

DA-685 Series WinXP Embedded User's Manual

First Edition, July 2012

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DA-685 Series WinXP Embedded User's Manual

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Introduction

Thank you for purchasing Moxa's DA-685 series of x86 ready-to-run embedded computers. This manual introduces the software configuration and management of DA-685 computers running the Windows Embedded Standard 2009 operating system. For hardware installation, connector interfaces, setup procedures, and upgrading the BIOS, please refer to the DA-685 Series Hardware User's Manual.

Microsoft Windows Embedded Standard 2009 is a specialized operating system consisting of componentized Windows XP Professional features that allows you to build a wide range of innovative, small footprint devices. Windows developers will find Moxa's DA-685 computer plus Windows Embedded Standard 2009 operating system to be the right solution for a wide range of applications.

The following topics are covered in this chapter:

- ❑ **Overview**
- ❑ **Software Specifications**
 - Application Development Environment
 - Networking and Communication Capabilities
 - Supporting Services and Daemons
- ❑ **How to Determine Firmware Build Versions**
- ❑ **Inserting a USB Mass Storage Device into the Computer**
- ❑ **Insert a Compact Flash Card Storage into a DA-685-XPE Computer**
- ❑ **Inserting a SATA Hard Disk into a DA-685-XPE Computer**

Overview

DA-685 industrial computers excel in a wide array of power automation applications. The DA-685 series is based on the Intel x86 processor and supports VGA, 6 Gigabit Ethernet ports, 2 RS-232 serial ports, 6 2 wire RS-485 serial ports, CompactFlash, and USB. They come in a standard 2U/19" rackmount chassis. The Intel Atom processor gives the DA-685 enough punch to perform demanding industrial tasks without consuming a lot of power or heat, providing users with a highly cost-effective, durable system.

DA-685 computers run Windows Embedded Standard 2009 (pre-installed), providing a familiar environment for developing sophisticated application software. Moxa provides comprehensive software support to help programmers develop bug-free code quickly and at a lower cost.

Software Specifications

The software features of the DA-685-XPE embedded computers are listed below:

Application Development Environment

The DA-685-XPE is fully compatible with the XP Professional Development Environment.

The DA-685-XPE's use of Windows Embedded Standard 2009 with SP3 provides the following common, popular application development features that make programming convenient and easy.

Every application that runs in Windows XP can be executed in the DA-685-XPE, so there is no migration cost.

Windows Embedded Standard 2009 is based on the same binary files as Windows XP Professional; Windows Embedded Standard 2009 enables you to rapidly develop reliable and full-featured connected devices.

- **Microsoft .Net Framework 3.5**—This component includes the common language runtime (CLR) and the .NET Framework class library.
- **Active Directory Service Interface (ADSI) Core**—Provides the basic functionality for ADSI. This component routes any requests to the corresponding provider according to the path it is provided.
- **Active Template Library (ATL)**—Supports ATL applications.
- **Certificate Request Client & Certificate Auto enrollment**—This component includes the common language runtime (CLR) and the .NET Framework class library.
- **COM Base**—Component Object Model (COM) includes a programming model and a set of application programming interfaces (APIs), and does not include a dedicated user interface.
- **Common Control Libraries**—(Side by Side) the component provides common user interface (UI) controls.
- **Common File Dialogs**—Support for common dialog boxes.
- **Direct3D**—The infrastructure for two-dimensional and three-dimensional graphics.
- **DirectPlay**—Provides a networking API that can enable any application to operate over both a peer-to-peer and client/server topology.
- **DirectShow**—Base filter graph and device enumeration support for all DirectShow applications. This component also provides most DirectShow filters.
- **Distributed Transaction Coordinator (MSDTC)**—A distributed transaction facility for Microsoft Windows systems, which uses transaction-processing technology. MSDTC exploits loosely coupled systems to provide scalable performance.
- **Enhanced Write Filter**—An upper filter in the storage device driver stack that redirects disk write operations to volatile (RAM) or non-volatile (disk) storage.
- **Event Log**—A dynamic-link library (DLL) that runs as part of Services.exe. This component stores and retrieves events that can be viewed in the event viewer.
- **Internet Explorer 7**—The Internet Explorer Web browser that allows customers to connect to the Internet or to an intranet (see properties via inetctl.cpl).
- **Mapi32 Libraries**—The infrastructure for e-mail support.

- **Message Queuing (MSMQ) Core**—Message Queuing is a messaging infrastructure and a development tool for creating distributed messaging applications for Microsoft Windows operating systems; it provides guaranteed message delivery, efficient routing, increased security, support for sending messages within transactions, and priority-based messaging.
- **Microsoft Visual C++ Run Time Libraries**—The Microsoft C++ Runtime Library.
- **NTFS**—The NTFS File System driver (NT File System). Use NTFS instead of FAT for optimum file system security.
- **Power Management**—This component includes a dynamic-link library for power management features in the xpepm.dll file, and a command-line tool for using power management on a run-time image in the xpepm.exe file. **Note:** Instead of using this component, Shutdown.exe is the preferred method to shut down the system.
- **Registry Editor**—The Registry Editor (regedit.exe, regedt32.exe).
- **RPC**—Facilitates local remote procedure calls (RPCs) using the ncalrpc and ncacn_np protocol sequences, and provides support for dynamic endpoint resolution. The RPC name service provides remote procedure call (RPC) named services functionality, such as the RPC Locator. The RPC Named Service component exposes all RpcNs* RPC functions. The RPC server provides a variety of RPC and Component Object Model (COM) services, including RPC Endpoint Mapper, COM Service Control Manager (SCM) and COM Object Resolver.
- **Smart Card Cryptographic Service Providers**—Supports features such as smart card logon and improved e-mail security. Smart cards must be capable of certain RSA public key cryptographic operations. These functions are exposed by using CryptoAPI and, specifically, through a CSP. Typically, each type of smart card requires a CSP, which is provided by the card vendor.
- **USB 2.0**—The core drivers needed to communicate with an Enhanced Host Controller Interface (EHCI) that is compliant with USB .95 or 1.0.
- **Windows API—User**—Provides the user-mode component of the Windows operating system API.
- **Windows Media Player 11**—Playback functionality for digital media that includes videos, CDs, and DVDs for end users and developers.
- **Windows Script Engines**—A complete scripting environment for Windows, including command-line scripting, script languages, and the ability to host script engines within your applications.
- **WMI**—Bundles the features that combine to create the Windows Management Instrumentation (WMI) technologies.

Networking and Communication Capabilities

The DA-685-XPE embedded computers provide powerful hardware communication interfaces for network-centric embedded applications, including Ethernet and serial ports, and also support the networking and communications capabilities that are built into Windows Embedded Standard 2009 with SP3 OS. The following features are supported:

- **DHCP Client Service**—Registers and updates Internet Protocol (IP) addresses and Domain Name System (DNS) records for your target system.
- **IP Security Services**—This component provides IP Security (IPsec) services for all IP traffic.
- **Dial-Up Networking**—Provides the infrastructure necessary to implement a Remote Access Service (RAS) client.
- **Microsoft-Windows-HTTP**—Services that implement the functionality of the HTTP protocol on a server.
- **TCP/IP Networking**—Implements the core TCP/IP protocol stack, which includes the IPv4 version for the following protocols: Transmission Control Protocol (TCP), User Datagram Protocol (UDP), raw, Internet Control Message Protocol (ICMP), Internet Group Membership Protocol (IGMP), and Address Resolution Protocol (ARP). The component also includes Wshtcpip.dll, which is the Winsock provider for TCP/IP to enable socket-level communication over TCP/IP.
- **TAPI**—A Telephony API (TAPI) Telephony Service Provider (TSP).
- **Simple Network Management Protocol (SNMP)**—SNMP is an agent service that provides management systems with information about activities that occur at the Internet Protocol (IP) network layer. The SNMP agent monitors network traffic, and retrieves and updates local management information based on the

requests from the SNMP manager. The agent also notifies registered managers with traps when significant events occur.

- **Time Service Core**—Synchronizes a workstation's clock with other computers using the Network Time Protocol (NTP) version 3. For increased accuracy, this component also incorporates algorithmic enhancements from NTP 4.
- **Windows Firewall/Internet Connection Sharing (ICS)**—Windows Firewall provides a barrier between your device and network connections to help reduce attacks by hackers, viruses, and worms across networks. Strongly recommended.
- **Wireless Zero Configuration**—Support for the Windows implementation of the IEEE 802.11 standard. This component performs automatic configuration and authentication for IEEE 802.11 wireless network adaptors.
- **Unimodem**—Provides the infrastructure necessary for applications to communicate with a modem.

Supporting Services and Daemons

In addition to development and communication capability, the DA-685-XPE embeds the services and daemons shown below. These common and easy-to-use application servers help users migrate industrial communication applications to the DA-685-XPE embedded computer very easily and conveniently.

- **COM+ Services**—The next evolution of Microsoft Component Object Model (COM) and Microsoft Transaction Server (MTS).
- **Computer Browser Service**—Computer browsing functionality exposed by Windows through Microsoft Networking. It allows a client machine to browse its network neighborhood for available computers, exposing file and print sharing services.
- **Disk Management Services**—Support for disk and volume management operations. The component implements a Component Object Model (COM) interface that can be used to query and configure disks and volumes (both basic and dynamic). The component also monitors disk arrivals and removals and other changes in the storage subsystem.
- **IIS Web Server**—Allows you to create and manage Web sites.
- **Terminal Server**—Microsoft Terminal Server client application (mstsc.exe).
- **Remote Registry Service**—Enables remote users to modify registry settings on this computer.
- **Telnet Server**—Allows users to connect to Telnet servers from remote computers.

How to Determine Firmware Build Versions

Use the **mxver** command to obtain the firmware version of the DA-685-XPE embedded computer. This information is particularly important for identifying which features your embedded computer supports.

- Run the **mxver.exe** utility from the command line:

```
C:\> mxver
```

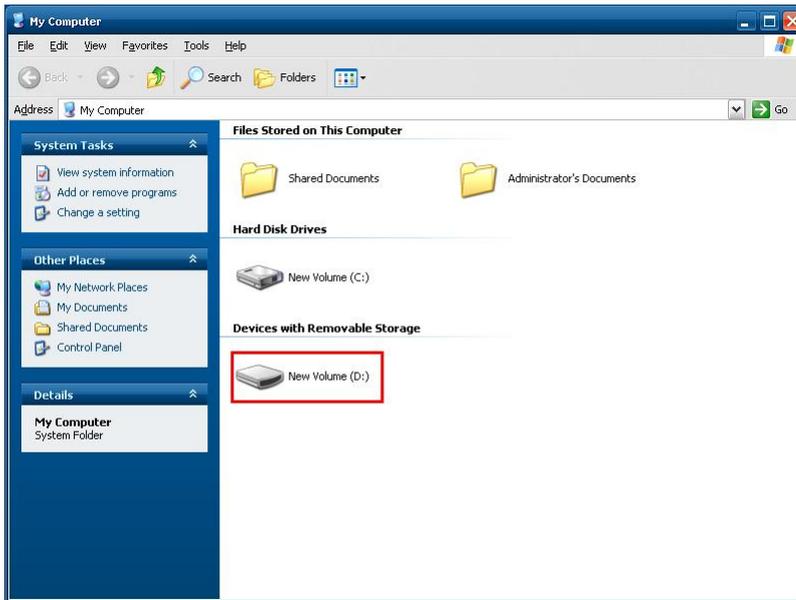
```
Model Name: DA-685-XPE
```

```
Build Date: 12060118
```

```
Version: V1.0
```

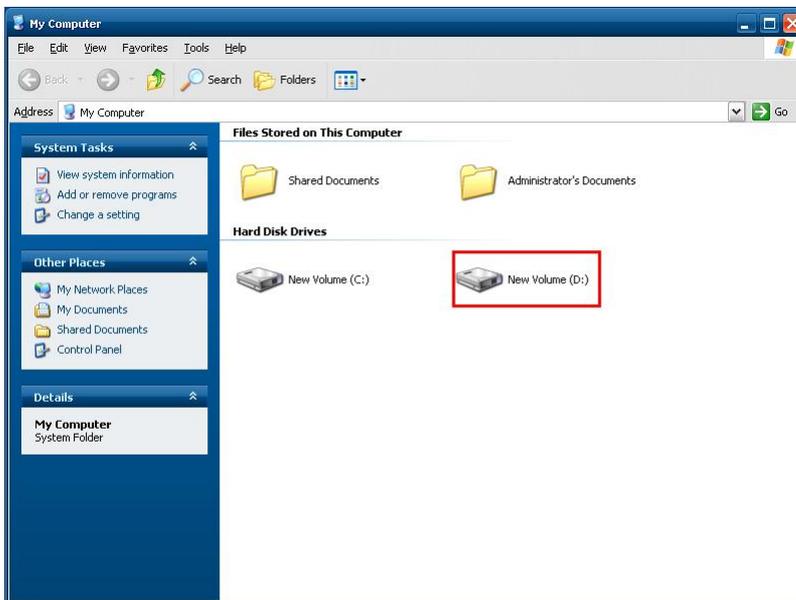
Inserting a USB Mass Storage Device into the Computer

Inserting a USB mass storage device will generate a new drive on the DA-685-XPE. The new drive should be visible in the File Explorer.



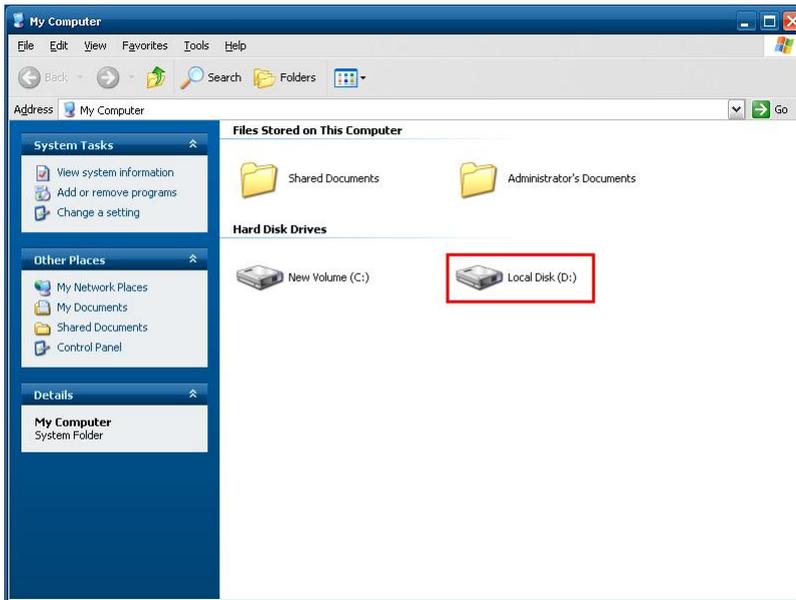
Insert a Compact Flash Card Storage into a DA-685-XPE Computer

There is a Compact Flash slot in the side of DA-685-XPE computer. The Compact Flash slot is designed for storage expansion. Please note that it does not support “Plug and Play” and “Hot swap”. If you plug a CF card into the slot when entering the operating system, it may cause system damage. Make sure to turn off power before inserting the CompactFlash card. After CF card is inserted, you can power on the DA-685-XPE. A new drive icon will can be found in the **My Computer** screen.



Inserting a SATA Hard Disk into a DA-685-XPE Computer

Inserting a SATA hard disk device will generate a new disk that should appear in the File Explorer.



