

# **V2416 Series WinXP Embedded User's Manual**

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# V2416 Series WinXP Embedded User's Manual

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# Table of Contents

|   |            |
|---|------------|
| <b>1. Introduction</b> .....                                | <b>1-1</b> |
| Overview .....  | 1-2        |
| Software Specifications.....                                | 1-2        |
| Application Development Environment .....                   | 1-2        |
| Networking and Communication Capabilities .....             | 1-3        |
| Supporting Services and Daemons .....                       | 1-4        |
| How to Determine Firmware Build Versions.....               | 1-4        |
| Inserting a USB Mass Storage Device into the Computer ..... | 1-5        |
| Inserting a CF Card in the Computer .....                   | 1-5        |
| Inserting SATA hard disks into a V2416 Computer .....       | 1-6        |
| Four RS-232/422/485 Serial Ports .....                      | 1-7        |
| Digital Input/Output Channels.....                          | 1-7        |
| <b>2. Software Configuration</b> .....                      | <b>2-1</b> |
| Starting Your V2416-XPE Computer .....                      | 2-2        |
| Resetting Your V2416-XPE Computer .....                     | 2-2        |
| Configuring the Display Settings.....                       | 2-2        |
| Changing the Network Settings .....                         | 2-5        |
| Operating Your V2416-XPE Computer with a Telnet Client..... | 2-5        |
| Adjusting the System Time .....                             | 2-6        |
| Starting and Stopping Services.....                         | 2-7        |
| Simple Network Management Protocol (SNMP) .....             | 2-7        |
| Remote Desktop (RDP).....                                   | 2-8        |
| Serial Ports .....  | 2-9        |
| Enhanced Write Filter .....                                 | 2-10       |
| File Based Write Filter .....                               | 2-10       |
| HDD Hot Swap Function Configuration.....                    | 2-12       |
| Starting the mxhtspd Function .....                         | 2-12       |
| Configuring the Disk Drive Letters for Disk Removal .....   | 2-13       |
| Programming the Scripts.....                                | 2-14       |
| Checking the Log File.....                                  | 2-16       |
| <b>3. Management Tools</b> .....                            | <b>3-1</b> |
| Computer Management .....                                   | 3-2        |
| Component Services .....                                    | 3-2        |
| Event Viewer.....   | 3-2        |
| Internet Information Services (Web/FTP).....                | 3-3        |
| ODBC Data Source Administrator.....                         | 3-6        |
| Performance Monitor .....                                   | 3-7        |
| Services .....  | 3-7        |
| <b>4. System Recovery</b> .....                             | <b>4-1</b> |
| Recovery Environment .....                                  | 4-2        |
| Recovery Procedure .....                                    | 4-2        |

## Introduction

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Thank you for purchasing the Moxa's V2416 x86 ready-to-run embedded computers. This manual introduces the software configuration and management of V2416 computers running the Windows Embedded Standard 2009 operating system. For hardware installation, connector interfaces, setup procedures, and upgrading the BIOS, please refer to the V2416 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 V2416 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**

**□ Inserting a CF Card in the Computer**

**□ Inserting SATA hard disks into a V2416 Computer**

- Four RS-232/422/485 Serial Ports
- Digital Input/Output Channels

## Overview

V2416 embedded computers come with four RS-232/422/485 serial ports, making it ideal for connecting a wide range of serial devices. The dual 10/100/1000 Mbps Ethernet ports offer a reliable solution for network redundancy, delivering continuous operations for data communication and management. As an added convenience, the V2416 computer has six DIs and two DOs for connecting digital input/output devices.

In addition, the CompactFlash and USB sockets provide the V2416 computer with the reliability needed for industrial applications that require data buffering and storage expansion. Most importantly, the V2416 computer comes with 2 removable slots for inserting additional storage media, such as hard disks or SSD drives; it also supports hot swapping for convenient, fast and easy storage expansion. The V2416 provides user-defined programmable LEDs and a related API for storage management, supporting storage plug/unplug functionality, automatic storage removal and storage status display. Moreover, API Library is included for easy development and storage capacity notification.

Pre-installed with Windows Embedded Standard 2009, the V2416 provides programmers with a friendly environment for developing sophisticated, bug-free application software at a low cost.

## Software Specifications

The software features of the V2416-XPE embedded computers are listed below:

### Application Development Environment

The V2416 is fully compatible with the XP Professional Development Environment.

The V2416'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 V2416, 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.
- **ASP.NET 2.0**—A unified Web application platform that provides the services necessary to build and deploy enterprise-class Web 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 inetcp.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 V2416-XPE embedded computer provides powerful hardware communication interfaces for network-centric embedded applications, including 2 Ethernet and 4 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 V2416-XPE embeds the services and daemons shown below. These common and easy-to-use application servers help users migrate industrial communication applications to the V2416-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

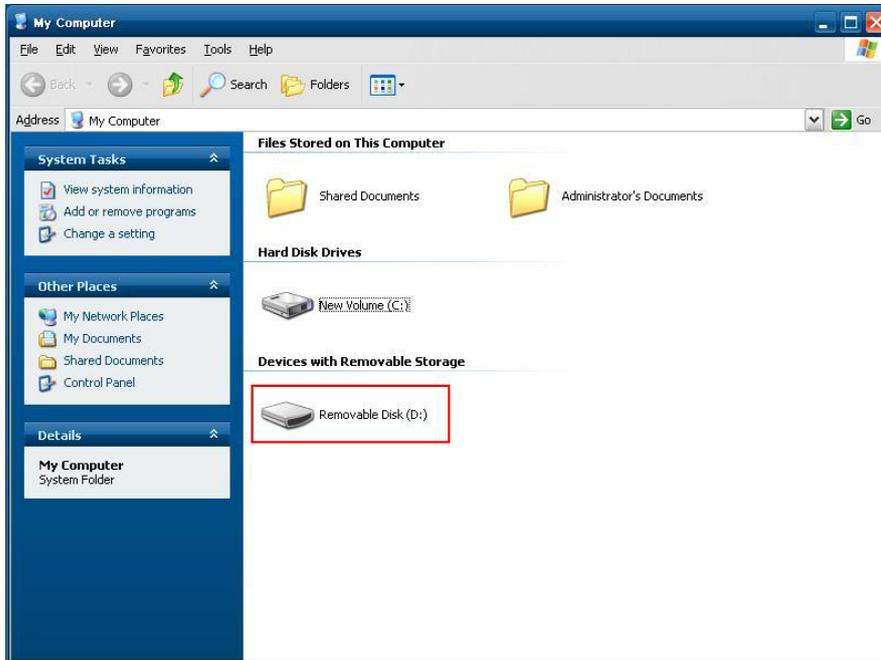
Use the **mxver** command to obtain the firmware version of the V2416-XPE embedded computer. This information is particularly important for identifying which features your embedded computer supports.

- Execute the mxver.exe command line utility.

