MOXA®

DA-660-8/16-LX
Quick Installation Guide

Third Edition, April 2009

1. Overview

DA-660 products are RISC-based ready-to-run embedded computers designed for industrial data acquisition applications. They feature 8 or 16 RS-232/422/485 serial ports and dual Ethernet ports based on the Intel XScale IXP422 communication processor. The casing is a standard 1U, 19-inch wide rack-mounted rugged enclosure. This robust, rack-mountable mechanism design provides the hardened protection needed for industrial environment applications, and lets users easily install DA-660 on a standard 19-inch rack. Using DA-660 products, you can easily build a control system with distributed architecture for embedded technologies, such as SCADA systems, plant floor automation, and power electricity monitoring applications.

2. Package Checklist

Before installing DA-660, verify that the package contains the following items:
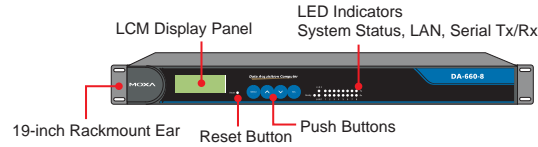
- 1 DA-660
- 19-inch Rackmount Kit
- DA-660 Quick Installation Guide (this guide)
- DA-660 Document & Software CD
- Cross-over Ethernet cable
- CBL-RJ45M9-150: 150 cm, 8-pin RJ45 to DB9 (M) serial port cable
- CBL-RJ45F9-150: 150 cm, 8-pin RJ45 to DB9 (F) console port cable
- Power Cord
- Product Warranty Booklet

Notify your sales representative if any of the above items are missing or damaged.
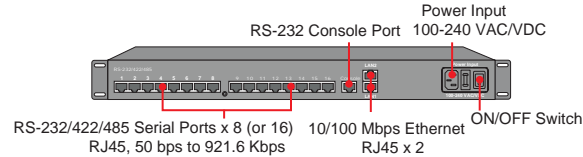
3. DA-660 Panel Layout

NOTE: Two models of DA-660 are available. DA-660-16 has 16 RS-232/422/485 serial ports and DA-660-8 has 8 RS-232/422/485 serial ports.

Front View

LCM Display Panel

LED Indicators
System Status, LAN, Serial Tx/Rx

19-inch Rackmount Ear   Reset Button   Push Buttons

Rear View

Power Input
100-240 VAC/VDC

RS-232 Console Port

RS-232/422/485 Serial Ports x 8 (or 16)   10/100 Mbps Ethernet
RJ45, 50 bps to 921.6 Kbps   RJ45 x 2

ON/OFF Switch

LED Indicators

The following LED indicators are located on the front panel of the DA-660.

LED Name	LED Color	LED Function
Ready	Green	Power is on and functioning normally.
LAN1-2	Orange	10 Mbps Ethernet connection
	Green	100 Mbps Ethernet connection
P1-P16 (Tx)	Green	Serial port 1-16 is transmitting data.
	Off	Serial port 1-16 is not transmitting data.
P1-P16 (Rx)	Orange	Serial port 1-16 is receiving data.
	Off	Serial port 1-16 is not receiving data.

4. Installing Your DA-660

Desktop Mounting

Place your DA-660 on a clean, flat, well-ventilated desktop. For better ventilation, attach the 4 pads from the desktop kit to the bottom of the unit, and leave some space between the DA-660 and other equipment. Do not place equipment or objects on top of the unit, as this can cause damage to the product.

Rack Mounting.

DA-660 can be mounted on a standard 19-inch rack. Use the enclosed pair of L-shaped metal plates and screws to fasten your DA-660 to the rack cabinet. There are two options to do this. You can lock either the front or the rear panel of the DA-660 to the front side of the rack. Each L-shaped plate has 6 holes, leaving two outer or inner holes open for your convenience.
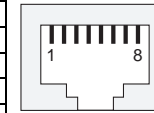
5. Connecting Your

Power Connector

Connect the 100-240 VAC/VDC power line to DA-660's power connector. If the power is properly supplied, the Ready LED on the front panel will glow a solid green when the OS is ready.

Ethernet Port

The two 10/100 Mbps Ethernet ports (LAN 1 and LAN 2) use RJ45 connectors.

Pin	Signal
1	ETx+
2	ETx-
3	ERx+
6	ERx-

Serial Port

There are eight serial ports (P1 to P8) on DA-660-8 and 16 ports on DA-660-16. All serial ports use RJ45 connectors. Each port can be configured by software as type RS-232, RS-422, or RS-485. The pin assignments are shown in the following table:

Pin	RS-232	RS-422	RS-485
1	DSR	---	---
2	RTS	TXD+	---
3	GND	GND	GND
4	TXD	TXD-	---
5	RXD	RXD+	Data+
6	DCD	RXD-	Data-
7	CTS	---	---
8	DTR	---	---
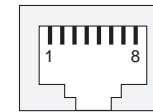
Console Port

The console port is an RJ45 RS-232 port. It can be connected to a V90 or GPRS modem via PPP. The pin definitions are the same as for the serial ports.

Reset Button

Press the "Reset" button on the front panel continuously for at least 5 seconds to load the factory default configuration. After the factory default configuration has been loaded, the system will reboot automatically. The Ready LED will blink for the first 5 seconds, and then maintain a steady glow once the system has rebooted.

