

# DA-681 Series

▶ Award-winning Product



**x86 rackmount embedded computers with 4 isolated RS-232 and 8 isolated RS-485 ports, 6 LANs, VGA, CompactFlash, USB**



- > IEC 61850-3 compliant for power substation automation systems (DPP-T models only)
- > Intel Celeron M 1 GHz processor with 400 MHz FSB
- > 1 x 200-pin DDR2 SO-DIMM socket supporting DDR2 400 up to 1 GB (512 MB built-in)
- > Six 10/100 Mbps Ethernet ports
- > 1 CompactFlash socket, 1 IDE ATA-150 connector for storage expansion
- > USB 2.0 ports for high speed peripherals
- > 4 isolated RS-232 and 8 isolated RS-485 ports
- > Serial port speed from 50 bps to 921.6 kbps (nonstandard baudrates supported)
- > Embedded Linux or Windows Embedded Standard 2009 OS
- > 19-inch rackmount model, 1U height
- > Dual 100/240 VAC/VDC power input (single power and dual power models available)
- > Fanless design



## Overview

The DA-681 computer is based on the Intel x86 processor and supports VGA, 6 Ethernet ports, 4 RS-232 and 8 RS-485 serial ports with isolation, CompactFlash, and USB. The DA-681 comes in a standard 19-inch, 1U high form factor, making it an ideal platform for industrial applications.

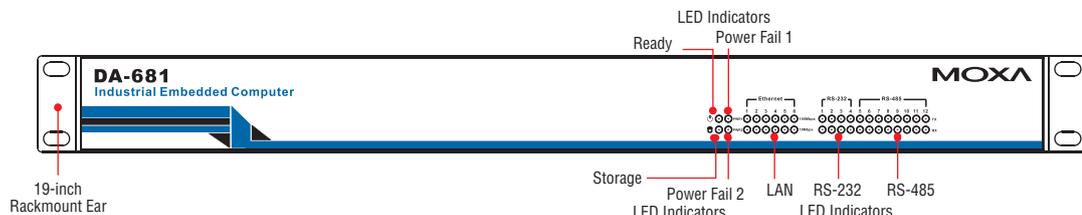
With its robust design, the DA-681 is suitable for industrial automation applications that require standard 19-inch rackmount solutions, such as power automation, transportation, and oil and gas. Another plus is that the serial ports come with 2 kV digital galvanic isolation

protection to guarantee communication reliability in harsh industrial environments. In addition, the DPP-T models are compliant with the IEC 61850-3 standard, making them ideal for power substation automation systems.

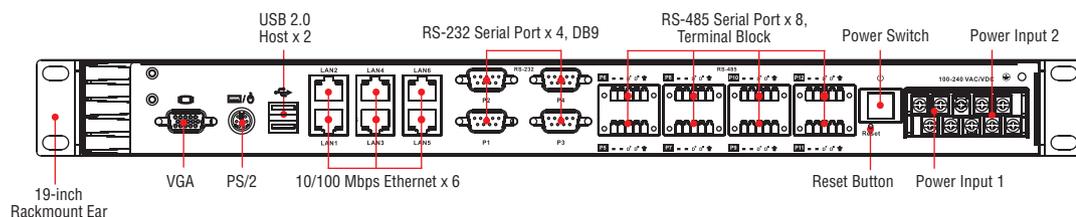
The DA-681 runs Linux or Windows Embedded Standard 2009 (pre-installed), providing a friendly environment for developing sophisticated application software. The great software support that Moxa provides makes the programmer's job easier, and helps programmers develop bug-free code quickly and at a lower cost.