Software Configuration

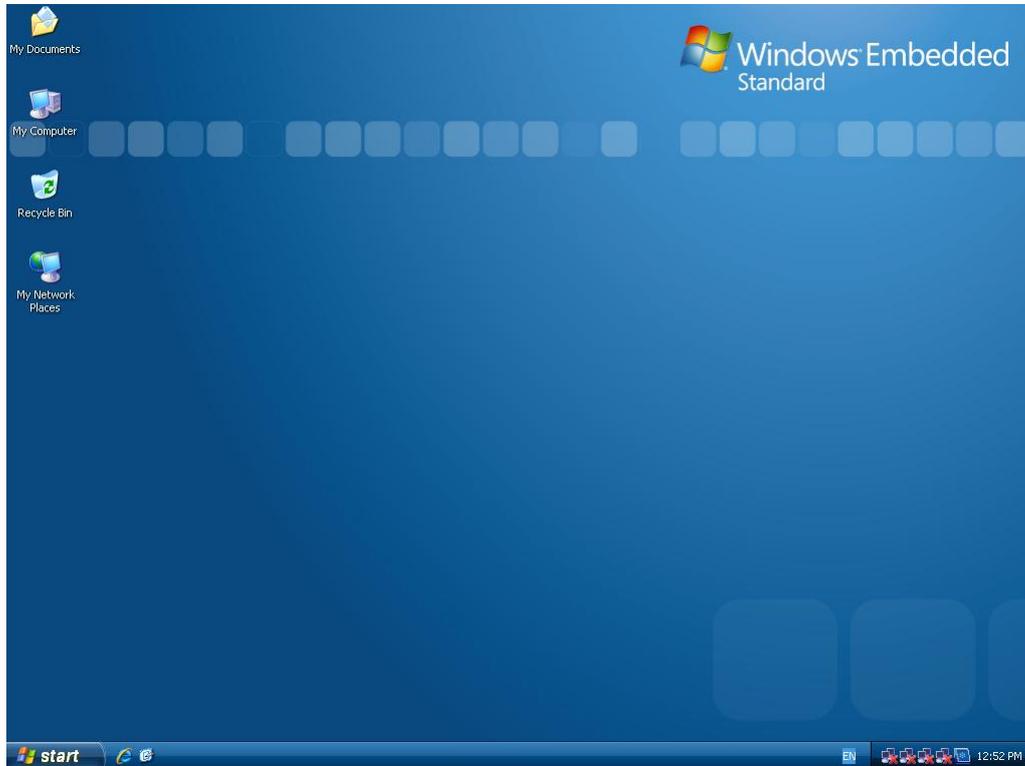
In this chapter, we explain how to operate a DA-685-XPE computer directly or from a PC. Instructions are given on how to adjust the system time, troubleshoot network connectivity, and manage other functions. Some of these operations can be done with system commands after gaining access to the computer, and others can be done from the “Control Panel,” which is described in a later chapter.

The following topics are covered in this chapter:

- ❑ **Starting Your DA-685-XPE Computer**
- ❑ **Resetting Your DA-685-XPE Computer**
- ❑ **Changing the Network Settings**
- ❑ **Operating Your DA-685-XPE Computer with a Telnet Client**
- ❑ **Adjusting the System Time**
- ❑ **Starting and Stopping Services**
- ❑ **Simple Network Management Protocol (SNMP)**
- ❑ **Remote Desktop (RDP)**
- ❑ **Configuring Serial Ports**
- ❑ **Enhanced Write Filter**
- ❑ **File Based Write Filter**

Starting Your DA-685-XPE Computer

Connect the CRT or LCD monitor to the DA-685-XPE 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. Once the system is ready, the desktop will appear on your monitor.



Resetting Your DA-685-XPE Computer

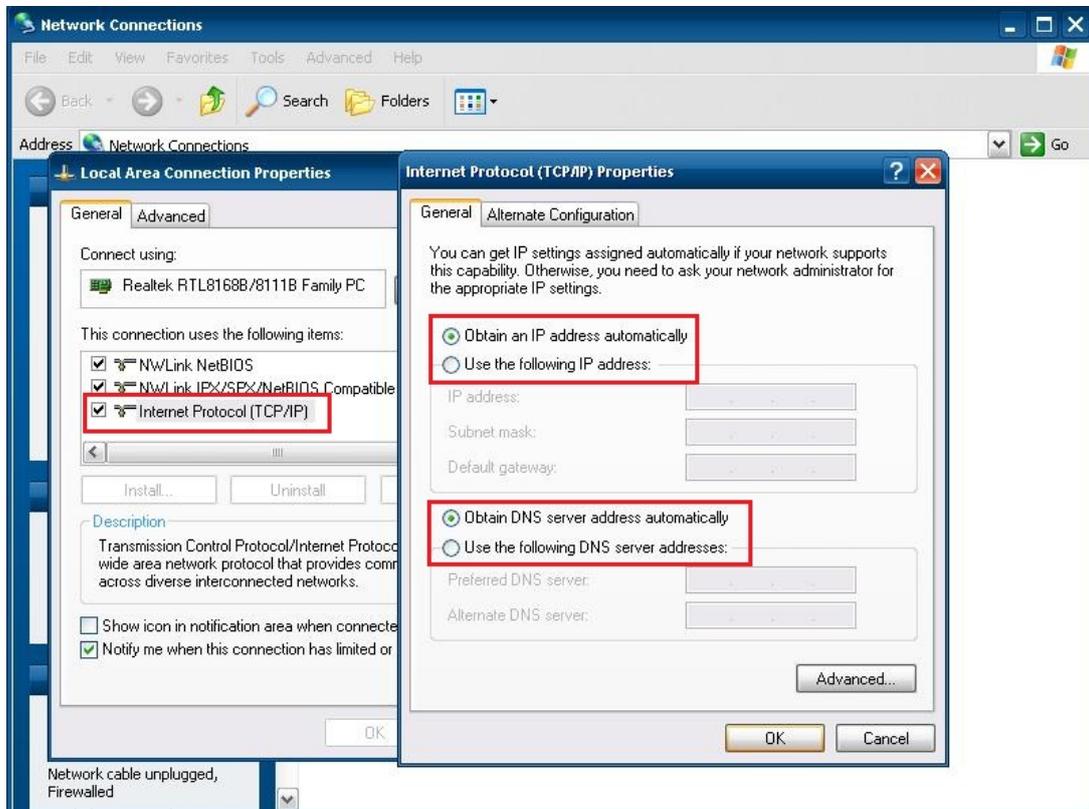
- **To reset the DA-685 computer:**
Press the power switch button on the rear panel for more than 1 second to shut down your computer. Press the power switch again to restart your computer.
- **Software Shutdown / Reboot:**
Click **Start** → **Turn Off Computer** to turn off or restart the DA-685-XPE computer.

Changing the Network Settings

The DA-685-XPE computer comes with six network interfaces. All of the default IP addresses are DHCP. Choose **Start** → **Network Connections**, and then right-click the network interface icon, select **Properties**.



Next, click **Internet Protocol (TCP/IP)** and select **Properties** to enter the network settings page. The default values are **Obtain an IP address automatically**, and **Obtain DNS server address automatically**. If you must configure the computer to use a fixed IP address, check **Use the following IP address** and be prepared to provide the IP address, subnet mask, and default gateway. You also need to check **Use the following DNS server address**, and provide a preferred and/or alternate DNS server. Click **Advanced** for more detailed settings. When finished, click **OK** to complete the network settings.



Operating Your DA-685-XPE Computer with a Telnet Client

Use a crossover Ethernet cable to connect your development workstation directly to the target computer, the DA-685-XPE, or use a straight-through Ethernet cable to connect the DA-685-XPE to a LAN hub or switch. Next, use a telnet client on your development workstation to connect to the Telnet console utility of the DA-685-XPE. After a connection has been established, type the login name and password as requested to log on to the computer.

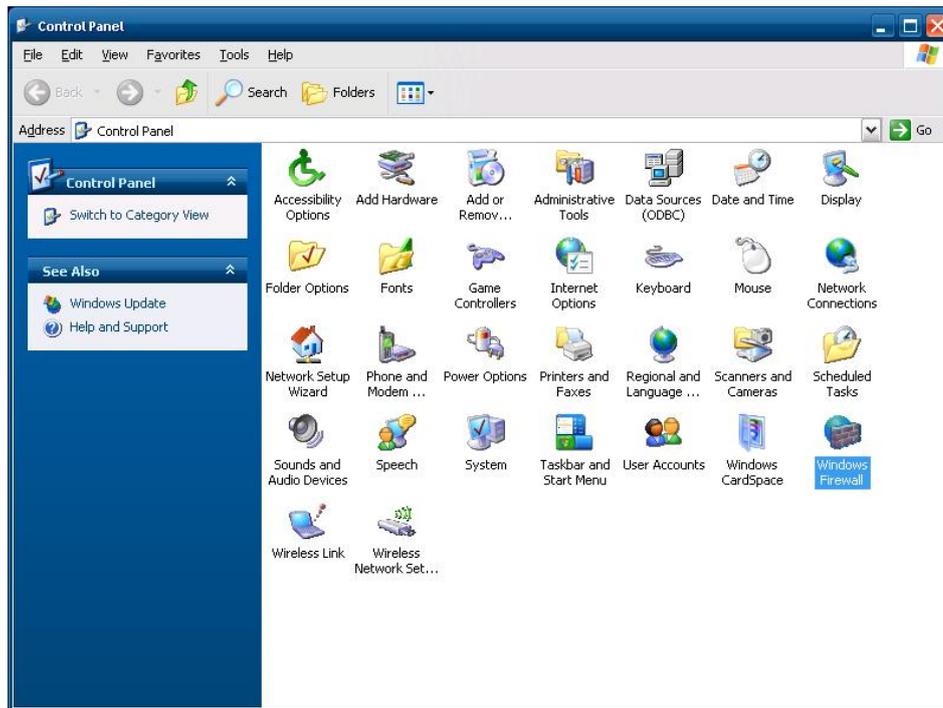
After logging in through the Telnet client, a list of commands will be available for operating the computer. Use **HELP** to display all of the commands, or type **HELP [command name]** to display extended help for the selected command. Some of these commands, such as **DATE** and **TIME**, are very 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**.

NOTE The default user id is "administrator" and the default password is not set; you need to create a new password for this account to use this telnet client.

NOTE There is a connection limitation on using Telnet clients. You are only allowed to create connections with two Telnet clients at the same time.

Before using Telnet, do the following steps to verify that TCP Port 23 on your computer and the DA-685-XPE are open.

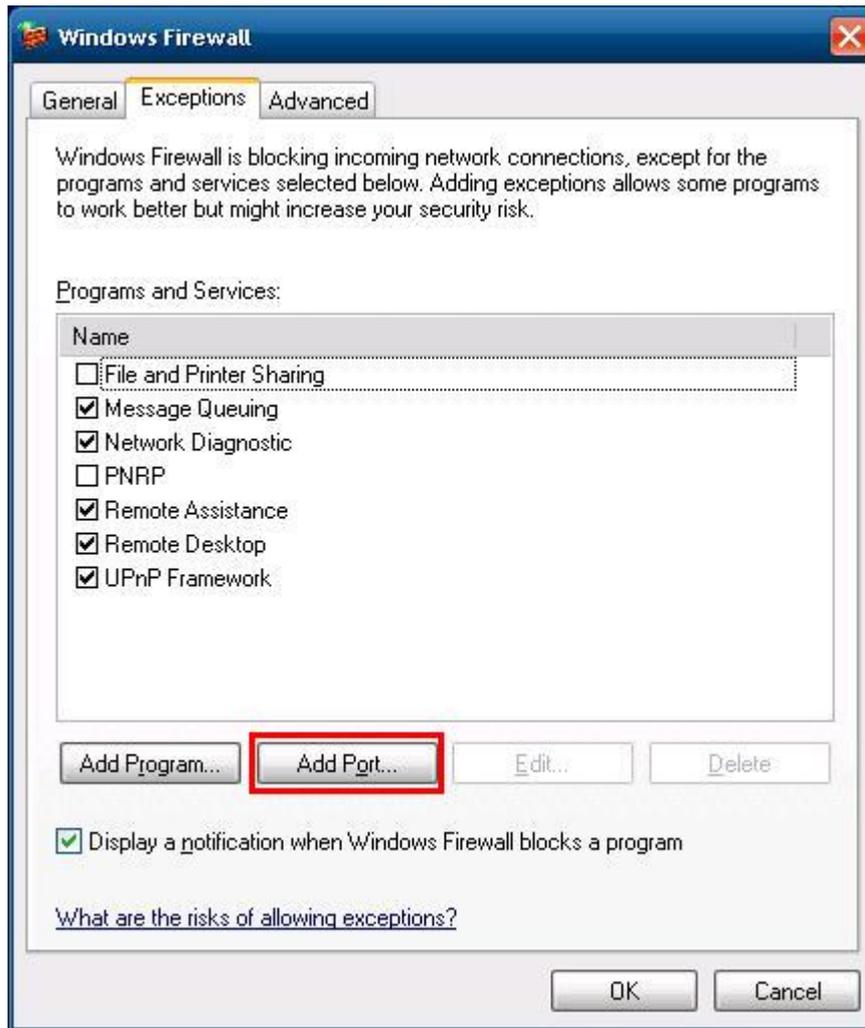
1. Click on **Start** → **Control Panel**. Double-click on **Windows Firewall**.



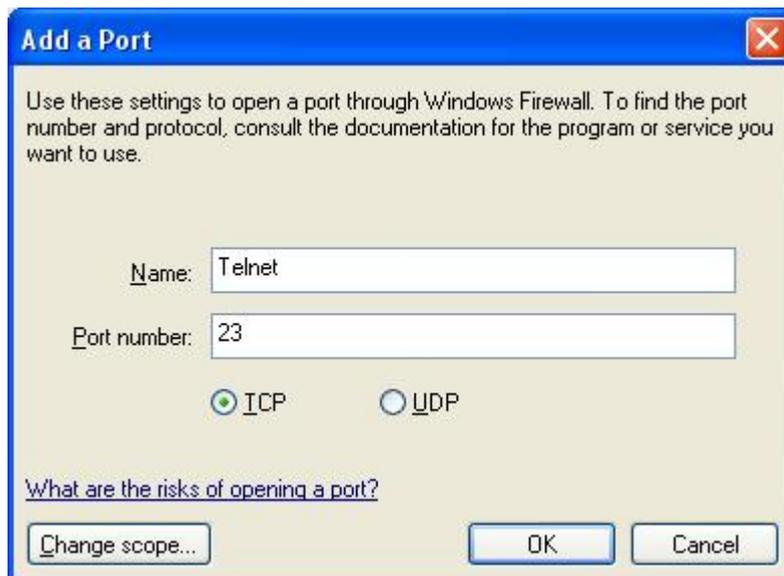
2. Click **Exceptions** tab.



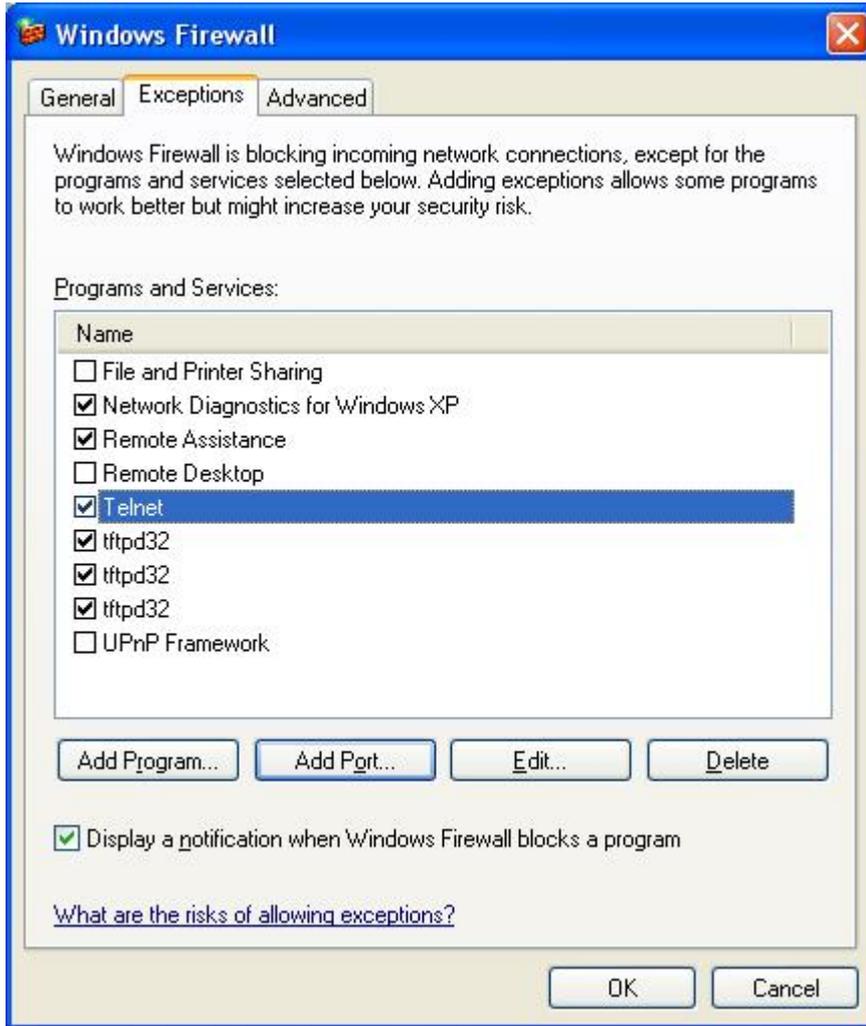
- 3. Click **Add Port**.



