

# UC-8416/8418 Series

**RISC ready-to-run embedded computers with 8 serial ports, 3 LANs, DIOs, 8 switch ports, 2 CAN ports, USB, CompactFlash**



- > Intel XScale IXP435 533 MHz processor
- > 8 RS-232/422/485 serial ports
- > 2 CAN-bus ports (UC-8418)
- > 8 unmanaged-switch ports (UC-8416)
- > 12 digital input and 12 digital output channels (UC-8418)
- > 3 10/100 Mbps Ethernet ports
- > 2 USB 2.0 hosts for mass storage devices
- > Supports IPv6 function (Linux model only)
- > DIN-rail or wall-mounting installation
- > Robust, fanless design
- > -40 to 75°C wide temperature model available
- > Ready-to-run Embedded Linux or Windows CE 6.0



## Overview

The UC-8416/8418 series embedded computers come with 8 RS-232/422/485 serial ports, 3 Ethernet ports, 2 CAN ports, 8 Ethernet ports, 12 digital input channels, 12 digital output channels, a CompactFlash socket, and 2 USB 2.0 hosts.

The computers use the Intel XScale IXP435 533 MHz RISC CPU. This powerful computing engine supports several useful communication functions, but will not generate too much heat. The built-in 16 MB NOR Flash ROM and 256 MB SDRAM give you enough memory to run your application software directly on the UC-8418, and the 32 MB NAND Flash can be used to provide additional data storage. Moreover, the 256 KB SRAM offers a better data retention mechanism for avoiding data loss. These computers come with various communication interfaces, such as serial ports, Ethernet ports, CAN ports, and

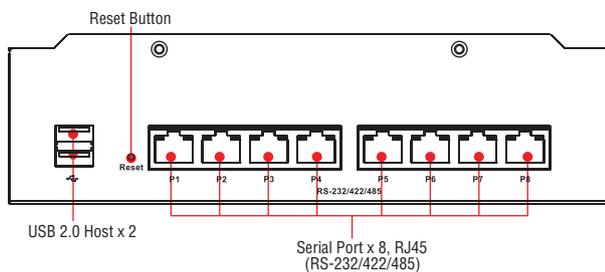
digital input/output channels, making them ideal as a communication platform for industrial applications that require network and device communications.

The UC-8416/8418 Series comes with the Linux 2.6 or Windows CE 6.0 platform pre-installed to provide an open software operating system for software program development. Software written for a desktop PC can be easily ported to the UC-8416/8418 Series platform by using a common compiler, without needing to modify the code, making these computers an optimal solution for use with industrial applications, but with minimal cost and effort.

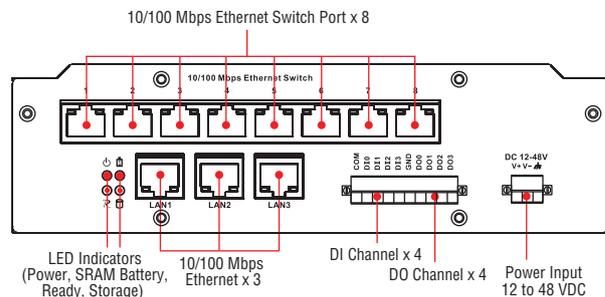
In addition to the standard model, a -40 to 75°C wide temperature model is also available for harsh industrial environments.

## Appearance

Front View

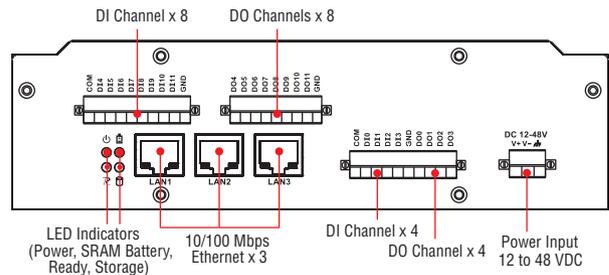
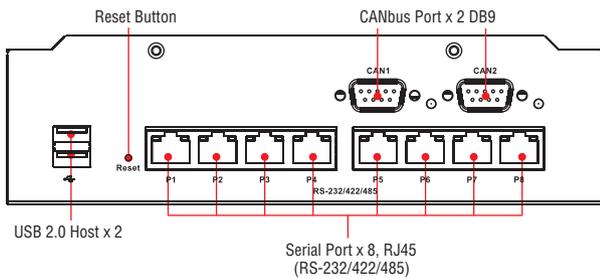


Rear View



UC-8416

## UC-8418



## Hardware Specifications

### Computer

**CPU:** Intel XScale IXP435, 533 MHz

**Expansion Bus:** PCI/104 onboard

**USB:** USB 2.0 hosts x 2, type A connectors

**DRAM:** DDR2 SDRAM, 256 MB (512 MB max.)

#### Flash:

- NOR Flash, 16 MB to store OS (32 MB max. on CV request)
- NAND Flash, 32 MB to store data

