

# DA-720-DPP Series

**x86 2U 19-inch high density 14 gigabit Ethernet rackmount computers with 6th Gen Intel® Core™ i7 CPU**



- > IEC 61850-3, IEEE 1613, and IEC 60255 compliant for power substation automation systems
- > EN 50121-4 compliant for railway wayside applications
- > 6th Gen Intel® Core™ i7/i5 CPU (Skylake)
- > 2 built-in DDR4 memory sockets
- > 1 mSATA for OS and 1 SATA III for storage expansion
- > 14 gigabit Ethernet ports for network redundancy
- > 2 PCIe expansion slots for expansion modules
- > 4 USB ports for high speed peripherals
- > 2 isolated RS-232/422/485 ports
- > Embedded Debian 8 Linux (W10 by CTOS)
- > Supports 110 to 240 VDC and 100 to 240 VAC power inputs



## Overview

The DA-720-DPP series computers are x86 platforms with 14 gigabit Ethernet ports, 2 isolated RS-232/422/485 serial ports, USB, VGA, and 2 PCIe ports for expansion modules. The DA-720-DPP comes in a standard 19-inch 2U rack-mountable case with a robust design ideal for specialized industrial automation applications, including power substations, transportation and shipping, and oil and gas production and supply.

With IEC-61850-3 and IEEE 1613 compliance, the DA-720-DPP is sure to deliver stable and reliable system operation for power applications. The DA-720-DPP also complies with the IEC 60255 standards which cover 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 with the standard ensures that the DA-720-DPP will work reliably and seamlessly with IEDs as part of a robust substation automation system.

EN 50121-4 compliance confirms that the DA-720-DPP can deliver stable and reliable system operations in rail applications. In station ISCS (Integrated Supervisory Control System) and wayside control and monitoring systems, a powerful front-end processor is needed for controlling the local SCADA and traction power relay house. The expandable serial interfaces and 14 gigabit Ethernet ports enable the integration of station subsystems, including AFC, PAS, PSD, and FAS, on a single platform. For wayside applications, you can also integrate disaster prevention, traction power, and signaling and safety systems to provide an integrated view of your smart rail setup.

The DA-720-DPP comes with one of two different CPU options, and basic models that allow system designers to install the mSATA, RAM, and operating system according to their specific requirements. Such

a wide choice of options is particularly welcome when it comes to designing customized industrial solutions.

The DA-720-DPP comes with 2 PCIe ports for expansion modules, including an 8-port RS-232/422/485 module, as well as 4-port and 8-port 10/100/1000 Mbps LAN modules. The DA-720-DPP computers can support up to 22 gigabit LAN ports plus 10 serial ports, or 14 gigabit LAN ports and 18 serial ports, making the DA-720-DPP an ideal solution for a wide range of industrial automation applications.

### Smart Recovery Function

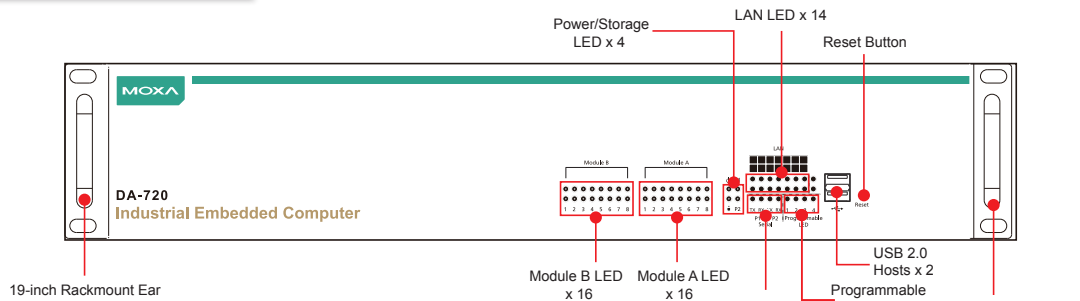
The DA-720-DPP's Smart Recovery function minimizes downtime by making it easy to recover from operating system crashes. Engineers who are experts in a particular vertical market may not have enough computer domain knowledge to know how to fix operating system problems. Moxa Smart Recovery™ is an automated BIOS-level software recovery system that allows engineers to automatically trigger OS recovery to minimize downtime.

