

# V2616A Series

## High performance network video recorder computer



- > Compliant with EN 50121-4
- > Complies with all EN 50155 mandatory test items\*
- > IEC 61373 certified for shock and vibration resistance
- > Two hot-swappable storage trays for 2.5-inch SSDs or HDDs
- > SynMap for system health monitoring
- > 24 to 110 VDC wide range isolated power input
- > Easy coin battery replacement
- > Smart Recovery for manual or automatic system recovery

\*This product is suitable for rolling stock railway applications, as defined by the EN 50155 standard. For a more detailed statement, click here: [www.moxa.com/doc/specs/EN\\_50155\\_Compliance.pdf](http://www.moxa.com/doc/specs/EN_50155_Compliance.pdf)



### Introduction

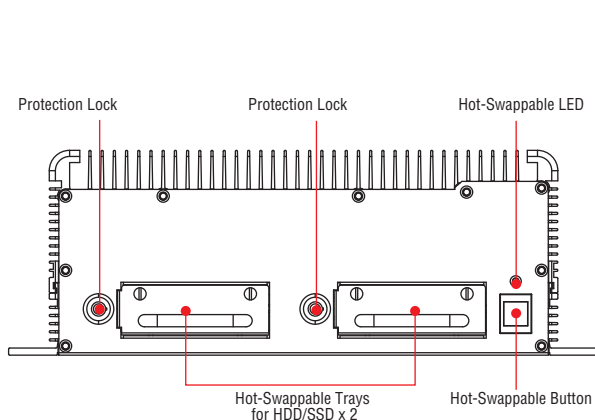
The V2616A series of embedded computers are based on the Intel Core i5/i7 processor, and feature 2 RS-232/422/485 serial ports, dual gigabit LAN ports, 3 USB 2.0 ports, and dual VGA/DVI-D video outputs. The V2616A computers are compliant with mandatory sections of EN 50155, covering operating temperature, power input voltage, surge, ESD, and vibration, as well as conformal coating and power insulation, making them suitable for a variety of industrial applications.

The V2616A computers come with a CFast socket that provides ample and secure data buffering or additional storage expansion, as well as 2 hot-swappable storage trays that accept 2.5-inch solid state or hard disk storage drives, and may be arranged in RAID 1 arrays to give full data redundancy.

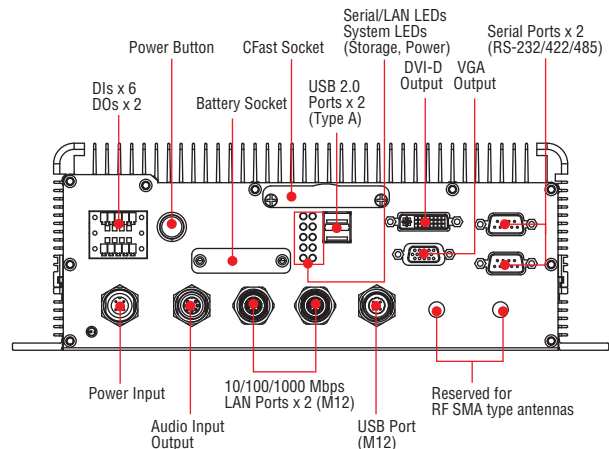
The V2616A series comes with pre-installed Windows Embedded Standard 7 or Debian 7 environments, allowing programmers and system integrators to choose their preferred computing and development platform.

