DA-681 Series
WinCE User's Manual

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WinCE User's Manual

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1
Introduction

Thank you for purchasing the Moxa DA-681 Series of x86 ready-to-run embedded computers. This manual introduces the software configuration and management of DA-681 embedded computers running the Windows CE operating system. For hardware installation, connector interfaces, setup, and upgrading the BIOS, please refer to the DA-681 Series Hardware User's Manual.

Microsoft Windows CE is an open, scalable, 32-bit operating system 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, point-of-sale terminals, and display devices, such as HMI, advertisement appliances, and interactive panels.

This chapter covers the following topics:

❑ **Overview**
❑ **Product Features**
❑ **Software Specifications**
   ➢ Application Development Environment
   ➢ Networking and Communication Capabilities
   ➢ Supporting Services and Daemons
   ➢ Graphics Tools
   ➢ Supporting Drivers
❑ **Memory and File Systems**
❑ **Hive-Based Registry**

Overview

The Moxa DA-681 Series embedded computers are x86-based rackmount embedded computers designed for industrial data acquisition applications.

The DA-681 main system is based on the Intel Celeron M processor and 910GMLE chipset, which supports standard x86 VGA, USB, PS/2 keyboard/mouse, 4 Gigabit LAN ports, and IDE/SATA disk interface. In addition, the DA-681 has a CompactFlash Socket and pre-installed embedded ready-to-run operating system. Programmers will find the full-function development kit a great benefit for developing software and building reliable communication applications.

The housing is a standard 1U, 19-inch wide rack-mounted rugged enclosure. This robust, rack-mountable design provides the hardened protection needed for industrial environment applications.

Moreover, the DPP-T models are in full compliance with IEC 61850-3 standards to meet the demands of power substation automation.

Product Features

The DA-681 Series Basic System has the following common features:

- IEC 61850-3 certified for power substation automation systems (DPP-T models only).
- Intel Celeron M 1 GHz processor with 400 MHz FSB.
- Intel 910GMLE + ICH6M chipset.
- 200-pin DDR2 SODIMM socket x 1, supporting DDR2 400 up to 1 GB.
- 6 10/100 Mbps Ethernet ports for network redundancy.
- 1 CompactFlash socket.
- 4 RS-232, 8 RS-485 serial ports.
- 2 SATA connector for storage expansion.
- 2 USB 2.0 ports for high speed peripherals.
- 19-inch rackmount, 1U high form factor.
- Fanless design.
- 100/240 VAC/VDC power inputs.
- Shipped with DDR2 512 MB memory.
- Ready-to-run Windows CE 6.0 platform pre-installed on a 512 MB flash disk module.

Software Specifications

The DA-681-CE embedded computer provides the following common, popular application development features, networking/communications capabilities and supporting services/daemons to make the Windows CE environment into an easy and convenient programming tool. The software features of the DA-681-CE embedded computer are listed below:

Application Development Environment

- **Microsoft .Net Compact Framework 2.0**—Microsoft .NET CF is a software package designed by Microsoft for connecting information, people, systems, and devices. One of the main features of .Net CF is the use of XML Web services, which allow small, discrete, building-block applications to connect to each other and to other, larger applications over the Internet. Microsoft Visual Studio .NET and the Microsoft .NET Framework allow developers to develop XML Web services quickly, and integrate them easily with other applications.

- **C/C++ Programming Languages**—You can use the eVC4++ or Visual Studio 2005 to develop C/C++ programs.

- **COM and DCOM**—The Component Object Model (COM) is a platform-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 devices.

- **Message Queuing (MSMQ)** —The Message Queuing (MSMQ) implementation makes it possible for applications to communicate with other applications across networks and systems that might be temporarily offline.

- **SOAP Toolkit**—The client-side SOAP Toolkit functionality in Microsoft Windows CE allows an application to invoke Web service operations while the server-side functionality maps invoked Web service operations to Component Object Model (COM) object method calls.

- **XML**—Extensible Markup Language (XML) is the universal format for data on the Web. XML allows developers to describe and deliver rich, structured data from any application in a standard, consistent way. XML does not replace HTML, but is a complementary format.

Networking and Communication Capabilities

- **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 Saving Time.

- **Serial Communications**—Includes a special driver for Moxa serial ports.

- **Network Utilities (IpConfig, Ping, Route)**—Utilities for troubleshooting various network problems.

- **TCP/IP**—Includes IP, Address Resolution Protocol (ARP), Internet Control Message Protocol (ICMP), Internet Group Membership Protocol (IGMP), Transmission Control Protocol (TCP), User Datagram Protocol (UDP), name resolution and registration, DNS Client, and DHCP.

- **Dial-up Networking**—Consists of RAS client API and the Point to Point Protocol (PPP). RAS and PPP support Extensible Authentication Protocol (EAP) and RAS scripting

- **PPPoE**—Point-to-Point Protocol over Ethernet (PPPoE) provides the ability to connect a network of hosts, over a simple bridging access device, to a Remote Access Concentrator.

Supporting Services and Daemons

- **FTP Server**—A sample server used for transferring files to and from remote computer systems over a network using TCP/IP.
- **File Server**—The File Server functionality in Microsoft® Windows® CE enables clients to access files and other resources over the network.
- **Telnet Server**—A sample server that allows remote administration through a standard telnet client.
- **Web Server (IIS)**—Includes ASP, ISAPI, and Web Administration ISAPI Extensions.

Graphics Tools

- **Graphics Device Interface (GDI)**—Provides information about the fundamental graphics architecture for Windows CE.
- **Diect3D Mobile Display Drivers**—Provides information about creating a display driver that supports Direct3D Mobile.
- **DirectDraw Display Drivers**—Provides information about creating a display driver that supports DirectDraw.
- **Video Codecs and Renderers**—DirectShow Video Renderer, MPEG-I Video Codec, MS RLE Video Codec, Video/Image Compression Manager, WMV/MEPG-4 Video Codec.

Supporting Drivers

- **Watchdog Driver**—Provides a Watchdog API for use with applications.

Memory and File Systems

The default memory space for the DA-681-CE is 512 MB. Approximately 233 MB of this space will be used for the operating system and user applications. If you would like to use the rest of the space, you will need to adjust the system memory manually. Refer to **Adjusting the System Memory** section for details on how to do this.

The DA-681-CE's internal file system controls access to the compact flash card and a RAM disk. The file system provides persistent storage for applications and related data, even when the main power supply is lost. When the system resets, all files stored in RAM disk will be lost.

The root directory is a ROM file system, which differs from the system used by Moxa's UC-7400-CE embedded computer. The DA-681-CE root file system is a persistent file system. There is no any RAM file system stored in DA-681-CE.

The internal file system is uses a FAT (File Allocation Table). This means that the internal file system of the computer provides the ability to mount external FAT file systems.

The additional file systems on USB and CompactFlash storage devices are placed at the root of the internal file system. If you intend to use these devices to port data between your PC and the DA-681-CE computer, please format them as the FAT file system on your PC.

Hive-Based Registry

The registry for the DA-681-CE is a hive-based registry, in contrast to a RAM-based registry. The hive-based registry stores registry data inside files, or hives, which can be kept in a file system, which removes the need for performing backup and restore on power off.

2

Software Configuration

In this chapter, we explain how to operate a DA-681-CE computer either directly, or from a PC over the network. In addition, we explain how to handle system time adjustment, troubleshoot network connectivity, and other operations. Some of these operations can be handled with system commands after gaining access to the computer, and others can be done by using a "System Manager" described in a later chapter.

This chapter covers the following topics:

❑ **Starting Your DA-681-CE Computer**
❑ **Resetting Your DA-681-CE Computer**
  ➢ Cold-Start
  ➢ Warm-Start
  ➢ Reset to Factory Default
❑ **Changing the Network Settings**
❑ **Operating Your DA-681-CE Computer with a Telnet Client**
❑ **RAMDisk**
❑ **Adjusting the System Time**
❑ **Adjusting the Time Zone**
❑ **Adjusting the System Memory**
❑ **Starting and Stopping Services**
❑ **Troubleshooting Network Connectivity**
❑ **Simple Network Management Protocol (SNMP)**
❑ **Remote Display Control**
❑ **Inserting a USB Storage Device into the Computer**
❑ **Inserting a CompactFlash Card into the Computer**
❑ **4 RS-232 Serial Ports and 8 RS-485 Serial Ports**
❑ **Accessing Files through File Sharing**
❑ **BIOS Status Notification**
❑ **How to Determine the Firmware Build Version**

Starting Your DA-681-CE Computer

Connect the display monitor to the DA-681-CE computer, and then power it up by connecting it to the power adaptor. It takes about 30 to 40 seconds for the system to boot up. During the boot-up process you should see the "Windows Embedded CE 6.0" loader image displayed on your monitor, along with a progress bar.
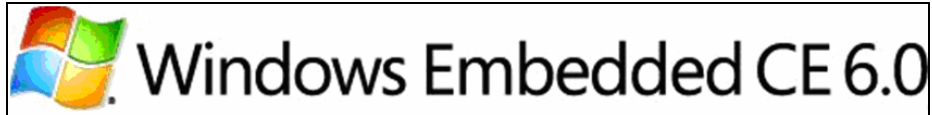
Once the system is ready, the desktop will appear on your monitor.
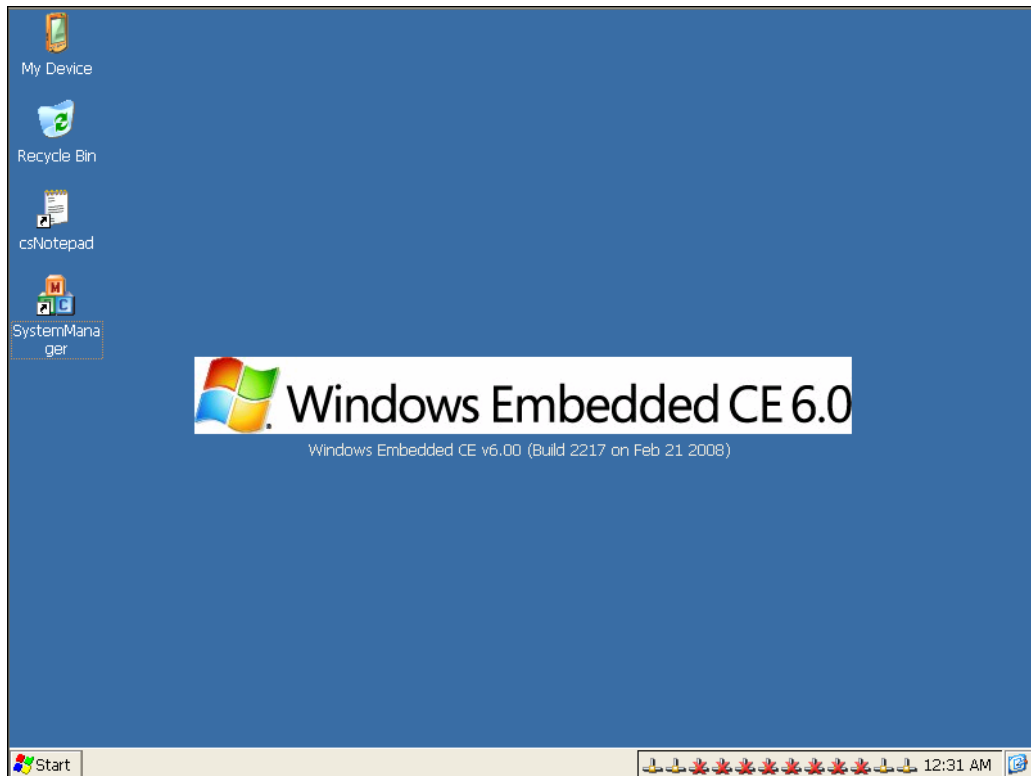
Resetting Your DA-681-CE Computer

Cold-Start

Disconnect and then reconnect the power. The computer will reboot itself right away.

