

V2416 Series

x86 ready-to-run embedded computer with Intel Atom N270 CPU, VGA, DVI-I, audio, 2 Ethernet LAN ports, 4 serial ports, 6 DIs, 2 DOs, 3 USB ports, 1 CompactFlash slot, 2 hot-swappable storage trays



- > High performance network video recorder for rolling stock applications
- > Compliant with EN 50121-4 and a portion of EN 50155 specifications
- > IEC 61373 certified for shock and vibration resistance
- > Two SATA II storage connectors with hot-swappable trays
- > Custom APIs for independent control of LEDs and internal storage monitoring
- > -40° to 70°C wide temperature models available



Introduction

The V2416 Series embedded computers are based on the Intel Atom N270 x86 processor and feature 4 RS-232/422/485 serial ports, dual LAN ports, and 3 USB 2.0 hosts. In addition, V2416 computers provide VGA and DVI-I outputs and are compliant with a portion of EN 50155 specifications, covering operating temperature, power input voltage, power surges, ESD, and vibration, making them particularly well-suited for railway and industrial applications.

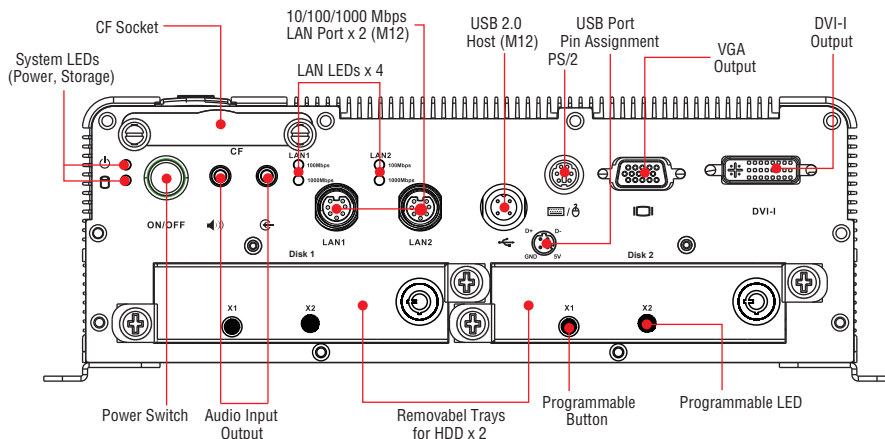
The CompactFlash socket, SATA connectors, and USB sockets provide the V2416 computers with further reliability, perfect for industrial applications that require data buffering and storage expansion. Most importantly, V2416 computers come with key enhancements for

mass storage media, such as two hot-swappable SATA drive trays for convenient and fast storage maintenance, user-programmable LEDs, and an API that simplifies customizing mass storage monitoring and management. Lastly, Moxa's MDM API is also included, giving users a convenient gateway-client model that eases the distributed automation and control of multiple devices by a single host device.

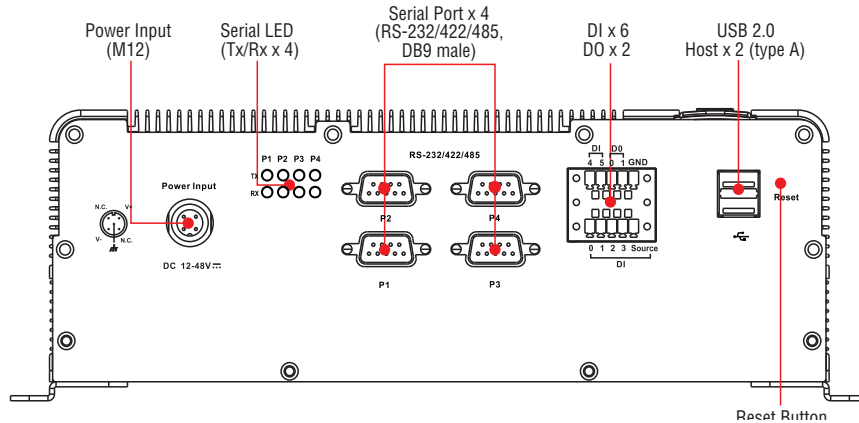
V2416 series computers come pre-installed with a choice of Linux, Windows Embedded Standard 2009, or Windows Embedded Standard 7, giving our customers their choice of software environments for the development of platform applications.