**Model Name: V2416-XPE**  
**Build Dat: 11030714**  
**Version: V1.0**

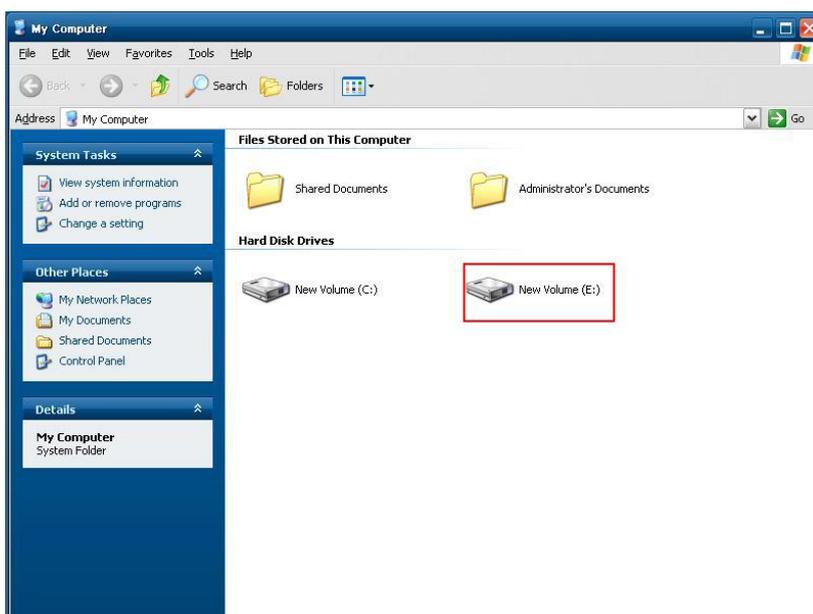
# Inserting a USB Mass Storage Device into the Computer

Inserting a USB mass storage device will generate a new drive on the V2416-XPE. The new drive should be visible in the File Explorer.



# Inserting a CF Card in the Computer

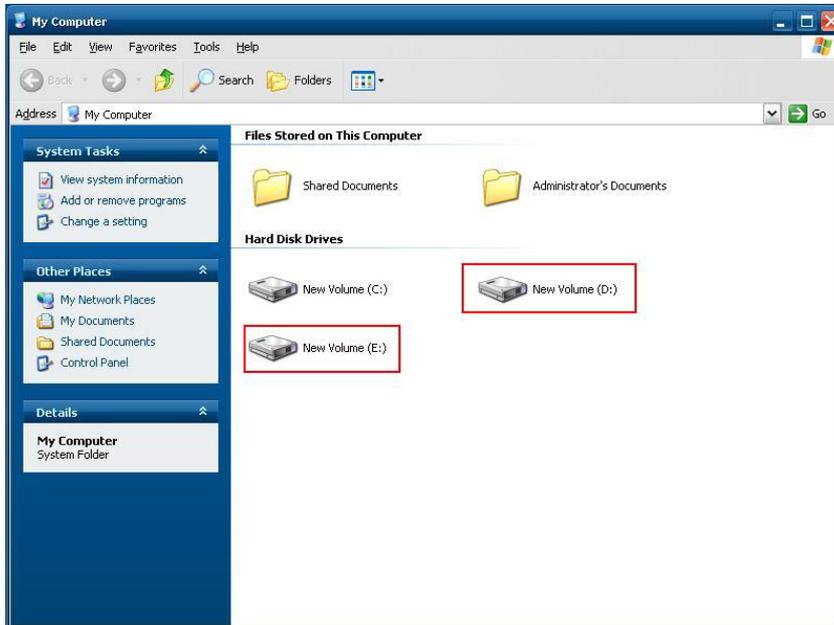
Note that the V2416-XPE computer is shipped with a CompactFlash card already inserted and the Windows Embedded Standard 2009 platform installed. However, if you have installed the operating system on the hard disk, the CF card can be used for storage expansion. When inserted, the CF drive will be detected as a new disk in the File Explorer.



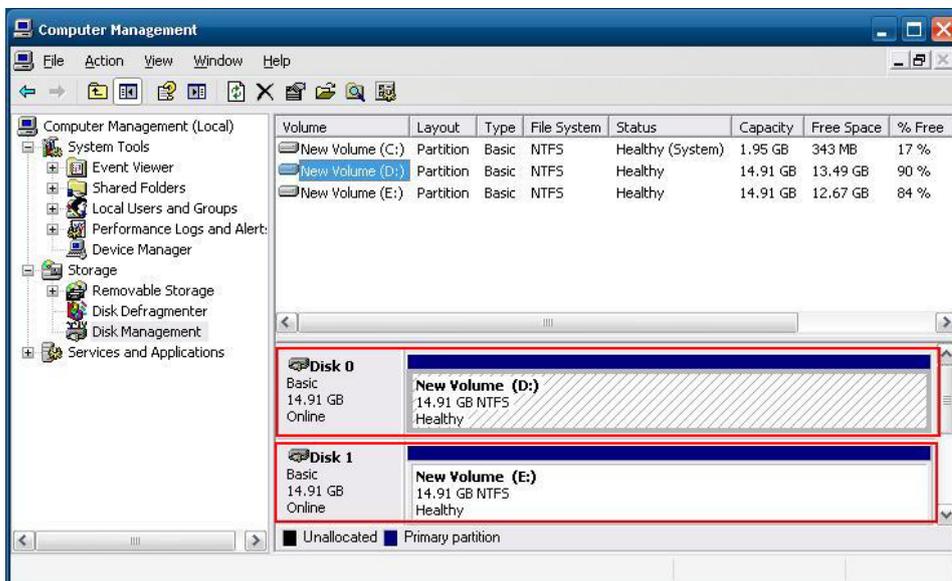
**The V2416-XPE does not support CF "Plug and Play" and "Hot Swap." Please make sure to turn off the computer before inserting a new CF card.**

# Inserting SATA hard disks into a V2416 Computer

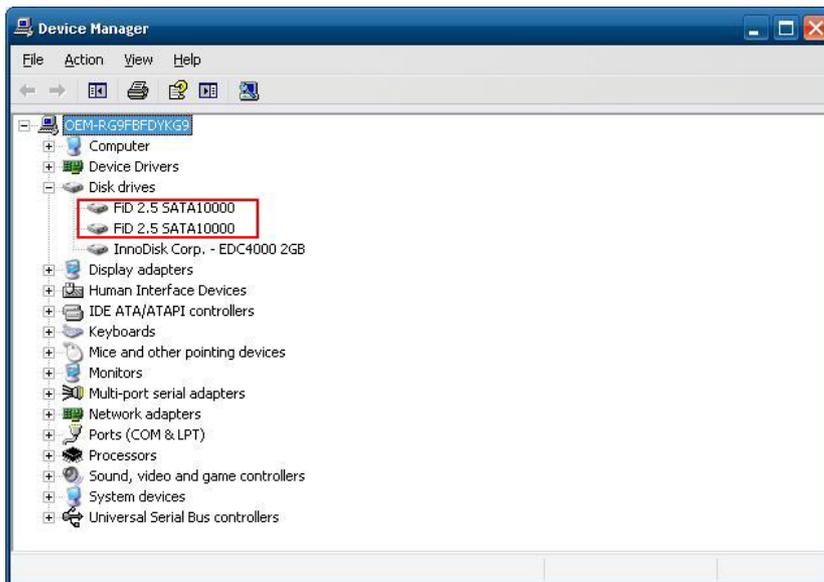
The V2416-XPE computer offers two removable disk trays that can be fit two SATA hard disks for storage expansion. Before installing hard disks, make sure that the computer is powered off. Insert the SATA hard disk devices will create new disks in the V2416-XPE. You should see it in the File Explorer.