Warm-Start

To reboot the computer when the power is on, push the reset button on the rear panel and then release it within 1 second. The computer will reboot itself.

Reset to Factory Default

If the computer is not working properly and you want to load factory default settings, press "8" when the "Windows Embedded CE 6.0" loader image is displayed during the first 4 or 5 seconds of the power on sequence. The optional prompts are described step by step as follows:

Step1: **Scan Disk (Automatically).**

Windows CE 6.0 supports the FAT file system. Sometimes, due to unstable power or application issues, the files, directories, or FAT table could be damaged. The "Scandisk" routine will help you scan the file system and auto-fixed file or directory corruption problems.

⚠️ **ATTENTION**

After running Scan Disk, you might find some files named "FILE00xx.chk," which means some files or directories were damaged and hves been fixed.

Step2: **Reset to Default? (Y/N).**

Type "Y" to load factory default settings and the configuration file.

Step3: **Clean all files and directories? (Y/N)**

You can clear all garbage files and directories by selecting this option.

Step4 **Proceed? (Y/N)**

Type "Y" to start the Reset to Factory Defaults Procedure. After the factory default configuration has been loaded, the system will reboot automatically.

Changing the Network Settings

The DA-681-CE computer comes with six 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
LAN 3	192.168.5.127	255.255.255.0
LAN 4	192.168.6.127	255.255.255.0
LAN 5	192.168.7.127	255.255.255.0
LAN 6	192.168.8.127	255.255.255.0

There are two ways for you to change your network setting.

Use Windows CE Network Control Panel utility

Step1: Move you mouse go to the **[Start]** → **[Settings]** → **[Network and Dial-Up Connections]**.
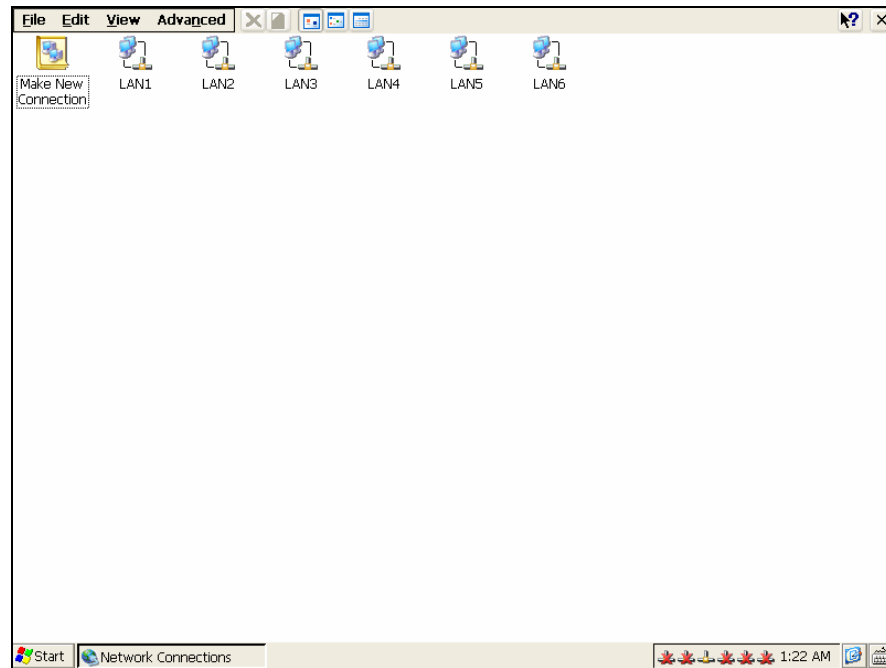
Step2: Right-Click the **LAN** icon and click the **[property]**

Step3: Click "**OK**" button after configuration is done.

Use telnet client to logon to DA-681-CE

Normally, you are required to change them because they are located on a different local network from that of your development workstation. Without changes, you cannot connect to them directly. Use the *netconfig* utility to complete the task. Type *netconfig -h* to get help on this utility.

```
\> netconfig -h

Usage: netconfig -n <AdapterName | Alias> [-EnableDHCP]
[-i <IP address>] [-m <netmask>] [-g <gateway>] [-d <DNS server>]
[-w <WINS Server>] [-noask]
e.g.: netconfig -n LAN1 -i 192.168.10.101 -g 192.168.10.254
    : netconfig -n LAN1 -EnableDHCP


Alias:

     LAN1=PCI\RTCENIC1
     LAN2=PCI\RTCENIC2
```

For example, your development workstation has a LAN port at 192.168.1.5 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-681-CE Computer with a Telnet Client

Before using the Telnet client, we suggest that you change the network settings of the computer (see the section "Changing the Network Settings") so that at least one of the network ports is situated in the same subnet segment as your development workstation.

Use a crossover Ethernet cable to connect your development workstation directly to the target computer, or use a straight-through Ethernet cable to connect the computer to a LAN hub or switch. Next, use a Telnet client on your development workstation to connect to the Telnet console utility of the target computer. After a connection has been established, type the login name and password as requested to log on to the computer.

After logging in through the Telnet client, a list of commands will be available for operating 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 computer's system time. 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

Network
RAMDISK
BLDR
SPLASH.BMX
EBOOT.BIX
BOOT.INI
NK.BIN
Windows
Temp
Registry
Program Files
My Documents
Control Panel.lnk
Documents and Settings
Application Data
Recycled
```

RAMDisk

The DA-681-CE supports the RAMDisk function, which refers to a virtual disk that can be used to store data and programs. This is particularly convenient since it offers faster speed for storing data and running programs. However, please note that all data and programs stored on the RAMdisk will be lost once the system is restarted.

⚠️ **ATTENTION**

You can only create 9 WinCE Telnet clients at the same time.

Adjusting the System Time

Setting the System Time Manually

Use the **date** and **time** command line utilities to query the current system date/time or 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 the Time Zone

Windows CE 6.0 supports Time Zone setting. You can use **Control Panel → Date/Time** to adjust your current Time Zone. **Daylight saving Date** and **Daylight saving Time** are also supported.

Adjusting the System Memory

Approximately 233 MB of the 512 MB of SDRAM memory space is used for the main memory to run the operating system and user applications. If you would like to use the rest of the space, you will need to adjust the system memory manually.

From **Control Panel → System → Memory**, simply drag the bar to the left if you would like to use more memory space.
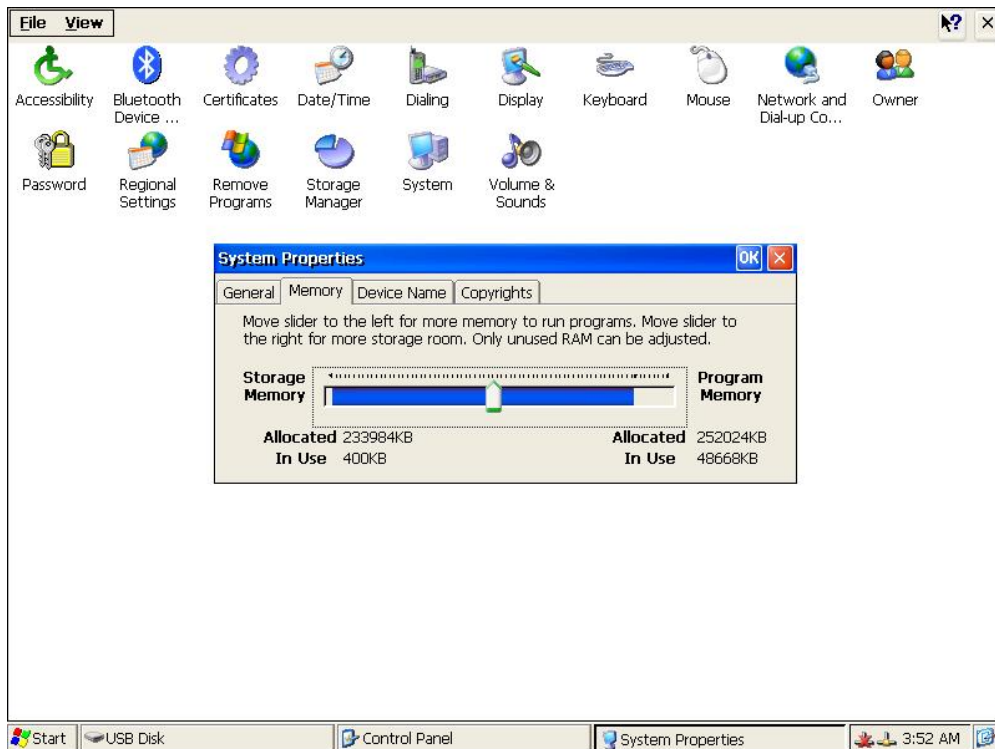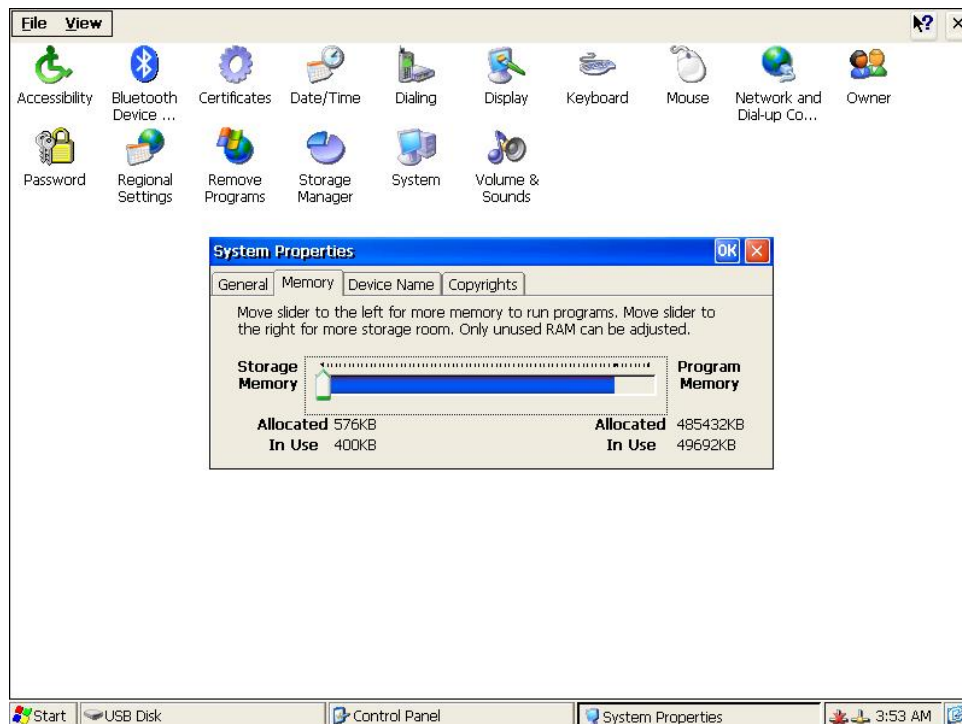
Starting and Stopping Services

After boot-up, the DA-681-CE computer runs several services continuously to serve requests from users or other programs. Notable services include Telnet ("TEL0:"), world wide web HTTP ("HTP0:"), and file transfer FTP ("FTP0:"). Services can be started or stopped by using the name of the service with the command "services."

For example, use the following command to start the FTP service:

\> services start FTP0:

Use the following command to Stop the FTP service:

\> services stop FTP0:

The DA-681-CE supports the following default services:

TEL0:   Telnet Service
FTP0:   FTP Service

Troubleshooting Network Connectivity

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