Appearance

Front View



Rear View



Hardware Specifications

Computer

CPU: Intel Atom N270 1.6 GHz processor
System Chipset: Intel 945GSE + ICH7-M
BIOS: 8 Mbit PLCC, with ACPI
FSB: 533 MHz
System Memory: 2 GB capacity, 1 GB (LX and XPE models)/2 GB (W7E models) pre-installed: 1 slot of 200 pin DDR2-533 SO-DIMM SDRAM
USB: 3 bootable USB 2.0 ports: 2 type A, 1 M12
OS (pre-installed): Debian 5 ("Lenny"), Windows Embedded Standard 2009, or Windows Embedded Standard 7

Storage

Built-in: 2 GB (LX and XPE models)/8 GB (W7E models) onboard industrial DOM to store OS
Storage Expansion: 1 type I/II CompactFlash slot for memory expansion
HDD Support: 2 hot-swappable SATA-II connectors for mass storage, with removable trays.

Other Peripherals

KB/MS: 1 PS/2 interface; supports keyboard and mouse via a Y cable
Audio: Line-in, line-out interface

Display

Graphics Controller: Intel Generation 3.5 Integrated Graphics Engine, 250 MHz core render clock and 200 MHz core display clock at 1.05-V core voltage

DVI Interface: DVI-I connector (Chrontel CH7307 SDVO to DVI transmitter), up to 1600 x 1200 resolution

VGA Interface: DB15 female connector, up to 2048 x 1536 resolution

Ethernet Interface

LAN: 2 auto-sensing 10/100 Mbps M12 ports

Serial Interface

Serial Standards: 4 software-selectable RS-232/422/485 ports* (DB9 male)

*COM1's pin 9 signal can be set by jumper as N/C (default), +5 V, or +12 V

ESD Protection: 4 kV for all signals

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 (non-standard baudrates supported; 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: 6, source type

Input Voltage: 0 to 30 VDC at 25 Hz

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 (Source to DI)

Isolation: 3 kV optical isolation

Digital Output

Output Channels: 2, sink type

Output Current: Max. 200 mA per channel

On-state Voltage: 24 VDC nominal, open collector to 30 VDC

Connector Type: 10 pin screw-fastened Euroblock terminal (6 inputs, 2 outputs, DI Source, GND)

Isolation: 3 kV optical isolation

LEDs

System: Indicators for power, storage, plus 2 programmable LEDs on each storage tray

LAN: 2 on each port: 100 Mbps & 1000 Mbps

Serial: 2 on each serial port: 1 Tx & 1 Rx

Switches and Buttons

Power Switch: Recessed / flush front panel button

Reset Button: For warm reboot (front panel)

Programmable Button: 1 recessed button on each removable tray

Physical Characteristics

Housing: Aluminum

Weight: 4 kg

Dimensions:

Without ears: 154 x 250 x 86 mm (6.06 x 9.84 x 3.38 in)

With ears: 154 x 275 x 92 mm (6.06 x 10.83 x 3.62 in)

Mounting: DIN rail, wall, VESA

Environmental Limits

Operating Temperature: (without HDD installed)

Standard models: -25 to 60°C (-13 to 140°F)

Wide temp. models: -40 to 70°C (-40 to 158°F)

Storage Temperature: (without HDD installed)

-40 to 85°C (-40 to 185°F)

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

Anti-vibration: EN 50155 standard

Anti-shock: EN 50155 standard

Conformal Coating: Available on request

Power Requirements

Input Voltage: 12 to 48 VDC (M12 connector)

Note: Compliant with EN 50155 on 24 VDC

Power Consumption: 26 W

- 2.16 A @ 12 VDC
- 1.08 A @ 24 VDC
- 542 mA @ 48 VDC

Standards and Certifications

Safety: UL 60950-1, CSA C22.2 No. 60950-1-07, EN 60950-1
EMC: EN 55022 Class A, EN 61000-3-2 Class D, EN 61000-3-3, EN 55024, FCC Part 15 Subpart B Class A
Green Product: RoHS, CRoHS, WEEE

Rail Traffic: EN 50155*, EN 50121-2-3, EN 50121-4, IEC 61373

*Complies with a portion of EN 50155 specifications. Please contact Moxa or a Moxa distributor for details.

Reliability

Automatic Reboot Trigger: Built-in WDT (watchdog timer) supporting 1-255 level time interval system reset, software programmable

