DA-660-8/16-CE User's Manual

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DA-660-8/16-CE User's Manual

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Table of Contents

1

Introduction

Microsoft® Windows® CE 5.0 is an open, scalable, 32-bit operating system (OS) that allows you to build a wide range of innovative, small footprint devices. A typical Windows® CE-based device is designed for a specific use, and often runs disconnected from other computers, or distributed as a front-end to a centralized host. Examples include enterprise tools, such as industrial controllers, communications hubs, and point-of-sale terminals, and display devices, such as HMI, advertisement appliances, and interactive panels.

The DA-660 WinCE series of ready-to-run embedded computers includes the 8-port DA-660-8-CE and the 16-port DA-660-16-CE.

The following topics are covered in this chapter:

❑ **Overview**
  ➢ Package Checklist
  ➢ Model Descriptions and Features
  ➢ Hardware Specifications
❑ **Software Features**
  ➢ Applications Development Environment
  ➢ Networking and Communications Capabilities
  ➢ Supported Servers and Daemons
❑ **Obtaining the Firmware Build Version**
❑ **Memory and File Systems**
  ➢ RAM-based Storage
  ➢ Onboard Flash Memory Storage
  ➢ External Media Storage
  ➢ Caution When Storing Data
  ➢ Storing Data in RAM vs. Flash Memory
❑ **Hive-Based Registry**
❑ **RS-232/422/485 Serial Ports**

Overview

The DA-660 WinCE embedded computer is ideal for reliable, small-footprint, programmable, communication-centric applications. DA-660 uses an Intel XScale IXP-422 RISC-based CPU running at a clock rate of 266 MHz. Unlike the CISC architecture under an X86 CPU, the RISC design supports compact instruction sets. A RISC-based CPU generates less heat and consequently enhances reliability. To provide sufficient data storage and run-time memory for your applications, DA-660 integrates 32 MB of Flash memory and 128 MB of SDRAM. In addition, the DA-660 has two LAN ports and 8 or 16 serial ports to extend its communication capabilities. Two efficient LAN ports support high-performance data transmission over the Intranet/Internet. Each serial port supports an RS-232/422/485 3-in-1 operation mode switch to provide centrally-controlled connectivity to diverse serial devices.

The Da-660 WinCE system is built on the Microsoft® Windows® CE 5.0 operating system (OS). Using a common, widely used programming environment makes DA-660 suitable for new system development and legacy system migration.

The hardware and software capabilities of the Da-660 WinCE system make it an ideal computing platform for data acquisition and transmission applications.

Package Checklist

Before installing the Da-660 WinCE system, verify that the package contains the following items.

- 1 DA-660 WinCE
- 19-inch Rackmount Kit
- Quick Installation Guide
- Document & Software CD
- Cross-over Ethernet cable
- CBL-RJ45M9-150: 150 cm, 8-pin RJ45 to male DB9 serial port cable
- CBL-RJ45F9-150: 150 cm, 8-pin RJ45 to female DB9 console port cable
- Power Cord
- Product Warranty Statement

NOTE: *Notify your sales representative if any of above items is missing or damaged.*

Model Descriptions and Features

The Da-660 WinCE Series (referred to in this manual as DA-660) consists of two models. Both models have exactly the same software features and hardware specifications, but DA-660-8-CE has 8 serial ports and DA-660-16-CE has 16 serial ports.

The following table lists the hardware specifications of the models in more detail.

Hardware Specifications

Model	DA-660-8-CE	DA-660-16-CE
CPU	Intel XScale IXP-422 266 MHz	
RAM	128 MB	
Flash	32 MB	
LAN	Auto-sensing 10/100 Mbps × 2 with built-in 1.5 KV magnetic isolation protection, RJ45 Connector	
Serial Port	RS-232/422/485 × 8 RJ45 Connector	RS-232/422/485 × 16 RJ45 Connector
Serial Protection	15 KV ESD	
Data Bits	5, 6, 7, 8	
Stop Bits	1, 1.5, 2	
Parity	None, Even, Odd, Space, Mark	
Flow Control	RTS/CTS, XON/XOFF, RS-485 ADDC™	
Speed	50 bps to 921.6 Kbps	
Serial Console	RS-232 × 1, RJ45 Connector	
LCM	128 × 32 dots	
Keypad	4 buttons	
Real Time Clock	Yes	
Buzzer	Yes	
Reset Button	Reset to Default × 1	
Power Input	100- to 240 VAC/VDC auto ranging (47 to 63 Hz for AC input)	
Power Consumption	12W	
Dimensions (W × D × H)	480 × 198 × 45 mm (with rack-mount ears) 440 × 198 × 45 mm (without rack-mount ears)	
Operating temperature	-10 to 60°C (14 to 140°F), 5 to 95% RH	
Storage temperature	-20 to 70°C (-4 to 176°F), 5 to 95% RH	
Regulatory Approvals	EMC: CE Class A, FCC Class A Safety: UL, CUL, TUV	
Warranty	5 years	

Software Features

DA-660 ready-to-run embedded computers are network-centric, head-less computers that are designed to be programmable for embedded communication applications.

Applications Development Environment

The Windows® CE operating system provides an easy-to-use programming environment for the DA-660. In fact WinCE's popular application development features make programming as convenient and easy as in a PC environment.

- **C Libraries and Run-times**—Compared to the C libraries and run-times used on a desktop PC running Windows®, the C libraries and run-times on a DA-660 WinCE are a subset of the WIN32 APIs. The system supports a full ANSI C run-time, standard input/output library, standard input/output ASCII library, and standard ASCII string functions. In addition, compiler C++ exception handling and Run-Time Type Information (RTTI) equivalent to desktop C++ compilers are supported.

- **Component Services (COM and DCOM)**—The Common Object Model (COM) is an operating system-independent, object-oriented system for creating binary software components that can interact with other COM-based components in the same process space, in other processes, or on remote machines.
- **Microsoft® Foundation Classes (MFC)**—MFC is a comprehensive class library and complete object-oriented application framework designed to help build applications, COM components, and controls.
- **SOAP Toolkit**—SOAP is an XML-based protocol for object exchange and remote procedure calls. Microsoft® Windows® CE 5.0 provides functionality similar to the SOAP Toolkit version 2 on the desktop. It provides a layer that allows COM objects to use SOAP as the transport protocol for remote procedure calls and to interact with Web services.
- **Microsoft® .NET Compact Framework 2.0**—Offers a choice of programming languages, initially Microsoft® Visual Basic® and Microsoft® Visual C#, and eliminates the common problems faced with language interoperability.
- **XML**—Provides the Document Object Model (DOM) for base XML functionality, support for XML Query Language (XQL) and XPATH, Extensible Style Sheet Language Transformations (XSLT) that enables you to transform one class of XML document to another, SAX2 support for event-based parsing of XML documents (including MSXML Writer), and parsing based on Simple API for XML (SAX) for resource-constrained target devices.
- **Winsock 2.2**—Provides enhanced capabilities over Winsock 1.1, including installable service providers for additional third-party protocols, and Media sense.