### Proactive Monitoring Function

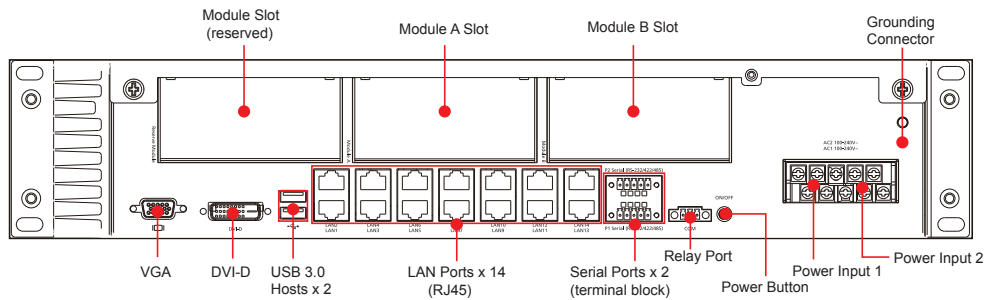
Moxa Proactive Monitoring is a small-footprint, resource-friendly, easy-to-use utility that allows users to track a number of system parameters. Users can view the current parameter values for these key parts by simply clicking on the icons corresponding to the parameters in the user interface. User-defined key part indicators (KPIs) are used to monitor the computer's key parts. Visible and/or audio alerts are triggered automatically via relay and SNMP traps when these KPIs exceed their preset threshold values, making it extremely convenient for operators to avoid system downtime by setting up predictive maintenance tasks well in advance.

## Appearance

Front View



Rear View



## Hardware Specifications

### Computer

**CPU:** Intel 6th Gen Skylake Processor (BGA CPU package)

- Core i5-6300U, 2.4 GHz, dual-core CPU
- Core i7-6600U, 2.6 GHz, dual-core CPU

**OS:** Linux Debian 8 (pre-installed)

**Note:** Windows 10 Enterprise LTSB 64-bit available by CTOS

**System Chipset:** Intel® HD Graphics 520

**BIOS:** 128 Mbit Flash BIOS, Plug & Play, ACPI

**System Memory:** 32 GB capacity, 4 GB for Linux Debian 8 pre-installed; 2 slots for DDR4 SO-DIMM

**USB:** 4 USB ports, system bootable, type A connector

Front: 2 USB 2.0 ports

Rear: 2 USB 3.0 ports

### Storage

**Built-in:** 8 GB industrial mSATA to store 64-bit Debian 8 Linux OS

**Storage Expansion:**

- 1 x SATA 3.0

### Display

**Graphics Controller:** Intel® HD Graphics (Integrated)

**Display Interface:** 1 VGA output (DB15 female connector) and 1 DVI-D

**Resolution:**

- VGA: CRT display mode with pixel resolution up to 1920 x 1200 @ 60 Hz
- DVI-D: Display mode with pixel resolution up to 1920 x 1200 @ 60 Hz

### Ethernet Interface

**LAN:** Auto-sensing 10/100/1000 Mbps ports x 14

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

### Serial Interface

**Serial Standards:** 2 RS-232/422/485 ports (terminal block)

**ESD Protection:** 8 kV contact, 15 kV air

**Surge Protection:** 2 kV line-to-line and 4 kV line-to-ground surge protection, 8/20 μs waveform

**Insulation:** 500 V

**Isolation:** 2 kV

**Pull low/high:** 150k

**Flow Control:** Not supported

**Baudrate:** 50 bps to 115.2 kbps

### Serial Signals

**RS-232:** TxD, RxD, RTS, CTS, 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

**LAN:** Link or Active

**Serial:** 2

**Programmable:** 4 LEDs

**Communication:** Module A x 16, Module B x 16

### Switches and Buttons

**Power Button:** On/Off (on rear panel)

**Reset Button:** Hard Reset (on front panel)

### Physical Characteristics

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

**Weight:** 6.5 kg (14.33 lb)

**Dimensions:** 440 x 301 x 90 mm (17.32 x 12.20 x 3.54 in) (without rackmount ears)

**Mounting:** Standard 19-inch rack

### Environmental Limits

**Operating Temperature:** -25 to 55°C (-13 to 131°F)

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

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

**Anti-Vibration:** 3 mm (2-9 Hz), 10 m/s<sup>2</sup> (9-200 Hz), 15 m/s<sup>2</sup> (200-500 Hz) @ IEC-61850-3, IEC 60870-2-2/Bm/(3M6)/(4M6), sine wave, 2-500 Hz, 1 Oct/min, 10 cycles, 2 hrs 40 mins per axis