## Appearance

### Front View



### Rear View



## Hardware Specifications

### Computer

**CPU:** Intel Celeron M 1 GHz processor  
**OS (pre-installed):** Windows Embedded Standard 2009, Linux 2.6  
**System Chipset:** Intel 910GML + ICH6M chipset  
**BIOS:** 4 mega-bit Flash BIOS, PCI Plug & Play, ACPI function support  
**FSB:** 400 MHz  
**System Memory:** 1 GB capacity, 512 MB pre-installed: 1 slot of 1 GB 200-pin DDR2-400 SO-DIMM  
**Expansion Bus:** PCI/104 onboard (DPP-T models only)  
**USB:** USB 2.0 compliant hosts x 2, Type A connector, supports system boot up

### Storage

**Built-in:** 1 GB (LX) / 2 GB (XPE) industrial DOM onboard to store OS via IDE interface  
**Storage Expansion:** CompactFlash socket  
**HDD Support:** SATA connector for HDD expansion

### Other Peripherals

**KB/MS:** 1 PS/2 interface, supports standard PS/2 keyboard and PS/2 mouse

### Display

**Graphics Controller:** Integrated graphics with built-in Intel 910GME, and built-in Intel extreme Graphics 2 technology  
**Display Memory:** Dynamic video memory (shares up to 32 MB of system memory)  
**Display Interface:** CRT Interface for VGA output (DB15 female connector)  
**Resolution:** CRT display mode with pixel resolution up to 2048 x 1536 at 75 Hz

### Ethernet Interface

**LAN:** 6 auto-sensing 10/100 Mbps ports (RJ45)  
**Magnetic Isolation Protection:** 1.5 kV built-in

### Serial Interface

**Serial Standards:**

- 4 RS-232 ports (DB9 male)
- 8 RS-485 ports (terminal block)

**ESD Protection:** 15 kV for all signals  
**Isolation:** 2 kV digital galvanic isolation (DA-681-I-DPP-T only)

### 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 (supports non-standard baudrates; see user's manual for details)

### Serial Signals

**RS-232:** Tx+, Rx+, DTR, DSR, RTS, CTS, DCD, GND  
**RS-485-2w:** Data+, Data-, GND

### LEDs

**System:** Power x 1, Storage x 1  
**LAN:** 10M x 6, 100M x 6  
**Serial:**  
 RS-232: 4 x Tx, 4 x Rx  
 RS-485: 8 x Tx, 8 x Rx  
**Power Failure:** LED x 2 (dual power models)

### Physical Characteristics

**Housing:** SECC sheet metal (1 mm)  
**Weight:** 4.5 kg  
**Dimensions:** 440 x 315 x 45 mm (17.32 x 12.40 x 1.77 in), 19 inch 1U height  
**Mounting:** Standard 19-inch rackmount

### Environmental Limits

**Operating Temperature:**  
 SP and DP models: -10 to 60°C (14 to 140°F)  
 DPP-T models: -40 to 75°C (-40 to 167°F)

**Storage Temperature:**  
 SP and DP models: -20 to 80°C (4 to 176°F)  
 DPP-T models: -40 to 85°C (-40 to 185°F)

**Ambient Relative Humidity:** 5 to 95% (non-condensing)  
**Anti-vibration:** 7 mm (2-9 Hz), 20 m/s/s (9-200 Hz), 15 m/s/s (200-500 Hz) @ IEC-61850-3, IEC 60870-2-2/Cm/(3M6)/(4M6), sine wave, 2-500 Hz, 1 Oct/min, 10 cycles, 2 hrs 40 mins per axis  
**Anti-shock:** 300 m/s<sup>2</sup> @ IEC-61850-3, IEC 60870-2-2/Cm/(3M6)/(4M6), half sine wave, 11 ms

### Power Requirements

**Input Voltage:** Single or dual inputs, 100 to 240 VAC/VDC auto-ranging, 47 to 63 Hz, terminal block  
**Power Consumption:** 26 W

### Standards and Certifications

**Safety:** UL 60950-1, CSA C22.2 No. 60950-1-03, EN 60950-1, CCC (GB4943, GB9254, GB17625.1)  
**EMC:** EN 55022, EN 61000-3-2, EN 61000-3-3, EN 55024, FCC Part 15 Subpart B Class A  
**Power Automation:** IEC 61850-3 (DPP-T models only)  
**Green Product:** RoHS, CRoHS, WEEE