Networking and Communications Capabilities

For network centric embedded application usage, DA-660 not only provides powerful communication hardware interfaces, including dual Ethernet and 3-in-1 serial ports, but also supports the networking and communications capabilities that are built into the Windows® CE 5.0 OS. The following features are supported:

- **Simple Network Management Protocol (SNMP)**—Monitors remote connections to the network.
- **Simple Network Time Protocol (SNTP) Client**—Provides support for synchronizing the device's system time with an SNTP server, and supports Daylight Savings Time.
- **Serial Communications**—In addition to the 16550 UART driver bound to a debug port and the console port, a special driver for 8 or 16 additional Moxa home-made serial ports is also included.
- **Network Utilities (IpConfig, Ping, Route)**—Utilities for troubleshooting various network problems.
- **TCP/IP**—Includes IP, Address Resolution (ARP), Internet Control Message (ICMP), Internet Group Membership (IGMP), Transmission Control (TCP), User Datagram (UDP), name resolution and registration, and DHCP.

Supported Servers and Daemons

In addition to the development and communication capabilities mentioned above, DA-660 embeds the services and daemons listed below. These common and easy-to-use application servers help users migrate the DA-660 embedded computer to industrial communication applications easily and conveniently.

- **Telnet Server**—A sample server that allows remote administration through a standard Telnet client.
- **FTP Server**—A sample server used for transferring files to and from remote computer systems over a network using TCP/IP.

- **Web Server (HTTPD)**—Includes ASP, ISAPI Secure Socket Layer support, SSL 2, SSL 3, Transport Layer Security (TLS/SSL 3.1) public key-based protocols, and Web Administration ISAPI Extensions.
- **Dial-up Networking**—Consists of a RAS client API and Point to Point Protocol (PPP). RAS and PPP support Extensible Authentication Protocol (EAP) and RAS scripting.

Obtaining the Firmware Build Version

There are three ways to obtain the firmware version of the DA-660 embedded computer. This information is particularly important for feature identification.

- Examine the welcome message after you log on to the computer.
- Log on to the Web-based management system (described in a later chapter) to view the system information.
- Check the firmware version on the LCM display.

Memory and File Systems

The DA-660-8/16-CE file system allows file storage on the system RAM or on the onboard flash memory. Files can also be stored on external media such as a USB drive or CompactFlash card.

RAM-based Storage

About 20 MB of the 128 MB SDRAM is available for user applications and data. The operating system and kernel image occupy the rest of the space. The root directory is stored in RAM, along with subdirectories such as "Windows", "Temp", "My Documents", "Network", and "Program Files". Files can be temporarily stored in these directories, but they will be deleted when the system is shut down or restarted. Persistent files and programs should be placed in the "NORFlash" directory.

Onboard Flash Memory Storage

Onboard flash memory storage is provided through the "NORFlash" directory. Anything that is saved in this directory will be retained when power is disconnected or lost. 15.5 MB of storage is available.

External Media Storage

When external media is installed, such as a USB drive or CompactFlash card, it will be found as an additional directory. For data that is intended to be shared with a PC, the external media should be formatted using the PC's FAT file system.

Caution When Storing Data

It is recommend that the onboard NOR flash be used for storing programs only. For log data generated by your programs, use external storage media such as CompactFlash or a Network File System. CompactFlash is much easier to replace if it is damaged or full.

NOR flash memory has a life cycle of 100,000 write operations at the block (128 KB) level. It does not support BBM (Bad Block Management). For this reason, a FAT file system would not know if a flash block has reached the end of its life cycle. The FAT file system would continue to scan the block again and again, eventually resulting in an unpredictable state.

In addition, the FAT file system searches for free space sequentially when performing write operations. As files are deleted, free storage space becomes more and more fragmented, making it difficult to search. When a file is frequently updated, data is deleted and rewritten to the same memory blocks over and over again. Eventually, the FAT file system would be unable to read those blocks, causing the operating system to hang.

Although CompactFlash cards also have a life cycle, most use NAND flash memory with hardware controllers that implement BBM. This feature allows the FAT file system to flag and skip any bad blocks. Furthermore, there is much more storage space available on CompactFlash cards than on the NOR flash memory. This space can be used cautiously to maximize the media's life cycle. An effective method is to create a large empty file (around 30 MB) to store log data. Data is written evenly over the space, and when the end of the space is reached, the write operations start over from the beginning of the space. This method reduces the number of write operations performed on each block.

Storing Data in RAM vs. Flash Memory

Although data saved in RAM will be deleted when the system shuts down, RAM storage has the advantage of faster read/write access and no life cycle issue.

For applications where important data is transmitted immediately and directly to a host, you can store the necessary log data in RAM. After the host receives the data, the data does not need to be retained and can be deleted.

Embedded computers have resource limits, so integrators need to determine when it is critical that data be stored on one of the file systems. When it is necessary for data to be stored, the appropriate file system should be used.

Hive-Based Registry

The registry for DA-660 is a hive-based registry instead of a RAM-based registry. The hive-based registry stores registry data inside files, or hives, which can be kept on any file system. This eliminates the need for performing backup and restore on power off.

RS-232/422/485 Serial Ports

The DA-660 embedded computer comes with two embedded serial ports, named COM1 and COM2. COM1 is hidden inside the box case for debugging purposes when developing firmware. COM2 is used as the console port. Although the console port can be used when developing applications (e.g., data acquisition and control), we suggest that you always use the serial ports located on the front of the device for your applications, and reserve COM2 for console access.

The additional serial ports are named COM3, COM4, etc., reading from left to right. The ports are designed for reliable, high-speed data transmission. The ports are 3-in-1 (i.e., they can be set for RS-232, RS-422, or RS-485) to make them suitable for many different applications. Each of the ports supports a baudrate up to 921600 bps.

2

Getting Started

In this chapter, we explain how to use a PC to operate a DA-660 computer. For clarity, the PC is referred to as a development workstation and the DA-660 computer is called a target computer.

In addition, manual steps are described to facilitate operations such as system time adjustment, troubleshooting network connectivity, etc. Some of these operations can be done via system commands after gaining access to the computer and others can be done by a Web-based management system, which is described in a later chapter.