You can also find the hard disks in the computer management screen.



The disks can also be found in **Control Panel/Device Manager**



**NOTE: The V2416 embedded computer supplies only 5V DC power for 2.5 inch SATA hard disks. If you want to use a 3.5 inch hard disk, you will need to use an external power supply for your SATA hard disk.**

## Four RS-232/422/485 Serial Ports

The serial ports of the V2416-XPE computer from bottom to top are named "COM1" to "COM4" COM1 to COM4 are RS-232/422/485 serial ports. Each of these ports supports baudrate settings of up to 921.6 Kbps.

## Digital Input/Output Channels

The V2416 provides six digital input and two digital output channels. You can set the operation mode by programming; the example "DIO" can be found under `\examples\C++\` of the Software DVD.

The code snippet is as follows:

```

/*
    index[n]: 0 ; BIT 0
              1 ; BIT 1
              2 ; BIT 2
              3 ; BIT 3
              ....
    data[n]: 0 ; Digital LOW
            1 ; Digital HIGH

*/
unsigned int    hDIO;
unsigned int port_no;
int data;
int intDout,intDin;
int nDout=0;
int port=0,mode=0;
int n=0;
WCHAR sin,smode;
printf("UART Mode Test Program\n");
printf("\t (0) Exit Program\n");
printf("\t (1) Display DIN\n");
printf("\t (2) Display DOUT\n");

```

```

printf("\t (3) Set DOUT value\n");
    printf("\t (4) Display both DIN and DOUT\n");
sin=getwchar();
n=_wtoi(&sin);
do
{
    switch (n)
    {
        // if char == '1', display the digital input
        case 1:
            //Open dio
            hDIO=mxdio_open();
            for(int i=0;i<=5;i++)
            {
                //Get digital input
                port_no=i;
                intDin=mxdio_get_din(hDIO,port_no);
                printf("Din%d = %d\n",port_no,intDin);
            }
            //Close DIO
            mxdio_close(hDIO);
            break;
        // if char == '2', display the digital output
        case 2:
            //Open dio
            hDIO=mxdio_open();
            for(int i=0;i<=1;i++)
            {
                //Get digital input
                port_no=i;
                intDin=mxdio_get_dout(hDIO,port_no);
                printf("Dout%d = %d\n",port_no,intDin);
            }
            //Close DIO
            mxdio_close(hDIO);
            break;
        // if char == '3', Set the digital output
        case 3:

            //Get Port Number
            getchar();
            printf("Input the Port Number (0 ~ 1) = \n");
            smode=getwchar();
            port_no=_wtoi(&smode);

            //Get Value
            getchar();
            printf("Input the value (0 or 1) = ");
            smode=getwchar();
            data=_wtoi(&smode);

            //Open DIO
            hDIO=mxdio_open();
            //Set DOUT
            nDout=mxdio_set_dout(hDIO,port_no, data);

```

```

        if(!nDout)
        {
            printf("Set digital output fail!\n");
        }
        else
        {
            printf("Set digital output success!\n");
        }
        //Close DIO
        mxdio_close(hDIO);
        break;
    case 4:
        // if char == '4', Get both digital input and digital output
        //Open dio
        hDIO=mxdio_open();
        for(int i=0;i<=5;i++)
        {
            //Get digital input
            port_no=i;
            intDin=mxdio_get_din(hDIO,port_no);
            if(intDin==-1)
            {
                printf("\n");
            }
            else
            {
                printf("Din%d = %d ",port_no,intDin);
            }
            intDout=mxdio_get_dout(hDIO,port_no);
            if(intDout==-1)
            {
                printf("\n");
            }
            else
            {
                printf(", Dout%d = %d\n",port_no,intDout);
            }
            //printf("Din%d = %d, Dout%d =
%d\n",port_no,intDin,port_no,intDout);
        }
        //Close DIO
        mxdio_close(hDIO);
        break;
    }
    getch();
    sin = getch();
    n = _wtoi(&sin);
} while (n != 0);

```

# Software Configuration

---

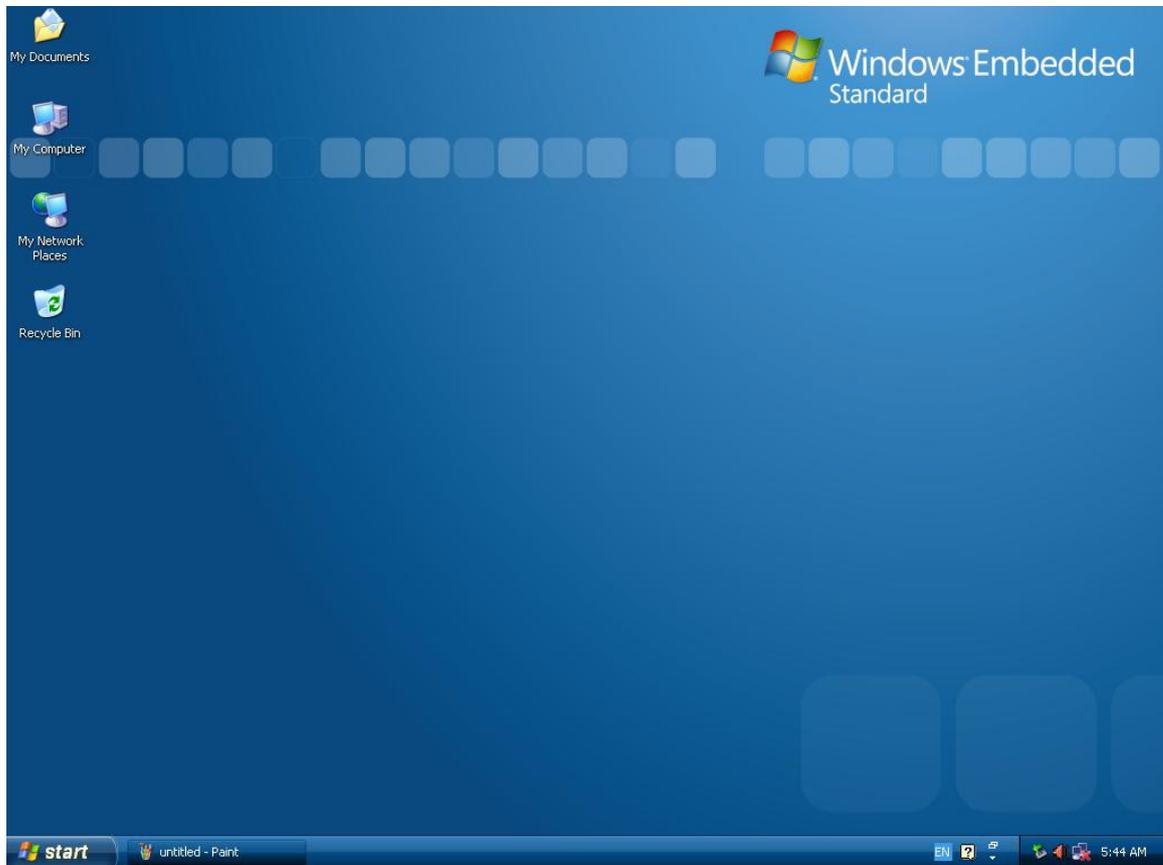
In this chapter, we explain how to operate a V2416-XPE computer directly or from a PC. Instructions are given on how to adjust the system time, troubleshoot network connectivity, and manage other functions. Some of these operations can be done with system commands after gaining access to the computer, 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 V2416-XPE Computer**
- ❑ **Resetting Your V2416-XPE Computer**
- ❑ **Configuring the Display Settings**
- ❑ **Changing the Network Settings**
- ❑ **Operating Your V2416-XPE Computer with a Telnet Client**
- ❑ **Adjusting the System Time**
- ❑ **Starting and Stopping Services**
- ❑ **Simple Network Management Protocol (SNMP)**
- ❑ **Remote Desktop (RDP)**
- ❑ **Serial Ports**
- ❑ **Enhanced Write Filter**
- ❑ **File Based Write Filter**
- ❑ **HDD Hot Swap Function Configuration**
  - Starting the mxhtspd Function
  - Configuring the Disk Drive Letters for Disk Removal
  - Programming the Scripts
  - Checking the Log File

