

V2416 Series

x86-based embedded computer with Intel Atom N270, dual LANs (M12 connectors), 4 serial ports, 6 DIs, 2 DOs, VGA, DVI-I, 3 USB ports, 2 SATA storage connectors, 2 removable storage trays, CompactFlash



- > High performance network video recorder for rolling stock applications
- > Compliant with EN 50121-4 and essential sections of EN 50155
- > IEC 61373 certified for shock and vibration resistance
- > Two SATA II connectors for commercial HDDs or industrial SSDs
- > Two hot-swappable trays for storage expansion
- > User-defined programmable LEDs and API for storage management
- > API Library for easy development and storage volume notification
- > Integrated MDM API for easy remote management
- > -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 the essential sections of EN 50155 covering operating temperature, power input voltage, power surges, ESD, and vibration, which makes them particularly well-suited for railway and industrial applications.

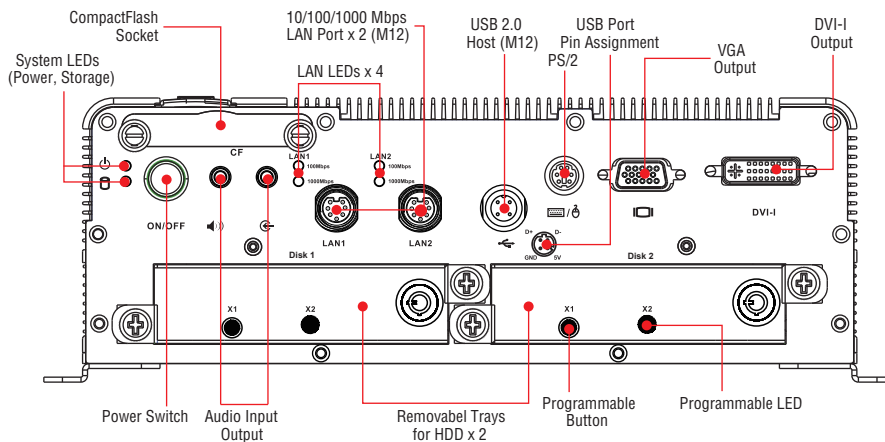
The CompactFlash socket, SATA connectors, and USB sockets provide the V2416 computers with further reliability, perfect for industrial applications that require data buffering and storage expansion. Most importantly, the V2416 computers come with 2 removable slots for

inserting additional storage media, such as hard disks or SSD drives; it also supports hot swapping for convenient, fast, and easy storage expansion. It also provides user-defined programmable LEDs and the related API for storage management, supporting storage plug/unplug functionality, automatic storage removal, and storage status display. Moreover, API Library is provided for easy development and storage capacity notification.

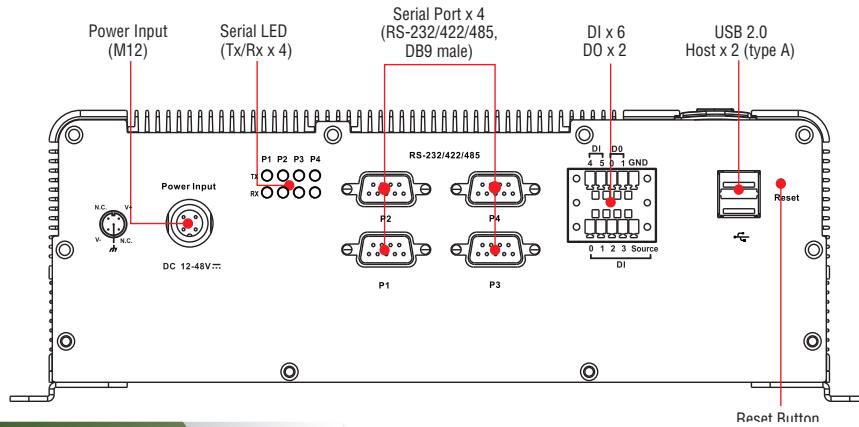
V2416 series computers come pre-installed with a choice of Linux or Windows Embedded Standard 2009, to provide programmers with a familiar environment in which to develop sophisticated, bug-free application software at a low cost.