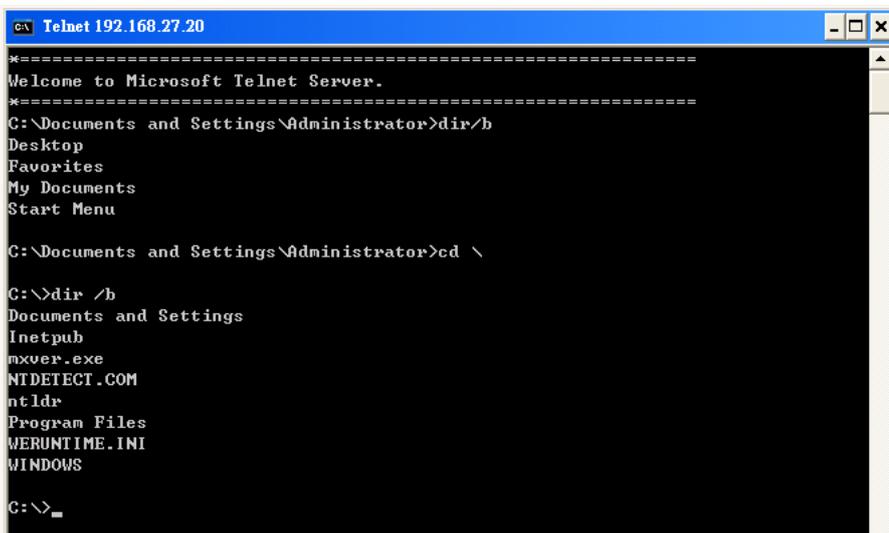
- 4. Enter the name, for example, **Telnet**, and Port number **23**. Click **OK** to continue.



- When finished, check if **Telnet** is in the **Programs and Services** list.

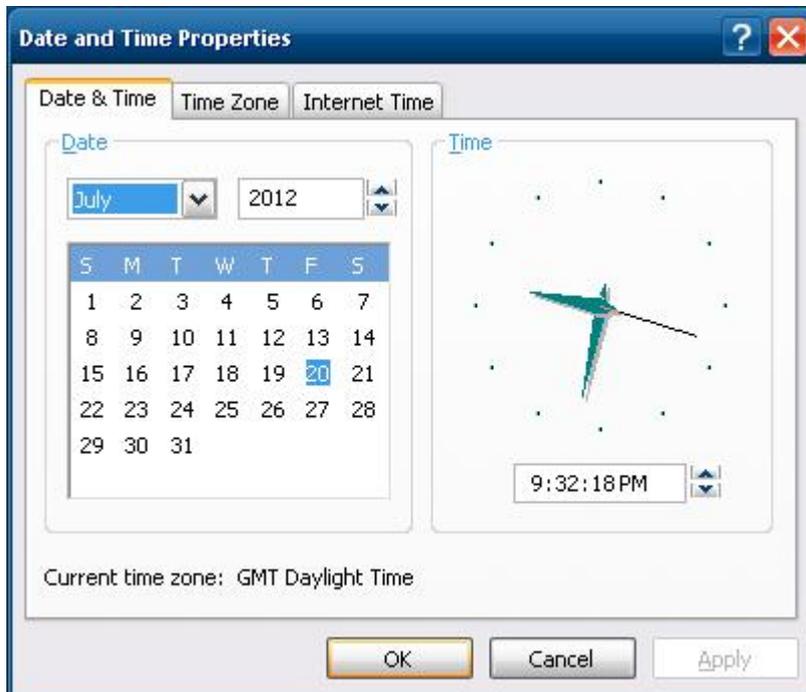


- Now you can run Telnet to connect to the DA-685-XPE.



Adjusting the System Time

- **Setting the System Time Manually:** Use the **date/time** command line utility to query the current system date/time or set a new system date/time.
- **Setting the System Time by Control Panel:** Go to the **Control Panel** and double click the **Date and Time** icon. You may adjust the date and time. When finished, click **OK**.

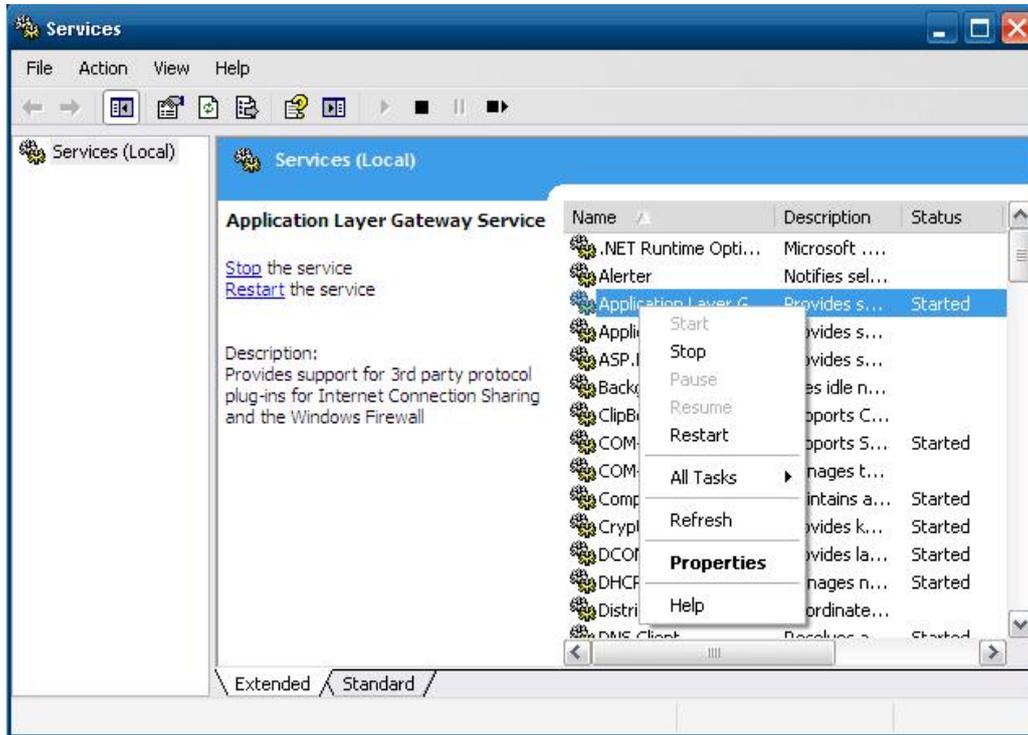


- **Synchronizing with an Internet Time Server:** Select **Internet Time** tab, and check **Automatically Synchronize with an Internet time server**. You may select the time server from the Server drop-down list, or type in the server name you want to synchronize with. Click **Update Now** to do the time synchronization. When finished, click **OK** to complete.



Starting and Stopping Services

Select **Start** → **Control Panel** → **Administrative Tools** and double click **Services**. Select and right-click on the service name, and then choose to stop or restart.



Simple Network Management Protocol (SNMP)

To check SNMP agent capabilities on a target DA-685-XPE (e.g., suppose the network IP is 192.168.3.127) computer, log on to the workstation computer on which the SNMP manager resides and then type:

```
\> snmpwalk -v 2c -c public 192.168.3.127 system
```

You will see a series of messages from the SNMP agent on the DA-685-XPE computer that allow you to monitor and manage the computer.

Remote Desktop (RDP)

To allow incoming remote connection to the DA-685-XPE computer, you need to configure the Remote Desktop (RDP) function on the DA-685-XPE computer. Follow these steps.

1. Right-click **My Computer** on the desktop of the DA-685-XPE computer, select **Properties**. Click **Remote** tab for further configuration.

2. Make sure that the **Allow users to connect remotely to this computer** checkbox is selected. Next, click **Select Remote Users**.



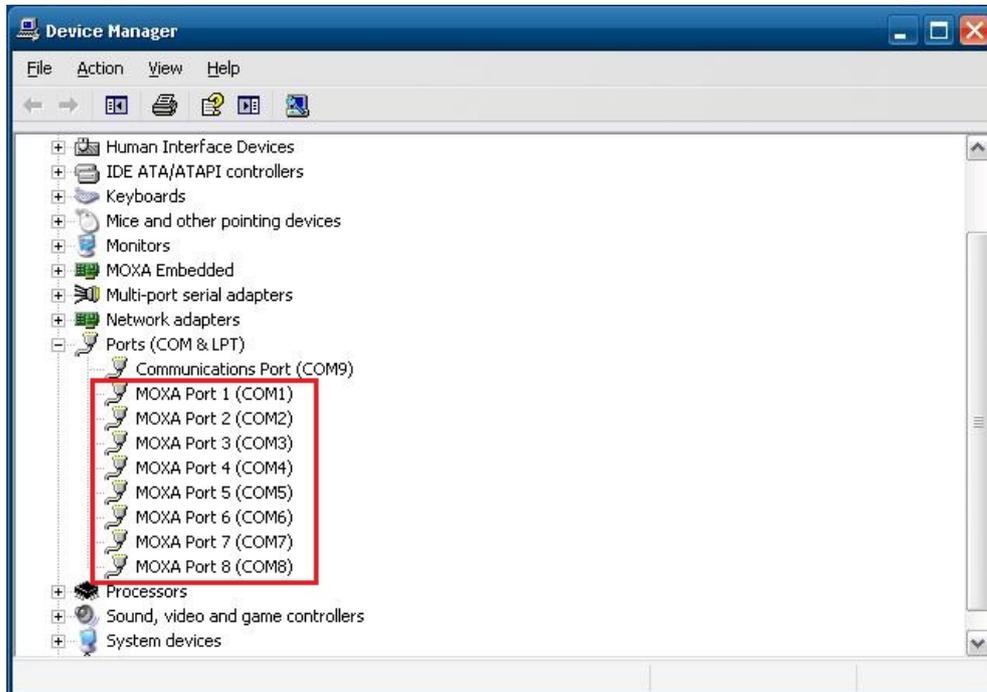
3. Add the users allowed to connect to your desktop. When finished, click **OK**.



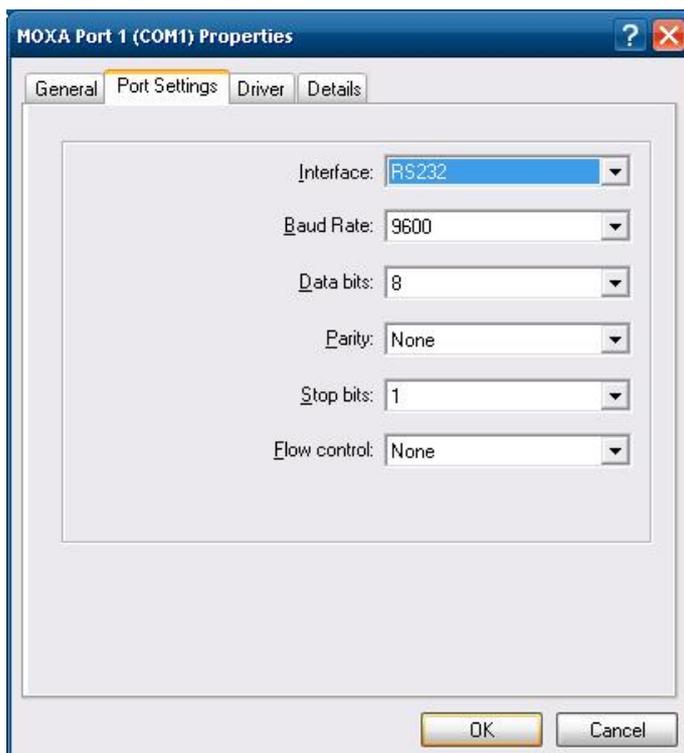
Configuring Serial Ports

The DA-685-XPE has 2 RS-232/422/485 serial ports with DB9 connectors, and 6 2-wire RS-485 serial terminal blocks. The ports are located on the rear panel of the computer.

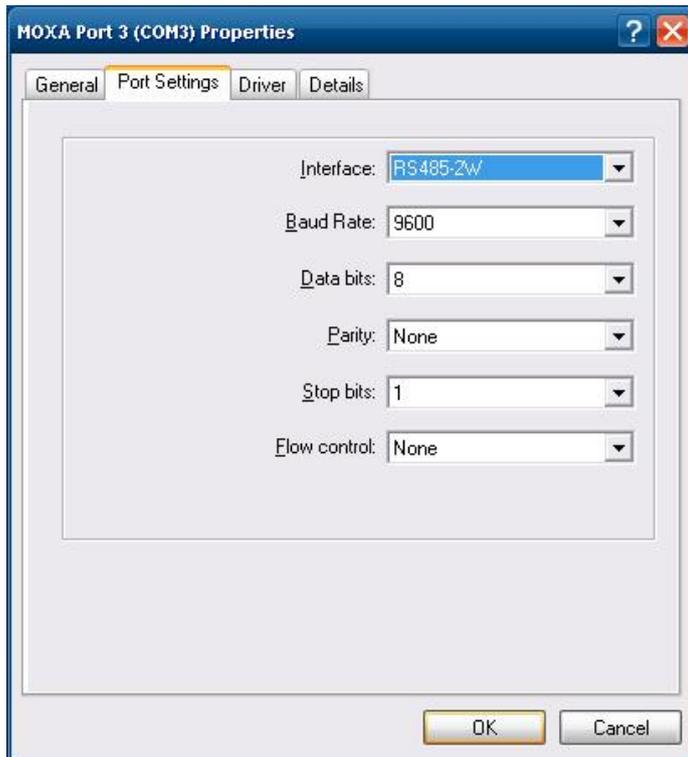
To configure the 2 RS-232/422/485 serial ports, first right-click the **My Computer** icon on the desktop and then select **Properties**. From the **System Properties** screen, select the **Hardware** tab, and then select **Device Manager**. Next, select **Ports (COM & LPT)** to see from **MOXA Port 1 (COM1)** to **MOXA Port 8 (COM8)**.



The Port 1 and Port 2 are RS-232/422/485 serial ports. Right-click the **COM** port you wish to configure, and then select **Properties**. Select **Port Settings** tab for further configuration. Note that they support bit rates up to **115,200** bps. Click **OK** to finish.



Ports 3 to 8 are 2-wire RS-485 terminal blocks. Right-click the **COM** port you wish to configure, and then select **Properties**. Select **Port Settings** tab for further configuration. Note that they support the bit rates up to **115,200** bps. Click **OK** to finish.



Enhanced Write Filter

The "Enhanced Write Filter" protects the contents of a volume on the target media volume by redirecting all writes to another storage location called an overlay. Use the following steps to enable the Enhanced Write Filter.

