

V2416A Series

Compact, fanless, anti-vibration railway computers



- > Intel Celeron/Core i7 high performance network video recorder for rolling stock applications
- > Two hot-swappable trays for 2.5-inch HDD/SSD storage expansion
- > API Library for easy development and storage volume notification
- > Dual independent DVI-I displays
- > 2 gigabit Ethernet ports with M12 X-coded connectors
- > 2 CFast sockets for OS backup
- > M12 A-coded power connector
- > Compliant with EN 50121-4
- > Complies with a portion of EN 50155 specifications
- > IEC 61373 certified for shock and vibration resistance
- > -40 to 70°C wide temperature models available
- > Supports SNMP-based system configuration, control, and monitoring (Windows Embedded Standard 7 only)



Introduction

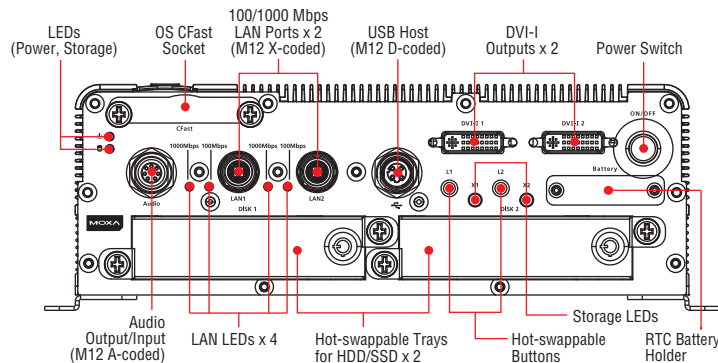
The V2416A Series embedded computers are based on the Intel 3rd generation processor and feature 4 RS-232/422/485 serial ports, dual LAN ports, and 3 USB 2.0 hosts. In addition, the V2416A computers provide dual DVI-I outputs and comply with a portion of EN 50155 specifications, covering operating temperature, power input voltage, surge, ESD, and vibration, making them suitable for a variety of industrial applications.

The CFast socket, SATA connectors, and USB sockets provide the V2416A computers with the reliability needed for industrial

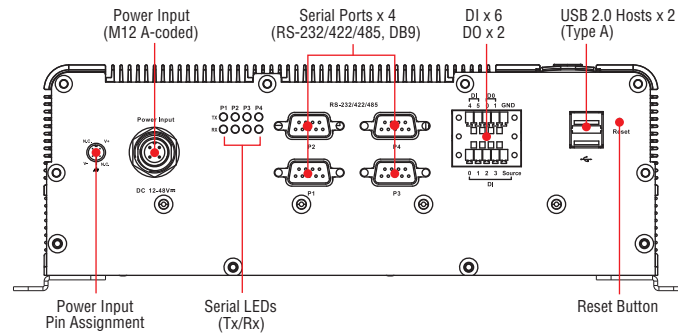
applications that require data buffering and storage expansion. Most importantly, the V2416A computers come with 2 hot-swappable storage trays for inserting additional storage media, such as hard disk or solid-state drives, and support hot swapping for convenient, fast, and easy storage replacement. Each storage tray has its own LED to indicate whether or not a storage module is plugged in. The V2416A series computers come pre-installed with a choice of Linux Debian 7 or Windows Embedded Standard 7 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 Celeron 1047UE processor (2M cache, 1.40 GHz) for the V2416A-C2 series
- Intel Core i7-3517UE processor (4M cache, 1.7 GHz) for the V2416A-C7 series

OS: Windows Embedded Standard 7 or Linux Debian 7

System Chipset: Mobile Intel® HM65 Express

System Memory: 1 DDR3-1600 SO-DIMM SDRAM slot, 8 GB max., 4 GB pre-installed

USB: USB 2.0 hosts x 3 (Type A connectors x 2, supporting system boot up, M12 connectors x 1)

Storage

HDD/SSD Support: 2 hot-swappable trays for 2.5-inch HDD/SSD storage expansion*

*Storage drive not included. Must be purchased separately.

CFast Support: 1 slot for OS*, 1 slot for backup storage

*32-bit W7E requires at least an 8 GB CFast card

*64-bit W7E requires at least a 16 GB CFast card (optional)

*Linux Debian 7 requires at least an 8 GB CFast card (must be purchased separately)

Other Peripherals

Audio: Line-in, line-out interface (M12 A-coded)

Display

Graphics Controller: Intel® HD Graphics 4000 (integrated)

Connector Type: 2 DVI-I connectors

Display Interface:

DVI up to 1920x1200 resolution @ 60 Hz

VGA up to 1920x1200 resolution @ 60 Hz

VGA up to 2048x1536 resolution @ 75 Hz

Ethernet Interface

LAN: Auto-sensing 10/100/1000 Mbps ports (M12 X-coded) x 2

Isolation Protection: 1.5 kV

Serial Interface

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

ESD Protection: 4 kV for all signals

Isolation Protection: 1.5 kV

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

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: Power x 1, Storage x 1, hot-swappable trays x 2