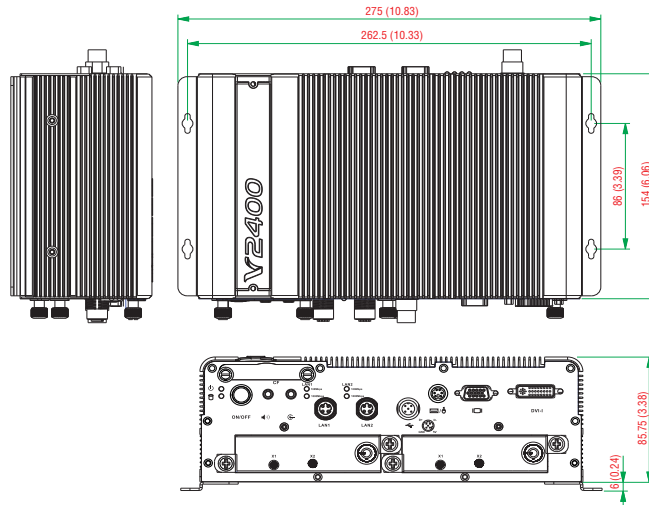
Warranty

Warranty Period: 3 years

Details: See www.moxa.com/warranty

Note: These hardware specifications describe the embedded computer unit itself, but not its official accessories. In particular, the wide temperature specification does not apply to accessories such as power adaptors and cables.

Dimensions



Unit: mm (inch)

Software Specifications

Linux

OS: Debian Linux 5.0, "Lenny", kernel 2.6.26

File System: EXT2/EXT3

Internet Protocol Suite: TCP, UDP, IPv4, SNMPv1/v2c/v3, ICMP, ARP, HTTP, CHAP, PAP, SSH 1.0/2.0, SSL, DHCP, NTP, NFS, Telnet, FTP, TFTP, PPP, PPPoE

Internet Security: OpenVPN, iptables firewall

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

Dial-up Networking: PPP Daemon for Linux that allows Unix machines to connect to the Internet through dialup lines, using the PPP protocol, as a PPP server or client. Works with 'chat', 'dip', and 'diald', among (many) others. Supports IP, TCP, UDP, and (for Linux) IPX (Novell).

File Server: Enables remote clients to access files and other resources over the network

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++ compiler
- GNU C library
- Perl

Tailored MIB File for SNMP Control: SNMP allows centralized network monitoring and control. With Moxa's proprietary MIB file, trap notifications keep network overhead low while providing monitoring and control of key BIOS settings; internal hardware sensors; interface connectivity for DI/DO, USB, and UART; and other peripheral devices.

Windows Embedded Standard 7

Core OS:

- 32-bit support
- Remote Client
- Remote Procedure Call

Applications and Services Development:

- .Net Framework 3.5
- Remote Desktop Protocol 7.1
- COM OLE Application Support
- COM+ Application Support
- MSMQ

Internet Services:

- Internet Explorer 8.0
- IIS 7.0

Diagnostics:

- Common Diagnostic Tools
- Problem Reports and Solutions

Fonts: Chinese (Trad. and Simp.), Japanese, Korean, Western, Middle Eastern, South East Asian, and South Asian Fonts

Graphics and Multimedia:

- MPEG DTV-DVD Audio Decoder (MPEG-2, AAC)
- MPEG Layer-3 Audio Codecs(MP3)
- MPEG4 Decoders
- Windows Media Video VC-1 (WMV) Codecs
- DirectX and Windows Device Experience
- Windows Media Player 12

Management:

- Group Policy Management
- Windows Management Instrument (WMI)
- Windows Update

Networking:

- Extensible Authentication Protocol (EAP)
- Internet Authentication Service

- Telnet Server
- Bluetooth
- Domain Services
- Network Access Protection
- Network and Sharing Center
- Quality of Service
- Remote Access Service (RAS)
- Telephony API Client
- Windows Firewall
- Wireless Networking

Security:

- Credential Roaming Service
- Credentials and Certificate Management
- Windows Authorization Manager (AZMAN)
- Windows Security Center
- Active Directory Rights Management
- Security Base
- Encrypted File System (EFS)

Embedded Features:

- Enhanced Write Filter (EWF)
- File-Based Write Filter (FBWF)
- Message Box Default Reply
- Registry Filter
- WSDAPI for .NET

File Systems and Data Store:

- Windows Data Access Components
- Windows Backup and Restore

Windows XP Embedded

OS: Windows Embedded Standard 2009 SP3

File System: NTFS

Internet Protocol Suite: DHCP, DNS, FTP, HTTP, SNT, NTP, Telnet, SMTP, SNMPv2, TCP, UDP, IPv4, ICMP, IGMP, IPsec, TAPI, ICS, PPP, CHAP, EAP, PPPoE, PPTP, NetBIOS

Web Server (IIS): Allows users to create and manage websites

Silverlight 2.0: Silverlight is a powerful development tool for creating engaging, interactive user experiences for Web and mobile applications using the .NET framework.

Remote Desktop: The Terminal Server Remote Desktop component provides remote access for the desktop of a computer running Terminal Services

Remote Registry Service: Enables remote users to modify registry settings on this computer

Watchdog: Features a hardware function to trigger system reset in a user specified time interval up to 60 seconds (Moxa API provided)

Enhanced Write Filter: Redirect disk write operations to volatile (RAM) or non-volatile (disk) storage

File-based Write Filter: The File Based Write Filter (FBWF) component redirects all write requests directed at protected volumes to the overlay cache, which records and displays the changes while preserving the protected status of the target volume.