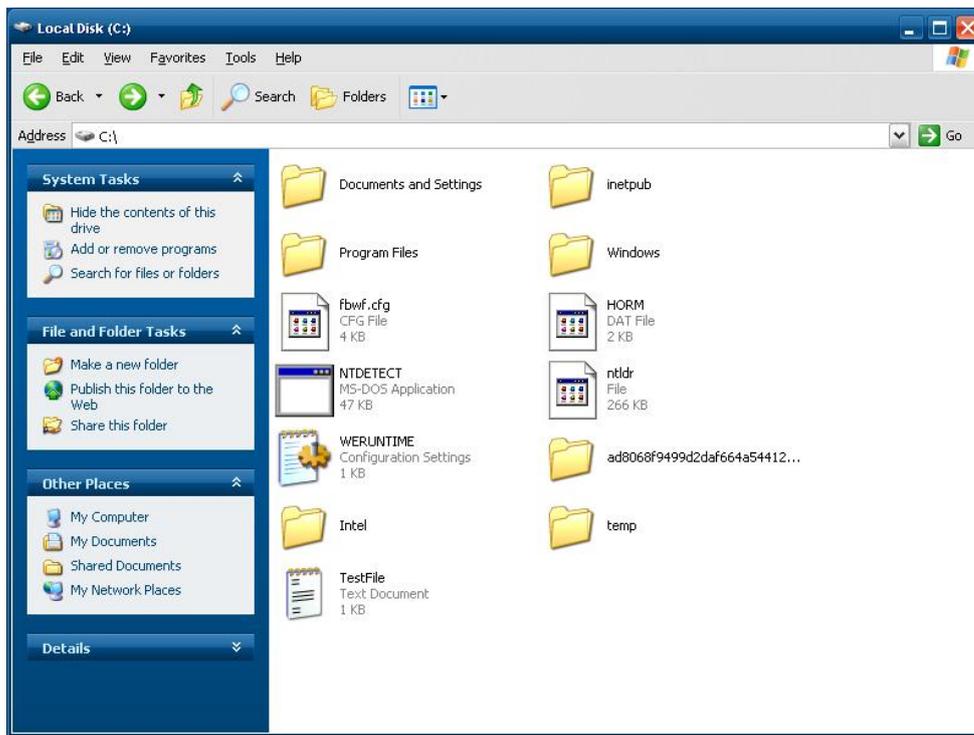
1. Type **EFWMGR C:** to check if the the Enhanced Write Filter is **Disabled**.

```

C:\WINDOWS\system32\cmd.exe
C:\Documents and Settings\Administrator>EFWMGR c:
Protected Volume Configuration
Type          RAM <REG>
State         DISABLED
Boot Command  NO_CMD
  Param1      0
  Param2      0
Volume ID     87 34 0E 72 00 02 00 00 00 00 00 00 00 00 00
Device Name   "\\Device\Harddisk0\DP<1>0-0+1"
Max Levels    1
Clump Size    512
Current Level N/A

Memory used for data 0 bytes
Memory used for mapping 0 bytes
  
```

2. To enable the filter, type **EFWMGR C: -enable**.
3. Reboot the system to activate the change.
4. As a test, delete a non-essential file on your protected volume and reboot the system; the file you just deleted should reappear.



File Based Write Filter

File-Based Write Filter (FBWF) allows Windows Embedded Standard 2009 to maintain the appearance of read and write access to write sensitive or read only storage. FBWF makes read and write access transparent to applications.

Writing to storage media may be undesirable or impossible in embedded devices. FBWF redirects all writes targeted for protected volumes to a RAM cache called an overlay. In this context, an overlay can be likened to a transparency overlay on an overhead projector. Any change made to the overlay affects the picture as seen in the aggregate, but if the overlay is removed, the underlying picture remains unchanged.

Follow the steps below to enable FBWF:

1. In the command prompt, type **fbwfmgr /displayconfig** to check if the FBWF is **disabled**.

```
C:\>fbwfmgr /displayconfig
File-based write filter configuration for the current session:
  Filter state: disabled.

File-based write filter configuration for the next session:
  Filter state: disabled.
C:\>
```

2. Type **fbwfmgr /enable** to enable FBWF. Reboot the system for the changes to come into effect.

```
C:\>fbwfmgr /enable
File-based write filter will be enabled on the next reboot.

C:\>
```

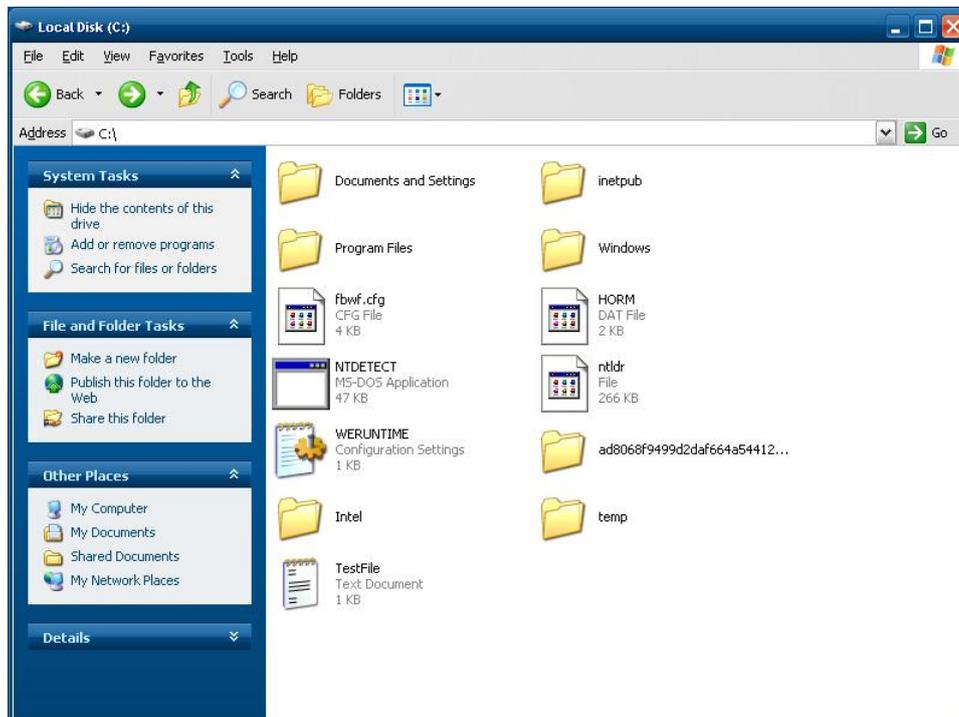
- When the system has rebooted, type **fbwfmgr /displayconfig** in the command prompt again to confirm that the status has been changed to **enabled**. The default folder for FBWF will be **\temp**. Type **fbwfmgr /help** for more detailed information.

```
C:\> fbwfmgr /displayconfig
File-based write filter configuration for the current session:
  filter state: enabled.
  overlay cache data compression state: disabled.
  overlay cache threshold: 64 MB.
  overlay cache pre-allocation: disabled.
  size display: actual mode.
  protected volume list:
    \Device\HarddiskVolume3
  write through list of each protected volume:
    \Device\HarddiskVolume3:
      \temp

File-based write filter configuration for the next session:
  filter state: enabled.
  overlay cache data compression state: disabled.
  overlay cache threshold: 64 MB.
  overlay cache pre-allocation: disabled.
  size display: actual mode.
  protected volume list:
    \Device\HarddiskVolume3
  write through list of each protected volume:
    \Device\HarddiskVolume3:
      \temp

C:\>
```

- You may copy a file (in this example, we will use TestFile.txt) to C:\temp and to C:\, and then reboot the system.



- After rebooting the system, you should see that the file in C:\ has disappeared and that the file in C:\temp remains.

Management Tools

The DA-685-XPE ready-to-run embedded computers are shipped with the Windows Embedded Standard 2009 operating system already installed. This network-centric platform is designed to serve as a front-end for data acquisition and industrial control applications. A set of Windows XP management tools are installed on the DA-685-XPE computer to resolve management issues.

The following topics are covered in this chapter:

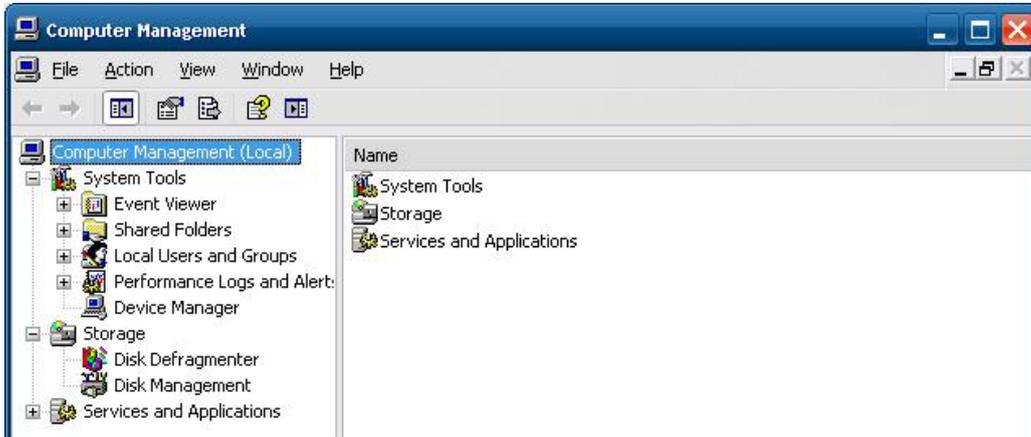
- ❑ **Computer Management**
- ❑ **Component Services**
- ❑ **Event Viewer**
- ❑ **Internet Information Services (Web/FTP)**
- ❑ **ODBC Data Source Administrator**
- ❑ **Performance Monitor**
- ❑ **Services**

Computer Management

[Control Panel] → [Administrative Tools] → Computer Management.

You can use the tools for a variety of tasks, such as disk partition, disk mount/dismount, and create/remove users.

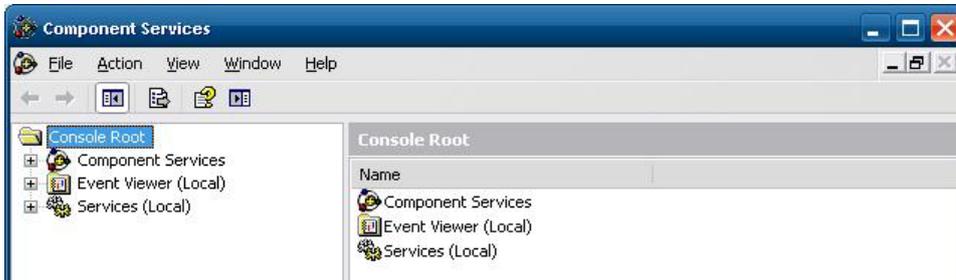
You can also check services in the Computer Management window.



Component Services

[Control Panel] → [Administrative Tools] → Component Services.

You can install/view/remove COM components with this tool.



Event Viewer

[Control Panel] → [Administrative Tools] → Event Viewer.

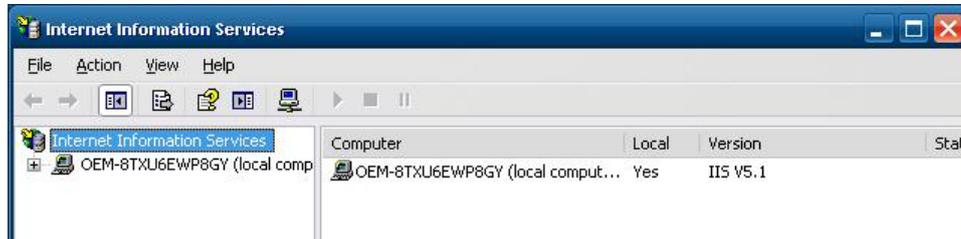
Every DA-685-XPE event, including system, applications, and security events are logged in this event database.



Internet Information Services (Web/FTP)

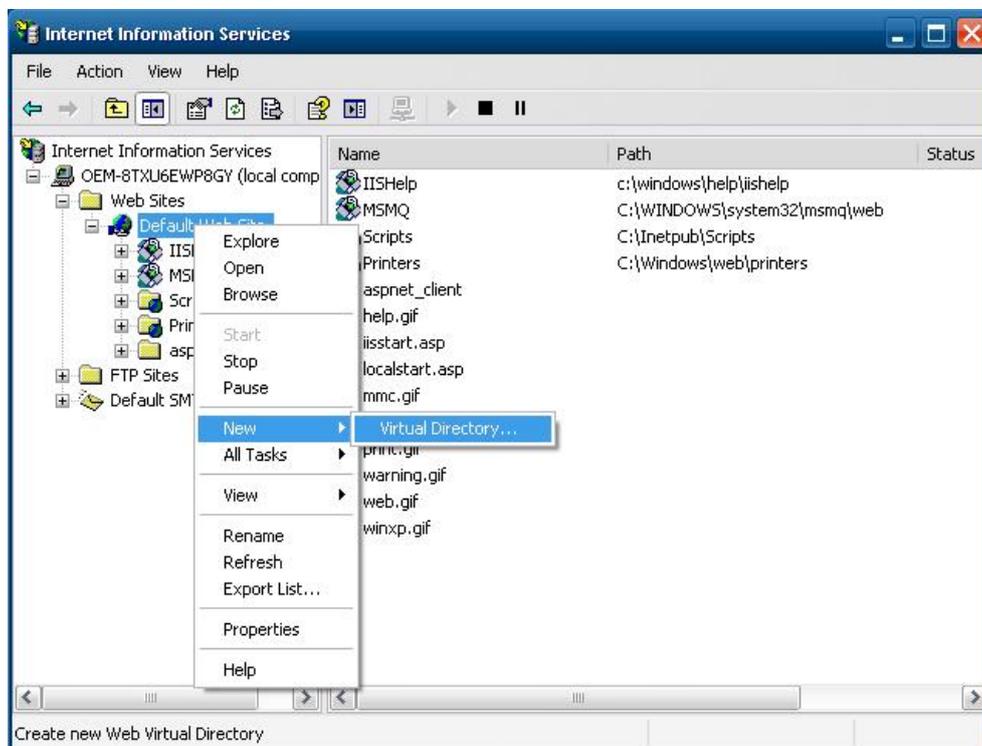
[Control Panel] → [Administrative Tools] → Internet Information Services.

If you need to set up Web or FTP, you must use this tool for configuration purposes, and you can also start/stop HTTP/FTP services.



A default web page is located in the directory **c:\inetpub**. Use this default page to test your web server. Follow the steps shown below to create the virtual directory.

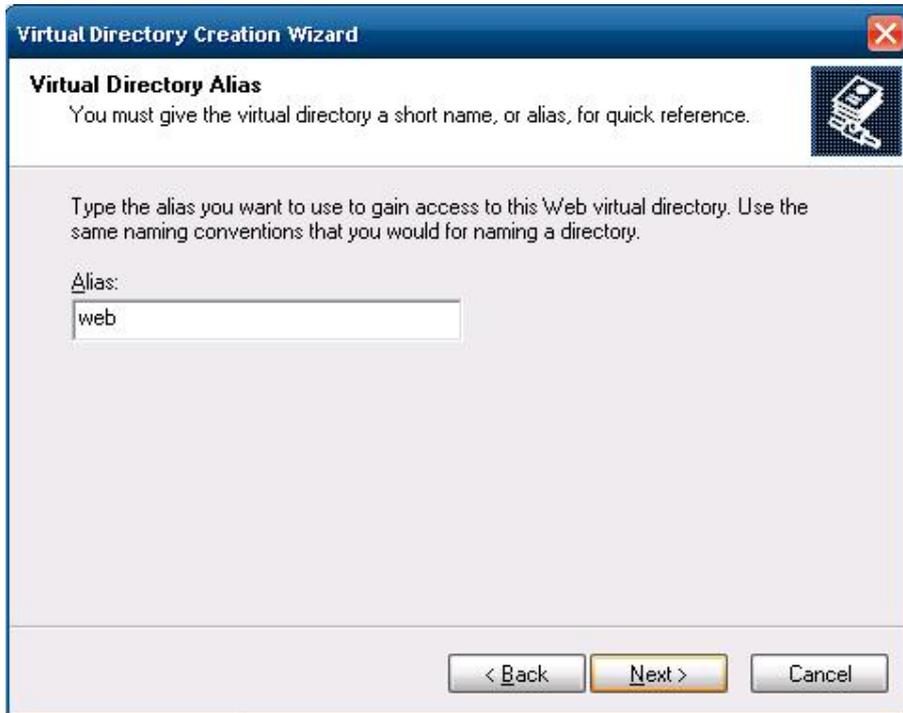
1. Create a virtual directory by selecting **Default Web Site** → **New** → **Virtual Directory**.