LAN: 2 per port (10/100/1000 Mbps)

Serial: 2 per port (Tx and Rx)

Switches and Buttons

Power Switch: on/off (front panel)

Reset Button: For warm reboot (front panel)

Hot-swappable: trigger (on each removable tray)

Physical Characteristics

Housing: Aluminum

Weight: 4 kg (8.98 lb)

Dimensions:

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

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

Mounting: Wall, DIN rail (optional), VESA (optional)

Environmental Limits

Operating Temperature*:

Standard models: -25 to 55°C (-13 to 131°F)

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

Storage Temperature*: -40 to 85°C (-40 to 185°F)

*without HDD installed

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 A-coded)

Note: Compliant with EN 50155 at 24 VDC

Input Current:

• 3.3 A @ 12 VDC

• 0.82 A @ 48 VDC

Power Consumption: 40 W

Standards and Certifications

Safety: UL 60950-1, EN 60950-1

EMC: EN 55022/24

EMI: CISPR 22, FCC Part 15B Class A

EMS:

IEC 61000-4-2 ESD: Contact 6: kV; Air: 8 kV

IEC 61000-4-3 RS: 80 MHz to 1 GHz: 20 V/m

IEC 61000-4-4 EFT: Power: 2 kV; Signal: 2 kV

IEC 61000-4-5 Surge: Power: 2 kV; Signal: 2 kV

IEC 61000-4-6 CS: 10 V

IEC 61000-4-8

Green Product: RoHS, CRoHS, WEEE

Rail Traffic: EN 50155*, EN 50121-3-2, EN 50121-4, IEC 60571

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

Reliability

Automatic Reboot Trigger: Software-programmable watchdog timer configurable from 1 to 255 seconds

MTBF (mean time between failures)

Time: 332,173 hrs

Standard: Telcordia (Bellcore) Standard TR/SR

Warranty

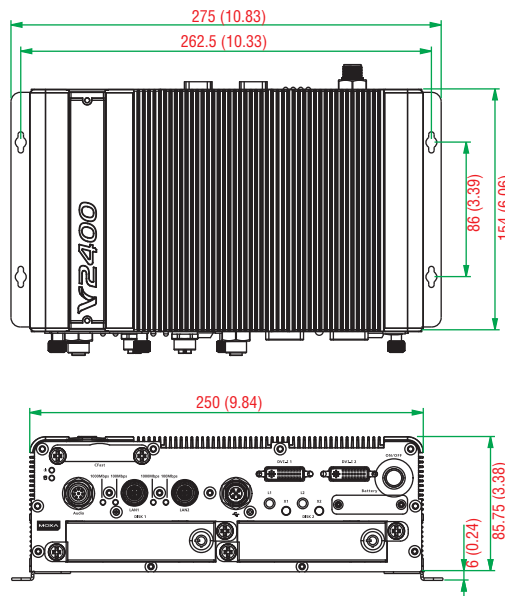
Warranty Period: 3 years

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 adapters and cables.

Dimensions

Unit: mm (inch)



Software Specifications

Linux

OS: Linux Debian 7

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

File System: EXT 4

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

Internet Security: OpenVPN, Netfilter/iptables

Secure Shell for Remote Access: SSH allows remote logins to a secure encrypted console from any connected network dial-up

Dial-up Networking: PPP Daemon for Linux that allows Unix machines to connect to the Internet through dialup lines, using the Point-to-Point Protocol (PPP). Works with 'chat', 'dip', and 'dialup', '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: A watchdog timer that triggers a system reset upon software freezes, for both specific applications and system-wide failures.

Application Development Software:

- Moxa API Library (Watchdog timer, Moxa serial I/O control, Moxa DI/DO API)
- GNU C library
- Perl

Windows Embedded Standard 7

Core OS:

- 32-bit or 64-bit supported
- Remote Client
- Remote Procedure Call

Applications and Services Development:

- .Net Framework 4.5
- Remote Desktop Protocol 7.1
- COM OLE Application Support
- COM+ Application Support
- MSMQ

Internet Services:

- Internet Explorer 11
- IIS 7.0

File Systems and Data Storage:

- Windows Data Access Components
- Windows Backup and Restore

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

Embedded Self-Health Diagnostic Software: SNMP-based remote scripting layer for monitoring, reporting, and control