Application Development Software:

- Moxa API Library
- Microsoft .Net Framework 3.5 with SP1
- Active Directory Service Interface (ADSI) Core
- Active Template Library (ATL), ASP.NET 2.0
- Common Control Libraries
- Common File Dialogs
- Direct3D, DirectPlay, DirectShow, and Direct show filters
- Mapi32 Libraries
- Message Queuing (MSMQ) Core
- Microsoft Visual C++ Run Time Libraries
- Power Management dynamic-link library
- RPC
- Windows API, Script Engines, and WMI

Tailored MIB File for SNMP Control: SNMP allows centralized network monitoring and control. With Moxa's proprietary MIB file, trap notifications keep network overhead low while providing monitoring and control of key BIOS settings; internal hardware sensors; interface connectivity for DI/DO, USB, and UART; and other peripheral devices.

Ordering Information

Available Models

V2416-XPE: x86 ready-to-run embedded computer with Intel Atom N270 CPU, VGA, DVI-I, audio, 2 Ethernet LAN ports, 4 serial ports, 6 DIs, 2 DOs, 3 USB ports, 1 CompactFlash slot, 2 hot-swappable storage trays, Windows Embedded Standard 2009, -25 to 60°C operating temperature (EN 50155 Class T1)

V2416-LX: x86 ready-to-run embedded computer with Intel Atom N270 CPU, VGA, DVI-I, audio, 2 Ethernet LAN ports, 4 serial ports, 6 DIs, 2 DOs, 3 USB ports, 1 CompactFlash slot, 2 hot-swappable storage trays, Debian Linux 5.0 "Lenny", -25 to 60°C operating temperature (EN 50155 Class T1)

V2416-W7E: x86 ready-to-run embedded computer with Intel Atom N270 CPU, VGA, DVI-I, audio, 2 Ethernet LAN ports, 4 serial ports, 6 DIs, 2 DOs, 3 USB ports, 1 CompactFlash slot, 2 hot-swappable storage trays, Windows Embedded Standard 7, -25 to 60°C operating temperature (EN 50155 Class T1)

V2416-T-XPE: x86 ready-to-run embedded computer with Intel Atom N270 CPU, VGA, DVI-I, audio, 2 Ethernet LAN ports, 4 serial ports, 6 DIs, 2 DOs, 3 USB ports, 1 CompactFlash slot, 2 hot-swappable storage trays, Windows Embedded Standard 2009, -40 to 70°C operating temperature (EN 50155 Class T1)

V2416-T-LX: x86 ready-to-run embedded computer with Intel Atom N270 CPU, VGA, DVI-I, audio, 2 Ethernet LAN ports, 4 serial ports, 6 DIs, 2 DOs, 3 USB ports, 1 CompactFlash slot, 2 hot-swappable storage trays, Debian Linux 5.0 "Lenny", -40 to 70°C operating temperature (EN 50155 Class T1)

V2416-T-W7E: x86 ready-to-run embedded computer with Intel Atom N270 CPU, VGA, DVI-I, audio, 2 Ethernet LAN ports, 4 serial ports, 6 DIs, 2 DOs, 3 USB ports, 1 CompactFlash slot, 2 hot-swappable storage trays, Windows Embedded Standard 7, -40 to 70°C operating temperature (EN 50155 Class T1)

Note: Conformal Coating is available on request.

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

DK-DC50131-01: DIN rail mounting kit

Package Checklist

- V2416 embedded computer
- PS2 to KB/MS Y-type cable
- Documentation and software CD or DVD
- Quick installation guide (printed)
- Warranty card
- Wall mounting Kit

M12 Connectors (can be purchased separately)

M12A-5P-IP68: Field-installation A-coded screw-in power connector, 5-pin female M12 connector, IP68-rated

M12A-5PMM-IP68: D-coded screw-in USB connector, 5-pin male M12 connector, IP68-rated

M12A-8PMM-IP68: Field-installation A-coded screw-in Gigabit Ethernet connector, 8-pin female M12 connector, IP68-rated

M12 Cables (can be purchased separately)

CBL-M12(FF5P)/Open-100 IP67: 1-meter A-coded M12-to-5-pin power cable, 5-pin female M12 connector, IP67-rated

CBL-M12MM8PRJ45-BK-100-IP67: 1-meter A-coded M12-to-RJ45 Cat-5E UTP Gigabit Ethernet cable, 8-pin male M12 connector, IP67-rated