**Anti-Shock:** 100 m/s<sup>2</sup> @ IEC-61850-3, IEC 60870-2-2/Bm/(3M6)/(4M6), half sine wave, 11 ms

### Power Requirements

**Input Voltage:** 100 to 240 VAC; 110 to 240 VDC

**Input Current:**

0.82 A @ 100 VAC

0.77 A @ 110 VDC

## Standards and Certifications

**Safety:** UL 60950-1, IEC 60950-1, EN 60950-1

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

**Railway:** EN 50121-4

**Protection Relay:** IEC 60255

**EMC:** EN 55032/24

**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: 20 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: 10 V

IEC 61000-4-8

IEC 61000-4-11

**Green Product:** RoHS, CRoHS, WEEE

## Reliability

**Alert Tools:**

- Built-in buzzer and RTC (real-time clock) with lithium battery backup
- Built-in relay for audio/visual alarm

**Automatic Reboot Trigger:** Built-in watchdog timer, configurable for restarts at 1 to 255 second intervals

**MTBF** (mean time between failures)

**Time:** 138319 hrs

**Warranty**

**Warranty Period:** 3 years

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

## Software Specifications

### Linux

**OS:** Linux Debian 8 64-bit

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

**File System:** EXT4

**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

**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 Point-to-Point Protocol (PPP). 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

### Windows 10 Enterprise LTSC (by CTOS)

**Core OS:**

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

**Applications and Services Development:**

- .Net Framework 4.6
- Remote Desktop Protocol 10
- COM OLE Application Support
- COM+ Application Support
- MSMQ
- Works Folder Client

**Internet Services:**

- Internet Explorer 11
- IIS 10

**File Systems and Data Storage:**

- Windows Data Access Components
- Windows Backup and Restore

**Diagnostics:**

- Common Diagnostic Tools
- Problem Reports and Solutions

**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
- Create and play DVDs
- Photo Viewer
- Remote media streaming
- Windows Media Player
- Windows Mail
- Microsoft Print to PDF
- Internet Printing Client
- Windows Fax and Scan
- XPS Viewer
- XPS Services

**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:**

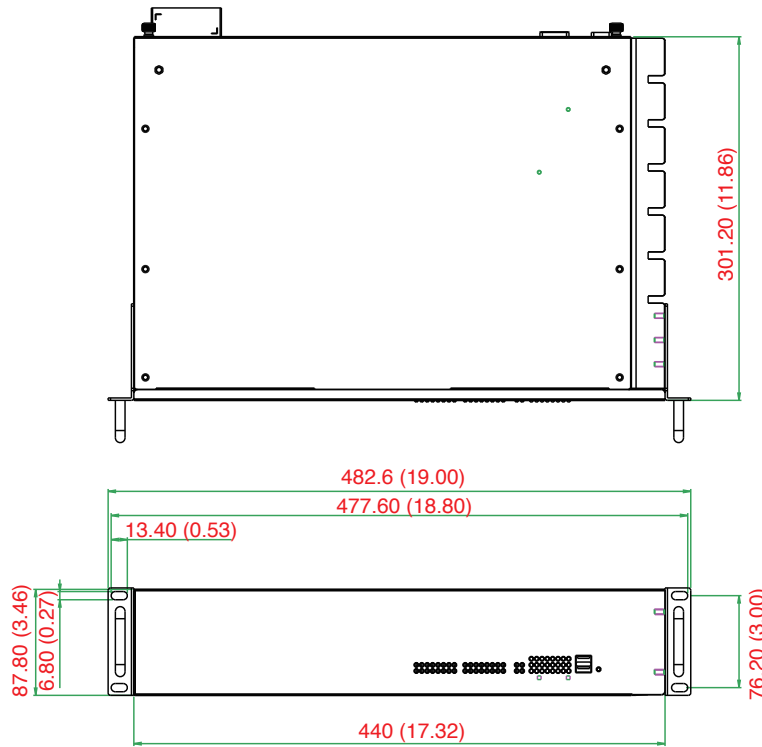
- Credential Roaming Service
- Credentials and Certificate Management
- Windows Authorization Manager (AZMAN)
- Windows Security Center
- Active Directory Rights Management
- Security Base
- Encrypted File System (EFS)
- MS AntiMalware
- Windows Defender