### Appearance

#### Front View



#### Rear View



## Hardware Specifications

### Computer

#### CPU:

- Intel® Core™ i5-3610ME dual-core processor (3M Cache, 2.7 GHz) for V2616A-C5 series
- Intel® Core™ i7-3517UE dual-core processor (4M Cache, 1.7 GHz) for V2616A-C7-T series
- Intel® Core™ i7-3612QE quad-core processor (6M Cache, 2.1 GHz) for V2616A-C8 series

**OS:** Linux or Windows Embedded Standard 7

**Note:** The OS is pre-installed.

**System Chipset:** Mobile Intel HM65 Express Chipset

**System Memory:** 16 GB capacity, 4 GB pre-installed: 2 slot of 8 GB DDR3-1600 SO-DIMM SDRAM

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

#### Storage

**Built-in:** 8 GB CFast to store OS

**Storage Expansion:** 2 hot-swappable storage trays for 2.5-inch SATA SSD or HDD

**HDD Support:** 1 internal SATA-II storage connector for 2.5-inch SSD or HDD

#### Expansion Slot:

1 full-size/half-size mini PCIe socket with 1 SIM card socket. Mini PCIe socket supports power on/off control

#### Other Peripherals

**Audio:** Line-in, line-out (M12)

#### Display

**Graphics Controller:** Intel® HD Graphics 4000 (integrated)

**DVI Interface:** DVI-D connector (Chrontel CH7307 SDVO to DVI transmitter), max. resolution 1920 x 1200

**VGA Interface:** DB15 female connector, max. resolution 2048 x 1536

#### Ethernet Interface

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

#### Serial Interface

**Serial Standards:** 2 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:** TxDA(-), TxDB(+), RxDB(+), RxDA(-), GND

**RS-485-4w:** TxDA(-), TxDB(+), RxDB(+), RxDA(-), GND

**RS-485-2w:** DataA(-), DataB(+), 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 Protection:** 3 kV

#### 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:** 1 Power, 1 Storage

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

**Serial:** 2 TX, 2 RX

#### Physical Characteristics

**Housing:** Aluminum

**Weight:** 5 kg (11.11 lb)

**Dimensions:** 287 x 290 x 101 mm (11.29 x 11.41 x 3.97 in)

**Mounting:** Wall (mounting kit must be purchased separately)

#### Environmental Limits

**Operating Temperature:** (without HDD installed)

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

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

**Storage Temperature:** (with SSD 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

#### Power Requirements

**Input Voltage:** 24 to 110 VDC, M12 connector

**Note:** 24 and 110 VDC are EN 50155 compliant

**Input Current:** 2.5 A @ 24 VDC to 0.55 A @ 110 VDC (SSD/HDD not attached)

**Power Consumption:** 60 W (no SSD/HDD attached)

**Power Button:** On/off (rear panel)

#### Standards and Certifications

**Safety:** UL 60950-1, CSA C22.2 No. 60950-1-07, EN 60950-1

**EMC:** EN 55032/24

**EMI:** CISPR 32, 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 50121-4, IEC 61373

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#### Reliability

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

**MTBF** (mean time between failures)

**Time:**

V2616A-C5 Series: 280,726 hrs

V2616A-C7/C8 Series: 261,297 hrs

**Standard:** Telcordia (Bellcore) Standard TR/SR

#### Warranty

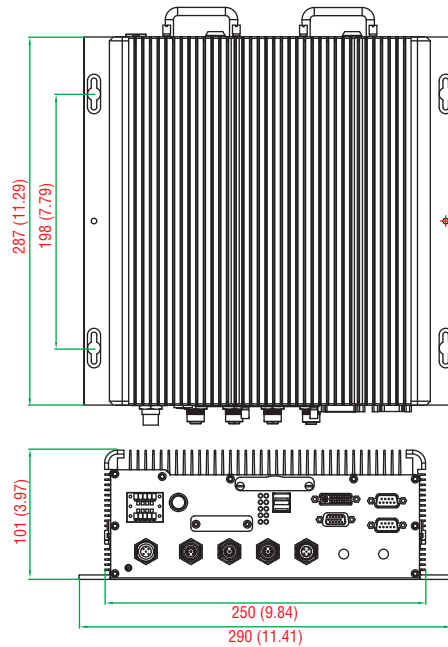
**Warranty Period:** 3 years

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

**ntpdate:** Sets the date and time via NTP

**Ethernet bonding:** The Ethernet bonding for combination of network interfaces on one host for redundancy and/or increased throughput

**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).

**mdadm:** A Linux utility used to manage software RAID devices

**Dmraid:** Discovers software RAID devices and activates RAID sets

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

**alsa-utils:** Contains various utilities for controlling audio cards

**Watchdog:** A watchdog timer that triggers a system reset upon software freezes, for both specific applications and system-wide failures.