```
Ethernet adapter Local Area Connection:
        IP Address ........ : 192.168.6.127
        Subnet Mask ....... : 255.255.255.0
        Adapter Name ...... : PCI\RTCENIC4
        Description ....... : PCI\RTCENIC4
        Adapter Index ..... : 1245189
        Address............ : 00 90 e8 00 d4 cf
        DHCP Enabled....... : NO
        Primary WinsServer  :
        Secondary WinsServer:


Ethernet adapter Local Area Connection:
        IP Address ........ : 192.168.5.127
        Subnet Mask ....... : 255.255.255.0
        Adapter Name ...... : PCI\RTCENIC3
        Description ....... : PCI\RTCENIC3
        Adapter Index ..... : 1310724
        Address............ : 00 90 e8 00 d4 ce
        DHCP Enabled....... : NO
        Primary WinsServer  :
        Secondary WinsServer:
Ethernet adapter Local Area Connection:
        IP Address ........ : 192.168.4.127
        Subnet Mask ....... : 255.255.255.0
        Adapter Name ...... : PCI\RTCENIC2
        Description ....... : PCI\RTCENIC2
        Adapter Index ..... : 1376259
        Address............ : 00 90 e8 00 d4 cd
        DHCP Enabled....... : NO
        Primary WinsServer  :
        Secondary WinsServer:


Ethernet adapter Local Area Connection:
        IP Address ........ : 192.168.3.127
        Subnet Mask ....... : 255.255.255.0
        Adapter Name ...... : PCI\RTCENIC1
        Description ....... : PCI\RTCENIC1
        Adapter Index ..... : 1441794
        Address............ : 00 90 e8 00 d4 cc
        DHCP Enabled....... : NO
        Primary WinsServer  :
        Secondary WinsServer:
Ethernet adapter Local Area Connection:
```

```
        IP Address ........ : 192.168.7.127
        Subnet Mask ....... : 255.255.255.0
        Adapter Name ...... : PCI\RTL81391
        Description ....... : PCI\RTL81391
        Adapter Index ..... : 1507334
        Address............ : 00 90 e8 00 d4 ca
        DHCP Enabled....... : NO
        Primary WinsServer  :
        Secondary WinsServer:


Ethernet adapter Local Area Connection:
        IP Address ........ : 192.168.8.127
        Subnet Mask ....... : 255.255.255.0
        Adapter Name ...... : PCI\RTL81392
        Description ....... : PCI\RTL81392
        Adapter Index ..... : 1572871
        Address............ : 00 90 e8 00 d4 cb
        DHCP Enabled....... : NO
        Primary WinsServer  :
        Secondary WinsServer:


        Host name.......... : DA-681-CE
        Domain Name........ :
        NODETYPE........... : 8      Routing Enabled.... :  NO
        Proxy Enabled...... :  NO
```

To troubleshoot network connectivity, reach ability, 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
```

To delete a routing item,

```
\> route DELETE 192.168.0.0
```

Simple Network Management Protocol (SNMP)

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

SNMP Agent
The SNMP agent is an SNMP application that monitors network traffic and responds to queries from SNMP manager applications. The agent also notifies the manager by sending a trap when significant events occur.

SNMP Manager
An SNMP manager is an SNMP application that generates queries to SNMP agent applications and receives traps from SNMP agent applications.