The following topics are covered in this chapter:

❑ **Starting Your DA-660 Computer**
❑ **Resetting Your DA-660 Computer**
❑ **Operating Your DA-660 Computer Via Serial Console**
❑ **Changing the Network Settings**
   ➢ Default IP Address
❑ **Operating Your DA-660 Computer Via Telnet Client**
❑ **User/Group Management**
❑ **Adjusting System Time and RTC Time**
❑ **Starting and Stopping Services**
❑ **Troubleshooting Network Connectivity**
❑ **Simple Network Management Protocol (SNMP)**

Starting Your DA-660 Computer

Connect the power cord that is shipped with the package to the AC/DC power connector (located on the right side of the rear panel) of the target computer. It takes about 30 to 60 seconds for the system to boot up. Once the system is ready, the **Ready** LED lights up and glows steadily till the computer is shutdown and the computer displays its model name and firmware version on the LCM.

Resetting Your DA-660 Computer

Cold-Start: Switch off and then switch on the power again. The computer reboots itself right away.

Resetting to Factory Defaults: To reset the system back to factory default settings, press and hold the **Reset to Default** button for at least 5 seconds. The buzzer sounds while the factory default settings are loaded. After the factory default settings have been loaded, the computer reboots itself.

Operating Your DA-660 Computer Via Serial Console

The serial console port (next to two LAN ports) gives users a convenient way of connecting the development workstation to the console utility of the target computer. This method is particularly useful when using the computer for the first time.

After you have wired a serial cable, go back to the development workstation and start a terminal program (e.g., HyperTerminal) by using the settings shown below for the serial console port.

Baudrate	115200 bps
Parity	None
Data bits	8
Stop bits	1
Flow Control	None
Terminal	ANSI

After a successful connection, type the login name and password as requested to logon the computer. The default values are both **"admin"**.

Login: admin
Password: admin

The console has a default timeout value of 15 minutes. To disable the timeout, you will need to change a value in the registry. Go to "**HKEY_LOCAL_MACHINE\Comm\CONSOLED**", and set the "**Timeout**" value to "FFFFFFFF".

Changing the Network Settings

The DA-660 computer comes with two network interfaces. The default IP addresses and netmasks of the network interfaces are as follows:

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

Normally, you are required to change them because they are located on a different local network from that of your development workstation. Use the command *netconfig* to complete the task. Type *netconfig -h* to examine the usage of the command.

```
\> netconfig -h
```

```
Usage: netconfig –n <"LAN1" or "LAN2"> [-m <netmask>] [-d <DNS server>] [-g <gateway>]
[-i <IP address>]
```

For example, your development workstation has a LAN port at 192.168.1.x and the Domain Name Server (DNS) is at 192.168.2.6. Execute the following command.

```
\> netconfig -n LAN1 –i 192.168.1.5 –m 255.255.255.0 –g 192.168.1.254 –d 192.168.2.6
```

Use command *netconfig* to view the new settings.

```
\> netconfig
LAN1 Interface Configuration:
IP Address:  192.168.1.5
SubNet Mask: 255.255.255.0
Gateway:         192.168.1.254
DNS:         192.168.2.6


LAN2 Interface Configuration:
IP Address:  192.168.4.127
SubNet Mask: 255.255.255.0
Gateway:
DNS:
```

Operating Your DA-660 Computer Via Telnet Client

Before operating your target computer using the Telnet client, we suggest that you change the network settings of the computer (see the earlier section) to have at least one of the two network ports situated in the same LAN as your development workstation.

Use a cross-over Ethernet cable to connect your development workstation directly to the target computer, or a straight-through Ethernet cable to connect the computer to a LAN hub or switch. Next, use a Telnet client in your development workstation to make a connection to the Telnet console utility of the target computer. Upon a successful connection, type the login name and password as requested to log on to the computer.

Login: admin
Password: admin

After passing the authentication validity check, a group of commands will be available to operate the computer. Use *HELP* to display all of the commands, or type *HELP [command name]* to display extended help for the selected command. Some of these commands, such as *DATE* and *TIME*, are very useful for managing the system time of the computer. Other commands, such as *DIR* and *MKDIR*, are good utilities for file management. For example, to inspect the file structure of the root directory, type *DIR*

```
\> dir /b
NORFlash
My Documents
Program Files
Temp
Windows
```

User/Group Management

User Group: You often want the target computer to be accessible by multiple users with different needs. For example, a specific service, such as ftp or telnet, is accessible only by the users within the permissible group. By default, three user groups, namely **ftpd**, **telnetd**, and **administrators** are pre-created for your convenience.

Adding a Group: Use the command *useradd –g <groupName>* to create a user group.

```
\> useradd -g yyyy
group yyyy has been added.
```

Deleting a Group: To remove a group, use the command *userdel –g <groupName>*.

```
\> userdel -g yyyy
group yyyy has been removed.
```

Adding a User: Use the command *useradd <newUserID>* to add a user for accessing the system. The user's password, by default, is the same as the user name.

```
\> useradd xxxx
user xxxx has been added.
```

In addition, you can permit this user to access a particular service by typing **-g** followed by the user group name of the service, i.e., *useradd –g <groupName> <newUserID>*. For example,

```
\> useradd -g telnetd xxxx
user xxxx is existent
group telnetd is existent
user xxxx has been added to group yyyy
```

Deleting a User: Use the command *userdel <userID>* to delete a user from the system. User "admin" **CANNOT** be deleted.

```
\> userdel xxxx
user xxxx has been deleted
```

You can also just remove a user from a user group by using the command *userdel –g <groupName> <newUserID>*. For example,

```
\> userdel -g yyyy xxxx
user xxxx has been removed from group yyyy
```

Changing the Password: Use the command *"passwd <userID>"* to change your login password. The user's password, by default, is the same as the user name.

```
\> passwd xxxx
Current password:
New password:
Retype new password:
Password has been changed
```

Adjusting System Time and RTC Time

The DA-660 computer has two time settings, the system time (or CPU clock) and the RTC (Real Time Clock) time. The system time regulates the execution of instructions and the RTC keeps track of the time even when the computer is turned off. RTC time runs on a special battery that is not connected to the normal power supply. Do not confuse a computer's real-time clock with its CPU clock.

