

# DA-820 Series

## IEC 61850 native PRP/HSR computer



- > Intel Core i7 dual/quad-core processor with Intel QM77 Express chipset
- > 2 x 204-pin SO-DIMM ECC DDR3 sockets, supporting un-buffered ECC DDR3 1333/1600 memory at 1333 and 1600 MT/s, 16 GB max.
- > 6 USB 2.0 ports for high speed peripherals
- > 3 PCIe x1 slots and 2 PCI slots for expansion modules
- > 1 PCIe x16 slot for an additional video card
- > Highly reliable design, supporting dual power, RAID 0/1/5/10, and PRP/HSR technology (with PRP/HSR expansion module)
- > Cybersecurity function
- > IEC 61850-3 (general requirements for electrical substation automation, EMC Level 4, C3, Bm)
- > IEEE 1613 compliant (environmental and testing requirements for communications networking devices in electric power substations)
- > IEC 60255 compliant (measuring relays and protection equipment)



### Overview

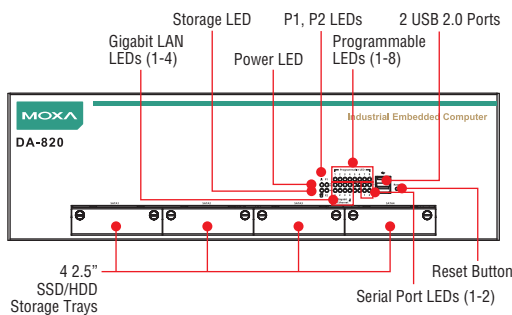
The DA-820's main operating system is based on the Intel quad-core i7-3612QE CPU and QM77 chipset, which supports standard x86, 2 VGA ports, 6 USB port, 4 gigabit LAN ports, and 2 3-in-1 RS-232/422/485 serial ports. The DA-820 is equipped with a 4 SATA disk interface and supports RAID 0/1/5/10 functionality. The DA-820 is specifically designed for substation applications that require precise time synchronization and adherence to the IEC 61850-3 standards. The flexible design makes the DA-820 suitable for local SCADA, environmental monitoring, video surveillance, protocol conversion, and PRP/HSR redundancy applications. In addition, the cybersecurity function makes the DA-820 an ideal solution for secure network communication applications.

The DA-820 complies with the IEC 60255 standards to enable the protection of electrical relays in a smart substation. IEC 60255 is one of the most widely used standards for testing relays and protection equipment, and compliance ensures that the DA-820 will work reliably and seamlessly with IEDs (intelligent electronic devices) as a part of the robust substation automation system.

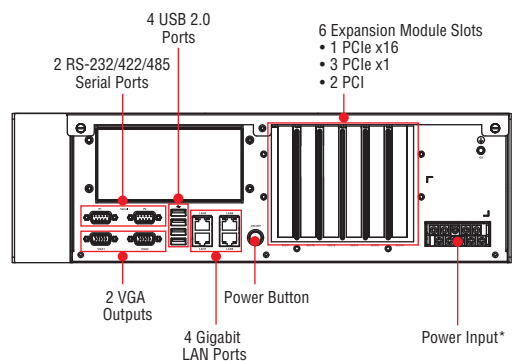
The housing is a standard 3U, 19-inch wide, rack-mounted rugged enclosure. This robust, rack-mountable design provides the hardened protection needed for industrial environment applications.

### Appearance

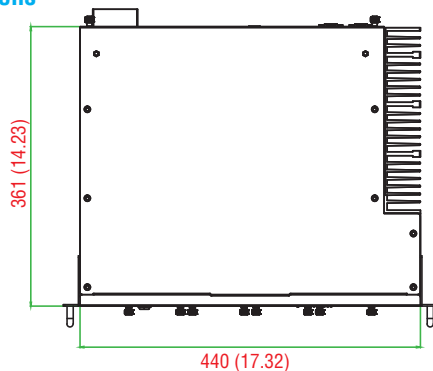
#### Front View



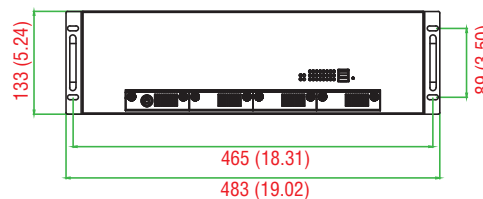
#### Rear View



## Dimensions



Unit: mm (inch)



## Hardware Specifications

### Computer

#### CPU:

- DA-820-C7: Intel dual-core i7-3555LE 2.5 GHz processor
- DA-820-C8: Intel quad-core i7-3612QE 2.1 GHz processor

#### OS (Optional):

- 64-bit Debian 7
- 64-bit Windows Embedded Standard 7
- 64-bit Windows 7 Professional for embedded systems
- Note:** The OS is optional; you may purchase Windows 7 Embedded Standard 7 or Windows 7 Professional for embedded systems via CTOS, or download Debian 7 from our website.

