: 50 Mbps (Dependent on carrier network support)	LTE: DC HSPA+ HSPA+/ GSM/EDGE	UMTS/HSPA+: 2100(B1),1900(B2) 850(B5),800(B6), 900(B8)	Quad-Band EDGE/GPRS/ GSM	✓
MC9090	Worldwide	HSPA+/CDMA EDGE/GSM	Downlink: 14.4 Mbps (HSPA+) 3.1 Mbps (EVDO) Uplink: 5.76 Mbps (HSPA+) 1.8 Mbps (EVDO)	−	UMTS/HSPA+: 800/850/1900/2100 MHz CDMA 1x EVDO Rev A: BC0,BC1	Quad-Band EDGE/GPRS/ GSM	✓
MC8090	Worldwide	HSPA+/EDGE/ GPRS/GSM	Downlink: 14.4 Mbps (HSPA+) Uplink: 5.76 Mbps (HSPA+)	−	UMTS/HSPA+ 800/850/1900/2100 MHz	Quad-Band EDGE/GPRS/ GSM	✓

(*) Cellular antenna is included.