**OS (pre-installed):** Linux

**SRAM:** 256 KB, battery backup

### Storage

**Storage Expansion:** CompactFlash socket

### Ethernet Interface

**LAN:** Auto-sensing 10/100 Mbps ports (RJ45) x 3

**Switch Port:** 10/100 Mbps unmanaged-switch ports (RJ45) x 8 (UC-8416)

**Magnetic Isolation Protection:** 1.5 kV, built-in

### Serial Interface

**Serial Standards:** RS-232/422/485 software-selectable ports (8-pin RJ45) x 8

**Console Port:** RS-232 (TxD, RxD, GND), 4-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:** RTS/CTS, XON/XOFF, ADDC® (automatic data direction control) for RS-485

**Baudrate:** 50 bps to 921.6 kbps (supports nonstandard baudrates; see user's manual for details)

### Serial Signals

**RS-232:** TxD, RxD, DTR, DSR, RTS, CTS, DCD, GND

**RS-422:** TxD+, TxD-, RxD+, RxD-, GND

**RS-485-4w:** TxD+, TxD-, RxD+, RxD-, GND

**RS-485-2w:** Data+, Data-, GND

### Digital Input

**Input Channels:**

UC-8416: DI x 4

UC-8418: DI x 12

**Input Voltage:** 0 to 30 VDC

**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)

**Connector Type:** 10-pin screw-fastened terminal block (4 points, COM, GND)

**Isolation:** 3 kV optical isolation

### Digital Output

**Output Channels:** UC-8416: DO x 4, sink type

UC-8418: DO x 12, sink type

**Output Current:** Max. 200 mA per channel

**On-State Voltage:** 24 VDC nominal, open collector to 30 V

**Connector Type:** 10-pin screw-fastened terminal block (4 points, GND)

**Isolation:** 3 kV optical isolation

**CANbus Communication (UC-8418 only)**

**Interface:** Dual optically-isolated CAN2.0A/2.0B compliant ports

**CAN Controller:** Phillips SJA1000T

**Signals:** CAN\_H, CAN\_L

**Isolation:** 2 kV digital isolation

**Speed:** 10 kbps to 1 Mbps

**Connector Type:** DB9 male

### LEDs

**System:** Power, Ready, Storage, Battery for SRAM

**LAN:** 10M/Link x 2, 100M/Link x 2 (on connector)

**Serial:** TxD x 8, RxD x 8

**Reset Button:** Supports "Reset to Factory Default"

### Physical Characteristics

**Housing:** SECC sheet metal (1 mm)

**Weight:** 1 kg (2.22 lb)

**Dimensions:** 200 x 57 x 120 mm (7.87 x 2.24 x 4.72 in)

**Mounting:** DIN rail, wall

### 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)

**Storage Temperature:**

Standard Models: -20 to 75°C (-4 to 167°F)

Wide Temp. Models: -40 to 85°C (-40 to 185°F)

**Ambient Relative Humidity:** 5 to 95% (non-condensing)

**Anti-Vibration:** 2 Grms @ IEC-68-2-34, random wave, 5-500 Hz, 1 hr per axis

**Anti-Shock:** 20 g @ IEC-68-2-27, half sine wave, 11 ms

### Power Requirements

**Input Voltage:** 12 to 48 VDC (3-pin terminal block)

**Input Current:**

- 310 mA @ 48 VDC
- 625 mA @ 24 VDC
- 1350 mA @ 12 VDC

**Power Consumption:** 15 W

### Standards and Certifications

**Safety:** UL 60950-1, EN 60950-1, CCC (GB9254, GB17625.1)

**EMC:** EN 55032 Class B, EN 55024, FCC Part 15 Subpart B Class B

### Reliability

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

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

**MTBF** (mean time between failures)

**Time:**

- UC-8416: 156,942 hrs
- UC-8418: 149,140 hrs

**Standard:** Telcordia (Bellcore) Standard

**Warranty**

**Warranty Period:** 5 years

**Details:** See [www.moxa.com/warranty](http://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:** Linux 3.8.13

**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 unsecure network

**File System:** JFFS2, NFS, Ext2, Ext3

**Internet Protocol Suite:** TCP, UDP, IPv4, IPv6, SNMPv1, ICMP, ARP, HTTP, CHAP, PAP, DHCP, NTP, NFS, SMTP, Telnet, FTP, TFTP, PPP, PPPoE

**Internet Security:** OpenVPN, IPTables Firewall

**Dial-up Networking:** PPP Daemon (pppd) for Linux that uses the PPP protocol and allows Unix machines to connect to the Internet as PPP servers or clients, through dialup. The PPP Daemon Works with chat, dip, and diald programs among others, and supports the IP, TCP, UDP, and IPX for Linux (Novell) protocols.