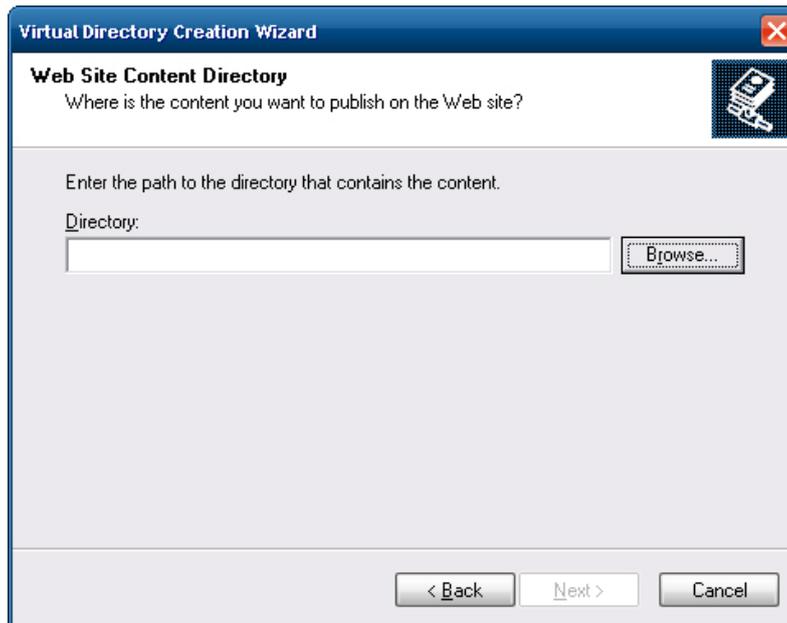
2. Follow the virtual directory creation wizard and complete the steps to create the virtual directory c:\inetpub.



3. Type an alias (for example **web**), into the text box. Click **Next** to continue.



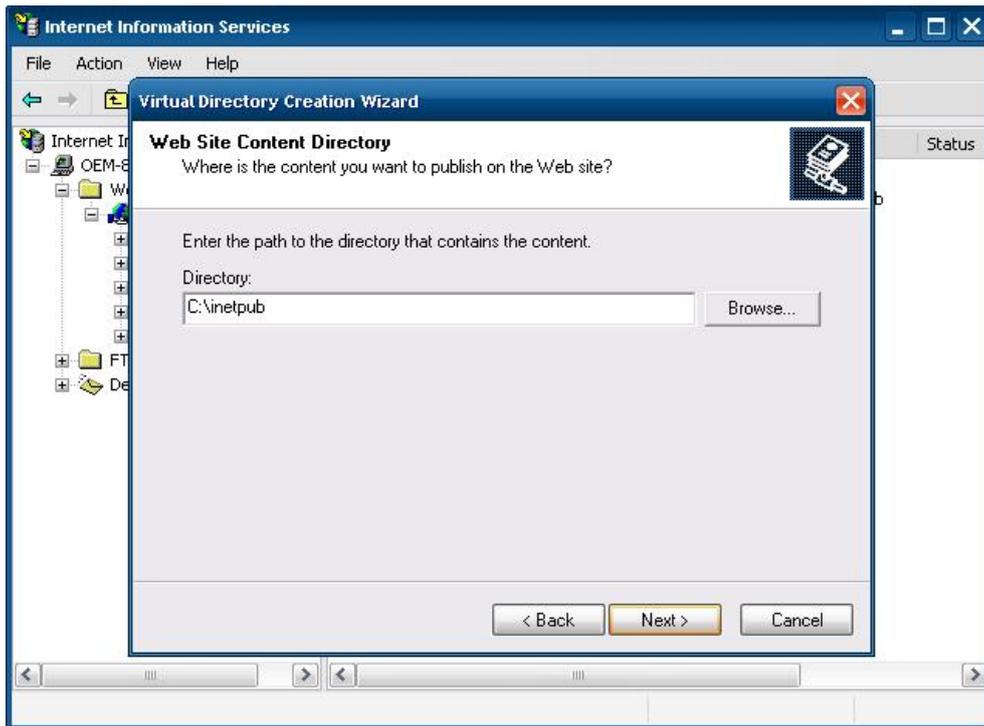
- Click **Browse** to select the folder.



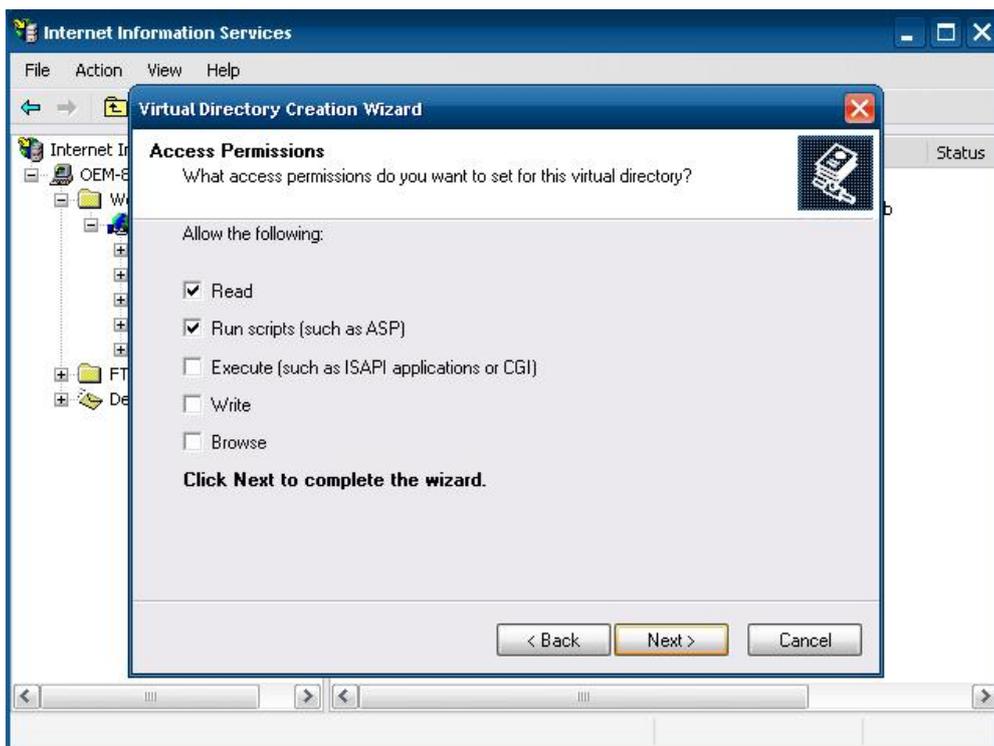
- Navigate the file tree and select an existing folder, or select **Make New Folder** to create new folder. Click **OK** to continue.



6. Click **Next** to continue.



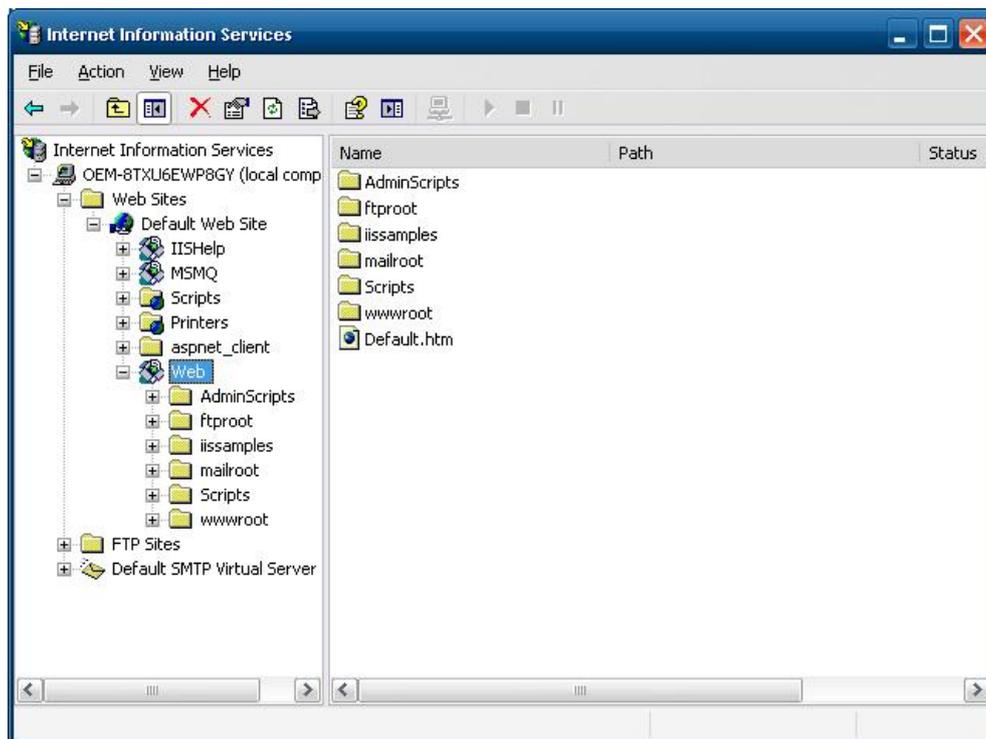
7. Next, you can configure access permissions. Check the items on the page, and click **Next** to continue.



- Click **Finish** to complete.



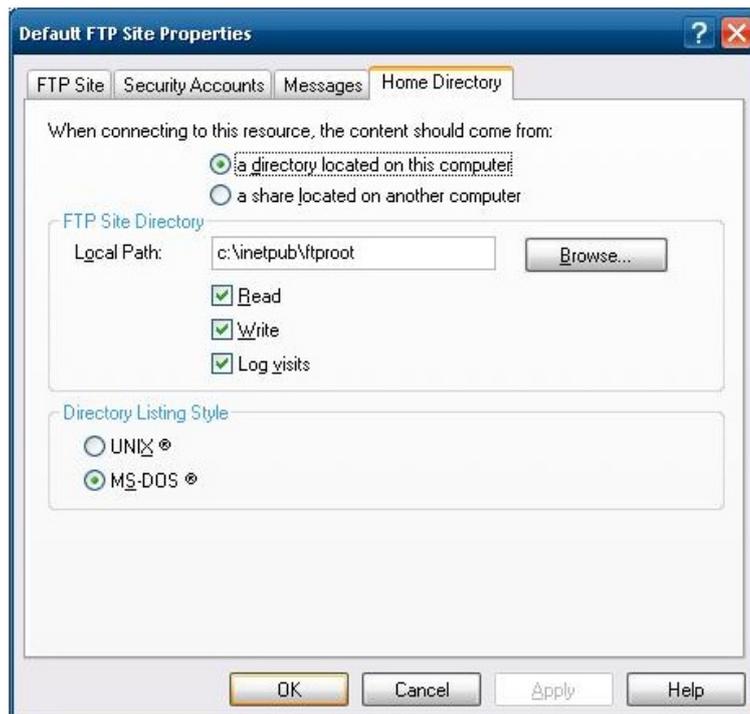
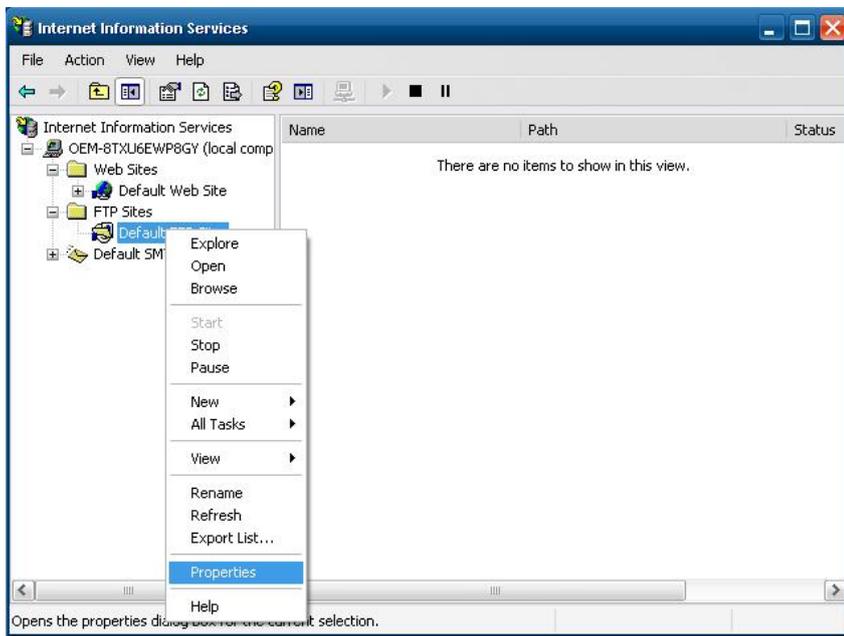
- When you complete the steps, the virtual directory **Web** will appear under **Default Web Site**.



- On your desktop, type **[IP Address]/WEB/Default.htm** (e.g., 192.168.1.127/WEB/Default.htm). The following message will appear. The steps are indicated in the following sequence of diagrams.



If you need to use the FTP server, you must create the default password for your account and turn on the write permission on your home directory located in **c:\inetpub\ftproot**. Select **FTP Sites → Default FTP Site → Properties → Home Directory**, and checkmark the **Write** checkbox. You should now be able to transmit files through the ftp server.