## Starting Your V2416-XPE Computer

Connect the CRT monitor or LCD monitor to the target 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 V2416-XPE Computer

- **Reset Button**  
A Reset button is located on the front panel of V2416-XPE. Press the reset button to shut down your computer, just as you would do with a standard PC.
- **Software Shutdown / Reboot**  
Click **Start** → **Turn Off Computer** to reboot or shutdown the V2416-XPE computer.

## Configuring the Display Settings

The V2416-XPE computer offers dual displays which allow users to connect the displays in VGA or DVI-I interfaces. The default setting will allow one display only. If you would like to use dual displays, Use the following steps to adjust display settings.

1. Double-click the display icon at the bottom right of the screen.

2. Select **Display Devices** and choose the operation mode.

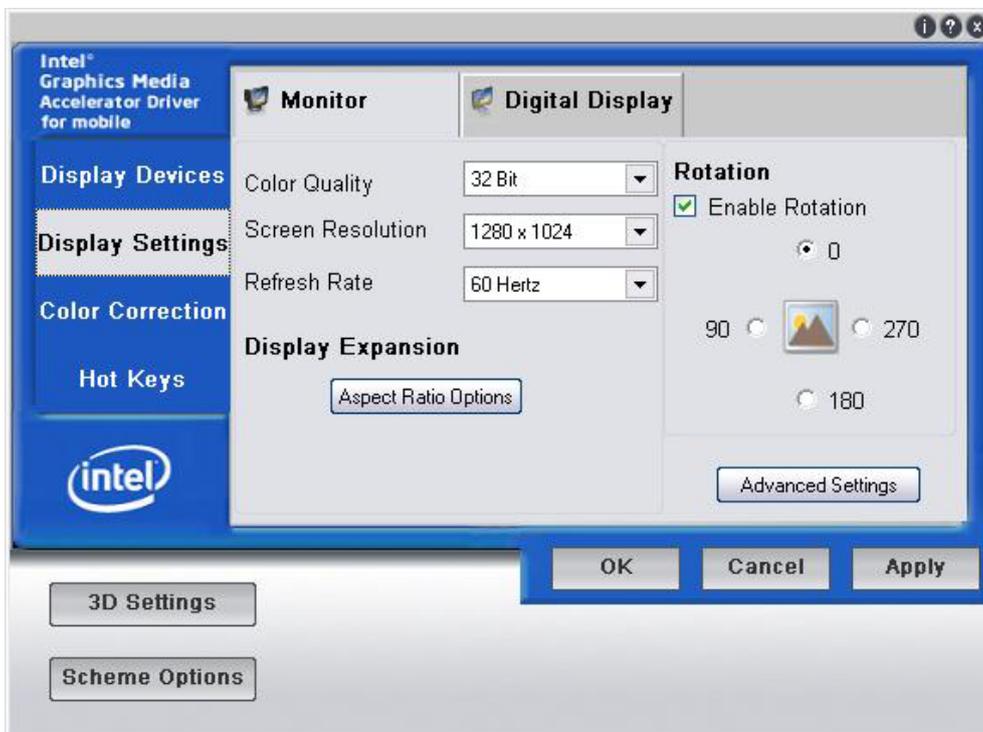
**Single Display:** This option allows one display to be used.

**Dual Display Clone:** This mode allows you to use two displays at the same time.

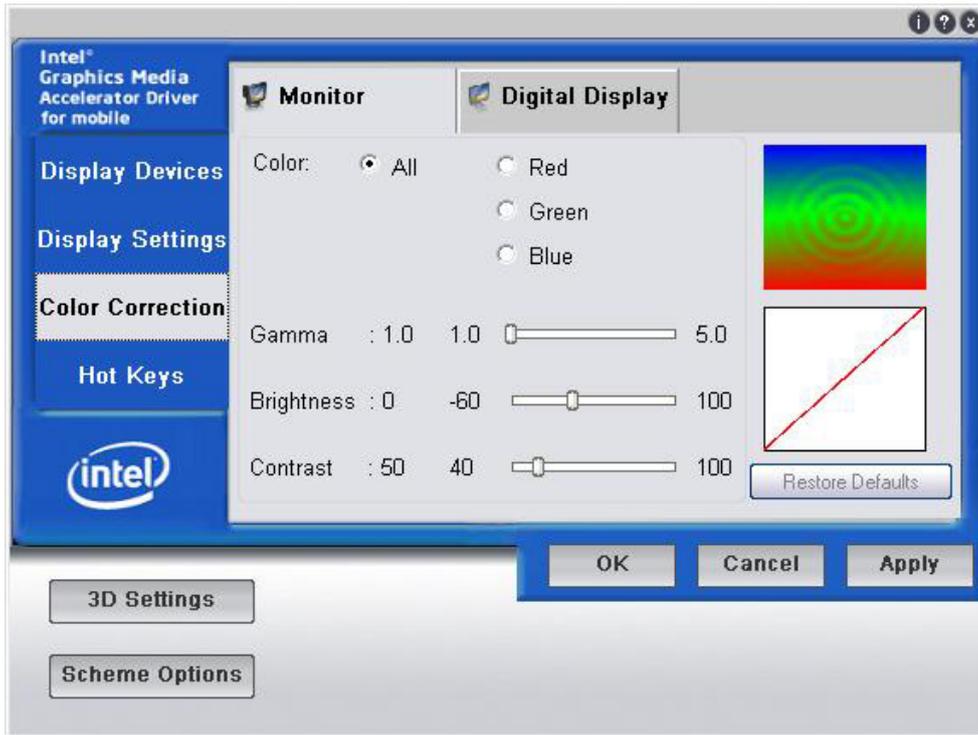
**Extended Desktop:** This mode allows you to use extended desktop function. You may use two displays to extend your desktop.