**Moxa mini-PCIe Reset Utility:** Resets the mini-PCIe module on the mini-PCIe slot

**Moxa Hotplug Daemon:** Monitors and manages the hard disk status

### Application Development Software:

- Moxa API library
- GNU C/C++ cross compiler
- GNU C library
- Perl

### Software Package:

- SNMP
- mx-e1000e
- mx-ptpd2

### Windows Embedded Standard 7

#### Core OS:

- Windows 7 Embedded, 32 bit
- 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

#### 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 East, 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

**International:**

- IME Simplified Chinese Support
- IME Traditional Chinese Support
- IME Japanese Support
- IME Korean Support

**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
- Windows Backup and Restore

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

**Ordering Information**

**Available Models**

**V2616A-C5:** (Barebone) x86 embedded computer with Intel Core i5-3610ME, VGA, DVI, 2 LANs, 2 serial ports, 6 DIs, 2 DOs, 3 USB 2.0 ports, 24 to 110 VDC power, -25 to 55°C operating temperature (EN 50155 Class T1)

**V2616A-C5-W7E:** x86 embedded computer with Intel Core i5-3610ME, VGA, DVI, 2 LANs, 2 serial ports, 6 DIs, 2 DOs, 3 USB 2.0 Ports, 24 to 110 VDC Power, Win7 Embedded, -25 to 55°C operating temperature (EN 50155 Class T1)

**V2616A-C5-CT-W7E:** x86 embedded computer with Intel Core i5-3610ME, VGA, DVI, 2 LANs, 2 serial ports, 6 DIs, 2 DOs, 3 USB 2.0 ports, 24 to 110 VDC power, Windows Embedded Standard 7, -25 to 55°C operating temperature (EN 50155 Class T1), conformal coating

**V2616A-C5-LX:** x86 embedded computer with Intel Core i5-3610ME, VGA, DVI, 2 LANs, 2 serial ports, 6 DIs, 2 DOs, 3 USB 2.0 ports, 24 to 110 VDC power, Linux, -25 to 55°C operating temperature (EN 50155 Class T1)

**V2616A-C5-CT-LX:** x86 embedded computer with Intel Core i5-3610ME, VGA, DVI, 2 LANs, 2 serial ports, 6 DIs, 2 DOs, 3 USB 2.0 ports, 24 to 110 VDC power, Linux, -25 to 55°C operating temperature (EN 50155 Class T1), conformal coating

**V2616A-C7-T:** (Barebone) x86 embedded computer with Intel Core i7-3517UE, VGA, DVI, 2 LANs, 2 serial ports, 6 DIs, 2 DOs, 3 USB 2.0 ports, 24 to 110 VDC power, -40 to 70°C operating temperature (EN 50155 Class TX)

**V2616A-C7-T-W7E:** x86 embedded computer with Intel Core i7-3517UE, VGA, DVI, 2 LANs, 2 serial ports, 6 DIs, 2 DOs, 3 USB 2.0 ports, 24 to 110 VDC Power, Windows Embedded Standard 7, -40 to 70°C operating temperature (EN 50155 Class TX)

**V2616A-C7-CT-T-W7E:** x86 embedded computer with Intel Core i7-3517UE, VGA, DVI, 2 LANs, 2 serial ports, 6 DIs, 2 DOs, 3 USB 2.0 ports, 24 to 110 VDC Power, Windows Embedded Standard 7, -40 to 70°C operating temperature (EN 50155 Class TX), conformal coating