Setting the System Time Manually: Use the *date*, and *time* commands to query the current system date/time or to set a new system date/time.

```
\> date
The current date is: Tuesday, November 22, 2005
Enter the new date (mm-dd-[yy]yy): 12-23-05

\> date /T
Wednesday, November 23, 2005

\> time
The current time is: 5:27:17 PM
Enter the new time (hh:mm:ss): 16:02:00

\> time /T
4:02:04 PM
```

Adjusting RTC Time: Use the command *hwclock -w* to convert the system time to the RTC time.

```
\> hwclock -w
```

Use the command *hwclock –w YYYY-MM-DD hh:mm:ss* to manually update the RTC time.

```
\> hwclock –w 2005-12-23 15:00:00
```

Use the command *hwclock* to query the updated RTC time.

```
\> hwclock
2005-12-23 15:00:00
```

Starting and Stopping Services

After booting up, the DA-660 computer runs several services continuously to serve requests from users or other programs. Notable services include telnet ("TEL0:"), console ("CON0:"), world wide web HTTP ("HTP0:"), and file transfer FTP ("FTP0:") etc. You seldom need to care about these services. However, you still can start up or stop a service with its associated name by using the command "services". For example,

Start the FTP service by

```
\> services start FTP0:
```

Stop the FTP service by

```
\> services stop FTP0:
```

Troubleshooting Network Connectivity

The **ipconfig** tool prints the TCP/IP-related configuration data of a host including the IP addresses, gateway and DNS servers.

```
\> ipconfig /all
Windows IP configuration
Ethernet adapter Local Area Connection:
IP Address: 192.168.4.127
Subnet Mask: 255.255.255.0
Adapter Name: IXP425ETHNPE2
Description: IXP425ETHNPE2
Adapter Index: 2
Address: 80 86 33 33 34 12
DHCP Enabled: NO
Ethernet adapter Local Area Connection:
IP Address: 192.168.14.202
Subnet Mask: 255.255.248.0
Default Gateway: 192.168.15.254
Adapter Name: IXP425ETHNPE1
Description: IXP425ETHNPE1
Adapter Index: 3
Address: 78 56 34 91 cc dd
DHCP Enabled: NO

Host name: DA660CE
Domain Name:
DNS Servers: 192.168.1.6
NODETYPE: 8
Routing Enabled: NO
Proxy Enabled: NO
```

To troubleshoot network connectivity, reachability, and name resolution, use the **ping** command. This command verifies IP-level connectivity to another TCP/IP computer by sending Internet Control Message Protocol (ICMP) Echo Request messages. The corresponding return Echo Reply messages are displayed, along with round-trip times. For more information, type **ping** without parameters.

```
\> ping www.moxa.com
Pinging Host www.moxa.com [192.168.1.16]
Reply from 192.168.1.16: Echo size=32 time<1ms TTL=126
Reply from 192.168.1.16: Echo size=32 time<1ms TTL=126
Reply from 192.168.1.16: Echo size=32 time<1ms TTL=126
```

The **route** utility allows you to view or modify network routing tables. Type this command without parameters to view a list of functions.

```
\> route
```

To view current routing items in the tables,

```
\> route PRINT
```

To add a routing item on network interface 1,

```
\> route ADD 192.168.0.0 MASK 255.255.0.0 192.168.15.254 IF 2
```

To delete a routing item,

```
\> route DELETE 192.168.0.0
```

Simple Network Management Protocol (SNMP)

SNMP belongs to the TCP/IP protocol suite and is the Internet standard protocol for network management. SNMP was developed to monitor and manage networks. It uses a distributed architecture that consists of agents and managers:

- The SNMP agent is an application that monitors network traffic. It responds to queries from SNMP manager applications. It also sends traps to notify the manager of significant events.
- The SNMP manager is an application that sends queries to SNMP agents and receives traps from SNMP agents.

The DA-660 computer installs an SNMP agent to serve as an SNMP device. You should install the SNMP manager on the workstation computer (for example, a Linux system) that monitors the network. After installing the nodes, you need to configure the SNMP manager and agent.

To check SNMP agent capabilities in a target computer (e.g, network IP at 192.168.3.127), please logon the workstation computer that, for example, a Linux-based computer, the SNMP manager resides and type

```
\> snmpwalk -v 2c -c public 192.168.3.127 system
SNMPv2-MIB::sysDescr.0 Microsoft Windows CE Version 5.0 (Build 1400)
SNMPv2-MIB::sysObjectID.0 SNMPv2-SMI::enterprises.8691.13.7420
SNMPv2-MIB::sysUpTime.0 1282929
SNMPv2-MIB::sysContact.0 Your System Contact Here
SNMPv2-MIB::sysName.0 WindowsCE
```

You will see a series of messages from the SNMP agent. From there, you can monitor and manage the computer.

3

Web-based Management System

Note: Internet Explorer 5.5 or above is required to use the web based management system.

DA-660 ready-to-run embedded computers are network-centric platforms designed to be used as front-end computers for data acquisition and industrial control. Due to the distributed characteristics of the devices that these computers control, they often reside in harsh areas as the devices themselves and are away from system administrators. To manage these computers, operations such as networking/server configuration, file management, and process (thread) monitoring/control become a critical area to consider.

The following topics are covered in this chapter:

- ❑ **Logging Onto Web-based Management System**
- ❑ **System Information**
- ❑ **Networking/Server Configuration**
- ❑ **Serial Port Configuration**
- ❑ **Process (Thread) Monitoring/Control**
- ❑ **Launching Processes Automatically**
- ❑ **Services Monitoring/Control**
- ❑ **Binary/Text File Management**

Logging Onto Web-based Management System

A web-based management system is provided for the DA-660-CE for easier management and system administration. The web-based management system uses a menu bar and CGI pages to provide access to commonly-used features.

Before using the web-based management system, your PC must have a web browser installed and a network connection to the DA-660-CE. To open the web-based management system, follow these steps:
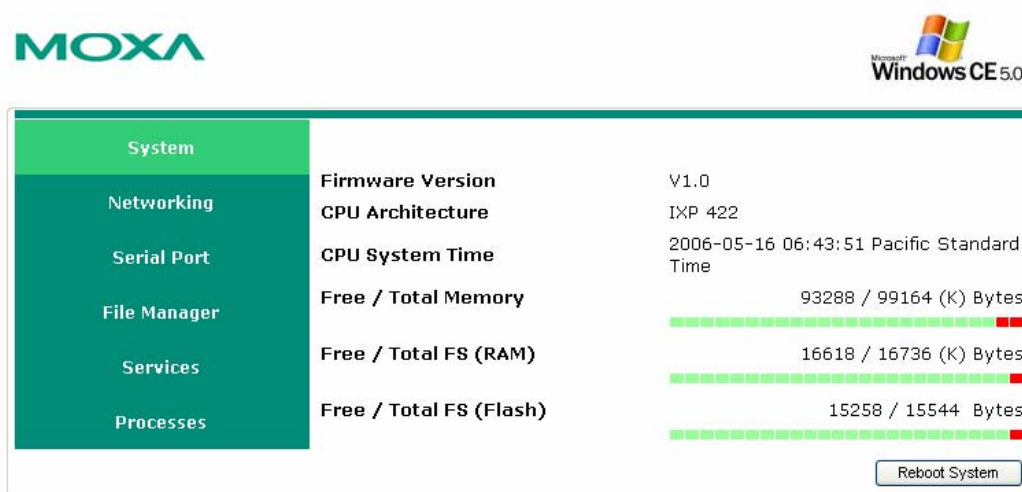
1. Point your PC's web browser to the DA-660-CE's IP address. When the main page opens, select **Web-Based Management**.