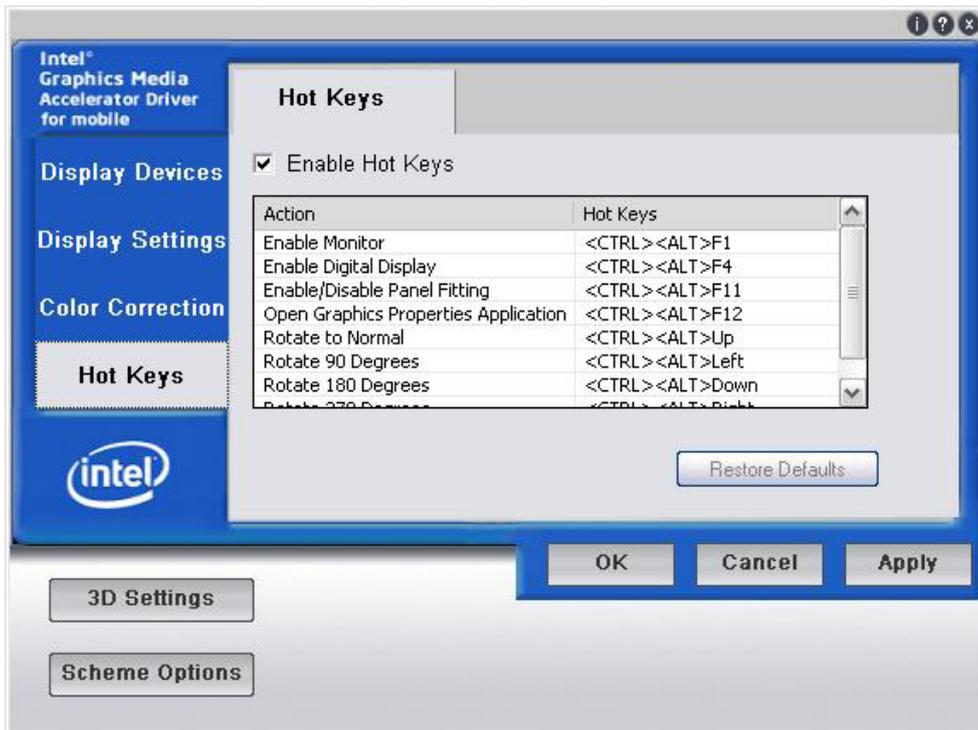
3. Select **Display Settings**, you may configure **Color Quality**, **Screen Resolution**, and **Refresh Rate** compatible with your displays. You may also select the **Enable Rotation** checkbox if you need rotation function.



4. Select **Color Correction**, you can adjust the color settings for your display.

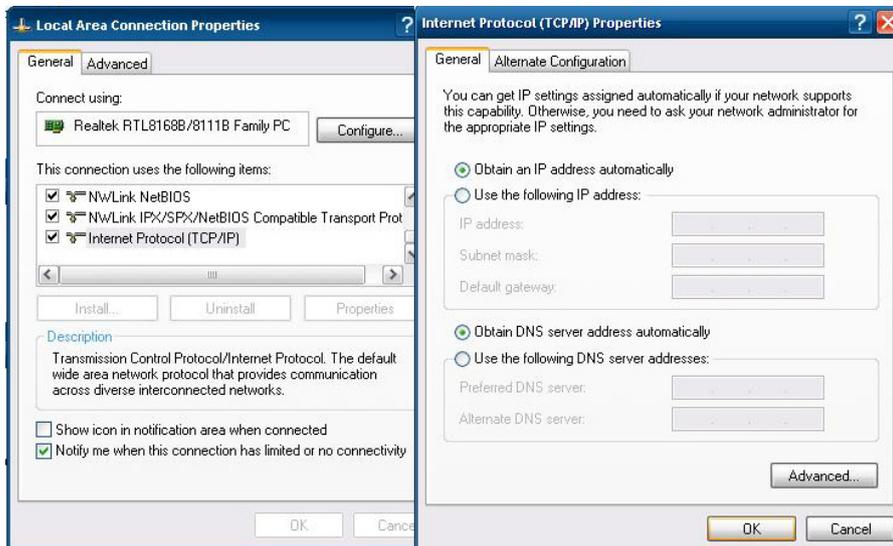


5. You can also use hot keys to change your display settings. When finished, click **Apply** and then **OK**.



## Changing the Network Settings

The V2416-XPE computer comes with two network interfaces. Both of the default IP addresses are DHCP. Choose **Start** → **Control panel** → **Network Connections** to enter the network settings page. Select the connection and choose **Properties** on the pop-up menu by right-clicking. You can specify the IP address manually or by DHCP. In addition, you can disable or enable either one or both connections with the pop-up menu.



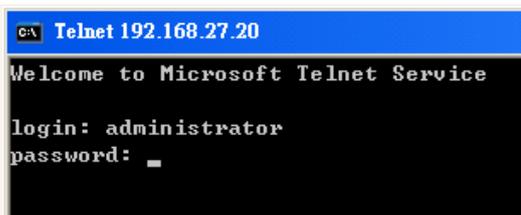
## Operating Your V2416-XPE Computer with a Telnet Client

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**.

**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.



```
C:\ Telnet 192.168.27.20
=====
Welcome to Microsoft Telnet Server.
=====
C:\Documents and Settings\Administrator>dir/b
Desktop
Favorites
My Documents
Start Menu

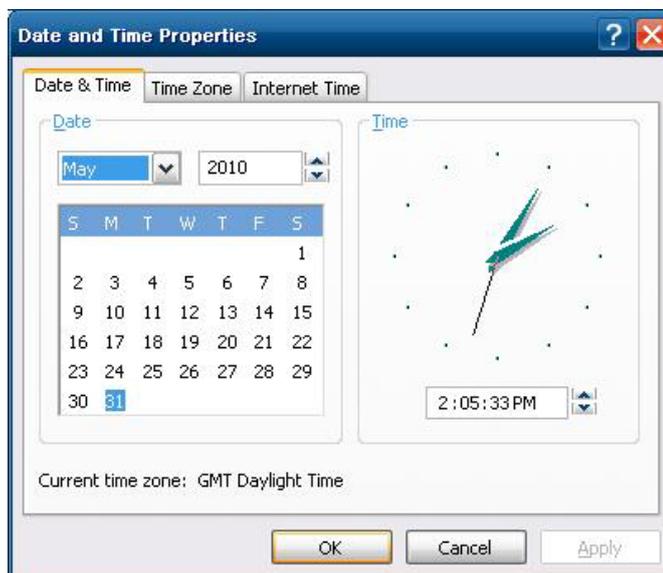
C:\Documents and Settings\Administrator>cd \

C:\>dir /b
Documents and Settings
Inetpub
mxver.exe
NTDETECT.COM
ntldr
Program Files
WERUNTIME.INI
WINDOWS

C:\>_
```

## 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.
- **Date/Time Control panel:** Go to the **Control Panel** and double click the **Date and Time** icon.