**Embedded Features:**

- Unified Write Filter (UWF)
- Message Box Default Reply
- Registry Filter
- WSDAPI for .NET

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

## Dimensions



## Ordering Information

### Available Models

**DA-720-C5-DPP:** Rackmount computer with Core i5-6300U, 2.4 GHz, dual-core CPU, without mSATA/RAM/OS, 14 gigabit Ethernet ports, 2 isolated RS-232/422/485 ports, 2 PCIe expansion slots, VGA x 1, DVI-D x 1, USB x 4, IEC 61850-3 compliant, -25 to 55°C operating temperature

**DA-720-C5-DPP-LX:** Rackmount computer with Core i5-6300U, 2.4 GHz, dual-core CPU, with 8G mSATA, 4G RAM and Linux Debian 8 64-bit, 14 gigabit Ethernet ports, 2 isolated RS-232/422/485 ports, 2 PCIe expansion slots, VGA x 1, DVI-D x 1, USB x 4, IEC 61850-3 compliant, -25 to 55°C operating temperature

**DA-720-C7-DPP:** Rackmount computer with Core i7-6600U, 2.6 GHz, dual-core CPU, without mSATA/RAM/OS, 14 gigabit Ethernet ports, 2 isolated RS-232/422/485 ports, 2 PCIe expansion slots, VGA x 1, DVI-D x 1, USB x 4, IEC 61850-3 compliant, -25 to 55°C operating temperature

**DA-720-C7-DPP-LX:** Rackmount computer with Core i7-6600U, 2.6 GHz, dual-core CPU, with 8G mSATA, 4G RAM and Linux Debian 8 64-bit, 14 gigabit Ethernet ports, 2 isolated RS-232/422/485 ports, 2 PCIe expansion slots, VGA x 1, DVI-D x 1, USB x 4, IEC 61850-3 compliant, -25 to 55°C operating temperature

Note: To order a DA-720 system with a pre-installed Windows 10 Enterprise LTSC 64Bit OS, please contact a Moxa sales representative.

### Package Checklist

- DA-720-DPP embedded computer
- Rackmount kit
- Documentation and software CD or DVD
- Quick installation guide (printed)
- Warranty card

### Recommended Configurations

Operating System	System Memory	mSATA for OS
Windows 10 Enterprise LTSC 64-bit	≥ 4 GB	≥ 8 GB
Linux Debian 8	≥ 4 GB	≥ 16 GB

**Optional DA-720 Expansion Modules** (can be purchased separately)

Expansion Module	Description	Module Slot A	Module Slot B	Reserve Slot
DE-LN04-RJ	4-port 10/100/1000 Mbps PCIe LAN module	✓	–	–
DE-LN08-RJ	8-port 10/100/1000 Mbps PCIe LAN module	✓	–	–
DE-SP08-I-TB	8-port RS-232/422/485 PCIe serial module	✓	✓	–

**DE-SP08-I-TB Serial Interface**

**Serial Standards:** 8 RS-232/422/485 ports, software selectable (terminal block connector)  
**ESD Protection:** 8 kV contact, 15 kV air  
**Surge Protection:** 2 kV line-to-line and 4 kV line-to-ground surge protection, 8/20 µs waveform  
**Insulation:** 1,500 V  
**Isolation:** 2 kV digital isolation  
**Pull low/high:** 1k/150k, jumper selectable (default 150k)  
**Termination Resistor:** 120 ohms, jumper selectable Serial (default null)

**DE-SP08-I-TB 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 115.2 kbps  
**Serial Signals**  
**RS-232:** TxD, RxD, RTS, CTS, GND  
**RS-422:** TxD+, TxD-, RxD+, RxD-, GND  
**RS-485-4w:** TxD+, TxD-, RxD+, RxD-, GND  
**RS-485-2w:** Data+, Data-, GND

**Optional Accessories** (can be purchased separately)

**DA-720 HDD Kit:** HDD/SSD installation package, supports single HDD/SSD  
**USB Dongle Kit:** USB dongle kit installation package. This kit can be installed inside the DA-720 and is suited for security applications. For example, a SCADA license key can be stored on the dongle for connecting to a SCADA system, or the DA-720-DPP's backup image can be stored on the dongle for use by Moxa's Smart Recovery feature.