The DA-681-CE 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 for a target DA-681-CE computer (e.g, network IP at 192.168.3.127), log in to the workstation computer on which the SNMP manager resides. For example, for a Linux-based computer type:

```
\> snmpwalk -v 2c -c public 192.168.3.127 system
SNMPv2-MIB::sysDescr.0 Microsoft Windows CE Version 6.0 (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 on the DA-681-CE computer. You will now be able to monitor and manage the computer.

Remote Display Control

The Remote Display Control application displays a screenshot of the target device and controls the target device remotely. To establish a connection between the desktop computer and target device, follow the steps below:

STEP1: Execute "**cerdisp.exe**" on target device, when the "CE Remote Display" application shows, click "**start**" button

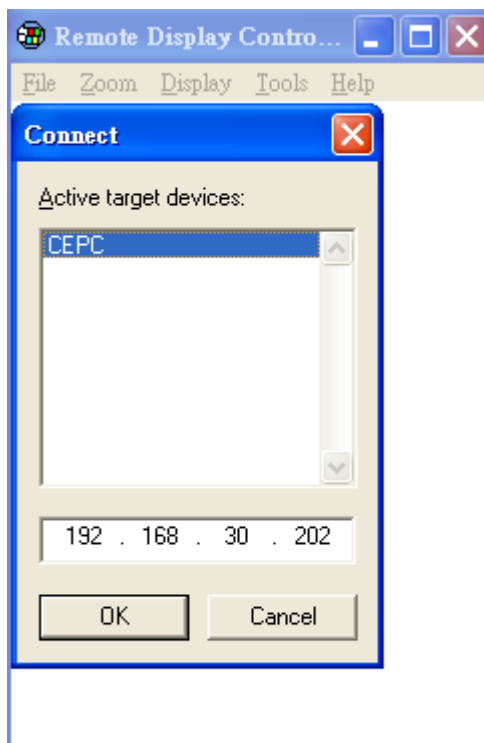(Make sure the "start" button becomes "stop")
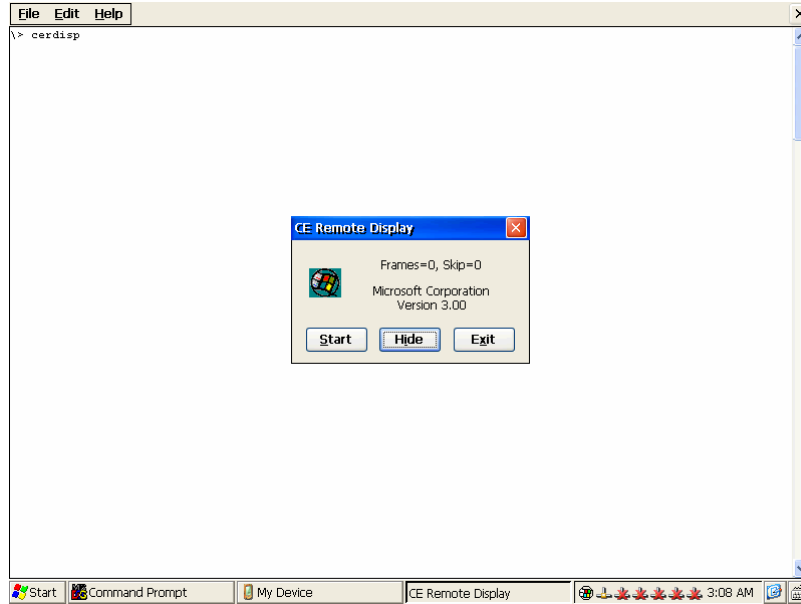
STEP2: Execute "**cerhost.exe**" on your desktop; this file is located under \software\RemoteDisplay in software CD. This will display the "Remote Display Control".
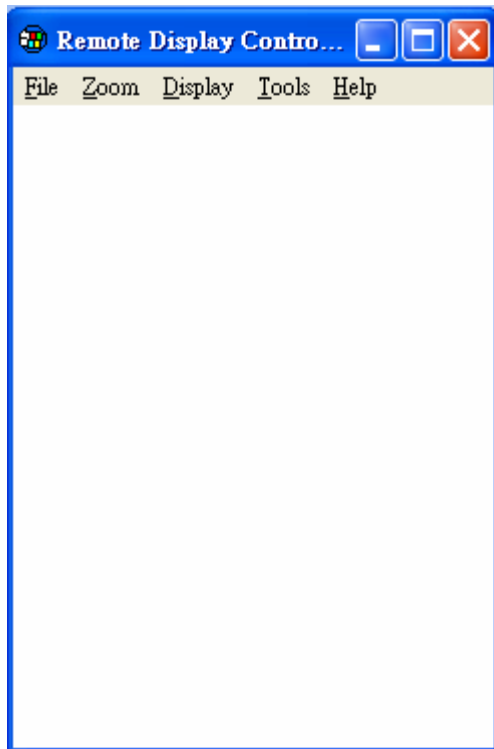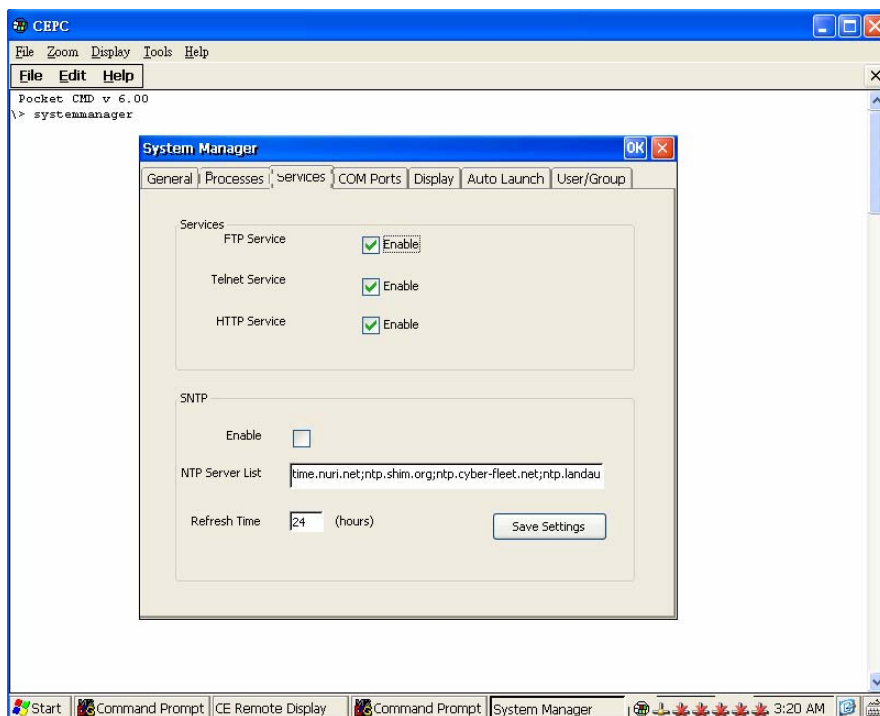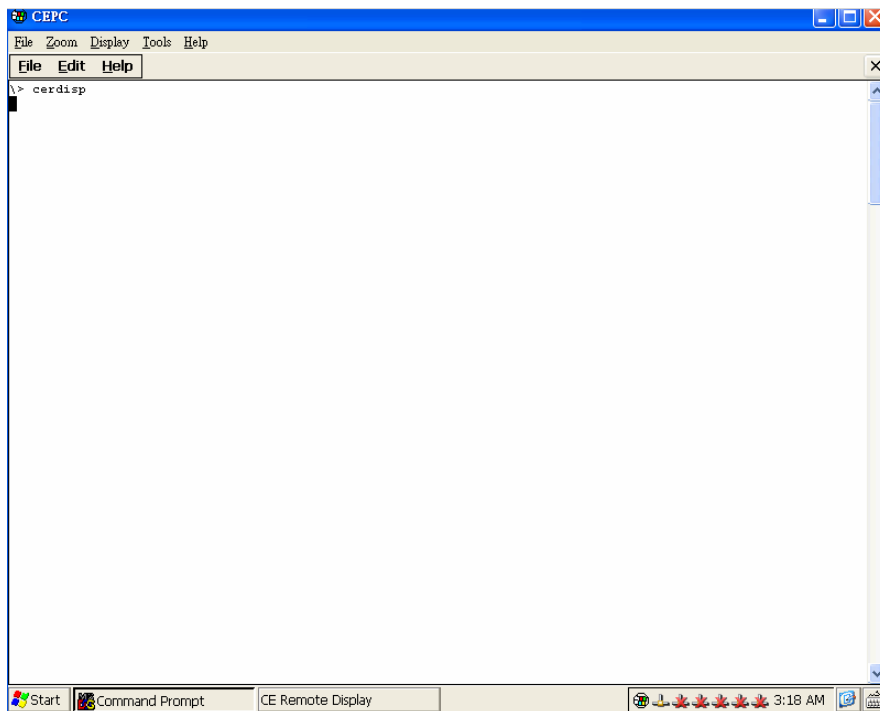
STEP3: Click "**File→Connect**" the "Connect" windows shows the target device in the list

STEP4: Select the device lists under "Active target devices" and click "**OK**" to connect to target device

STEP5: When the connection is established, you can see a screenshot of the target device and control the target device.

STEP6: To stop the connection, click "**File→Disconnect**" on your desktop machine and click "**stop**" on your target device.

Inserting a USB Storage Device into the Computer

When the first USB storage device is plugged into the DA-681-CE, a directory named **USBDisk** under the root directory on the internal file system is created as a link to the storage area. The directory created for the second USB device is **USBDisk2**.
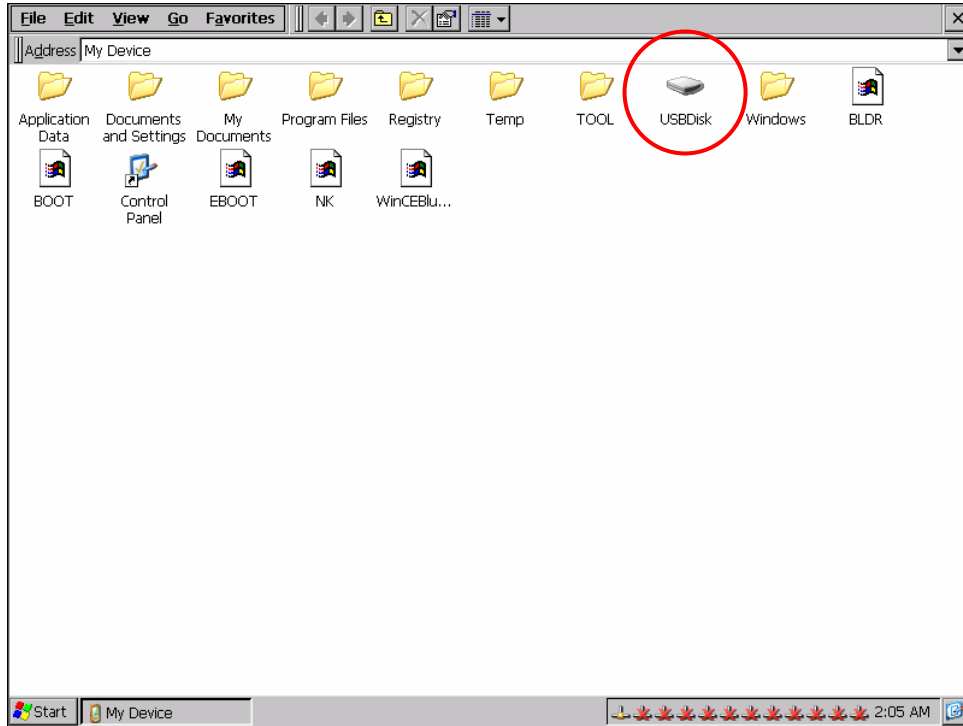
⚠ **ATTENTION**

We suggest formatting your USB Disk with the FAT format since the DA-681-CE does not support the NTFS format.

Inserting a CompactFlash Card into the Computer

The compact flash card is treated as a local disk drive for the DA-681-CE computer. When the first compact flash card is plugged into the DA-681-CE, a directory named **HardDisk** under the root directory on the internal file system is created as a link to the storage area.
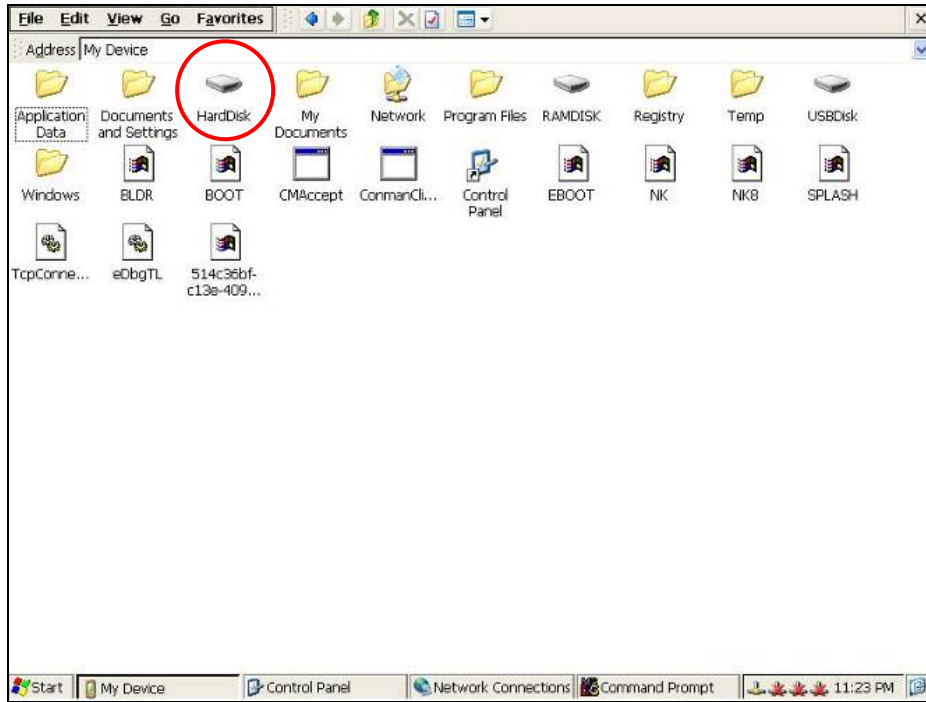
> ⚠️ **ATTENTION**
>
> We suggest formatting your CompactFlash card with the FAT format since the DA-681-CE does not support the NTFS format.

> ⚠️ **ATTENTION**
>
> DA-681 embedded computers do not support the CompactFlash hot swap and PnP (Plug and Play) functions. You must remove the power source first before inserting or removing the CompactFlash card.

4 RS-232 Serial Ports and 8 RS-485 Serial Ports

The 4 RS-232 serial ports of DA-681-CE computer from bottom to top and left to right are assigned COM port numbers 1 to 4. The 8 RS-485 serial ports are assigned COM port numbers 5 to 12. Each of these ports supports baudrate settings up to 921600 bps.

Accessing Files through File Sharing

A file server function is provided for transferring files to the DA-681-CE. **On PC**, Click **Start →
Run** and input **\\x.x.x.x** to invoke the following login window.

Note: x.x.x.x stands for DA-681-CE's IP address. After logging in, you will find that a file sharing folder has been created.
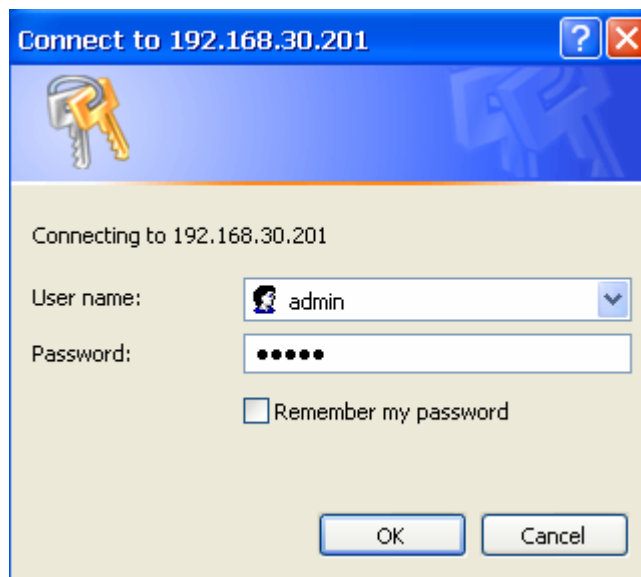
To manage file sharing, type the "netshare -h" command from any command window (either Telnet or console).
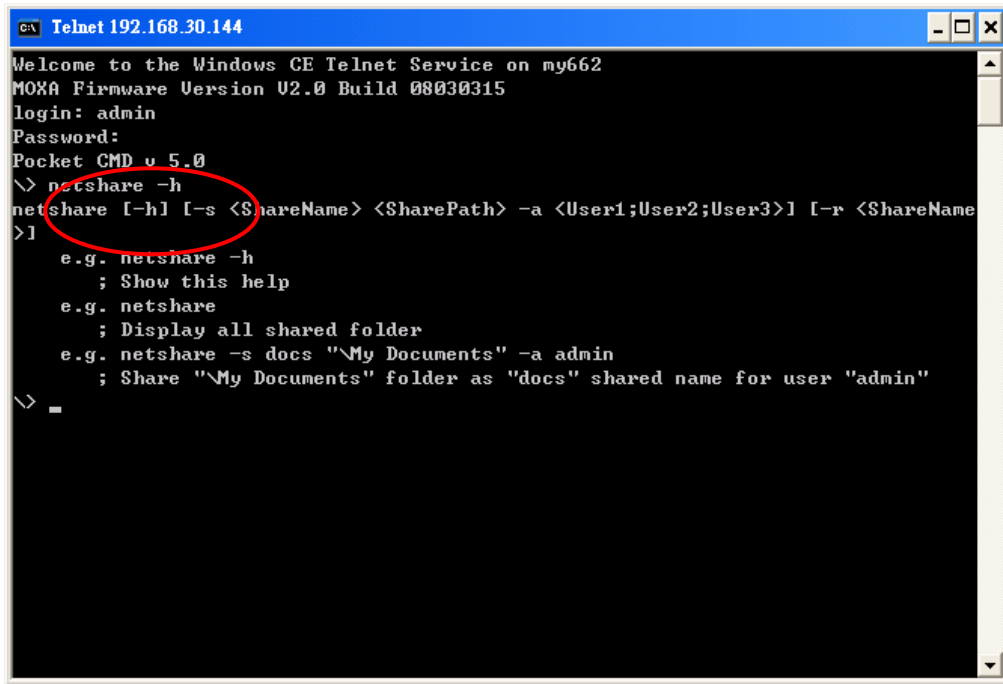

BIOS Status Notification

The notification window provides users with immediate system status updates through the four following types of message:

- **CMOS Checksum Error**-Some situations, such as low battery or when the CMOS is cleared, will cause the CMOS checksum error and the notification window shows.
  Note: If you update the new bios and reboot the device, you will see the notification windows pop up because the checksum has been changed. Simply close the window for the new setting.
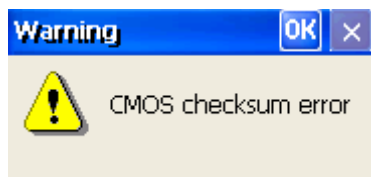

- **Keyboard Error**-If the keyboard was not installed in booting process, the notification window will pop up.
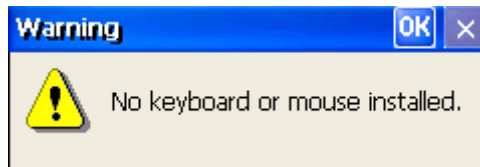
- **Processor Throttling Activated**-When the processor temperature exceeds the BIOS setting, the processor throttling function will activate, prompting the processor frequency to adjust and a notification window to pop up.
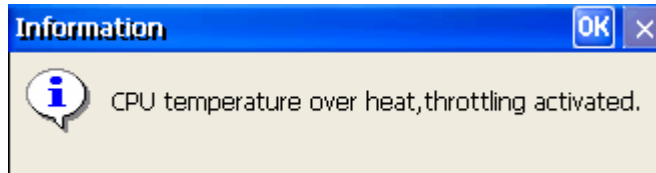
- **CPU Throttling Deactivated**-When the processor temperature returns to normal, the processor throttling function deactivates and the notification window pops up.
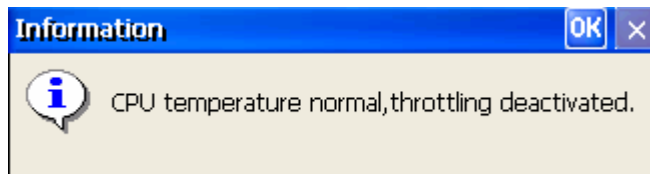

To disable a function, you can set the registry value "BIOSALARM" under HKLM\Software\MOXA\ to '0', then the service will stop until the next bootup.

In addition, you can get the status change by programming. For example, you can get "BIOS Status" from **\examples\C++\BIOSAlarm** in the Software DVD.

The code snippet is as follows:

```
#define BIOS_CHECKSUM_ERROR 0x0

#define BIOS_KEYBOARD_ERROR 0x1

Temperature_Status=Get_Temperature_Status();

ErrorCode=Get_Boot_ErrorCode();

Checksum_Error=(ErrorCode & (1<<BIOS_CHECKSUM_ERROR) ? 1:0);

Keyboard_Error=(ErrorCode & (1<<BIOS_KEYBOARD_ERROR) ? 1:0);
```

This function can be disabled or enabled by system manager; you can remove the auto launch item from system manager and enable it by adding the auto launch item under windows directory. The program name is "**BIOSAlarm.exe**".
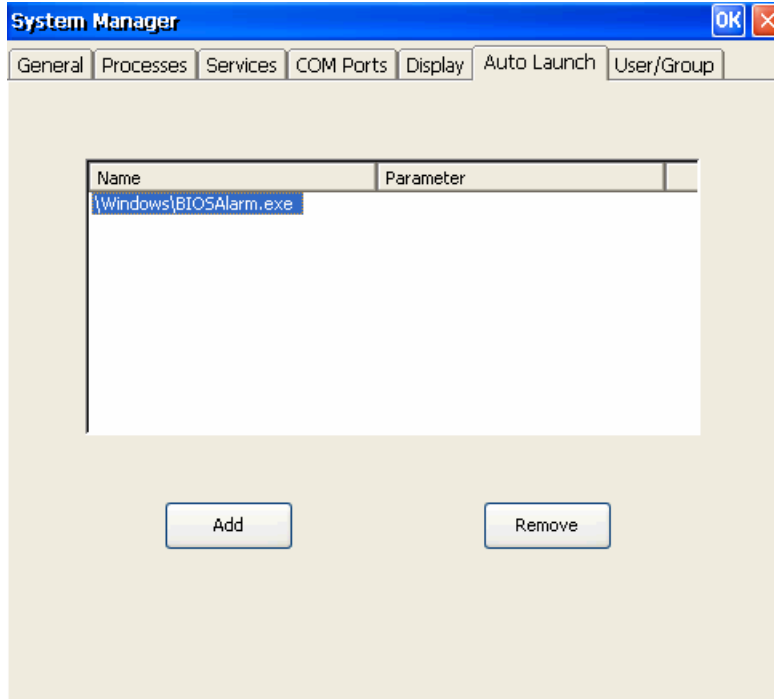
How to Determine the Firmware Build Version

Use the mxver command to obtain the firmware version. This information is particularly important for identifying which features your embedded computer supports.

Issue the **sysinfo.exe** command from the command line utility.

C:\> sysinfo

Model Name: DA-681-CE
Version: 1.0
Build Date: 08040711

3

Management Tools

The DA-681-CE ready-to-run embedded computer is shipped with Window CE operating system pre-installed. This operating system was designed to serve as a front-end for data acquisition and industrial control applications. A user-friendly management utility is also installed on each DA-681-CE computer to handle management issues. Before using this utility, make sure you have a display monitor connected to your DA-681-CE embedded computer, and then double-click the **System Manager** desktop icon.

This chapter covers the following topics:

❑ **System Information**
❑ **Serial Port Configuration**
❑ **Non-standard baudrates**
❑ **Process (Thread) Monitoring/Control**
❑ **Services Monitoring/Control**
❑ **DisplayUser/Group Management**
❑ **Auto Launch Configuration**
❑ **Web Server Configuration Page**

System Information

The first page displays the DA-681-CE's system information, including the firmware version of the computer, .the Net CF version, the system time, and system resources, including the main memory and file system usage.

Serial Port Configuration

The DA-681-CE has 12 serial ports. Ports 1 to 4 support the RS-232 interface, whereas ports 5 to 12 support the RS-485 2-wire interface. See the following figure for detailed information.
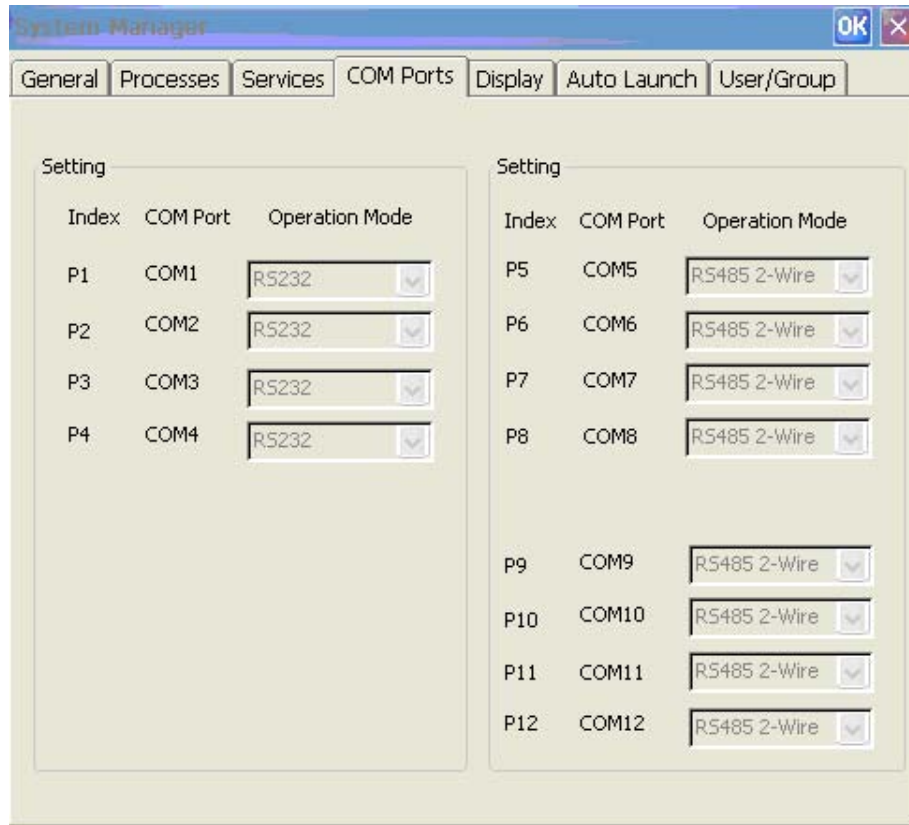
Non-standard baudrates

Moxa's UART ASIC supports most non-standard baudrates in the range 50 bps to 921.6 Kbps. In fact, supported baudrates are much denser towards the lower values. For example, no baudrates are supported between the integers 5320 and 5323, but 49 baudrates are supported between the integers 387 and 388. Of course this is the way it should be, since serial devices that require using non-standard baudrates generally use slower baudrates.

Before using a serial device that requires using a non-standard baudrate, you must first check that the DA-681 supports a baudrate within the tolerance specified by the serial device manufacturer.

Use the following formula to calculate which baudrates are supported by the DA-681:

(A) Baudrate = $921600/(N+M/8)$ bps, for $N = 1, 2, \ldots, 18431$, $M = 0, 1, 2, \ldots, 7$

      or

(B) Baudrate = $8 \times 921600/K$ bps, for $K = 8, 9, \ldots, 147456$

If you are a programmer and you need to write a driver for your serial device, then you may need to use formula A. If you have a serial device that requires using a non-standard baudrate, then you can use formula B to determine if the DA-681 supports a baudrate within the tolerance specified by the serial device manufacturer.

Example: Your serial device requires using a baudrate of 5340 bps and has a tolerance of 2 bps. Can the DA-681 be used with this device?

Solution: Set formula B to the desired baudrate and then solve for K.

8 x 912600/K = 5338   ==>   K = 1367.703259…

This shows that the supported baudrate closest to 5340 comes from setting K=1367 or K=1368.