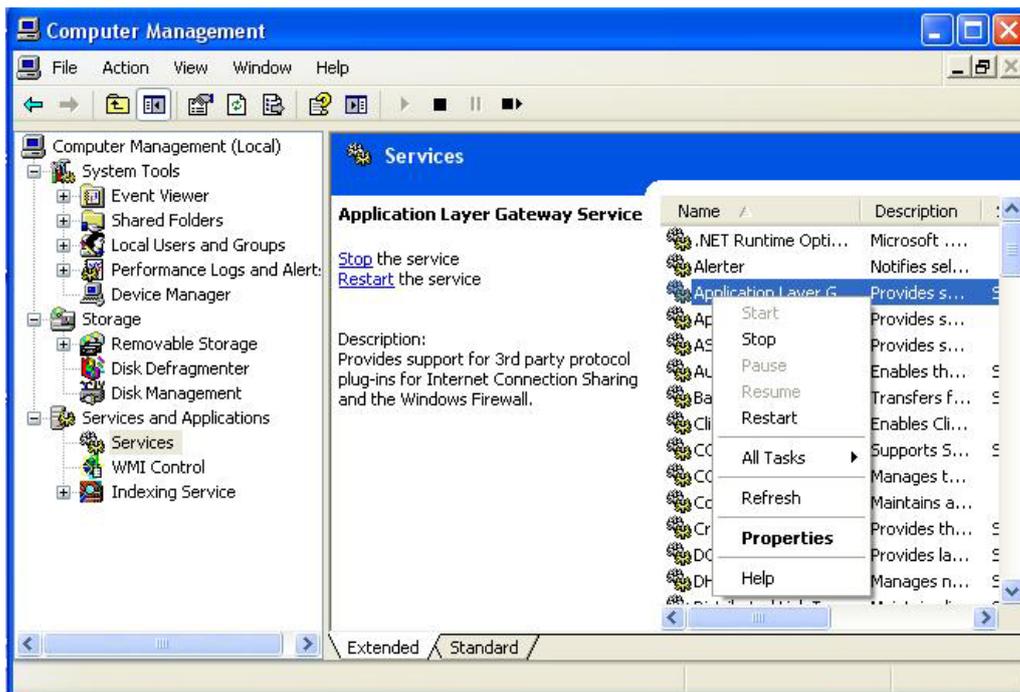


- **SNTP:** In the Date and Time Properties window, you can see the NTP server setting.



## 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 start.



## Simple Network Management Protocol (SNMP)

To check SNMP agent capabilities on a target V2416-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
```

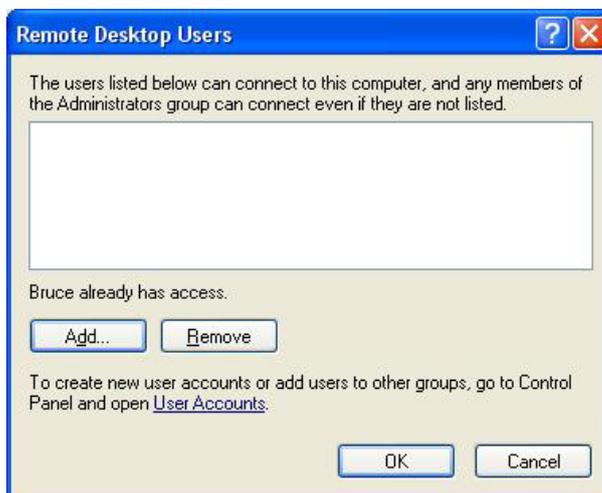
You will see a series of messages from the SNMP agent on the V2416-XPE computer that allow you to monitor and manage the computer.

# Remote Desktop (RDP)

You can connect to the target V2416-XPE computer remotely by using **Remote Desktop**. Right-click **My Computer** on your desktop, and select **Properties**. Click the **Remote** tab for further configuration.

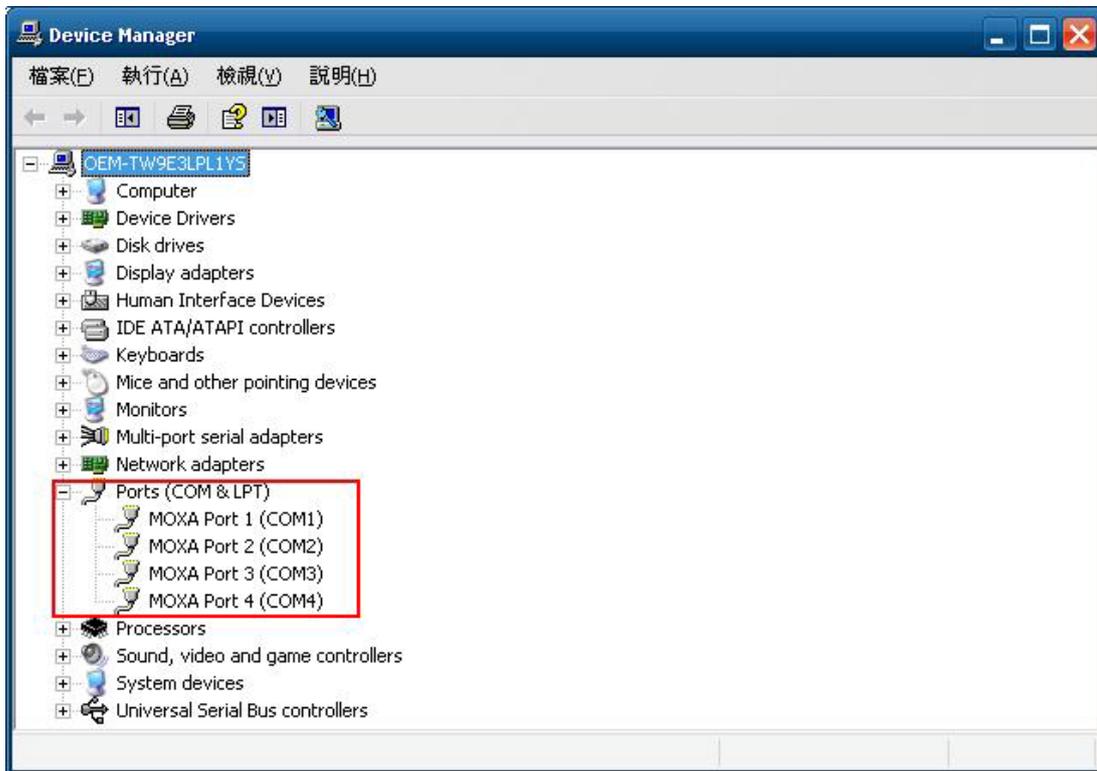


Make sure that the **Allow users to connect remotely to this computer** checkbox is selected. Next, click **Select Remote Users**, and add the users allowed to connect to your desktop. When finished, click **OK**.



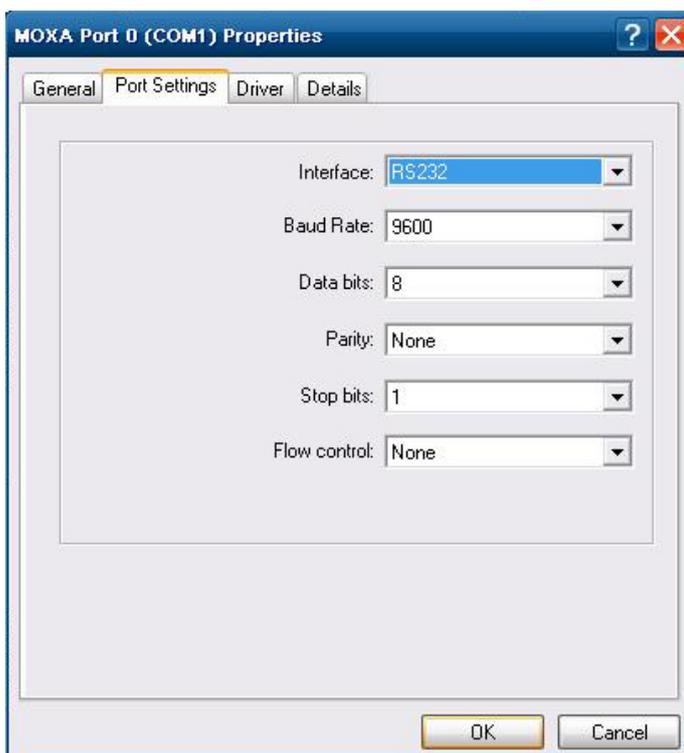
## Serial Ports

The V2416-XPE computer offers 4 serial ports, which can run RS-232, RS-422 or RS-485 serial interface. From **Control Panel** → **System** → **Hardware** → **Device Manager**, click **Ports (COM & LPT)**, you can see the four serial ports named COM1, COM2, COM3, and COM4.



Right-click the port you would like to configure, and then select **Properties**.

Select **Port Settings** tab, you can configure the serial port settings, such as interface, baudrate, (supports up to 921.6 Kbps), data bits, parity, stop bits and flow control method. 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 **EWFMGR C:** to check if the state of the Enhanced Write Filter is **Disabled**.
2. To enable the filter, type **EWFMGR C: -enable**.
3. Reboot the system to activate the change.
4. Delete a file on your protected volume and reboot the system; the file you just deleted will appear.