Appearance

Front View



Rear View



Hardware Specifications

Computer

CPU: Intel Atom N270 1.6 GHz processor
OS (pre-installed): Linux or Windows Embedded Standard 2009
System Chipset: Intel 945GSE + ICH7-M
BIOS: 8 Mbit Flash BIOS, PLCC type, ACPI function supported
FSB: 533 MHz
System Memory: 2 GB capacity, 1 GB pre-installed: 1 slot of 2 GB DDR2-533 200 pin SO-DIMM SDRAM
USB: 3 USB 2.0 compliant hosts; 2 with type A connectors supporting system bootup, 1 with M12 connector

Storage

Built-in: 2 GB onboard industrial DOM to store OS
Storage Expansion: CompactFlash socket for CF card expansion, supporting CF Type-I/II
HDD Support:
 HDD: 2 SATA-II connectors for storage expansion
 Removable Trays: Support for 2 additional connectors for storage expansion with hot-swappable function

Other Peripherals

KB/MS: 1 PS/2 interface supporting standard PS/2 keyboard and mouse through Y-type cable
Audio: Line-in, line-out interface

Display

Graphics Controller: Intel Gen 3.5 Integrated Graphics Engine, 250 MHz core render clock and 200 MHz core display clock at 1.05-V core voltage
VGA Interface: DB15 female connector, up to 2048 x 1536 resolution
DVI Interface: DVI-I connector (chrontel CH7307 SDVO to DVI transmitter), up to 1600 x 1200 resolution

Ethernet Interface

LAN: 2 auto-sensing 10/100/1000 Mbps ports (M12)

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 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 terminal block (6 DI points, 2 DO points, DI Source, GND)
Isolation: 3 KV optical isolation

LEDs

System: Power x 1, Storage x 1, Programmable x 2 on the removable trays

LAN: 100M/Link x 2, 1000M/Link x 2

Serial: TX x 4, RX x 4

Physical Characteristics

Housing: Aluminum
Weight: 4 kg
Dimensions:
 Without ears: 154 x 250 x 86 mm (6.06 x 9.84 x 3.39 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

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
Rail Traffic: EN 50155, EN 50121-2-3, EN 50121-4, IEC 61373
Green Product: RoHS, CRoHS, WEEE

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.

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)

Switches and Buttons

Power Switch: on/off (front panel)

Reset Button: For warm reboot (front panel)

Programmable Button: on/off (on each removable tray)

Power Requirements

Input Voltage: 12 to 48 VDC (M12 connector)