K=1368   ==> Baudrate1 = 5336.842105...

K=1367   ==> Baudrate2 = 5340.746159…

Since 5338 – Baudrate1 < 2, we can see that the DA-681 supports the serial device.

Note that we can use formula A to generate the so-called "standard" baudrates, which come from setting M=0, and setting N equal to certain integers.

| **Standard Baudrates**						
Baudrate	**N**	**M**		**Baudrate**	**N**	**M**
921600	1	0		4800	192	0
460800	2	0		2400	384	0
230400	4	0		1800	512	0
115200	8	0		1200	768	0
57600	16	0		600	1536	0
38400	24	0		300	3072	0
19200	48	0		150	6144	0
9600	96	0		75	12288	0
7200	128	0		50	18432	0

WARNING

Communication between a serial device and a Moxa UART port may not work correctly if the serial device uses a baudrate that it not within the correct tolerance of a baudrate calculated from either formula A or formula B.

Process (Thread) Monitoring/Control

You can use the management system to monitor and control processes or threads. The DA-681-CE computer can manage up to 32 processes. To view current processes, click the **Processes** item on the tab bar. Processes that are currently running will be displayed. You can kill a process by clicking the **kill** button.
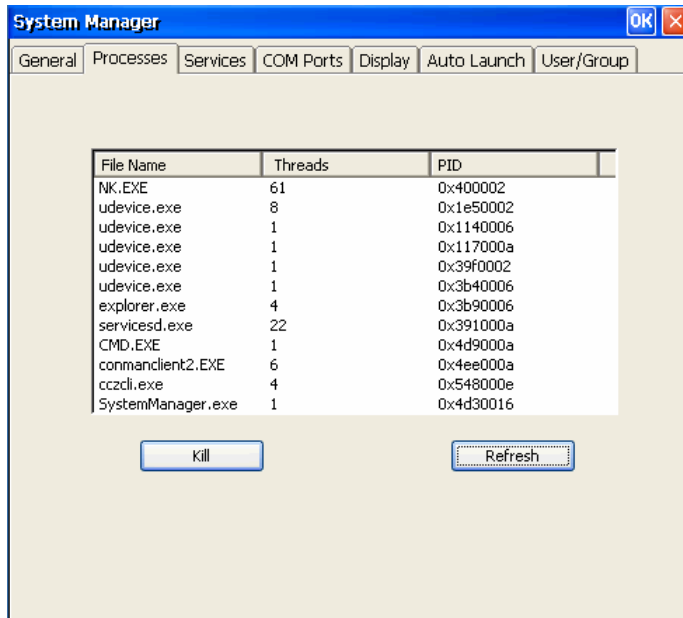
Services Monitoring/Control

Some services—such as FTP, Telnet and HTTP—run in the background. Click on a check box to toggle a start/stop operation for a particular service.
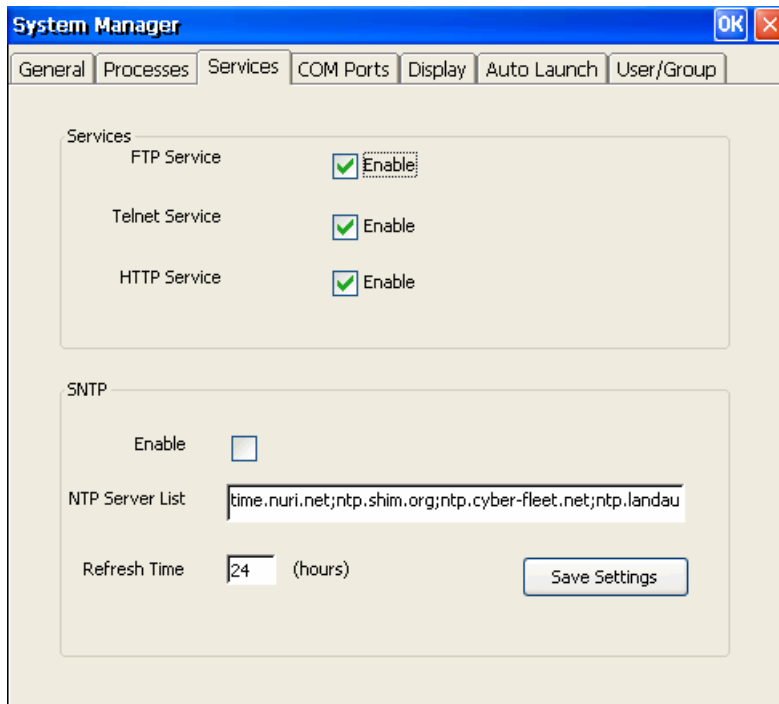
You can also adjust the time automatically by using SNTP. Click on the check box to enable the service and then click the button next to the box to activate it.

In order to keep the computer running normally, some listed services cannot be stopped. This type of service does not have a check box next to it.

Display

The DA-681-CE VGA output uses a DB15 female connector to display the Windows CE desktop on an LCD monitor or a CRT monitor. The default settings are **800x600**, **16 bit**, **60 Hz**. You should tune the setting to match your monitor's specifications. After setting these parameters on the **System Manager → Display** window, click **Apply** to save the settings to the computer, and then click **Yes** to restart the computer.
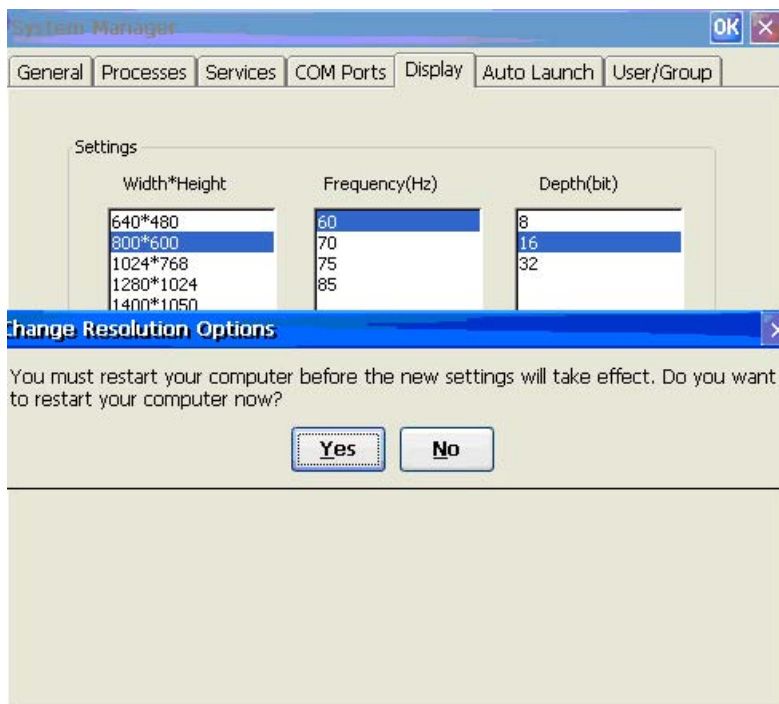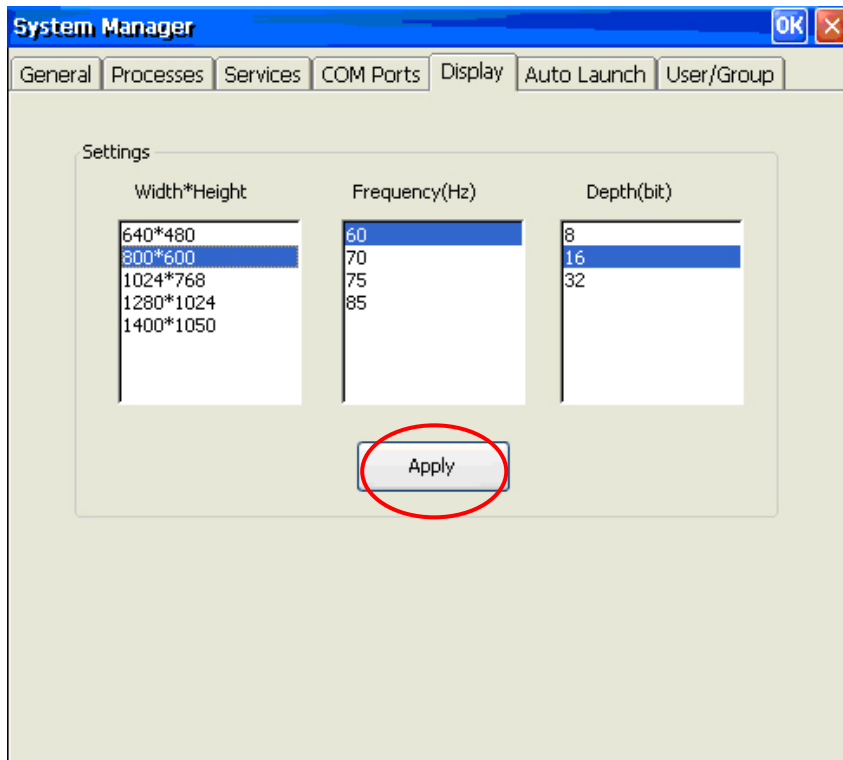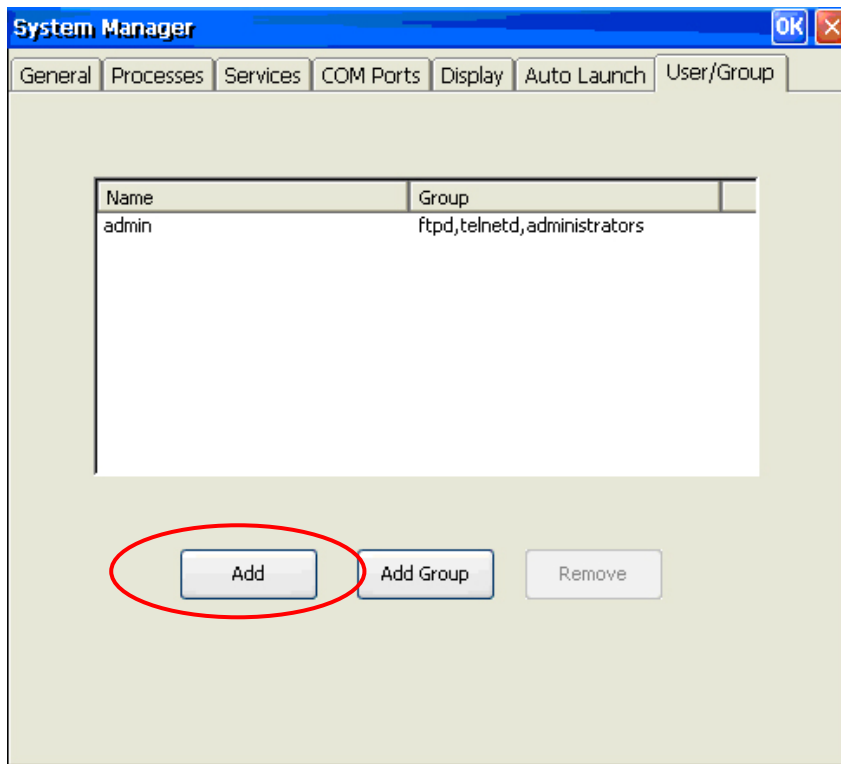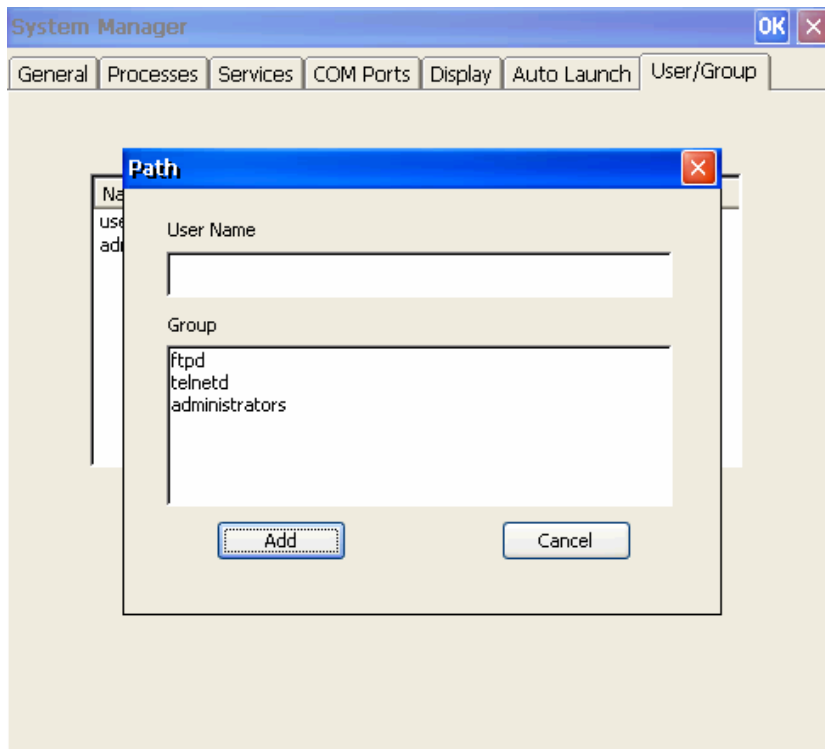

⚠️ **ATTENTION**

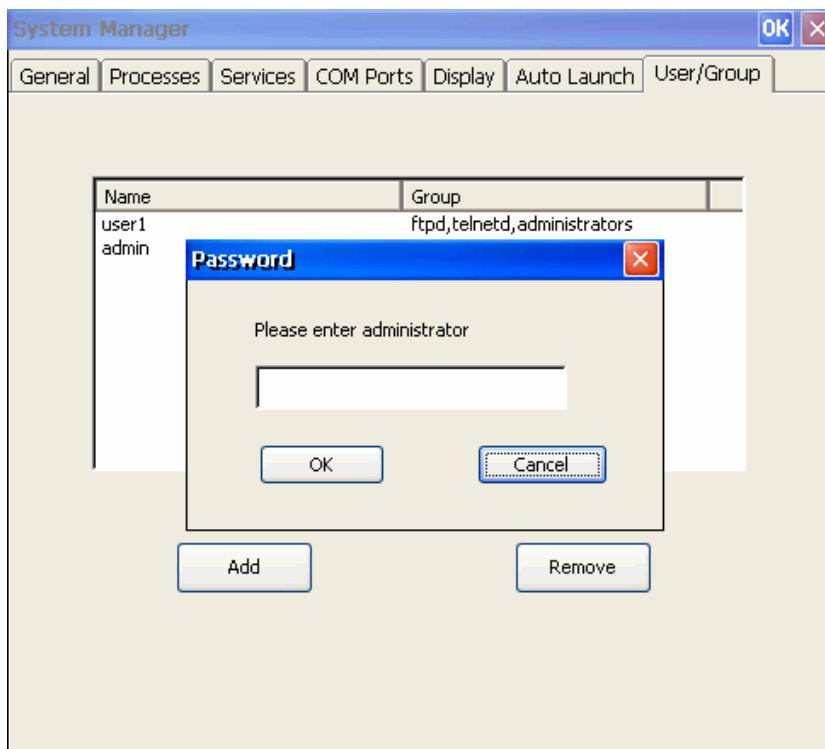You must restart (reboot) the system for the settings to take effect.

User/Group Management

You can add users by clicking the "**Add**" button to assign user name and group. And you can remove users by click the "**Remove**" button.
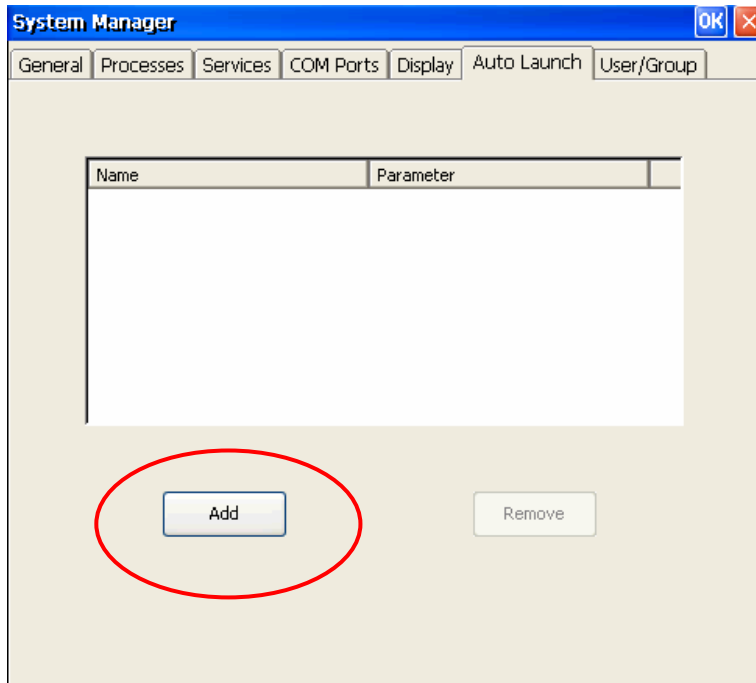
Enter the **administrator password** when you want to remove a user.

Auto Launch Configuration

You can specify programs to execute automatically after booting up. Click the **Add** button to add the program and restart the DA-681-CE to execute these programs.

Web Server Configuration Page

You can configure the DA-681-CE with an Internet browser. Your host must be running Windows 2000 or Windows XP to handle web administration. To do this, start Internet Explorer and then link to the url http://192.168.3.127/WebAdmin (if the DA-681's IP address is 192.168.3.127).
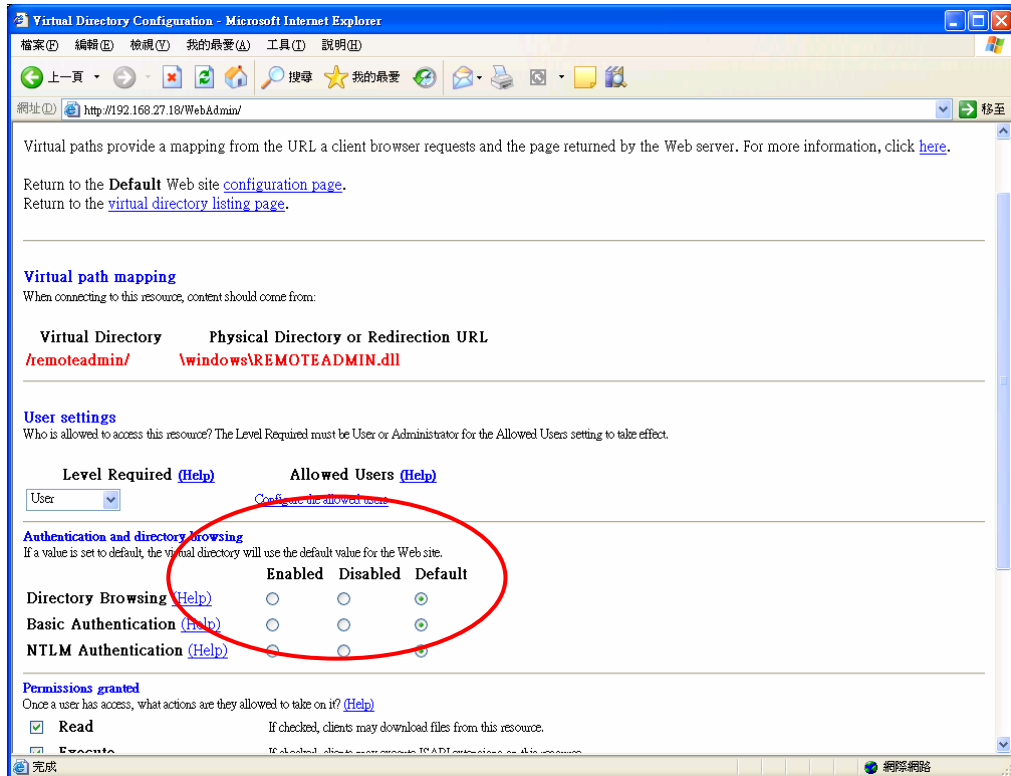
After the logging in, you should see the standard Web Server Configuration page.
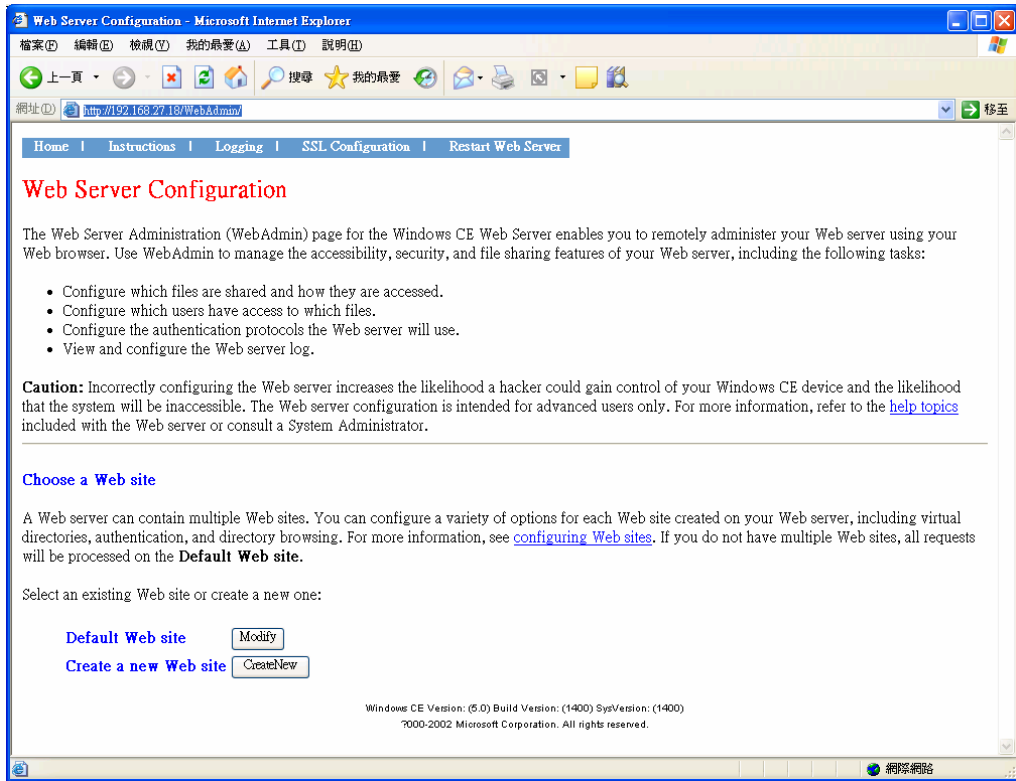
From this page you can create a new web site or create a virtual web path for your web application.

You can also change the authentication type for each web virtual directory.

4

System Recovery

The DA-681-CE ready-to-run embedded computers use a Windows CE platform. The Windows CE operating system firmware is located on the DOM CompactFlash card that is shipped with the DA-681-CE computer. You will need the firmware if the operating system files or disk file system is damaged.