2. When prompted, enter the required authentication data, including case-sensitive user ID and password. The default user ID and password are as follows:

    User ID: admin
    Password: admin

System Information

After you logon successfully, the main page displays the system information of the target computer, including the firmware version of the computer, the CPU system time, and system resources including main memory and file system usage (RAM and Flash).

Networking/Server Configuration

The target computer has two network interfaces. To view or change their settings, click the *Networking* item on the menu bar. After the page loads, enter the relevant details on the corresponding text fields and then click "**Update**" to make the changes effective for the interfaces.
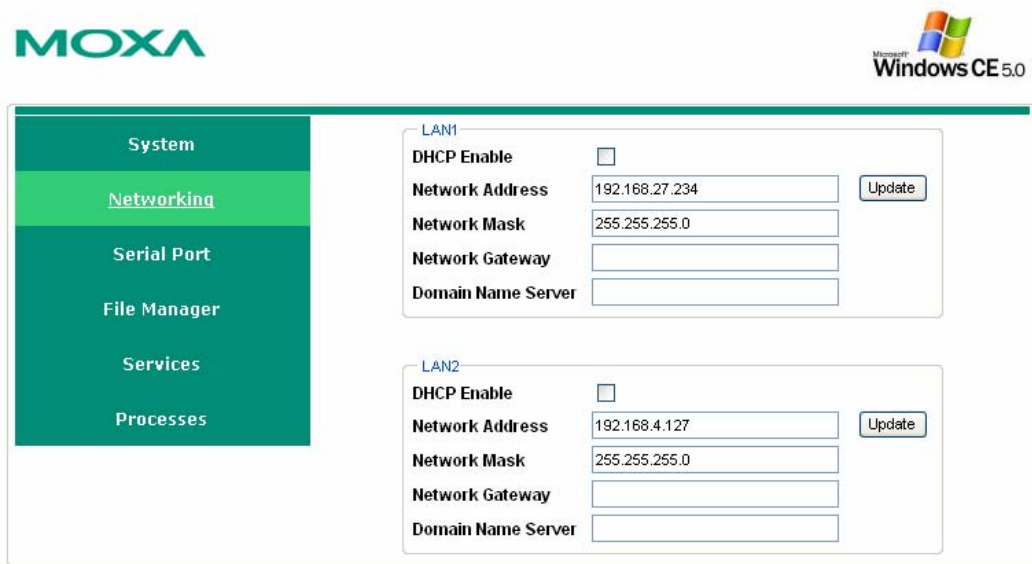
Serial Port Configuration

The embedded computer has multiple high-performance serial ports that can be set for RS-232, RS-422, or RS-485 operation. All serial ports are set to RS-232 by default, and serial ports can be set independently from one another. Changes will take effect when the system is rebooted, and will remain in effect until another change is made.
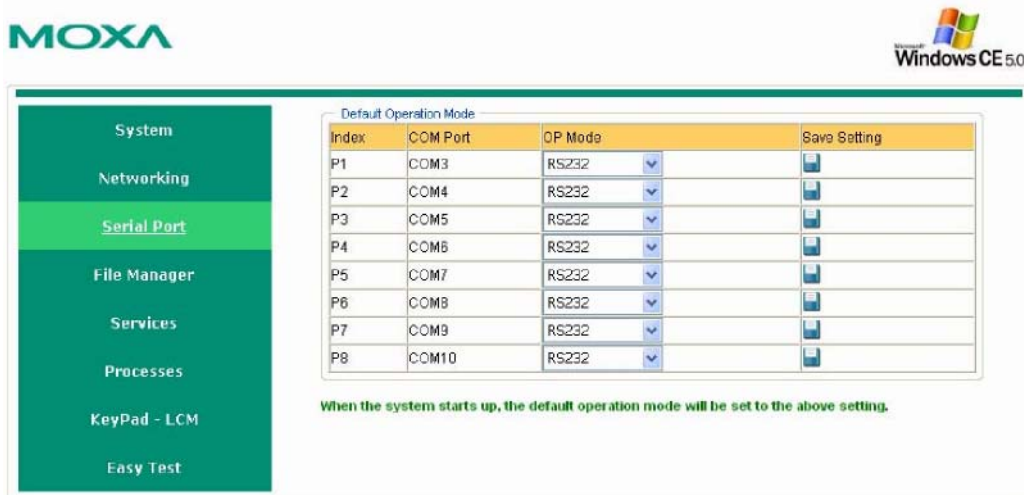
Process (Thread) Monitoring/Control

At runtime, the target computer manages up to 32 applications that you can monitor and control via the management system. To view current processes, click the *Processes* item on the main menu bar. You can kill a process by clicking the **kill** button next to the process name.

Launching Processes Automatically

To have your application start on boot, do the following:

Step 1: Click the *Processes* item on the main menu bar. At the lower part of the page, there is an area marked as "Automatic Launching".

Step 2: Fill in the full path of the application in the first text field and its arguments in a separate text field if there are any.

Step 3: Click **Add**.

Services Monitoring/Control

Some services run in the background to provide services, such as ftp, and telnet daemons etc, for user requests. To monitor and control these services, do the following:

Step 1: Click the **Services** item on the main menu bar. The running services are displayed.

Step 2: Click the relevant check box to toggle a start/stop operation for the desired service.