#### System Chipset: QM77

#### BIOS: SPI Flash 64 Mbit BIOS, PCI Plug & Play, ACPI function support

#### System Memory: Max. 16 GB capacity (204-pin SO-DIMM x 2, each supporting un-buffered ECC DDR3 memory at 1333 and 1600 MT/s, 8 GB Max.)

#### USB:

- Rear panel: USB 2.0 hosts x 4, Type A connector
- Front panel: USB 2.0 hosts x 2, Type A connector

### Storage

#### Built-in: CFast socket: Optional Cfast card to store OS

#### Storage Expansion: 4 SATA 2.0 interfaces, supporting RAID 0, 1, 5, 10, hot-swappable

### Display

#### Graphics Controller: Intel® HD Graphics 4000

#### Display Interface: 2 VGA outputs (DB15 female connector)

#### Resolution: CRT display mode with pixel resolution up to 2048 x 1536 at 75 Hz

### Ethernet Interface

#### LAN: Auto-sensing 10/100/1000 Mbps ports x 4

- Ethernet 1 to 3: Intel 82574 gigabit Ethernet controller
- Ethernet 4: Intel 82579 gigabit Ethernet controller supporting Intel AMT technology

#### Magnetic Isolation Protection: 1.5 kV built-in

### Serial Interface

#### Serial Standards: 2 RS-232/422/485 ports (DB9 male)

### 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

### LEDs

#### System: Power, Storage

#### Gigabit LAN: 100M x 4, 1000M x 4

#### Serial: TX/RX

#### Programmable: LED x 8

### Switches and Buttons

#### Power Switch: on/off (on rear panel)

### Physical Characteristics

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

#### Weight: 14 kg (31.11 lb)

#### Dimensions: 361 x 440 x 133 mm (14.23 x 17.32 x 5.24 in) (without rackmount ears)

#### Mounting: Standard 19-inch rackmount

### Environmental Limits

#### Operating Temperature:

- DA-820-C8: -40 to 60°C (-40 to 140°F)
- DA-820-C7: -40 to 75 °C (-40 to 167°F)

#### Storage Temperature: -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:

- High Voltage: 100 to 240 VAC/VDC, 50/60 Hz, 1 A
- Low Voltage: 24 to 110 VDC, 4.7 A

#### Multiple Power Supplies:

- SP: Single power supply
- DP: Dual power supplies

#### Power Consumption: 60 W

### Standards and Certifications

#### Safety: LVD, UL, cUL

#### Electrical Substation: IEC 61850-3, IEC 60255, IEEE 1613

#### Protection Relay: IEC 60255

#### EMC: EN 61000-6-2/6-4

#### EMI: CISPR 22, FCC Part 15B Class A

#### EMS:

- IEC 61000-4-2 ESD: Contact: 8 kV; Air: 15 kV
- IEC 61000-4-3 RS: 80 MHz to 1 GHz: 10 V/m
- IEC 61000-4-4 EFT: Power: 4 kV; Signal: 4 kV
- IEC 61000-4-5 Surge: Power 4 kV; Signal 4 kV
- IEC 61000-4-6 CS: Signal: 10 V
- IEC 61000-4-8: 20 A/m
- IEC 61000-4-9: 300 A/m
- IEC 61000-4-11: (AC models only)

#### Green Product: RoHS, CRoHS, WEEE

### Reliability

#### Alert Tools: Built-in buzzer and RTC (real-time clock) with lithium backup battery

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

**MTBF** (mean time between failures)**Time:**

DA-820-C7-DP-HV-T: 138,503 hrs  
 DA-820-C7-SP-HV-T: 191,570 hrs  
 DA-820-C8-DP-HV: 128,077 hrs  
 DA-820-C8-SP-HV: 172,182 hrs  
 DA-820-C7-SP-LV-T: 240,015 hrs  
 DA-820-C7-DP-LV-T: 221,019 hrs  
 DA-820-C8-SP-LV: 240,015 hrs  
 DA-820-C8-DP-LV: 221,019 hrs

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

**Warranty**

**Warranty Period:** 3 years

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

**Software Specifications****Linux**

**OS:** 64-bit Linux Debian 7

**Web Server (Apache):** Allows you to create and manage web sites; supports PHP and XML

**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 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:** 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)
- GNU C/C++ cross-compiler
- GNU C library
- Perl

**Software Package:**

- SNMP
- SafeGuard technology

**Windows Embedded Standard 7****Core OS:**

- 64-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

**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
- Create and Play DVDs
- Photo Viewer
- Remote media streaming
- Windows Media Center

**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)
- MS AntiMalware
- Windows Defender
- Bitlocker Secure Startup
- Applocker