To upgrade the Windows CE Operating System without clearing and formatting the disk file system, see the **Firmware Upgrade Procedure** section.

To recover the Windows CE operating system and clear and format the entire CompactFlash card, see the **Recovery Procedures** section.
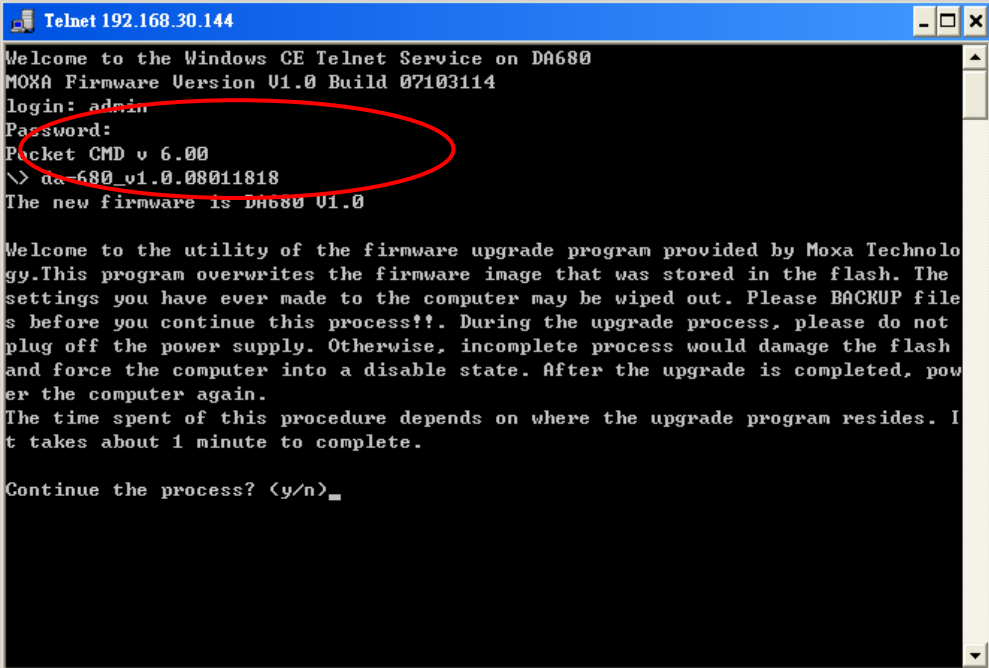
This chapter covers the following topics:

❑ **Firmware Upgrade Procedure**
❑ **Recovery Procedure**
  ➢ Recovery Environment

Firmware Upgrade Procedure

You must use the firmware upgrade installation file to upgrade the operating system firmware. The file can be downloaded from the Moxa Download Center:

http://web4.moxa.com/support/download_center.asp

1. Download the firmware upgrade installation file. The file name should have following format: **DA-681-CE_V1.008040912**.

2. Upload this file to the target machine under the root directory.

3. Log in to the target computer through **Telnet**.

4. Execute the file. Press **Y** to continue the process.

> ⚠️ **ATTENTION**
>
> **DO NOT** turn off power at this time, or the system may crash.

---

5. The upgrade procedure will take about 1 minute. After the upgrade is complete, select if you would like to keep the current network settings or restore the factory default values. Press **Y** to keep the current network settings.

6.   Reboot the system, the new firmware will be ready to run.

Recovery Procedure

This section describes the recovery procedure. Please follow the steps below.

Recovery Environment

The recovery environment includes the DA-681-CE embedded computer and a bootable USB disk with the recovery programs and system image file.
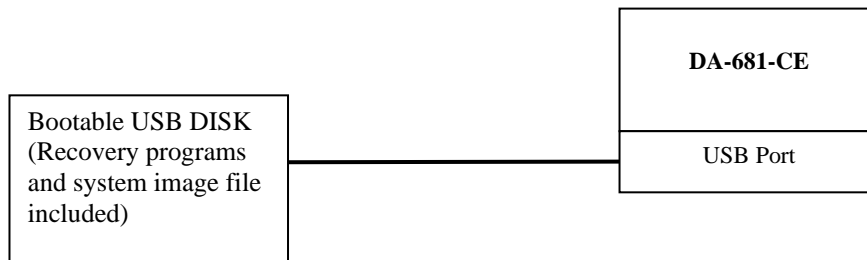
Step 1:   Format an Empty USB Disk.

One of two methods can be used to create a bootable USB disk:

Method 1: Use the HP USB Disk Format Tool.
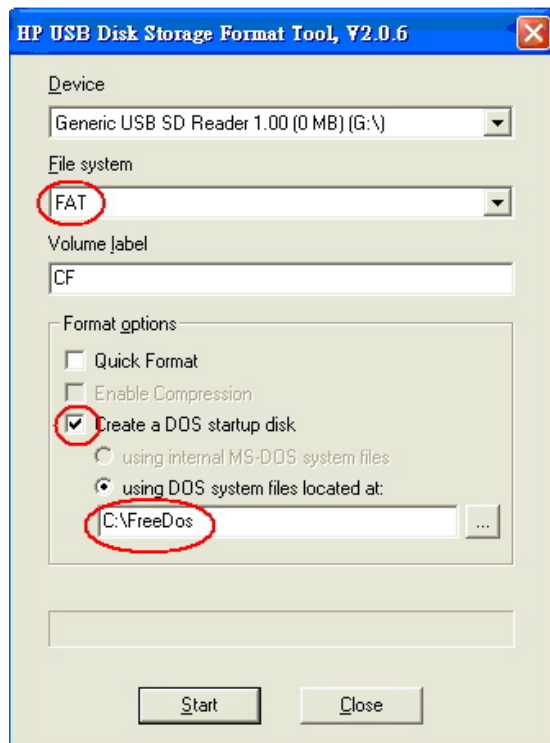
1. Download the FreeDOS system files **kernel.sys** and **command.com** from http://www.freedos.org/kernel/

2. Copy the DOS system files **kernel.sys** and **command.com** to a specified directory (in this example, **C:\FreeDOS**).

3. Start the HP USB Disk Storage Format Tool and select the USB device that you want to use as a bootable disk from the **Device** drop down box.

4. Select FAT from the **File system** drop down box.

5. Type the disk name in the **Volume label** field.

6. Check the option **Create a DOS startup disk** under format options.

7. Specify the directory of the system files (e.g., **C:\FreeDOS**).

8. Click **Start** to format and create the USB disk.

> ⚠️ **ATTENTION**
>
> The HP USB Disk Storage Format Tool can be downloaded from many different web sites. Type **HP USB Disk Storage Format Tool** to search the Internet, and then download it.

Method 2: Use BootFlashDOS utility.

Run the BootFlashDOS utility and then click **Start**.

> ⚠️ **ATTENTION**
>
> The BootFlashDOS utility can be downloaded from http://gocoding.com/page.php?al=bootflashdos.

Step 2:   Create a Windows CE Bootable USB Disk.

a.   The **ceboot** directory is located under **\utility_tools\Recovery\DA-681** on the CD shipped with DA-681-CE computer.

b.   Configure Windows Explorer to show hidden files (including protected operating system files).

c.   Copy all of the files in the **ceboot** directory to the root directory of your USB disk.
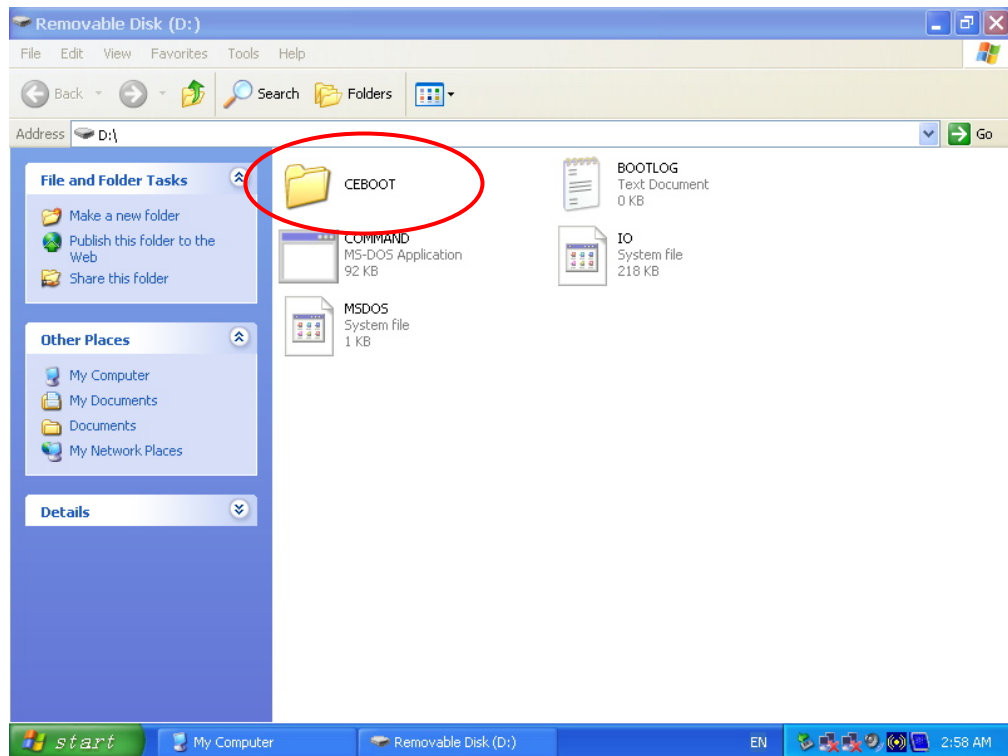
Step 3:   Setup the BIOS to Boot from the USB Disk.

a.   Insert the USB disk.

b.   Power on and press **DEL** to enter the bios setup menu.

c.   Select **Advanced → Hard Disk Boot Priority** and then press **Enter**.

d.   From the setup menu, use "↑" or "↓" to select the USB device

e.   Press "+" to move it up to the first priority, and press **Esc** to exit the setup menu.