Binary/Text File Management

On a PC, it is certainly convenient to have a friendly window-based file manager to browse, delete, and organize files and directories. On the target computer, such a convenient feature is simulated by the web-based management system. Click **File Manager** to view the directory tree of your target computer. Using the file manager, you can perform the following operations:

- To browse a child directory, click the name of the directory.
- To delete a file, click the *X* in front of the file icon.
- To create a child directory, click *Create Directory* and then follow the instructions.
- To refresh the current directory, click *Current Directory* at the top of the page.
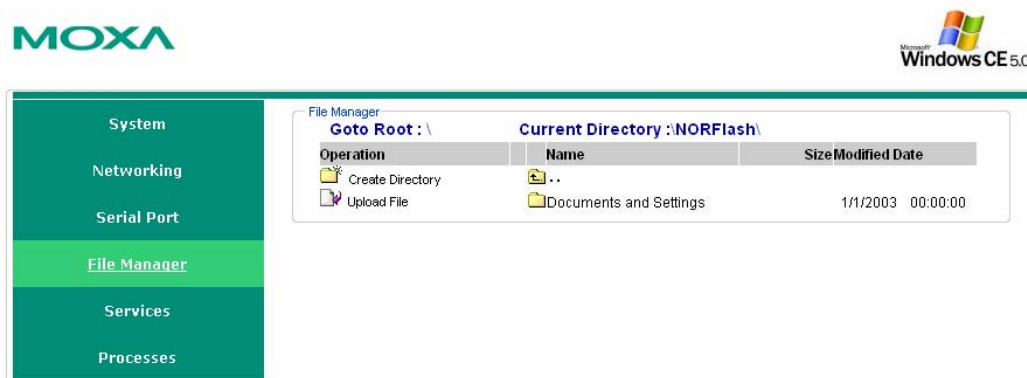
In addition, the management system offers a mechanism for file upload. This mechanism helps you transfer files from your workstation to the target computer in an easy way. For instance, after you have built an application on the development workstation, you can use this mechanism to upload the application to the current directory of the target computer.

Step 1: Click **Upload File**. A browser window pops up.

Step 2: From the pop-up browser window, click **Browse** to bring up a local file manager.

Step 3: Browse to and select the file that you want to upload and click **Open**.

Step 4: Navigate back to the browser window, and click **OK**. The system starts to upload the file.

Step 5: After the file is uploaded completely, refresh the page.

A

Using the LCM Keypad

Da-660 has an LCM and keypad that provide users with on-site parameter readings, and the ability to modify the configuration. Parameters that can be modified include model name, firmware version, network settings, etc. We use the DA-660-16-CE as an example to demonstrate the steps you should follow to configure these parameters.

LCM Display
Display the process values and parameters

Menu Key
Back to the previous menu

Select Key
Enter sub-menu

DA-660-16
Data Acquisition Computer

MENU ∧ ∨ SEL

Up Key
Browse sub-menus upward

Down Key
Browse sub-menus downward
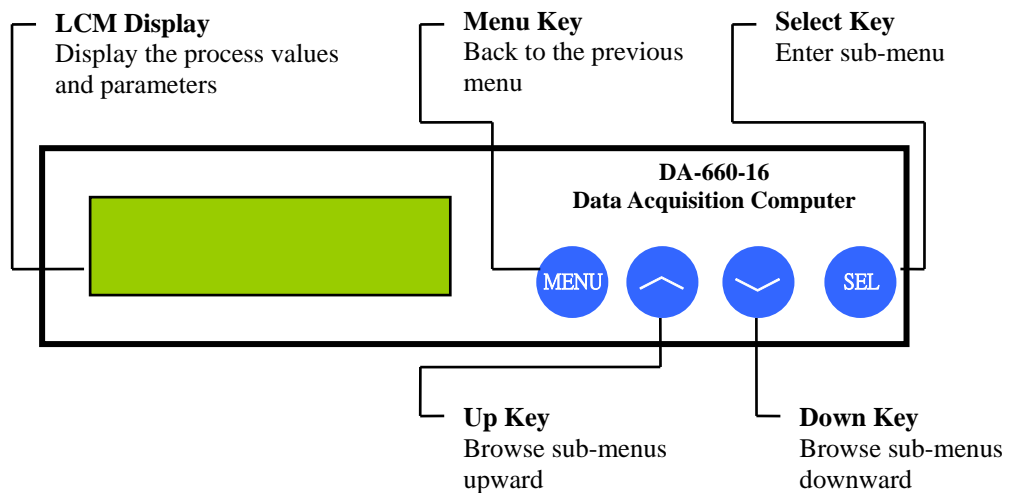
Typical Example

Model Name and Firmware Version – This is the 1st screen when the system boots up.

DA-660-16-CE
Ver 1.0
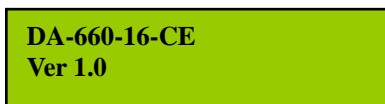
Press **"MENU"** to enter the main menu.

Main Menu

Network	↑
Serial Port	↓

Press "⌣" or use **"SEL"** to select an item.

Serial Port	↑
Console Port	↓

Press "⌣" or use **"SEL"** to select an item.

Console Port	↑
Return	↓

Press "⌢" or use **"SEL"** to select an item.

Network Settings (Port eth0 for example)

Network	↑
Serial Port	↓

Press **"SEL"**.

eth0	↑
eth1	↓

Press **"SEL"**.

eth0: IP	↑
192.168.3.127	↓

Press "⌣".

eth0: Broadcast	↑
255.255.255.255	↓

Press "⌣".

eth0: Netmask	↑
255.255.255.255	↓

Press "⌣".

eth0: Broadcast	↑
255.255.255.255	↓
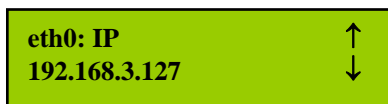
Press "⌢".
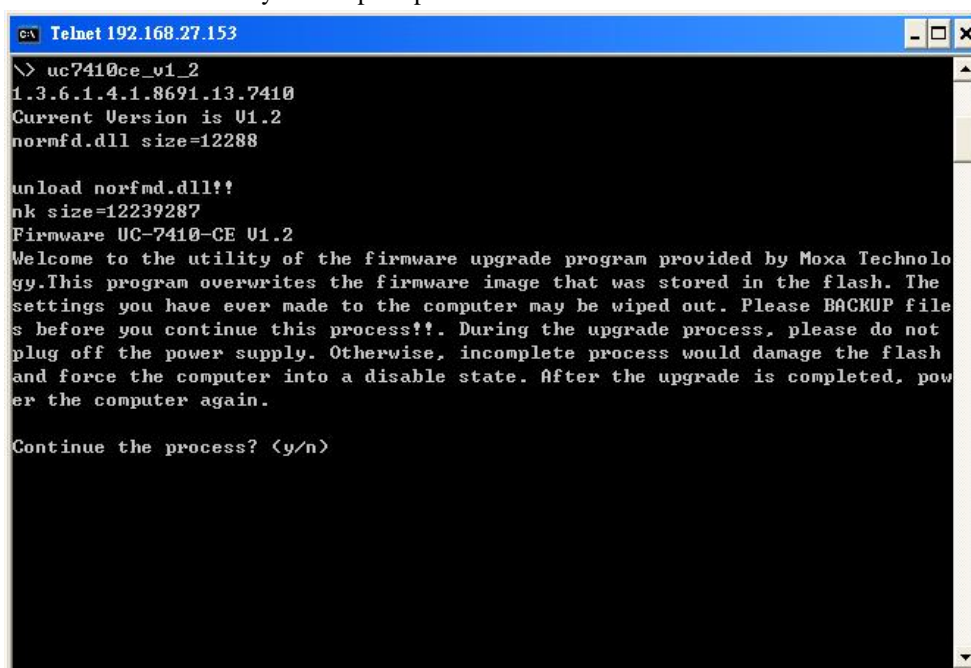
B