```

C:\WINDOWS\system32\cmd.exe

C:\Documents and Settings\Administrator>EWFMGR 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
  
```

## 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 the current FBWF status. The status defaults to **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:\>
  
```

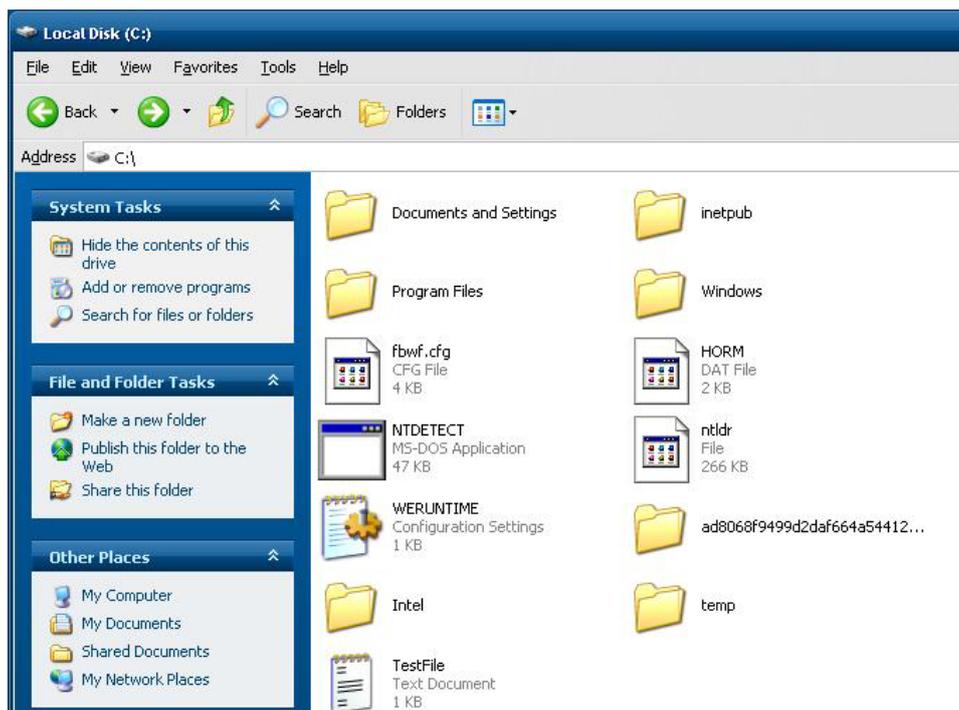
- When the system has rebooted, type **fbwfmgr /displayconfig** in the command prompt again to confirm that the status has been changed to **enabled**. The default folder for FBWF will be **\temp**. Type **fbwfmgr /help** for more detailed information.

```
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.

# HDD Hot Swap Function Configuration

The V2416-XPE computer comes with two removable and hot-swappable disk trays. Each tray includes an LED indicator and a button; both can be user-defined and programmed. See the following sections for detailed instructions on the Hot-swapping function for the computer.

## Starting the mxhtspd Function

The Moxa Hot-Swapping function will be automatically launched when you boot up the V2416-XPE embedded computer, and the removable hard disk can be monitored immediately.



Three actions will be handled by the **mxhtspd** program as the default settings.

**Handle the button action:** The button is related to corresponding hard disk. When you press the button, it can be automatically detected on the screen.



When you see **Disk has been unmounted** indication, you can remove the disk by pulling out the disk tray.

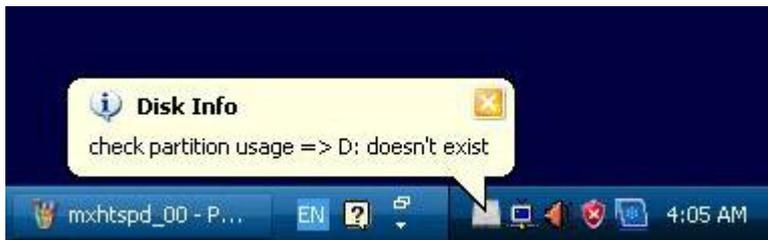


When a new hard disk is inserted, the system will automatically detect the hard disk and have it plugged into the system.



**Handle the LED action:** The LEDs are blinking when the hard disks are writing or sending data.

**Handle the disk capacity action:** When the storage use exceeds the limit set in the customizable settings, the LED will continuously blink to notify the user. The default setting is 90% disk utilization.



If you would like to change the disk capacity notification threshold, edit the file **mxhtspd.conf** under **C:\Program Files\MOXA\mxhtsp\config** and enter the new value:



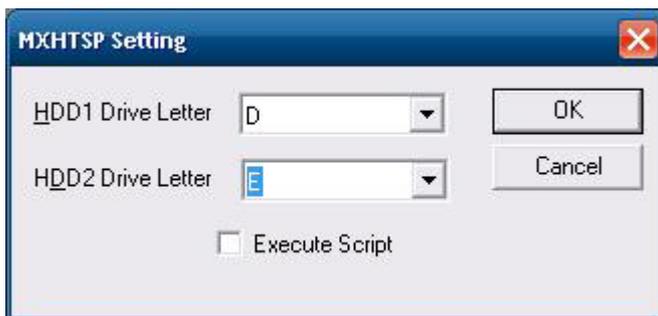