**V2616A-C7-T-LX:** x86 embedded computer with Intel Core i7-3517UE, VGA, DVI, 2 LANs, 2 serial ports, 6 DIs, 2 DOs, 3 USB 2.0 ports, 24 to 110 VDC power, Linux, -40 to 70°C operating temperature (EN 50155 Class TX)

**V2616A-C7-CT-T-LX:** x86 embedded computer with Intel Core i7-3517UE, VGA, DVI, 2 LANs, 2 serial ports, 6 DIs, 2 DOs, 3 USB 2.0 ports, 24 to 110 VDC power, Linux, -40 to 70°C operating temperature (EN 50155 Class TX), conformal coating

**V2616A-C8:** (Barebone) x86 embedded computer with Intel Core i7-3612QE, VGA, DVI, 2 LANs, 2 serial ports, 6 DIs, 2 DOs, 3 USB 2.0 ports, 24 to 110 VDC power, -25 to 55°C operating temperature (EN 50155 Class T1)

**V2616A-C8-W7E:** x86 embedded computer with Intel Core i7-3612QE, VGA, DVI, 2 LANs, 2 serial ports, 6 DIs, 2 DOs, 3 USB 2.0 ports, 24 to 110 VDC power, Windows Embedded Standard 7, -25 to 55°C operating temperature (EN 50155 Class T1)

**V2616A-C8-CT-W7E:** x86 embedded computer with Intel Core i7-3612QE, VGA, DVI, 2 LANs, 2 serial ports, 6 DIs, 2 DOs, 3 USB 2.0 ports, 24 to 110 VDC power, Windows Embedded Standard 7, -25 to 55°C operating temperature (EN 50155 Class T1), conformal coating

**V2616A-C8-LX:** x86 embedded computer with Intel Core i7-3612QE, VGA, DVI, 2 LANs, 2 serial ports, 6 DIs, 2 DOs, 3 USB 2.0 ports, 24 to 110 VDC power, Linux, -25 to 55°C operating temperature (EN 50155 Class T1)

**V2616A-C8-CT-LX:** x86 embedded computer with Intel Core i7-3612QE, VGA, DVI, 2 LANs, 2 serial ports, 6 DIs, 2 DOs, 3 USB 2.0 ports, 24 to 110 VDC power, Linux, -25 to 55°C operating temperature (EN 50155 Class T1), conformal coating

**Package Checklist**

- V2616A embedded computer
- 2 storage tray keys
- Power cable (CBL-M12FF5PPJ21-BK-15-IP68)
- 2 5-pin terminal blocks
- Documentation and software CD or DVD
- Quick installation guide (printed)
- Warranty card

## Optional Accessories

Type	Model	Description
<b>Ethernet</b>		
 Cable & Connector	CBL-M12XMM8PRJ45-BK-100-IP67	1-meter X-coded M12-to-RJ45 Cat-5E UTP Gigabit Ethernet cable, 8-pin male M12 connector, IP67-rated
 Connector	M12X-8PMM-IP67	Field-installation X-coded screw-in Gigabit Ethernet connector, 8-pin male M12 connector, IP67-rated
<b>Power</b>		
 Connector	M12A-5P-IP68	Field-installation A-coded screw-in power connector, 5-pin female M12 connector, IP68-rated
 Adapter	PWR-24270-DT-S1	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
 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
<b>Audio</b>		
 Connector	M12A-8PMM-IP67	Field-installation A-coded 8-pin male screw-in M12 connector, IP67-rated
<b>USB</b>		
 Connector	M12A-5PMM-IP68	D-coded screw-in USB connector, 5-pin male M12 connector, IP68-rated
<b>Storage Kit</b>		
 Internal Storage Kit	V2616A Internal Storage Kit	EN 50155 compliant HDD/SSD installation package
 Storage Tray	V2616A Hot-swappable Storage Kit	EN 50155 compliant HDD/SSD installation faceplate