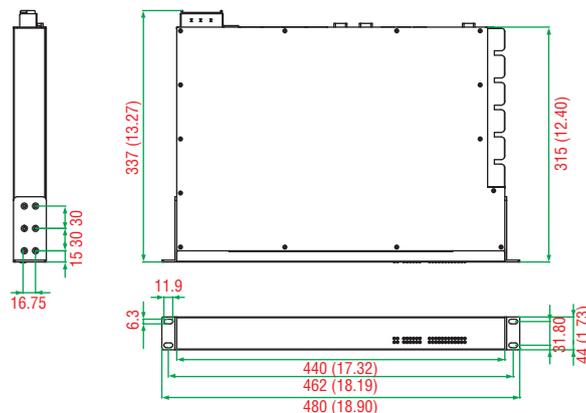
### Reliability

**Alert Tools:** Built-in buzzer and RTC (real-time clock) with battery lithium backup  
**Automatic Reboot Trigger:** Built-in WDT (watchdog timer) supporting 1-255 level time interval system reset, software programmable  
**MTBF (mean time between failures):** 100,847 hrs

### Warranty

**Warranty Period:** 3 years  
**Details:** See [www.moxa.com/warranty](http://www.moxa.com/warranty)

### Dimensions



Unit: mm (inch)

## Software Specifications

### Linux

**OS:** Linux 2.6.18, Debian Etch 4.0

**File System:** EXT2

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

### Windows XP Embedded

**OS:** Windows Embedded Standard 2009

**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

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

**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

#### Application Development Software:

- Moxa API Library
- Microsoft .Net Framework 3.5 with SP 1
- Active Directory Service Interface (ADSI) Core
- Active Template Library (ATL)
- 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

Model Name	Serial Ports		LAN Ports	Storage			OS	Power	IEC 61850-3 Certified
	RS-232	RS-485	10/100 Mbps	SATA	CF	USB			
DA-681-I-SP-XPE	4	8	6	✓	✓	✓	WES 2009	Single	–
DA-681-I-SP-LX	4	8	6	✓	✓	✓	Linux	Single	–
DA-681-I-DP-XPE	4	8	6	✓	✓	✓	WES 2009	Dual	–
DA-681-I-DP-LX	4	8	6	✓	✓	✓	Linux	Dual	–
DA-681-I-DPP-T-XPE	4	8	6	✓	✓	✓	WES 2009	Dual	✓
DA-681-I-DPP-T-LX	4	8	6	✓	✓	✓	Linux	Dual	✓

## Ordering Information

### Available Models

**DA-681-I-SP-XPE:** x86 rackmount computer with VGA, 6 Ethernet ports, 4 RS-232 ports, 8 RS-485 ports, CompactFlash, SATA, USB, Single Power, WES 2009, -10 to 60°C operating temperature

**DA-681-I-SP-LX:** x86 rackmount computer with VGA, 6 Ethernet ports, 4 RS-232 ports, 8 RS-485 ports, CompactFlash, SATA, USB, Single Power, Linux 2.6, -10 to 60°C operating temperature

**DA-681-I-DP-XPE:** x86 rackmount computer with VGA, 6 Ethernet ports, 4 RS-232 ports, 8 RS-485 ports, CompactFlash, SATA, USB, Dual Power, WES 2009, -10 to 60°C operating temperature

**DA-681-I-DP-LX:** x86 rackmount computer with VGA, 6 Ethernet ports, 4 RS-232 ports, 8 RS-485 ports, CompactFlash, SATA, USB, Dual Power, Linux 2.6, -10 to 60°C operating temperature

**DA-681-I-DPP-T-XPE:** IEC 61850-3 x86 ready-to-run rackmount computer with VGA, 6 Ethernet ports, 4 RS-232 ports, 8 RS-485 ports, CompactFlash, SATA, USB, dual power, WES 2009, -40 to 75°C operating temperature

**DA-681-I-DPP-T-LX:** IEC 61850-3 x86 ready-to-run rackmount computer with VGA, 6 Ethernet ports, 4 RS-232 ports, 8 RS-485 ports, CompactFlash, SATA, USB, dual power, Linux 2.6, -40 to 75°C operating temperature

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

**FK-76127-01:** Hard disk installation package

### Package Checklist

- DA-681 embedded computer
- Rackmount kit
- Ethernet cable: RJ45 to RJ45 cross-over cable, 100 cm
- Documentation and software CD or DVD
- Quick installation guide (printed)
- Warranty card