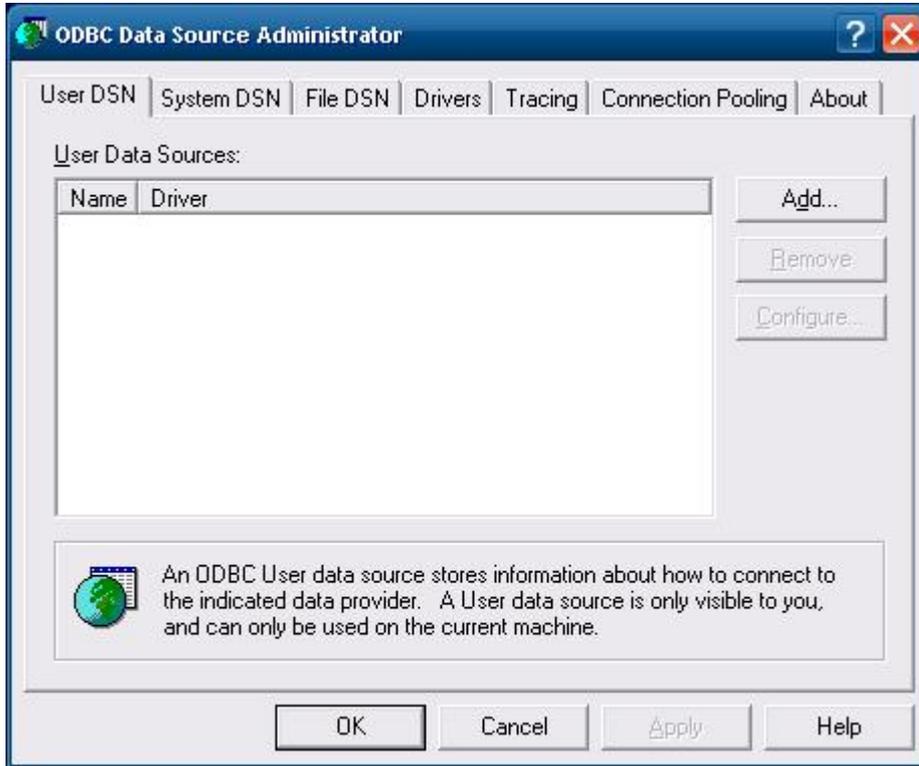


ODBC Data Source Administrator

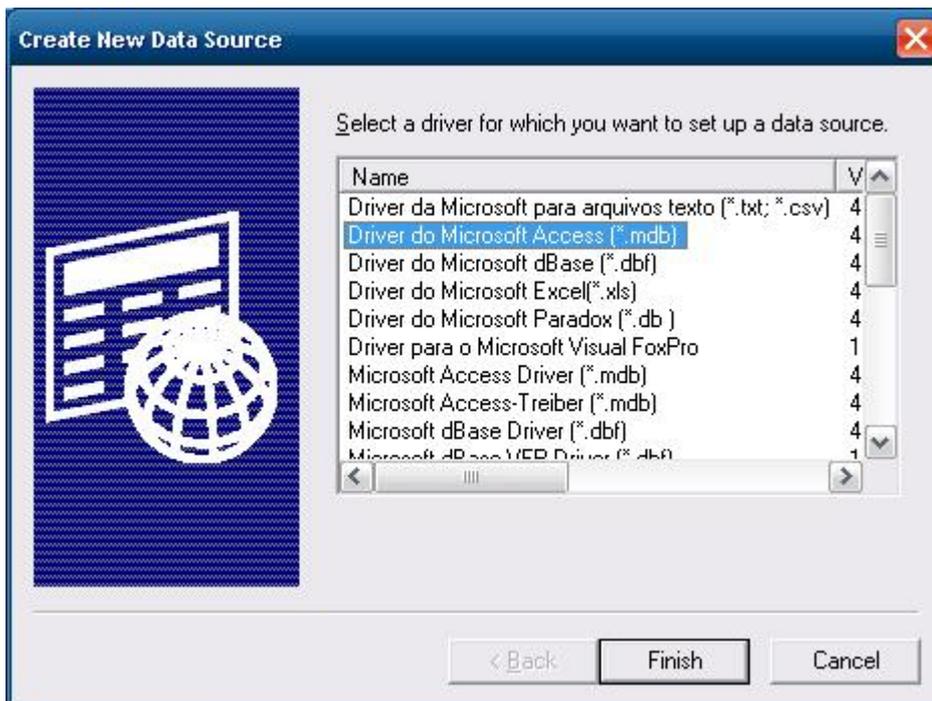
[Control Panel] → [Administrative Tools] → Data Sources (ODBC)

This database source configuration tool is for users to add, delete, or set up the data source, and then display information about the installed ODBC drivers. You can create a new data source or trace the calls to ODBC functions.

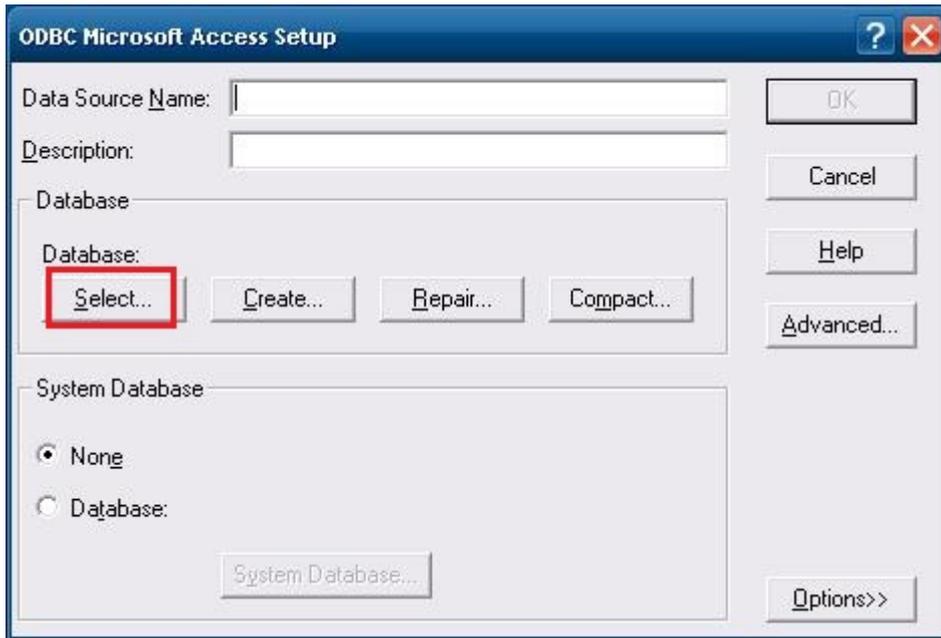
1. Click **Add** to continue.



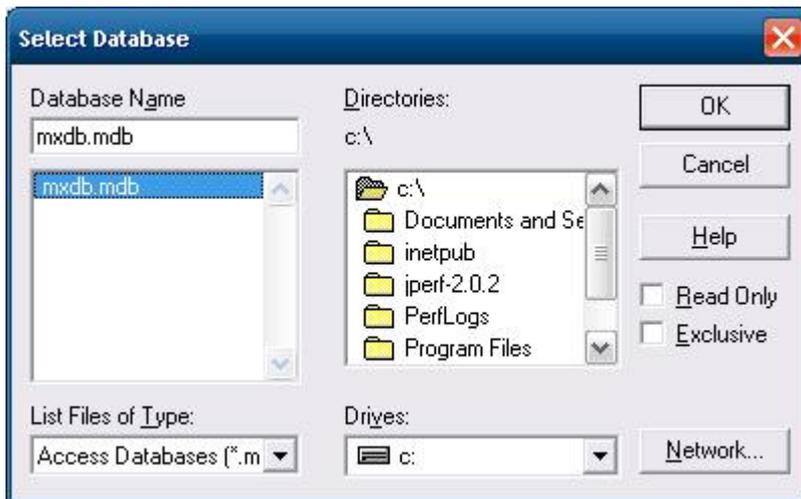
2. Select the driver to set up a data source (in this case, we select **Driver do Microsoft Access (*.mdb)**).



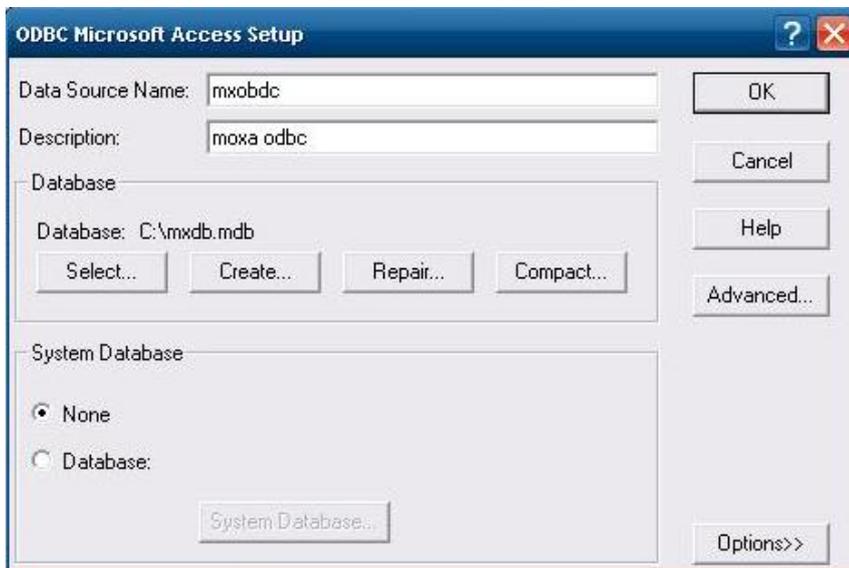
3. Select a local database from your computer, and then click **OK**.



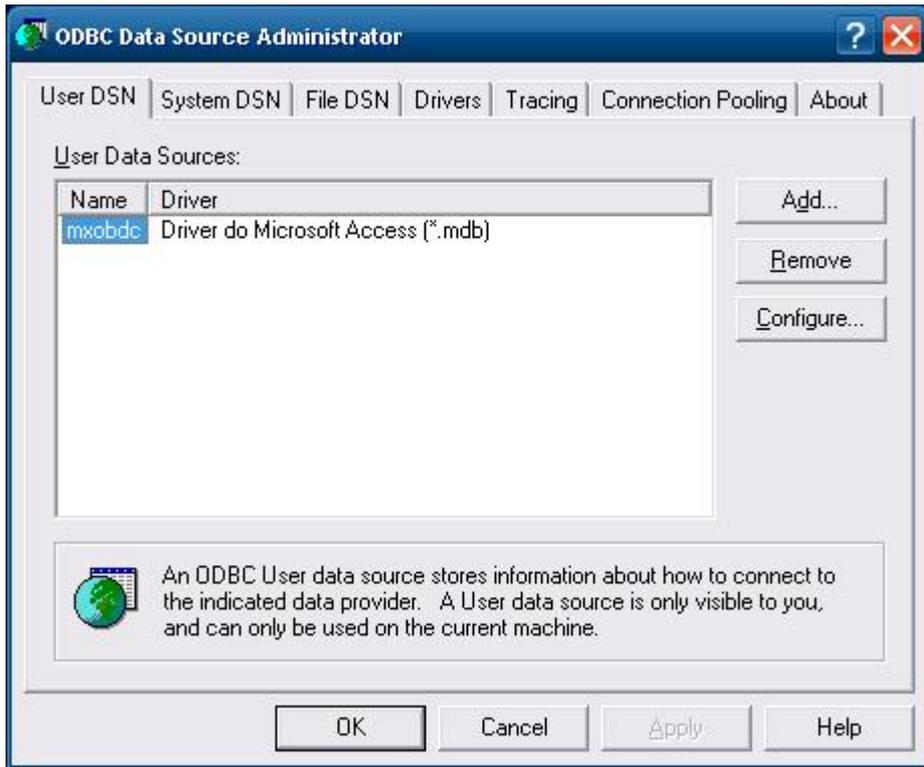
4. Select the database file from the directory. Click **OK** to continue.



5. Type **Data Source Name** and **Description**, and then click **OK**.

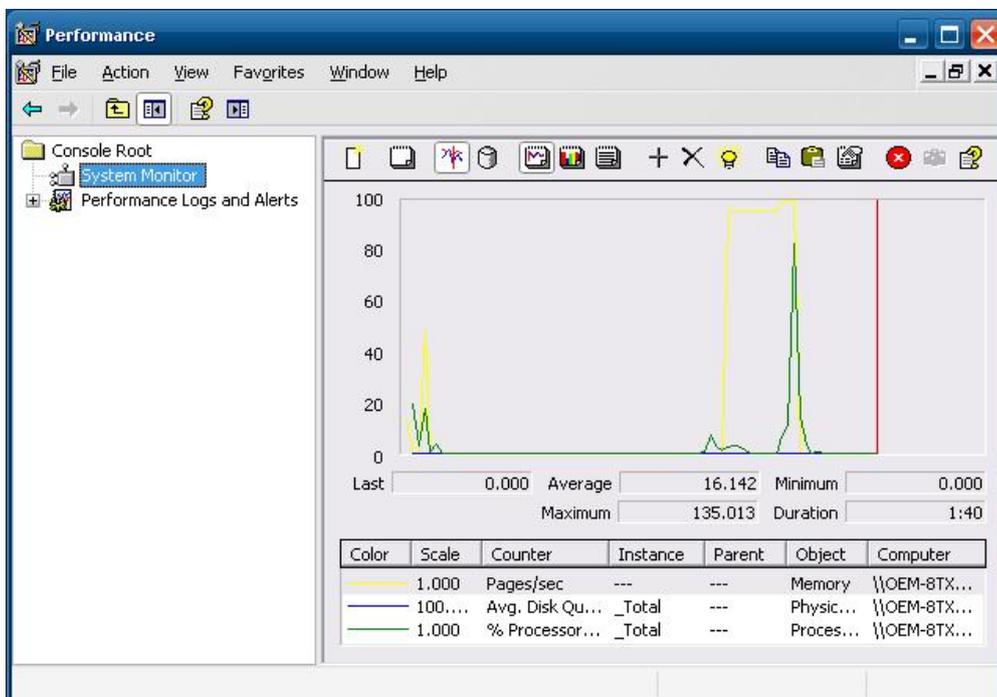


- A user data source has been successfully established. Click **OK** to finish.



Performance Monitor

[Control Panel] → [Administrative Tools] → Performance. You can use this tool to monitor system and network resources.

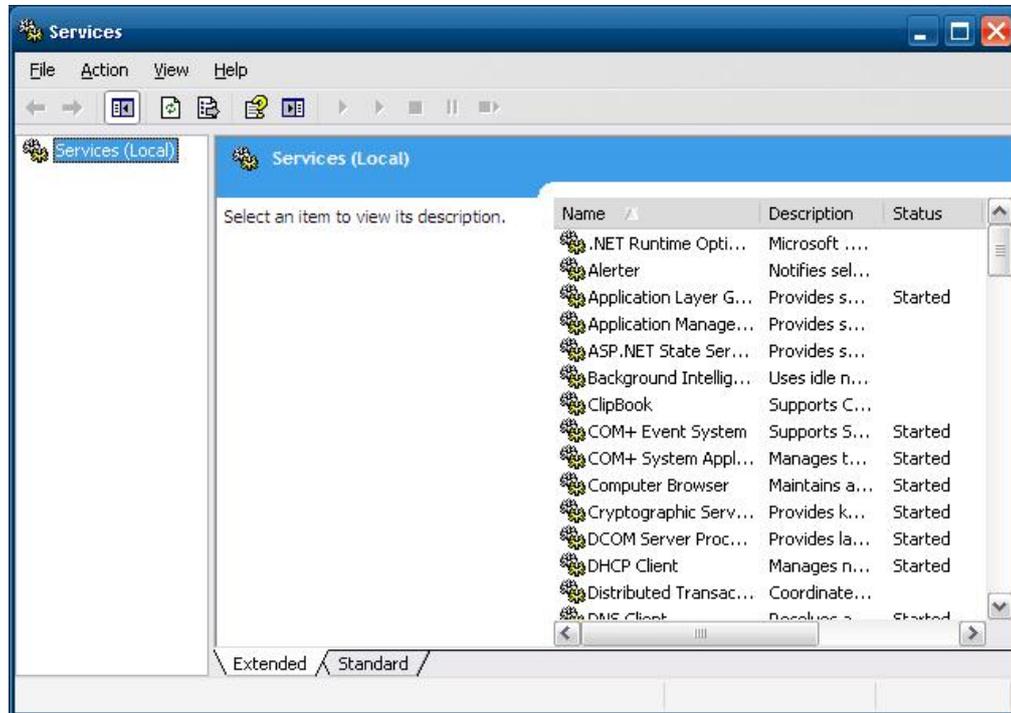


Services

[Control Panel] → [Administrative Tools] → Services

You can use this utility to start/stop/restart services.

(e.g. If you do not need telnet service you can stop it and set the “startup option” to “manual”.)



System Recovery

The DA-685-XPE ready-to-run embedded computers are a Windows Embedded Standard 2009 platform. This chapter describes the recovery process in the event of system instability.

The following topics are covered in this chapter:

- ❑ **Recovery Environment**
- ❑ **Recovery Procedure**
- ❑ **Saving the System to the USB Drive**

Recovery Environment

The environment includes a DA-685-XPE embedded computer and a bootable USB disk with the recovery programs and system image file.