Firmware Upgrade Procedure

Software features for Moxa embedded computers continue to be developed, improving quality and enhancing functionality. Firmware updates will be made available in the Moxa download center. When updating the firmware for your embedded computer, follow these instructions:

1. Visit the MOXA download center at http://web4.moxa.com/support/download_center.asp to download the appropriate firmware update file for your embedded computer. This will be an executable file such as **DA660CE_V1.2.07052314**.

2. Copy this file to the root directory (i.e., \) of your embedded computer. We do not recommend that you perform the update from a CompactFlash card or a USB drive, because performance will be very slow.

3. Log onto the embedded computer using a Telnet or console connection.

4. Execute the file. Enter "y" when prompted.

5. The upgrade proves should take about five minutes. When the process is complete, you will be asked if you wish to keep the current network settings. Press "Y" to keep the current network settings.

6. Enter "Y" when prompted to reboot the embedded computer.

The system will be restarted with the new firmware in effect.

C

Frequently Asked Questions

Q: Can the connection port for the web server (HTTPD) be changed to something other than 80?

A: Yes, you can change the connection port for the web server. This is accomplished by changing a registry setting.

The following instructions show how to change the HTTPD port to 81 instead of 80. In this example, the embedded computer is assigned an IP address of 192.168.3.127. Adapt the procedure as necessary for your embedded computer's IP settings.

Step 1. Open Internet Explorer and point it the following IP address:
http://192.168.3.127/sysadmin/?Client=IE4

If necessary, log on as an administrator. The default administrator user ID is "admin", and the default administrator password is "admin".

Step 2. Select "Registry Editor" in the top frame.

Step 3. Browse to "KEY_LOCAL_MACHINE\Comm\HTTPD".
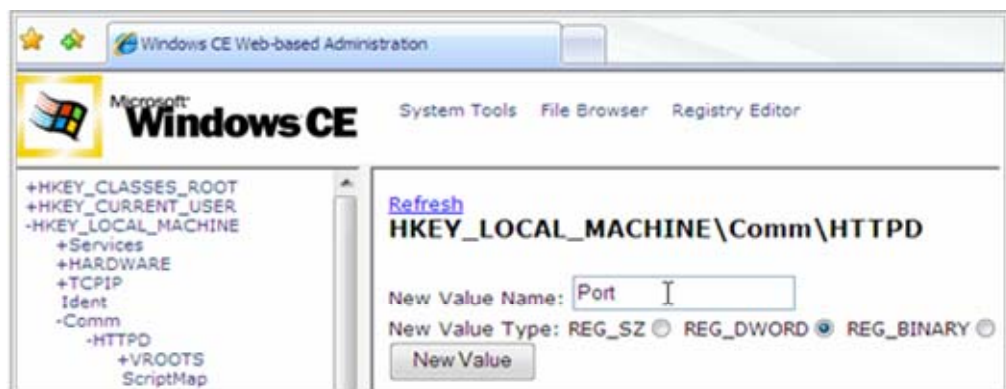
Step 4. Add a DWORD value named "Port". The default value must be zero.
For "New Value Name:", enter "Port"
For "New Value Type:", select REG_DWORD
Click the "New Value" button.

Step 5. Change "Port" to 51 (81 in HEX).
In the "Modified Value:" field, enter "51"
Go to the display position for "Port" and then click "Modify".

Step 6. Browse to "HKEY_LOCAL_MACHINE\Services\HTTPD\Accept\TCP-80".

Step 7. Change the value of "SockAddr" to "02 00 00 51 00 00 00 00 00 00 00 00 00 00 00 00".

For "Modified Value:", enter "02 00 00 51 00 00 00 00 00 00 00 00 00 00 00 00"

Go to the display position for "SockAddr" and click "Modify".

Step 8. Log onto the embedded computer from a Telnet client and restart the web server.

```
/> services stop HTP0:
/> services start HTP0:
```

Step 9. Try the new URL to verify that the change was successful:

http://192.168.3.127:81/

Q: What type of file system is supported by Moxa embedded computers?

A: Moxa embedded computers support TFAT (Transaction-safe File Allocation Table) file systems for the on-board flash memory. TFAT protects the file system from write corruption during critical events such as a sudden power loss.

However, the TFAT file system may not be recognized by PCs. Therefore, Moxa embedded computers support the FAT (File Allocation Table) file system for external storage media such as USB drives and CompactFlash cards.

Q: Where can I store files permanently on Moxa embedded computers?

A: There is a sub-directory named "NORFlash" under the root directory. Use this directory to store persistent files.

Q: Do Moxa embedded computer have a "C:\\" or "D:\\" directory as found on desktop PCs?

A: Moxa embedded computers have a single root directory, "\". Any external storage media will appear as subdirectories under the root directory, as follows:

USB drives: "\USBDisk" and "\USBDisk2"

CompactFlash cards: "\CFFolder"

Q: Can I delete any Windows CE system files?

A: No, you should not be able to delete any system files. Even if you somehow succeed in deleting the files, they will simply reappear when the system reboots.

Q: Can I add other users besides "admin"?

A: Yes, by using the command "useradd". The command "userdel" can be used to delete users.

Q: Is there a way control user access for each function service (FTP, Telnet,...)

A: Yes. Log onto the embedded computer with the "admin" account. Use the command "useradd" to create user groups and assign users to them. Three groups are already created by default: "administrators", "telnetd", and "ftpd".

Q: **If I accidentally delete system files or corrupt the operating system, is there any way to recover the system or reset the embedded computer to factory defaults?**

A: If the embedded computer is behaving strangely or not working properly, you may reset it back to factory default settings. While the embedded computer is powered on, use a paper clip or pin to hold the "Reset to Default" button down for five seconds. This is a recessed button on the front of the unit.

A buzzer will sound as the factory default settings are loaded. When the procedure is completed, the system will automatically reboot. At that time, the embedded computer will have rolled back to its original state as defined by the original registry database. Persistent files in the "NORFlash" directory will not be altered and should remain intact.