Note: Compliant with EN 50155 on 24 VDC

Power Consumption: 26 W

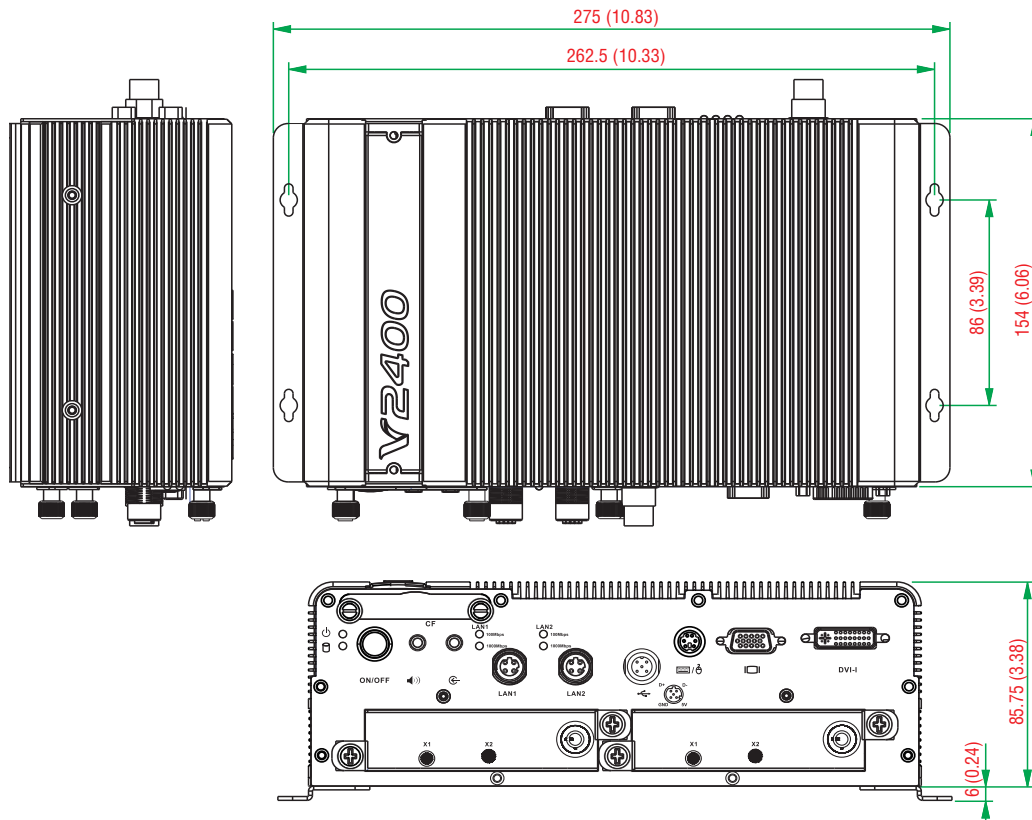
2.16 A @ 12 VDC

1.08 A @ 24 VDC

542 mA @ 48 VDC

Dimensions

Unit: mm (inch)



Software Specifications

Linux

OS: Debian Linux 5.0, Lenny; kernel 2.6.32

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 XP Embedded

OS: Windows Embedded Standard 2009 SP3

File System: NTFS

Internet Protocol Suite: DHCP, DNS, FTP, HTTP, SMTP, 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: A free runtime that powers rich application experiences and delivers high quality, interactive video across multiple platforms and browsers, using the .NET framework

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

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

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

Enhanced Writer 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-based industrial computer with Intel Atom N270, dual LANs (M12 connectors), 4 serial ports, 6 DIs, 2 DOs, VGA, DVI-I, 3 USB ports, 2 SATA storage connectors, Windows Embedded Standard 2009, -25 to 60°C operating temperature (EN 50155 Class T1)

V2416-LX: x86-based industrial computer with Intel Atom N270, dual LANs (M12 connectors), 4 serial ports, 6 DIs, 2 DOs, VGA, DVI-I, 3 USB hosts, 2 SATA storage connectors, Linux 2.6, -25 to 60°C operating temperature (EN 50155 Class T1)

V2416-T-XPE: x86-based industrial computer with Intel Atom N270, dual LANs (M12 connectors), 4 serial ports, 6 DIs, 2 DOs, VGA, DVI-I, 3 USB ports, 2 SATA storage connectors, Windows Embedded Standard 2009, -40 to 70°C operating temperature (EN 50155 Class TX)

V2416-T-LX: x86-based industrial computer with Intel Atom N270, dual LANs (M12 connectors), 4 serial ports, 6 DIs, 2 DOs, VGA, DVI-I, 3 USB hosts, 2 SATA storage connectors, Linux 2.6, -40 to 70°C operating temperature (EN 50155 Class TX)

Note: Conformal Coating is available on request.

Optional Accessories (can be purchased separately)

PWR-24250-DT-S1: Power adaptor

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, Australian plug

PWC-C7CN-2B-183: Power cord with 2-pin connector, China plug

DK-DC50131-01: DIN-Rail 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-8PMM-IP68: Field-installation A-coded screw-in Gigabit Ethernet connector, 8-pin female M12 connector, IP68-rated

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

Package Checklist

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