UC-8100 Series

Arm-based wireless-enabled DIN-rail industrial computer with 2 serial ports and 2 LAN ports

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 Arm-based 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

- 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
- Moxa Industrial Linux with 10-year long-term support

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
- Wireless Antenna x 2 (only available in cellular module accessories)
- SD/SIM Card Holder
- USB 2.0 Port

Top View

- Programmable Button
- Power Input
- Console Port
- Serial Port 1 (RS-232/422/485)
- Serial Port 2 (RS-232/422/485)

Bottom View
## Hardware Specifications

### Computer

- **CPU**: Armv7 Cortex-A8 300/600/1000 MHz
- **OS (preinstalled)**: Moxa Industrial Linux (Debian 9, Kernel 4.4)
- **USB**: USB 2.0 hosts x 1, Type A connector
- **DRAM**: DDR3 SDRAM
  - UC-8112-LX: 512 MB
  - UC-8162-LX: 512 MB
  - UC-8132-LX: 256 MB
  - UC-8131-LX: 256 MB

### Storage

- **Main Storage**: 8 GB eMMC flash with OS preinstalled
- **Storage Expansion**: SDHC/SDXC socket for storage expansion

### 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 (0.49 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**: External RTC (real-time clock)
- **Automatic Reboot Trigger**: External WDT (watchdog timer)
**Software Specifications**

### Linux

- **OS:** Moxa Industrial Linux (Debian 9)
- **Web Server (Apache):** Allows you to create and manage web sites; supports PHP and XML
- **Terminal Server (SSH):** Provides secure encrypted communications between two untrusted hosts over an insecure network
- **Kernel:** GNU/Linux 4.4
- **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

### Package Checklist (computer)

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

### Moxa Industrial Linux

**Long-Term Support:** Moxa Industrial Linux allows users to keep the same kernel version and Debian user space without needing to upgrade the entire system frequently. In addition, subscription services for each major release of Moxa Industrial Linux, throughout its 10-year life-cycle phase, provide security updates and bug fixes.

**Cybersecurity:**
- Moxa Industrial Linux comes with a built-in utility that helps developers implement a cybersecurity protection mechanism based on IEC 62443-4-2 international standards.
- Security Update of Existing Software Packages: All software packages installed on the UC-2100 Series can be updated either from Debian Linux’s APT server or Moxa’s APT server.

### Package Checklist (computer)

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

### MTBF (mean time between failures)

<table>
<thead>
<tr>
<th>Model</th>
<th>CPU</th>
<th>RAM</th>
<th>Serial</th>
<th>Ethernet</th>
<th>Mini PCIe Socket for Wireless Module</th>
<th>SD Socket</th>
</tr>
</thead>
<tbody>
<tr>
<td>UC-8162-T-LX</td>
<td>1 Ghz</td>
<td>512 MB</td>
<td>2</td>
<td>2</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>UC-8132-T-LX</td>
<td>600 Mhz</td>
<td>512 MB</td>
<td>2</td>
<td>2</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>UC-8131-T-LX</td>
<td>300 Mhz</td>
<td>256 MB</td>
<td>2</td>
<td>2</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>UC-8112-T-LX</td>
<td>300 Mhz</td>
<td>256 MB</td>
<td>1</td>
<td>2</td>
<td>–</td>
<td>✓</td>
</tr>
</tbody>
</table>

**Warranty**

**Warranty Period:** 5 years

**Details:** See www.moxa.com/warranty

**Standard:** Telcordia (Bellcore) Standard TR/SR
## Optional Accessories

### Power Adapters, Power Cords, Console Cables

<table>
<thead>
<tr>
<th>Model Name</th>
<th>Package Contents</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>PWR-24270-DT-S1</td>
<td>Adapter x 1</td>
<td>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.</td>
</tr>
<tr>
<td>PWC-C7EU-2B-183</td>
<td>Power Cord x 1</td>
<td>Power cord with 2-pin connector, Euro plug.</td>
</tr>
<tr>
<td>PWC-C7UK-2B-183</td>
<td>Power Cord x 1</td>
<td>Power cord with 2-pin connector, British plug.</td>
</tr>
<tr>
<td>PWC-C7AU-2B-183</td>
<td>Power Cord x 1</td>
<td>Power cord with 2-pin connector, Australia plug.</td>
</tr>
<tr>
<td>PWC-C7CN-2B-183</td>
<td>Power Cord x 1</td>
<td>Power cord with 2-pin connector, China plug.</td>
</tr>
<tr>
<td>CBL-F9DFP1x4-BK-100</td>
<td>Console Cable x 1</td>
<td>Console cable with 4-pin connector.</td>
</tr>
</tbody>
</table>

### Wireless Package

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<thead>
<tr>
<th>Model Name</th>
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<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CELLULAR-LTE-EU</td>
<td>• Cellular module x 1 &lt;br&gt;• i-PEX MHF to SMA adapter with cable x 2 &lt;br&gt;• Screw set x 1</td>
<td>LTE regions: Asia, Europe, Australia, New Zealand (compatible with LTE/EU, HSPA+, GPRS/GSM, and GPS). LTE: B1, B3, B7, B8, B20 &lt;br&gt;UMTS/HSPA+: B1, B2, B5, B6, B8 &lt;br&gt;GNSS (GPS+Glonass).</td>
</tr>
<tr>
<td>WiFi-BGN</td>
<td>• WiFi module x 1 &lt;br&gt;• i-PEX MHF to RP-SMA adapter with cable x 2 &lt;br&gt;• Screw set x 1 &lt;br&gt;• ANT-WDB-ARM-02 WiFi antenna x 1</td>
<td>WiFi Package.</td>
</tr>
</tbody>
</table>

### Antennas and Internal Antenna Cables

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

### Mounting Kits

<table>
<thead>
<tr>
<th>Model Name</th>
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<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>WALLMOUNT-8100-01</td>
<td>Wall-mounting kit with screws</td>
<td>Wall-mounting Kit</td>
</tr>
</tbody>
</table>