**Enterprise Features:**

- Enterprise Search Scopes
- BranchCache
- DirectAccess
- Windows XP Mode

**Embedded Features:**

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

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

**Windows 7 Professional for Embedded Systems**

**Core OS:**

- 64-bit support
- Remote Client
- Remote Procedure Call

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- .Net Framework 3.5
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- COM+ Application Support
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- MS AntiMalware
- Windows Defender

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

**Ordering Information**

Model	Configuration
DA-820-C7-SP-HV	i7-3555LE, dual-core 2.5 GHz, 100 to 240 VAC/VDC, -40 to 60°C, w/o CFast/RAM/OS
DA-820-C7-SP-HV-T	i7-3555LE, dual-core 2.5 GHz, 100 to 240 VAC/VDC, -40 to 75°C, w/o CFast/RAM/OS
DA-820-C7-SP-LV-T	i7-3555LE, dual-core 2.5 GHz, 24 to 110 VDC, -40 to 75°C, w/o CFast/RAM/OS
DA-820-C7-DP-HV	i7-3555LE, dual-core 2.5 GHz, 100 to 240 VAC/VDC x 2, -40 to 60°C, w/o CFast/RAM/OS
DA-820-C7-DP-HV-T	i7-3555LE, dual-core 2.5 GHz, 100 to 240 VAC/VDC x 2, -40 to 75°C, w/o CFast/RAM/OS
DA-820-C7-DP-LV-T	i7-3555LE, dual-core 2.5 GHz, 24 to 110 VDC x 2, -40 to 75°C, w/o CFast/RAM/OS
DA-820-C8-SP-HV	i7-3612QE, quad-core 2.1 GHz, 100 to 240 VAC/VDC, -40 to 60°C, w/o CFast/RAM/OS
DA-820-C8-SP-LV	i7-3612QE, quad-core 2.1 GHz, 24 to 110 VDC, -40 to 60°C, w/o CFast/RAM/OS
DA-820-C8-DP-HV	i7-3612QE, quad-core 2.1 GHz, 100 to 240 VAC/VDC x 2, -40 to 60°C, w/o CFast/RAM/OS
DA-820-C8-DP-LV	i7-3612QE, quad-core 2.1 GHz, 24 to 110 VDC x 2, -40 to 60°C, w/o CFast/RAM/OS

**Package Checklist**

- DA-820 rackmount computer
- 19-inch rackmount kit
- Documentation CD or DVD
- Quick installation guide (printed)
- Warranty card

To order a DA-820 system with a pre-installed OS, please contact a Moxa sales representative.

**Recommended Configuration**

Operating System	System Memory	CFast Card
64-bit Linux Debian 7	≥ 2 GB	≥ 2 GB
Windows Embedded Standard 7	≥ 4 GB	≥ 16 GB

**Optional DA-820 Expansion Modules**

DA-IRIG-B-S-02-T	IRIG-B expansion module, PCI interface, 1 fiber IRIG-B in, 1 DB9M in/out, 1 DB9M out
DA-IRIG-B-S-04-T	IRIG-B expansion module, PCI interface, 1 fiber IRIG-B in, 1 DB9M in/out, 3 DB9M out
DA-PRP-HSR	PRP, HSR expansion module, PCIe interface
DE-GX02-SFP-T	2-port 1000 Mbps fiber card, SFP slot x 2, PCIe interface (SFP module excluded)
DE-FX02-SFP-T	2-port 100 Mbps fiber card, SFP slot x 2, PCIe interface (SFP module excluded)

Slot	No.	Expansion Card	Application	Moxa Product
PCIe x 16	1	Video Card	Video surveillance	(purchase from another vendor)
		RAID Card	Data storage	(purchase from another vendor)
PCIe x 1	3	PRP/HSR Card	Communication redundancy	DA-PRP-HSR
		LAN Card/Fiber Card	Data transmission	DE-GX02-SFP-T DE-FX02-SFP-T
		RS-232 RS-422 RS-485 CAN	Device control or data acquisition	CP-116E-A CP-118E-A-I CP-138E-A-I CP-134EL-A-I CP-602E-I (CAN Card)
PCI	2	IRIG-B	Time synchronization	DA-IRIG-B-S-02-T DA-IRIG-B-S-04-T
		RS-232 RS-422 RS-485 CAN	Device control or data acquisition	CP-118U/CP-118U-I CP-168U CP-104UL CP-602U-I (CAN Card)

Optional Accessories		
Model	Description	Application
Mini DB9F-to-TB	DB9 female to terminal block adapter	For IRIG-B card
DDR3-THERMAL-KIT-82001	DDR3 SDRAM Thermal Kit	For non-DDR3L SDRAM
FAN-KIT-82001	Fan kit without lock	Fan Kit for when using a 3rd party high performance graphics accelerator card in the PCIe x 16 slot.
FAN-KIT-82002	Fan kit with lock	Fan Kit for when using a 3rd party high performance graphics accelerator card in the PCIe x 16 slot.
HDD-DOOR-LOCK-82001	HDD kit with thermal hole	For heat dissipation