LCM Screen

DA-660 has an LCM screen on the front panel. The LCM can display 16 columns and 2 rows of text. After the DA-660 successfully boots up, the LCM will display the model name and firmware version as shown:

D	A	-	6	6	0	-	1	6							
V	E	R	.	1	.	0									

Push Buttons

There are four push buttons on the DA-660's front panel. These buttons are used to operate the LCM. Going from left to right, the buttons are:

Button	Action
MENU	Displays the main menu at any time.
⌒	Scrolls up through a list of items shown on the LCM screen's second line
⌄	Scrolls down through a list of items shown on the LCM screen's second line
SEL	Selects the option listed on the LCM screen.

Real Time Clock

DA-660's real time clock is powered by a lithium battery. We strongly recommend that you do not replace the lithium battery without help from a qualified Moxa support engineer. If you need to change the battery, contact the Moxa RMA service team.

ATTENTION
There is a risk of explosion if the battery is replaced by an incorrect type.

6. Powering on Your DA-660

To power on the DA-660, connect the power line to the DA-660's AC/DC power connector (located on the right side of the rear panel) with the power cord that is shipped with the product. Then, turn on the power switch. It takes about 30 seconds for the system to boot up. Once the system is ready, the Ready LED on the front panel will light up, and the DA-660 will display its model name and firmware version on the LCM display.

7. Connecting Your DA-660 to a PC

There are two ways to connect the DA-660 to a PC: through the serial console port or via Telnet over the network. The COM settings for the serial console port are: **Baudrate=115200 bps**, **Parity=None**, **Data bits=8**, **Stop bits =1**, **Flow Control=None**.

ATTENTION
Remember to choose the "VT100" terminal type. Use the CBL-RJ45F9-150 cable included with the product to connect a PC to DA-660's serial console port.

To use Telnet you will need to know DA-660's IP address and netmask. The default LAN settings are shown below. For first-time configuration, you may find it convenient to use a cross-over Ethernet cable to connect directly from the PC to the DA-660.

	Default IP Address	Netmask
LAN 1	192.168.3.127	255.255.255.0
LAN 2	192.168.4.127	255.255.255.0

Once the DA-660 is powered on, the Ready LED will light up, and a login page will open. Use the following default Login name and Password to proceed.

    Login: root
   Password: root

8. Configuring the Ethernet Interface

If you use the console cable for first-time configuration of the Network settings, use the following commands to edit the **interfaces** file:

```
#ifdown –a
  //Disable LAN1/LAN2 interface first, before you
  reconfigure the LAN settings. LAN 1 = ixp0, LAN 2=
  ixp1//
#vi /etc/network/interfaces
  //check the LAN interface first//
```

After the boot settings of the LAN interface has been modified, use the following commands to activate the LAN settings immediately:
```
#sync ; ifup –a
```

9. Developing Your Application
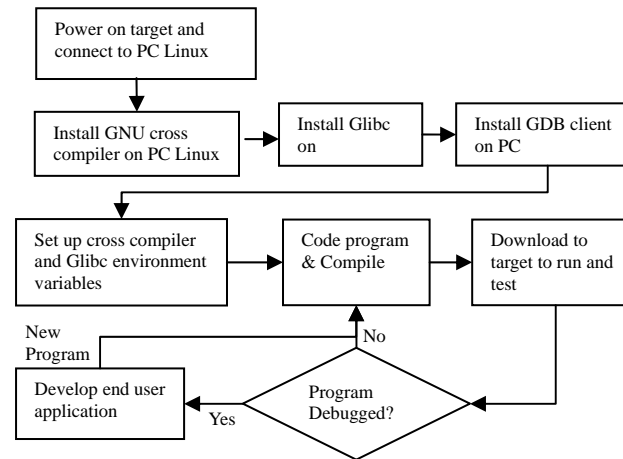
10. Installing the DA-660 Tool Chain

The PC must have the Linux Operating System pre-installed to install the DA-660 GNU Tool Chain. Redhat 7.3/8.0, with Linux Kernel 2.4.18 and compatible versions are recommended. The Tool Chain will use about 400 MB of your PC's hard disk space. Use the following command to install the Tool Chain from the DA-660 CD:
```
#mount /dev/cdrom /mnt/cdrom
#rpm –ivh /mnt/cdrom/mxscaleb-3.3.2-x.i386.rpm
```

The Tool Chain will be installed on your PC automatically.

11. Compiling and Running Hello.c

The path to the Tool Chain is:
```
PATH=/usr/local/mxscaleb/bin:$PATH
```
The DA-660 Software CD also includes several example programs. Here we use **Hello.c** as an example to show you how to compile and run your applications. Type the following commands on your PC:
```
# cd /tmp/
# mkdir example
# cp –r /mnt/cdrom/example/* /tmp/example
```
Next, go to the **Hello** subdirectory and type the following command:
```
#make
```
to finish compiling **Hello.c**.

Finally, run the executable file that was created to generate **hello-release** and **hello-debug**.

NOTE: Moxa also provides the Windows Tool Chain for DA-660. The Windows Tool Chain simulates a Linux environment on a Windows operating system, allowing you to develop programs for DA-660 on a Windows platform. The DA-660 User's Manual contains complete details on how to install the Windows Tool Chain.

12. Environmental Specifications

Power requirements	100 to 240 VAC/VDC auto ranging (47 to 63 Hz for AC input)
Dimensions (WxDxH)	480 x 198 x 45 mm (including rack-mount ears) 440 x 198 x 45 mm (without rack-mount ears)
Operating temp.	-10 to 60°C (14 to 140°F), 5 to 95% RH
Storage Temperature	-20 to 80°C (-4 to 176°F), 5 to 95% RH
Serial protection	15 KV ESD for serial port
Magnetic isolation	1.5 KV for Ethernet
Regulatory approvals	FCC Class A, CE Class A, UL, CUL, TÜV
Warranty	5 years