Q: **Can I reboot Moxa embedded computers remotely?**

A: Yes, Moxa embedded computers can be remotely rebooted. Log onto the embedded computer from a remote client and use the command "reboot" to reboot the system.

Q: **What type of CompactFlash device is supported by Moxa embedded computers?**

A: Moxa embedded computers have Type II CompactFlash slots. These slots support CompactFlash Type I and Type II mass storage devices.

Q: **What type of USB device is supported by Moxa embedded computers?**

A: Moxa embedded computers support USB 2.0 and 1.1 mass storage devices. If you cannot find the "USBDisk" directory, try unplugging the device and plugging it in again.

Q: **I plugged a USB drive into the computer, but I can not find the associated directory under the root directory.**

A: If you can not find the associated "USBDisk" or "USBDisk2" directory, try unplugging the device and plugging it in again.
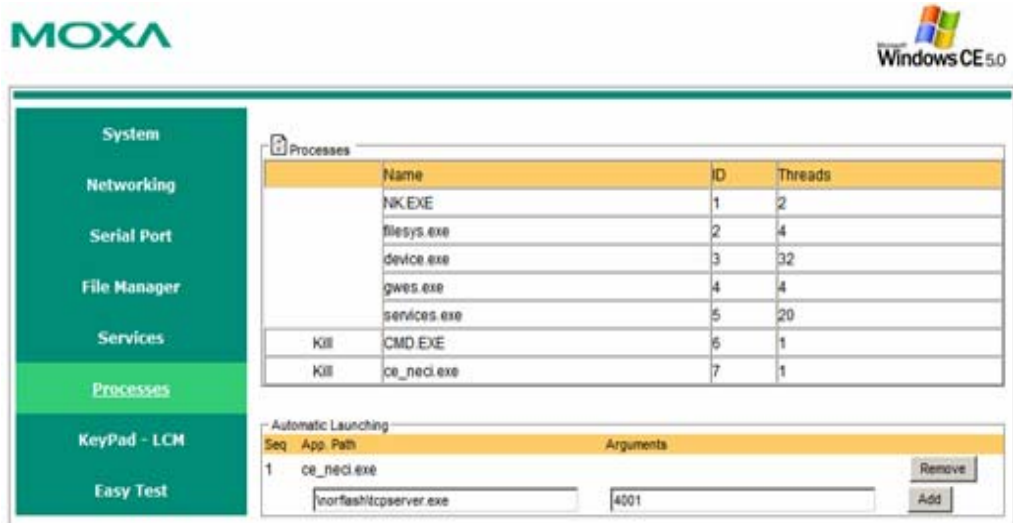
Q: **On Moxa embedded computers, how do I set up an application to start automatically upon bootup?**

A: To start an application automatically on bootup, log into the web-based management system and complete the following steps:
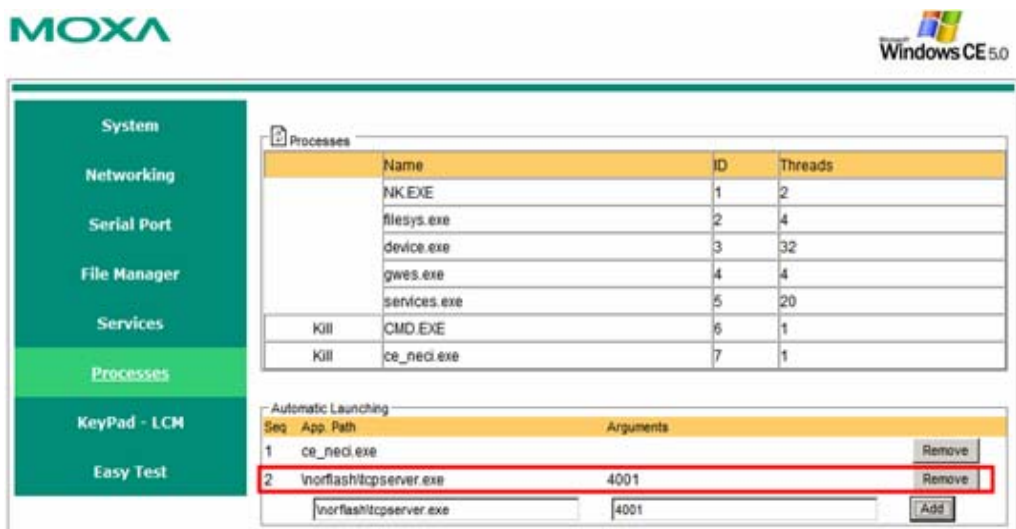
Step 1. Navigate to "Processes" and find the "Automatic Launching" section.
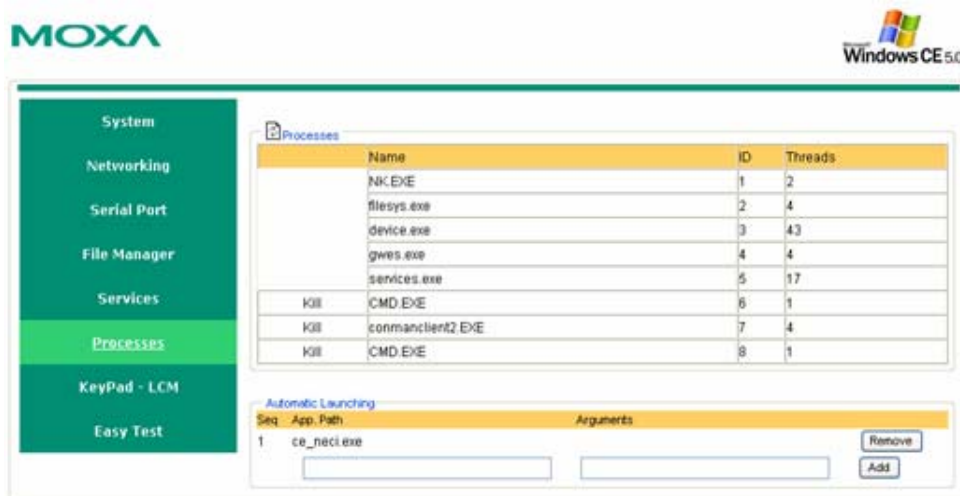
Step 2. In the first text field, enter the full path of the application. In the second text field, enter any arguments, if required. Click "Add".

Step 3. Repeat steps 1 and 2 to set up additional applications that will start automatically upon bootup.

Q: How do I monitor processes on Moxa embedded computers?

A: In the Telnet or serial console, you can execute "ps" to monitor current processes. In the web console, there is a "Processes" page. You can monitor processes and "kill" a pending application on the system.