Hardware

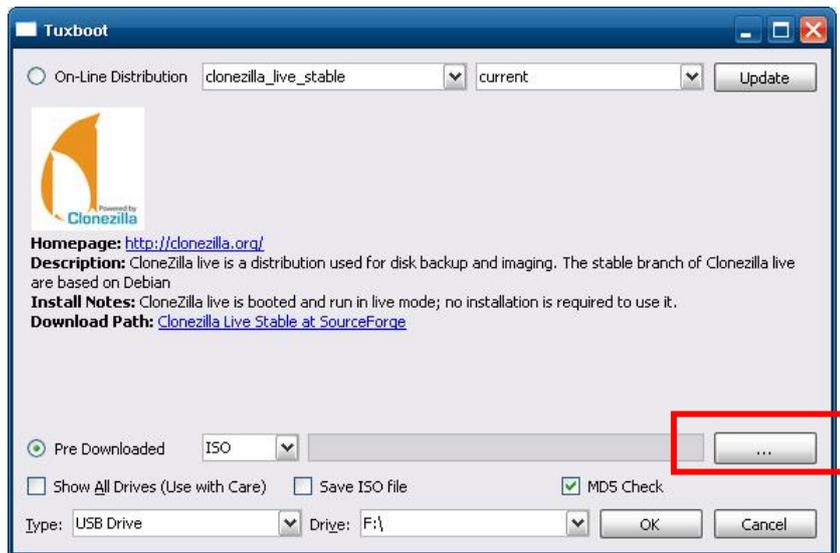
You will need a computer (a PC or notebook), a DA-685-XPE computer, and a USB disk with the recovery programs. **(Note: The USB disk should be at least 2GB.)**



Recovery Procedure

Step 1: Prepare your USB drive

1. Execute **tuxboot-windows-23.exe** from the **recovery\DA-685\CloneZilla** folder on the Software CD, then select **Pre Download**, and then click "..."



2. Select the ISO file in the directory.



3. Select **USB Drive** type, select a **Drive**, and then click **OK** to continue.



4. The boot files will be copied to your USB drive.



5. When finished, click **Exit** to stop the program.

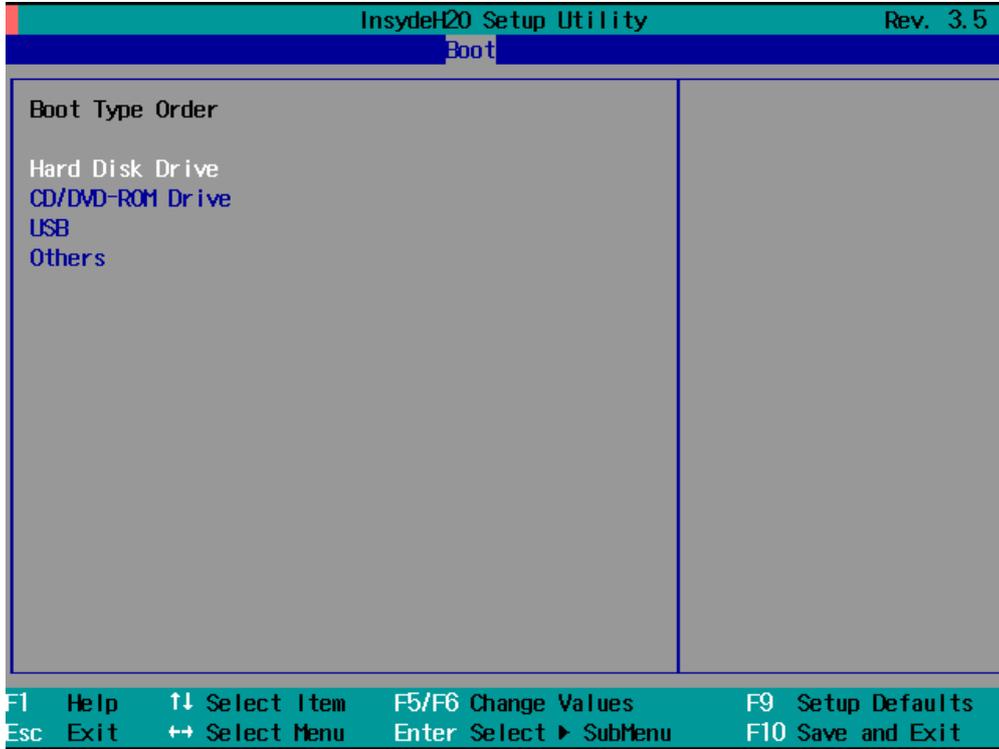


6. Manually unzip the **os_image.zip** from the **\recovery\DA-685** folder on the Software CD. A directory called **os_image** will appear. Copy this directory to **\home\partimag** on the USB drive.

Step 2: Change the BIOS Settings

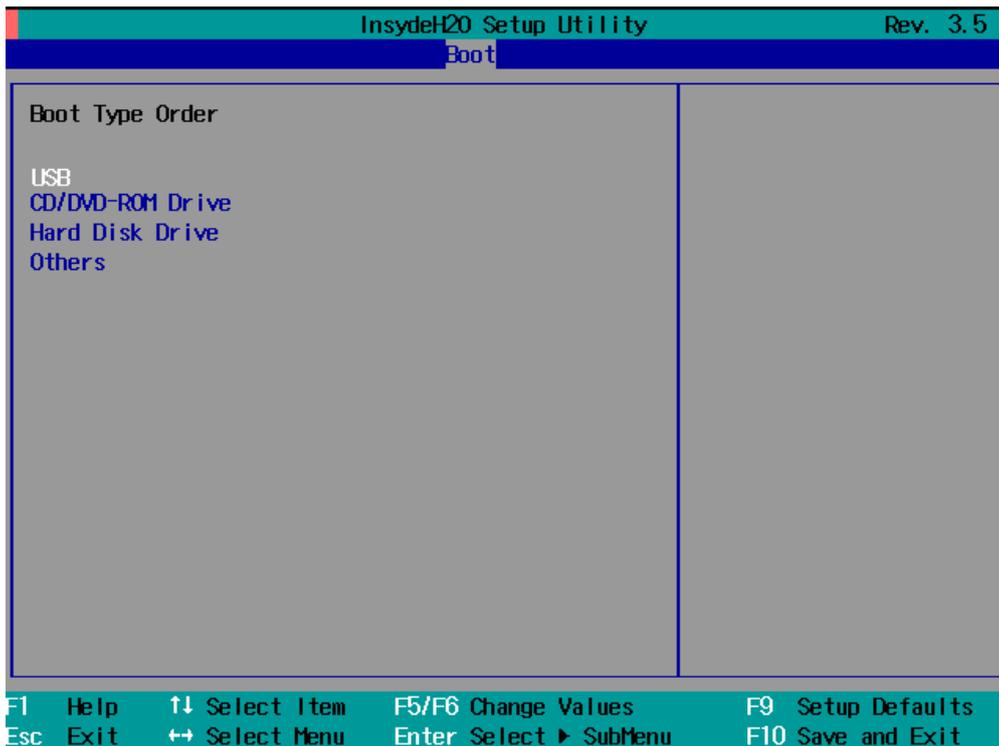
You will need to change the BIOS settings to boot from the USB disk.

1. Turn on the computer and press **F2** to enter the BIOS setup menu. Select **Hard Disk Boot Priority** and then press **Enter**.



2. Select USB disk and then press "+" to move it to the first boot device position; make sure your newly installed Compact Flash card is the second boot device.

Warning: An incorrect boot priority will cause recovery failure.

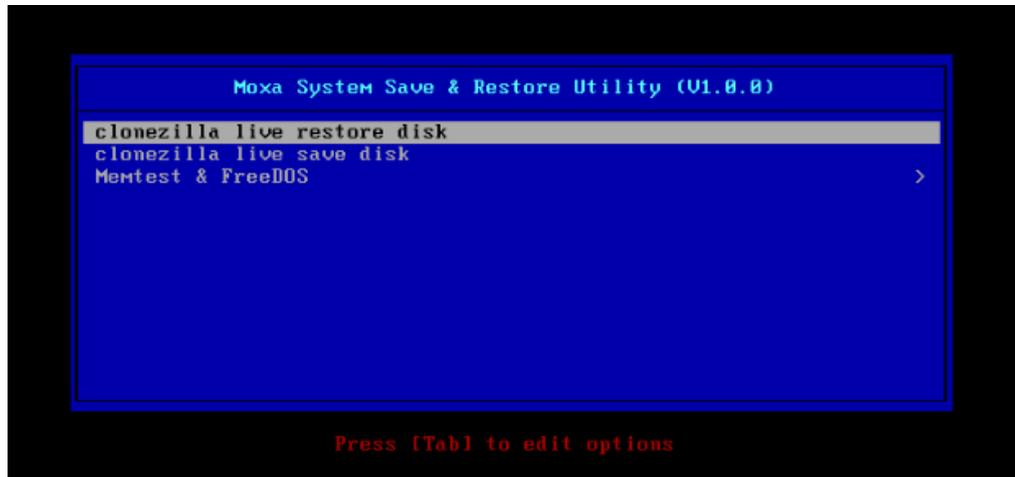


3. Press **F10** and then press **Enter** to save and exit bios setup.

Step 3: Restore the system from USB drive

Connect the USB disk to any of the DA-685-XPE's USB ports and then reboot the computer. The system will boot from the USB disk and the Pre-installation Environment and the recovery utility will appear.

1. Select **clonezilla live restore disk**.



2. Wait for the USB drive boot process to finish.

```
[ 5.153522] sd 0:0:0:0: [sda] Attached SCSI disk
[ 5.163726] sd 0:0:1:0: [sdb] Attached SCSI disk
[ 5.287941] sd 0:0:0:0: Attached scsi generic sg0 type 0
[ 5.310750] sd 0:0:1:0: Attached scsi generic sg1 type 0
[ 5.334915] sr 1:0:0:0: Attached scsi generic sg2 type 5
Begin: Loading essential drivers ... [ 5.690577] Atheros(R) L2 Ethernet Driver - version 2.2.3
[ 5.692430] Copyright (c) 2007 Atheros Corporation.
[ 5.726770] Broadcom NetXtreme II 5771x 10Gigabit Ethernet Driver bnx2x 1.62.00-6 (2011/01/30)
[ 5.914014] Btrfs loaded
[ 5.955475] device-mapper: uevent: version 1.0.3
[ 5.961407] device-mapper: ioctl: 4.19.1-ioctl (2011-01-07) initialised: dm-devel@redhat.com
done.
Begin: Running /scripts/init-premount ... done.
Begin: Mounting root file system ... [ 6.178946] Uniform Multi-Platform E-IDE driver
[ 6.186189] ide_generic: please use "probe_mask=0x3f" module parameter for probing all legacy ISA
IDE ports
[ 6.913744] FAT: utf8 is not a recommended IO charset for FAT filesystems, filesystem will be cas
e sensitive!
[ 7.047997] aufs: module is from the staging directory, the quality is unknown, you have been war
ned.
[ 7.072516] aufs 2.1-standalone.tree-38-rcN-20110228
Begin: Running /scripts/live-premount ... done.
[ 7.213433] loop: module loaded
[ 7.509770] squashfs: version 4.0 (2009/01/31) Phillip Lougher
Begin: Running /scripts/live-realpremount ... done.
Begin: Mounting "/live/image/live/filesystem.squashfs" on "//filesystem.squashfs" via "/dev/loop0" .
.. done.
done.
Begin: Running /scripts/live-bottom
... Begin: Configuring fstab ... done.
Begin: Preconfiguring networking ... done.
Begin: Loading preseed file ... done.
Begin: Running /scripts/init-bottom ... done.
INIT: version 2.88 booting
Using makefile-style concurrent boot in runlevel S.
live-config; hostname user-setup sudo locales tzdata keyboard-configuration sysvinit sysv-rc initram
fs-tools util-linux login openssh-server_
```

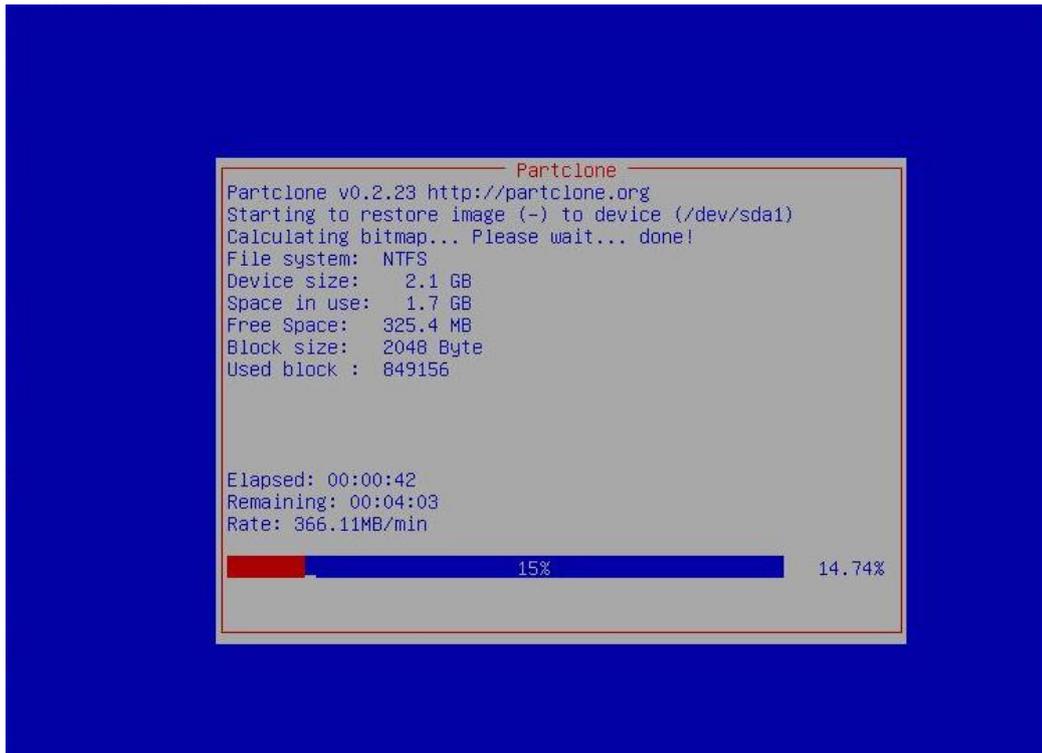
3. Enter **y** to continue the restore process.

```
The jobs in /etc/ocs/ocs-live.d/ are finished. Start "ocs-live-restore" now.
Setting the TERM as linux
*****
Clonezilla image dir: /home/partimag
*****
Shutting down the Logical Volume Manager
  No volume groups found
  No volume groups found
Finished Shutting down the Logical Volume Manager
*****
Activating the partition info in /proc... done!
*****
The following step is to restore an image to the hard disk/partition(s) on this machine: "/home/part
imag/xpe_savedisk" -> "sda sda1"
WARNING!!! WARNING!!! WARNING!!!
WARNING! THE EXISTING DATA IN THIS HARDDISK/PARTITION(S) WILL BE OVERWRITTEN! ALL EXISTING DATA WILL
BE LOST:
*****
Machine: VirtualBox
sda (2.1GB_VBOX_HARDDISK__ata-VBOX_HARDDISK_VB1c64a0a3-c9f7523d)
*****
Are you sure you want to continue? ?
[y/n] y
```