SmartRecovery: BIOS level system recovery tool

Ordering Information

Type	CTO Models						Pre-Configured Models		
Model	V2416A-C2	V2416A-C2-T	V2416A-C2-CT-T	V2416A-C7	V2416A-C7-T	V2416A-C7-CT-T	V2416A-C2-W7E	V2416A-C2-T-W7E	V2416A-C7-T-W7E
Computer									
CPU	Intel Celeron 1047UE 1.4 GHz			Intel Core i7-3517UE 1.7 GHz			Intel Celeron 1047UE 1.4 GHz		Intel Core i7-3517UE 1.7 GHz
Operating System (CTO*)	Optional Note: Windows Embedded Standard 7 (32-bit/64-bit) or Linux Debian 7 (64-bit)						Windows Embedded Standard 7 (32-bit)		
Memory (CTO*)	4 GB pre-installed, can be upgraded to 8 GB						4 GB pre-installed		
USB	USB 2.0 (Type A) x 2 USB 2.0 (M12 D-coded) x 1								
Power Input Voltage	12 to 48 VDC (M12 A-coded)								
Storage									
OS CFast Storage (CTO*)	Optional Note: 32-bit W7E requires at least an 8 GB CFast card, 64-bit W7E requires at least a 16 GB CFast card, and 64-bit Debian7 requires at least an 8 GB CFast card						8 GB CFast card pre-installed		
Backup CFast Storage (CTO*)	Optional								
SSD / HDD Storage (CTO*)	EN 50155 anti-vibration 2.5-inch SSD / HDD hot-swappable storage trays x 2 Note: Storage drive must be purchased separately								
Interface									
Display Interface	DVI-I x 2								
Audio Interface	Line in/out (M12 A-coded) x 1								
Ethernet Interface	10/100/1000 Mbps (M12 X-coded) x 2								
Serial Ports	RS-232/422/485 (DB9) x 4								
Digital Input Channels	6								
Digital Output Channels	2								
Environmental Limits									
Operating Temperature	T1: -25 to 55°C	TX: -40 to 70°C		T1: -25 to 55°C	TX: -40 to 70°C		T1: -25 to 55°C	TX: -40 to 70°C	
Conformal Coating	-	Yes		-	Yes		-		

*CTO = Configure To Order

Note:

Please refer to the Component Compatibility Guide (CCG) for the list of components that Moxa has validated to be compatible with this product. You can download the CCG from the Moxa product website. For components with a Moxa P/N, you can order the components together with your product from Moxa and we will install the selected components in your product. Moxa guarantees the compatibility of the components installed in your CTO product.

Package Checklist

- V2416A series embedded computer
- Wall-mounting kit
- 8 screws for hot-swappable HDD trays
- 8 HDD soft washers
- 2 keys for hot-swappable HDD trays
- Documentation and software CD or DVD
- Quick installation guide (printed)
- Warranty card

Optional Accessories (can be purchased separately)

Type	Model Name	Description
Ethernet		
 Cable & Connector	CBL-M12XMM8PRJ45-BK-100-IP67	8-pin male X-coded M12-to-RJ45 Cat-5E UTP gigabit Ethernet cable, 1 meter, IP67-rated
 Connector	M12X-8PMM-IP67	8-pin male X-coded circular threaded gigabit Ethernet connector, IP67-rated (for field installation)
Mounting Kits		
 Isolated Wall-mounting Kit	V2400 Isolated Wall-mounting Kit	Wall-mounting kit with isolation protection, including two wall-mounting brackets and four screws
 DIN-Rail Mounting Kit	DK-DC50131-01	DIN-rail mounting kit, including two DIN-rail brackets and eight screws
Power		
 Cable	CBL-M12(FF5P)/Open-100 IP67	5-pin female A-coded M12 power cable, 1 meter, IP67-rated
 Connector	M12A-5P-IP68	5-pin male circular threaded A-coded M12 power connector, IP68-rated (for field installation)
 Adapter	PWR-24250-DT-S1	Power adapter for testing and system development in the office under ambient temperature conditions: Input: 100 to 240 VAC, 50 to 60 Hz, 1.5 A Output: 24 VDC, 2.5 A, 60 W
 Power Cord	PWC-C7US-2B-183	Power cord with 2-pin connector, USA plug
 Power Cord	PWC-C7EU-2B-183	Power cord with 2-pin connector, Euro plug
 Power Cord	PWC-C7UK-2B-183	Power cord with 2-pin connector, British plug
 Power Cord	PWC-C7AU-2B-183	Power cord with 2-pin connector, Australia plug
 Power Cord	PWC-C7CN-2B-183	Power cord with 2-pin connector, China plug
Audio		
 Connector	M12A-8PMM-IP67	8-pin male circular threaded A-coded M12 connector, IP67-rated (for field-installation)
USB		
 Connector	M12A-5PMM-IP68	5-pin male circular threaded D-coded M12 USB connector, IP68-rated
Battery		
 Battery Kit	RTC Battery Kit	Lithium battery with built-in connector for easy replacement