```
            Phoenix - AwardBIOS CMOS Setup Utility
      Advanced

         Hard Disk Boot Priority                    Item Help

      1. USB-HDD0  :  USB FLASH DRIVE        Menu Level    ▶
      2. Pri.Slave :  AFAYA CF 256M
      3. Bootable Add-in Cards               Use <↑> or <↓> to
                                             select a device , then
                                             press <+> to move it
                                             up , or <-> to move it
                                             down the list. Press
                                             <ESC> to exit this
                                             menu.




      ↑↓:Move      PU/PD/+/-:Change Priority       F10:Save       ESC:Exit
        F5:Previous Values      F6:System  Defaults     F7:Turbo  Defaults
```

f.   Make sure the first boot device is **Hard Disk**. If not, press **Enter** to change it.

```
            Phoenix - AwardBIOS CMOS Setup Utility
     Main  Advanced  Peripherals  Power  HW Monitor  Defaults  Exit

    ▶ Hard Disk Boot Priority                        Item Help
      First Boot Device        [Hard Disk]
      Second Boot Device       [Hard Disk]    Menu Level    ▶
      Third Boot Device        [Removable]
      Boot Other Device        [Enabled]      Select Your Boot
                                              Device Priority.
    ▶ Advanced BIOS Features                   Please set
    ▶ Advanced Chipset Features                'Peripherals →
    ▶ PnP/PCI Configurations                    Onboard Device →
                                                Onboard LAN Boot ROM'
                                              to enable when you
                                              would like to boot
                                              from onboard Lan.




     ↑↓→←:Move  Enter:Select  +/-/PU/PD:Value  F10:Save  ESC:Exit  F1:General Help
       F5:Previous Values      F6:Default Settings      F7:Turbo Settings
```
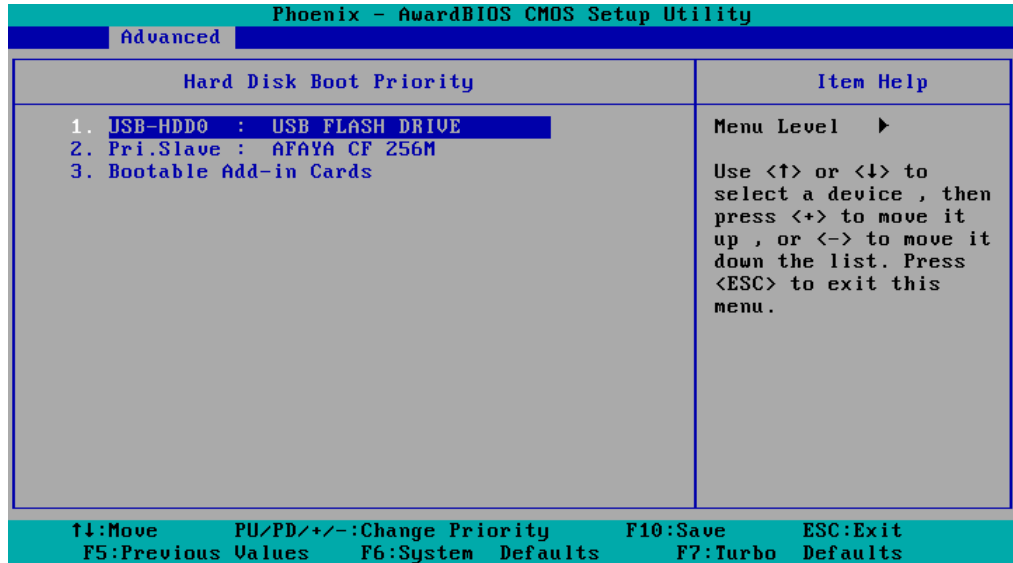
g.   Select **Exit → Save & Exit Setup** and then press **Enter**.

h.   Choose **Y** to save to the CMOS and then exit.

Step 4:   Recover Windows CE system from the USB Disk.

a.   If the BIOS setup is correct, it will restart and boot from the USB disk.

b.   Under command prompt, type **cd ceboot**.

c.   In the ceboot directory type **mkdisk** to execute the recovery procedure.

d.   When operation is complete, turn off the computer and remove the USB disk.

⚠️ **ATTENTION**

DO NOT turn off power at this time, or the system may crash.

Step 5:   Reset the BIOS to boot from the DOM or CompactFlash Disk.

a.   Power on and press **DEL** to enter the bios setup menu.

b.   Select **Advanced → Hard Disk Boot Priority** and then press **Enter**.

c.   From the setup menu, use "↑" or "↓" to select the DOM or CompactFlash device.

d.   Press "+" to move it up to the first priority, and press "Esc" to exit the setup menu.

e.   Select **Exit → Save & Exit Setup** and then press **Enter**.

f.   Choose **Y** to save to the CMOS and then exit.

g.   Wait a few minutes for the system to boot up. When the recovery process is finished, you will again see the Windows CE desktop.

```
             Phoenix - AwardBIOS CMOS Setup Utility
    Advanced

         Hard Disk Boot Priority                    Item Help

     1. Ch0 M.     :  AFAYA MDM 1G            Menu Level    ▶
     2. USB-HDD0   :  SD/MMC Card Reader
     3. Ch0 S.     :  AFAYA CF 256M           Use <↑> or <↓> to
     4. Bootable Add-in Cards                 select a device , then
                                              press <+> to move it
                                              up , or <-> to move it
                                              down the list. Press
                                              <ESC> to exit this
                                              menu.




    ↑↓:Move     PU/PD/+/-:Change Priority     F10:Save      ESC:Exit
      F5:Previous Values     F6:System  Defaults      F7:Turbo  Defaults
```