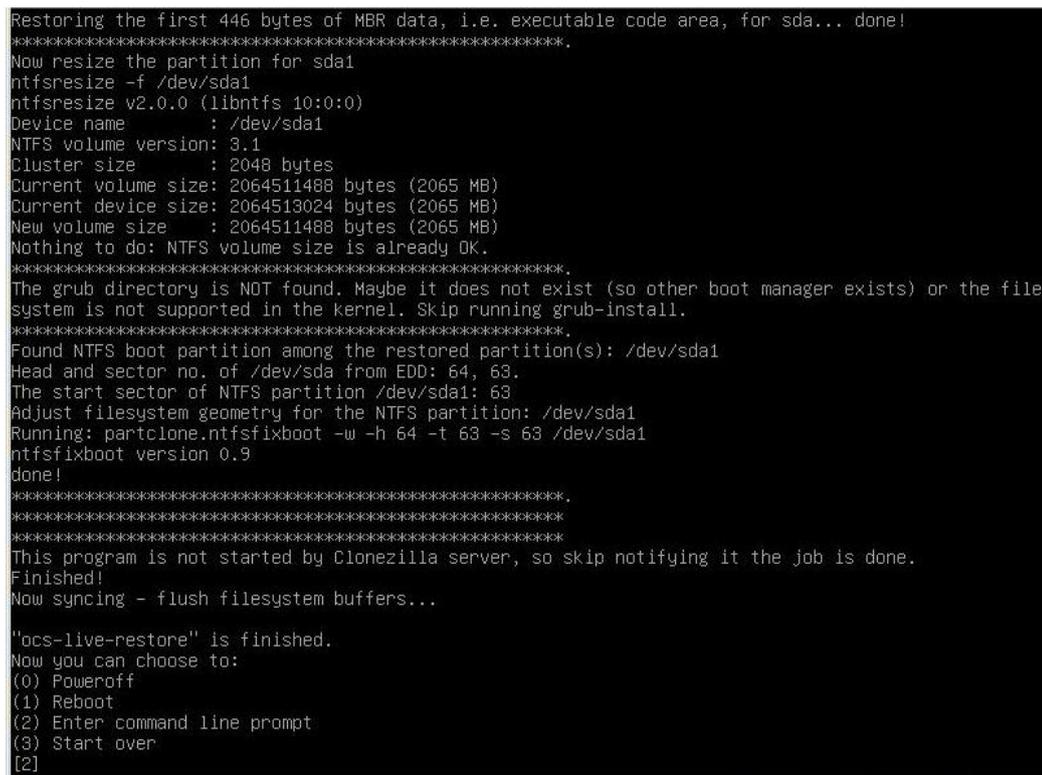
4. Enter **y** to confirm again.

```
The jobs in /etc/ocs/ocs-live.d/ are finished. Start "ocs-live-restore" now.
Setting the TERM as linux
*****
Clonezilla image dir: /home/partimag
*****
Shutting down the Logical Volume Manager
  No volume groups found
  No volume groups found
Finished Shutting down the Logical Volume Manager
*****
Activating the partition info in /proc... done!
*****
The following step is to restore an image to the hard disk/partition(s) on this machine: "/home/part
imag/xpe_savedisk" -> "sda sda1"
WARNING!!! WARNING!!! WARNING!!!
WARNING! THE EXISTING DATA IN THIS HARDDISK/PARTITION(S) WILL BE OVERWRITTEN! ALL EXISTING DATA WILL
BE LOST:
*****
Machine: VirtualBox
sda (2.1GB_VBOX_HARDDISK__ata-VBOX_HARDDISK_VB1c64a0a3-c9f7523d)
*****
Are you sure you want to continue? ?
[y/n] y
OK, let's do it!!
This program is not started by clonezilla server.
The following step is to restore an image to the hard disk/partition(s) on this machine: "/home/part
imag/xpe_savedisk" -> "sda (sda1)"
WARNING!!! WARNING!!! WARNING!!!
WARNING! THE EXISTING DATA IN THIS HARDDISK/PARTITION(S) WILL BE OVERWRITTEN! ALL EXISTING DATA WILL
BE LOST:
*****
Machine: VirtualBox
sda (2.1GB_VBOX_HARDDISK__ata-VBOX_HARDDISK_VB1c64a0a3-c9f7523d)
*****
Let me ask you again, Are you sure you want to continue? ?
[y/n] _
```

5. Wait for the process to finish.



6. Select **(0) Poweroff** to power off the computer.

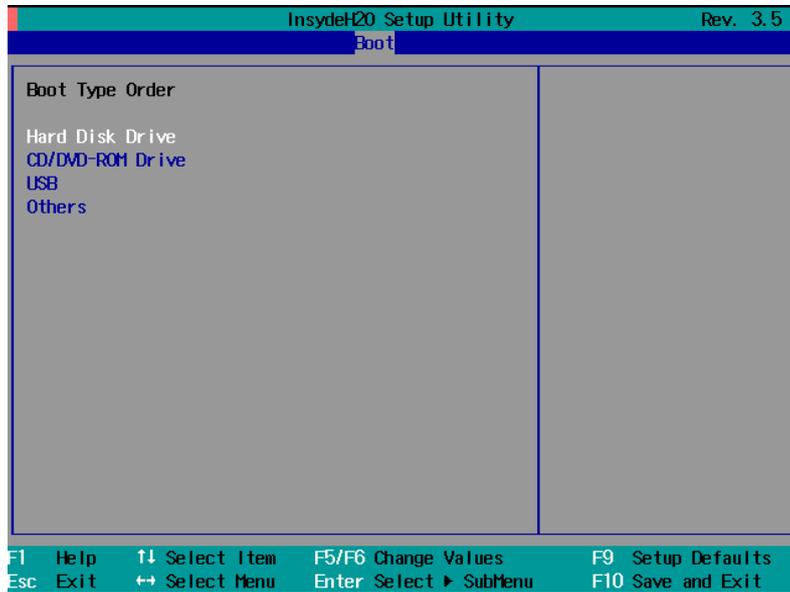


7. Remove the USB drive after the computer has been powered off.

Step 4: Change the BIOS Settings to Boot from the Original Disk

Now you will need to change the boot priority so that it can boot from the original disk. As the system reboots, press **DEL** to enter the BIOS setup menu.

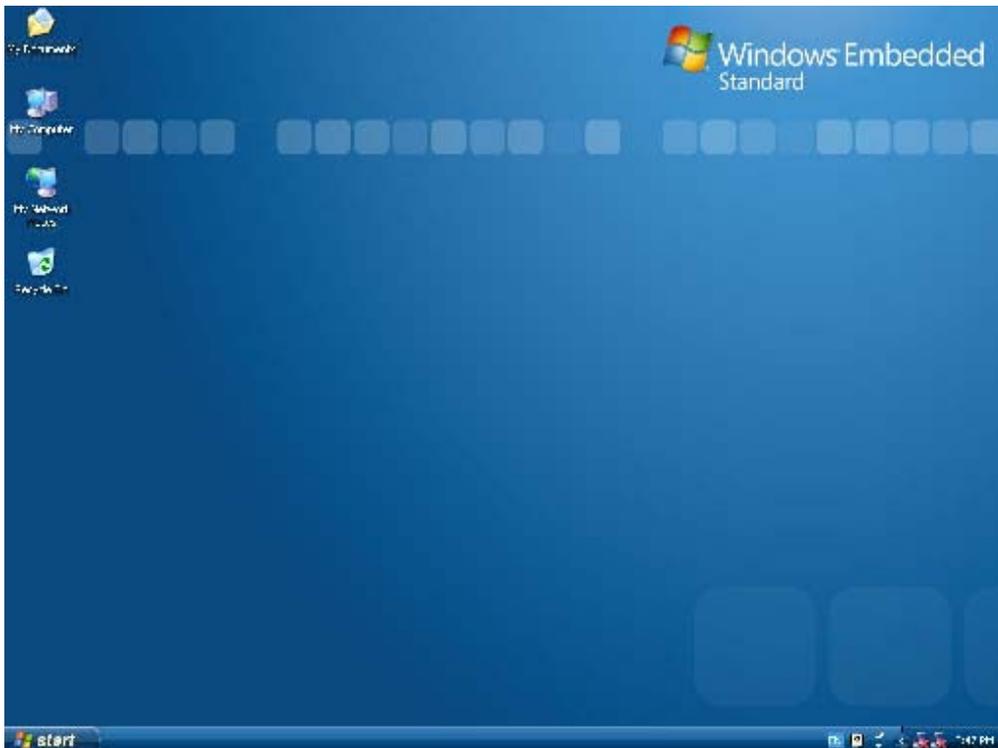
1. Select **Hard Disk Boot Priority** and then press **Enter**. Make sure the hard disk has first boot priority.



2. Press **F10** and then press **Enter** to save and exit BIOS settings.

Step 5: Reboot the Computer

You need to wait about 10 to 15 minutes for the system to restart, since the system configuration files will be initiated while booting up for the first time. **Do not turn off the computer or shut down the computer** while the system is restarting; otherwise, the IIS service will be terminated. When the operating system has successfully launched, you will need to restart your computer so that the new settings can be activated.

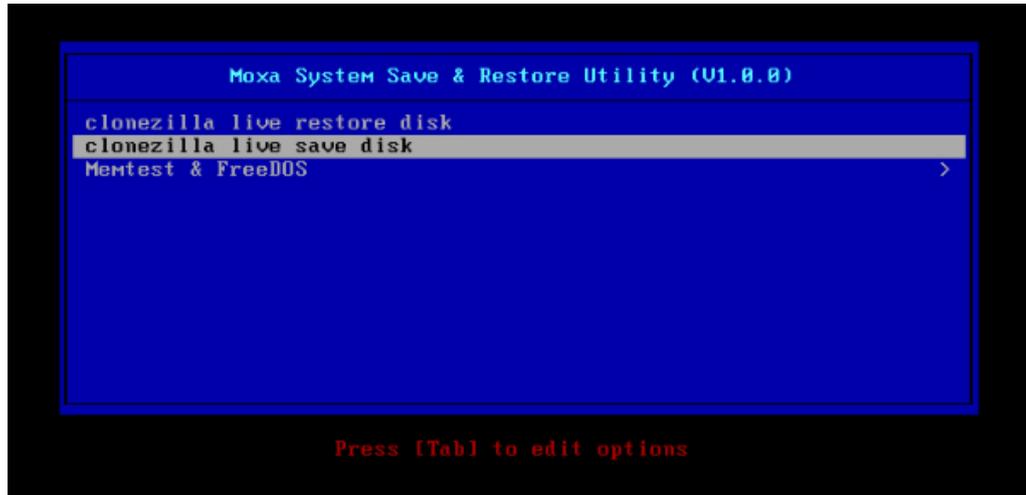


Saving the System to the USB Drive

You may also save the current system to the USB drive for system recovery in case the system crashes. Before saving the system to the USB drive, we suggest you remove all files under `\home\partimag\` on the USB drive. In addition, change the BIOS settings to make the USB drive the first boot priority.

When the system has been launched, take the following steps.

1. Select **clonezilla live save disk**.



2. Wait for the USB drive boot process to finish.

```

[ 5.141941] sd 0:0:1:0: [sdb] Attached SCSI disk
[ 5.257277] sd 0:0:0:0: Attached scsi generic sg0 type 0
[ 5.269691] sd 0:0:1:0: Attached scsi generic sg1 type 0
[ 5.280668] sr 1:0:0:0: Attached scsi generic sg2 type 5
Begin: Loading essential drivers ... [ 5.772551] Atheros(R) L2 Ethernet Driver - version 2.2.3
[ 5.774561] Copyright (c) 2007 Atheros Corporation.
[ 5.863196] Broadcom NetXtreme II 5771x 10Gigabit Ethernet Driver bnx2x 1.62.00-6 (2011/01/30)
[ 6.005932] Btrfs loaded
[ 6.054095] device-mapper: uevent: version 1.0.3
[ 6.059737] device-mapper: ioctl: 4.19.1-ioctl (2011-01-07) initialised: dm-devel@redhat.com
done.
Begin: Running /scripts/init-premount ... done.
Begin: Mounting root file system ... [ 6.289382] Uniform Multi-Platform E-IDE driver
[ 6.301889] ide_generic: please use "probe_mask=0x3f" module parameter for probing all legacy ISA
IDE ports
[ 6.801141] NTFS driver 2.1.30 [Flags: R/W MODULE].
[ 6.914295] NTFS volume version 3.1.
Begin: Running /scripts/live-premount ... done.
[ 7.331989] FAT: utf8 is not a recommended IO charset for FAT filesystems, filesystem will be cas
e sensitive!
[ 7.453369] aufs: module is from the staging directory, the quality is unknown, you have been war
ned.
[ 7.479098] aufs 2.1-standalone.tree-38-rcN-20110228
[ 7.610228] loop: module loaded
[ 7.905144] squashfs: version 4.0 (2009/01/31) Phillip Lougher
Begin: Running /scripts/live-realpremount ... done.
Begin: Mounting "/live/image/live/filesystem.squashfs" on "//filesystem.squashfs" via "/dev/loop0" .
.. done.
done.
Begin: Running /scripts/live-bottom
... Begin: Configuring fstab ... done.
Begin: Preconfiguring networking ... done.
Begin: Loading preseed file ... done.
Begin: Running /scripts/init-bottom ... done.
INIT: version 2.88 booting
Using makefile-style concurrent boot in runlevel S.
_
  
```

3. Enter **y** to continue.

```

Setting the TERM as linux
*****
Clonezilla image dir: /home/partimag
*****
Shutting down the Logical Volume Manager
. No volume groups found
. No volume groups found
Finished Shutting down the Logical Volume Manager
Selected device [sda] found!
The selected devices: sda
*****
Activating the partition info in /proc... done!
Selected device [sda] found!
The selected devices: sda
Searching for data partition(s)...
Excluding busy partition or disk...
Unmounted partitions (including extended or swap): sda1
Collecting info.. done!
Searching for swap partition(s)...
Excluding busy partition or disk...
Unmounted partitions (including extended or swap): sda1
Collecting info.. done!
The data partition to be saved: sda1
The swap partition to be saved:
Activating the partition info in /proc... done!
Selected device [sda1] found!
The selected devices: sda1
Getting /dev/sda1 info...
*****
The following step is to save the hard disk/partition(s) on this machine as an image:
*****
Machine: VirtualBox
sda (2103MB_VBOX_HARDDISK_ata-VBOX_HARDDISK_VB1c64a0a3-c9f7523d)
sda1 (2065MB_ntfs(In_VBOX_HARDDISK_)_ata-VBOX_HARDDISK_VB1c64a0a3-c9f7523d)
*****
-> "/home/partimag/xpe_savedisk".
Are you sure you want to continue? ? (y/n) y

```

4. Wait for the process to finish.

```

/dev/sdb1: read failed after 0 of 2048 at 0: Input/output error
. No volume groups found
. No volume groups found
Finished Shutting down the Logical Volume Manager
Checking the integrity of partition table in the disk /dev/sda...
Reading the partition table for /dev/sda..RETV=0
*****
done!
Saving the MBR data for sda...
1+0 records in
1+0 records out
512 bytes (512 B) copied, 0.00347646 s, 147 kB/s
*****
Starting saving /dev/sda1 as /home/partimag/xpe_savedisk/sda1.XXX...
/dev/sda1 filesystem: ntfs.
*****
Checking NTFS integrity in /dev/sda1... done!
Checking the disk space...
Use ntfsclone with gzip to save the image.
Image file will be split with size limit 1000000 MB.
*****
If this action fails or hangs, check:
* Is the disk full ?
*****
ntfsclone v2.0.0 (libntfs 10:0:0)
NTFS volume version: 3.1
Cluster size : 2048 bytes
Current volume size: 2064510976 bytes (2065 MB)
Current device size: 2064513024 bytes (2065 MB)
Scanning volume ...
100.00 percent completed
Accounting clusters ...
Space in use : 1770 MB (85.7%)
Saving NTFS to image ...
L 0.64 percent completed

```

5. Select **(0) Poweroff** so that the computer will power off when the process is finished.

```
Restoring the first 446 bytes of MBR data, i.e. executable code area, for sda... done!
*****
Now resize the partition for sda1
ntfsresize -f /dev/sda1
ntfsresize v2.0.0 (libntfs 10:0:0)
Device name      : /dev/sda1
NTFS volume version: 3.1
Cluster size     : 2048 bytes
Current volume size: 2064511488 bytes (2065 MB)
Current device size: 2064513024 bytes (2065 MB)
New volume size   : 2064511488 bytes (2065 MB)
Nothing to do: NTFS volume size is already OK.
*****
The grub directory is NOT found. Maybe it does not exist (so other boot manager exists) or the file
system is not supported in the kernel. Skip running grub-install.
*****
Found NTFS boot partition among the restored partition(s): /dev/sda1
Head and sector no. of /dev/sda from EDD: 64, 63.
The start sector of NTFS partition /dev/sda1: 63
Adjust filesystem geometry for the NTFS partition: /dev/sda1
Running: partclone.ntfsfixboot -w -h 64 -t 63 -s 63 /dev/sda1
ntfsfixboot version 0.9
done!
*****
*****
This program is not started by Clonezilla server, so skip notifying it the job is done.
Finished!
Now syncing - flush filesystem buffers...

"ocs-live-restore" is finished.
Now you can choose to:
(0) Poweroff
(1) Reboot
(2) Enter command line prompt
(3) Start over
[2]
```