**Watchdog:** Features a hardware function to trigger system reset in a user specified time interval (Moxa API 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)

**Windows Embedded CE 6.0**

**OS:** Windows Embedded CE 6.0

**File System:** FAT

**Internet Protocol Suite:** TCP, UDP, IPv4, IPv6, SNMPv2, ICMP, IGMP, ARP, HTTP, CHAP, PAP, SSL, DHCP, SNTP, SMTP, Telnet, FTP, PPP

**Web Server (WinCE IIS):** Supports ASP, ISAPI Secure Socket Layer (SSL 2/3) and Transport Layer Security (TLS/SSL 3.1) public key-based protocols, and Web Administration ISAPI Extensions

**Dial-up Networking:** Supports RAS client API and PPP, Extensible Authentication Protocol (EAP), and RAS scripting

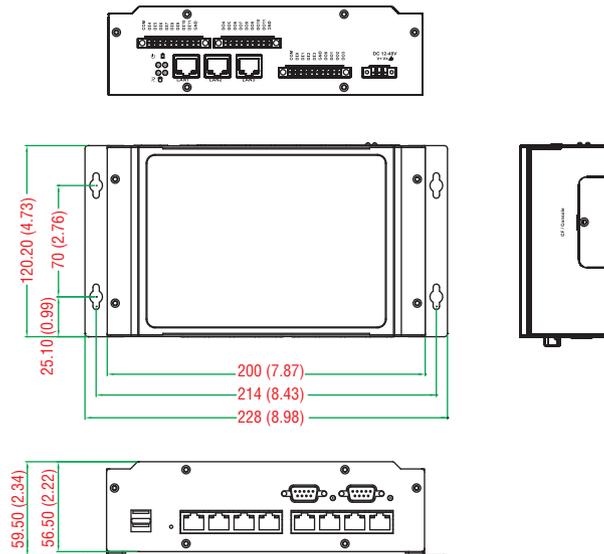
**Watchdog:** Features a hardware function to trigger system reset in a user-specified time interval. (Moxa API provided)

**Application Development Software:**

- Moxa WinCE 6.0 SDK
- Moxa API Library
- C runtime libraries
- Component Services (COM and DCOM)
- Microsoft® .NET Compact Framework 3.5
- XML, including DOM, XQL, XPATH, XSLT, SAX, SAX2
- SOAP Toolkit Client
- Winsock 2.2

**Dimensions**

Unit: mm (inch)



## Ordering Information

### Available Models

**UC-8416-LX:** RISC-based industrial embedded computer with 8 serial ports, 4 DIs, 4 DOs, 3 LANs, 8 switch ports, CompactFlash, USB, Linux OS, -10 to 60°C operating temperature

**UC-8416-CE:** RISC-based industrial embedded computer with 8 serial ports, 4 DIs, 4 DOs, 3 LANs, 8 switch ports, CompactFlash, USB, Windows CE 6.0 OS, -10 to 60°C operating temperature

**UC-8416-T-LX:** RISC-based industrial embedded computer with 8 serial ports, 4 DIs, 4 DOs, 3 LANs, 8 switch ports, CompactFlash, USB, Linux OS, -40 to 75°C operating temperature

**UC-8416-T-CE:** RISC-based industrial embedded computer with 8 serial ports, 4 DIs, 4 DOs, 3 LANs, 8 switch ports, CompactFlash, USB, Windows CE 6.0 OS, -40 to 75°C operating temperature

**UC-8418-LX:** RISC-based industrial embedded computer with 8 serial ports, 12 DIs, 12 DOs, 3 LANs, 2 CAN ports, CompactFlash, USB, Linux OS, -10 to 60°C operating temperature

**UC-8418-CE:** RISC-based industrial embedded computer with 8 serial ports, 12 DIs, 12 DOs, 3 LANs, 2 CAN ports, CompactFlash, USB, Windows CE 6.0 OS, -10 to 60°C operating temperature

**UC-8418-T-LX:** RISC-based industrial embedded computer with 8 serial ports, 12 DIs, 12 DOs, 3 LANs, 2 CAN ports, CompactFlash, USB, Linux OS, -40 to 75°C operating temperature

**UC-8418-T-CE:** RISC-based industrial embedded computer with 8 serial ports, 12 DIs, 12 DOs, 3 LANs, 2 CAN ports, CompactFlash, USB, Windows CE 6.0 OS, -40 to 75°C operating temperature

### Package Checklist

- UC-8416/8418 embedded computer
- Wall-mounting kit
- DIN-rail mounting kit
- Ethernet cable: RJ45-to-RJ45 cross-over cable, 100 cm
- CBL-4PINDB9F-100: 4-pin pin header to DB9 female console port cable, 100 cm
- Universal power adapter (including power jack converter)
- Documentation and software CD
- Quick installation guide (printed)
- Warranty card