## Configuring the Disk Drive Letters for Disk Removal

The default drive letters are **Disk D** and **Disk E**. Disk D refers to the disk drive installed in the Disk 1 slot, and Disk E to Disk 2 slot. If you need to insert only one disk, we suggest you insert it in the Disk 1. However, you may still insert the disk in the Disk 2. If it happens, we strongly suggest you change the disk drive letter in the **mxhtspd** setting so that it will not affect the function when you push the LED to remove the disk. To do so, follow the instructions below:

1. Right-click the **mxhtspd** icon at the bottom right of the screen and then select **Setting**.



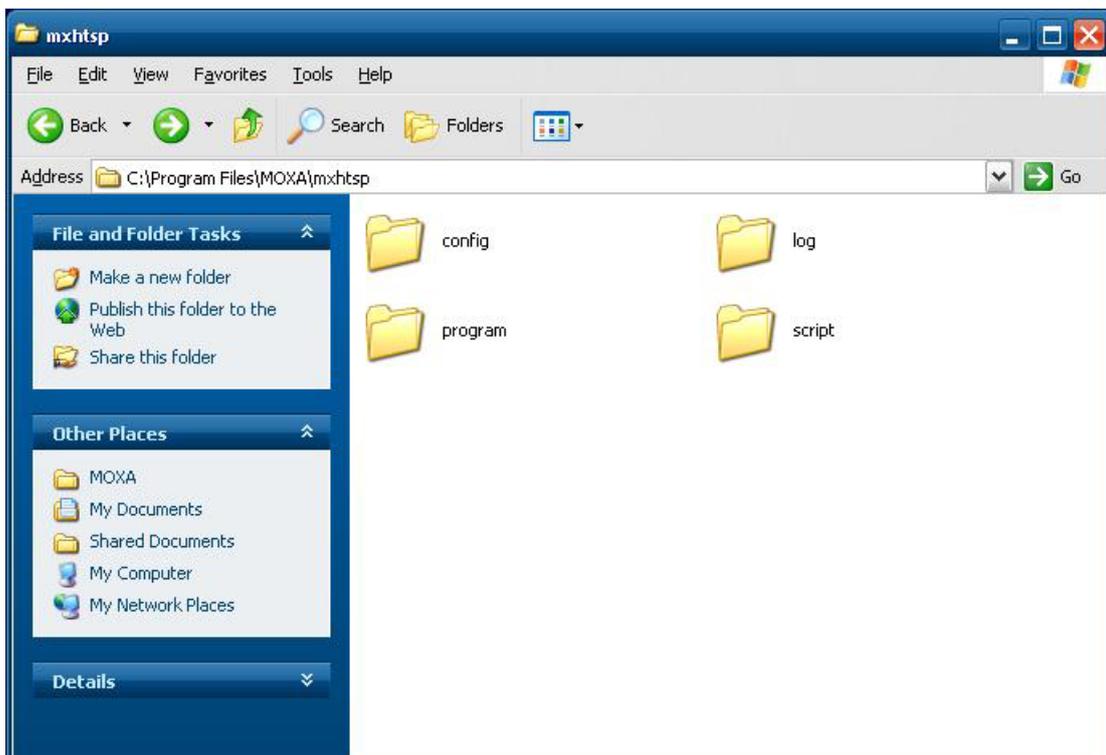
2. In the setting page, select the letter from the drop-down list for the specific hard disk. When finished, click **OK** to complete.



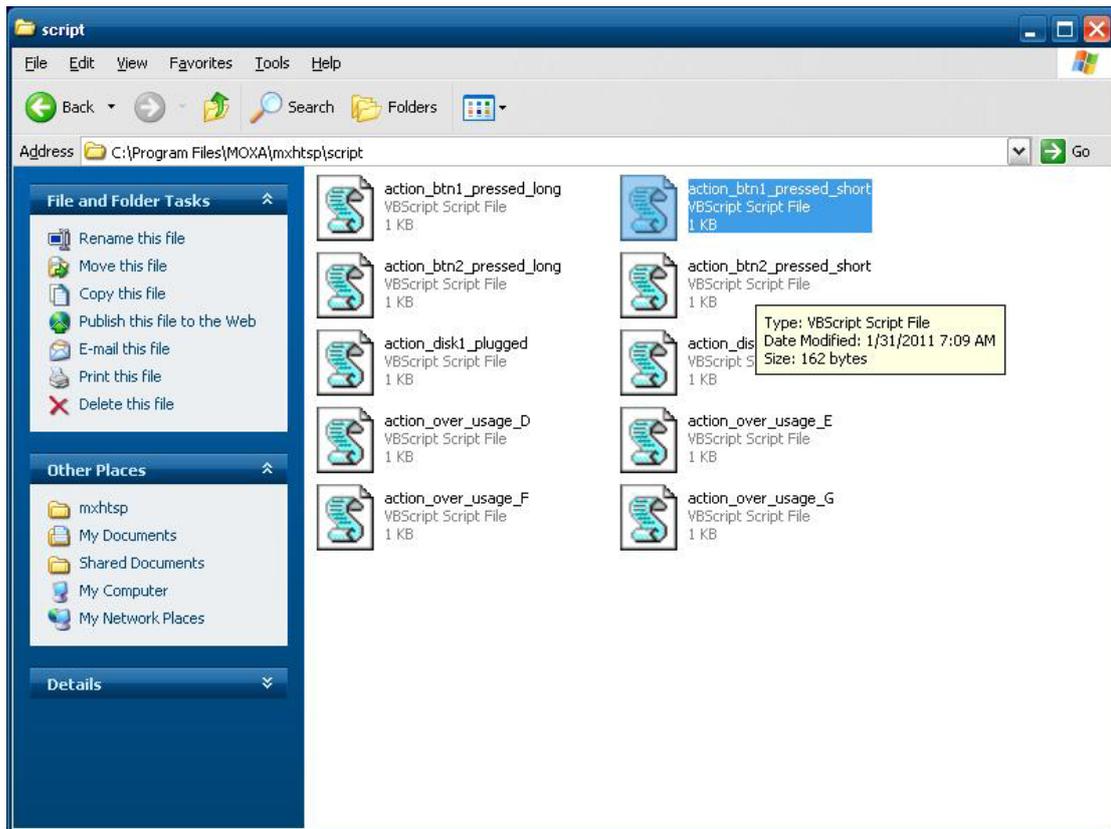
Please note that if the disk has been split into several disk partitions, just specify the first main drive letter. For example, if the disk in Disk 1 has been split as Disk D, Disk E, and Disk F, just set the Drive Letter as D. When you push the LED on the Disk 1, Disk D, E, and F all can be safely removed.

## Programming the Scripts

If you would like to customize the LED and button functions, use the scripts which are located under **C:\Program Files\MOXA\mxhtsp\script**.



Each script corresponds to a specific action. For example, when you press the Disk 1 button, the **action\_btn1\_press\_short.vbs** will be activated and the action pre-defined in the script will be executed. The script **action\_btn1\_press\_long.vbs** is activated when you press the button longer than 3 seconds.



Each script is defined as follows:

**action\_btn1\_press\_short.vbs:** This script is executed when Button 1 is pressed shorter than 5 seconds; the default action of this script is to remove the hard disk in Disk1.

**action\_btn1\_press\_long.vbs:** This script is executed when Button 1 is pressed longer than 5 seconds; the default action of this script is to blink the LED 1 three times.

**action\_btn2\_press\_short.vbs:** This script is executed when Button 2 is pressed shorter than 5 seconds; the default action of this script is to remove the hard disk in Disk 2.

**action\_btn2\_press\_long.vbs:** This script is executed when Button1 is pressed longer than 5 seconds, the default action of this script is to blink the LED2 three times.

**action\_disk1\_plugged.vbs:** This script is executed when Disk 1 is plugged; the default action of this script is to blink the LED 1 three times.

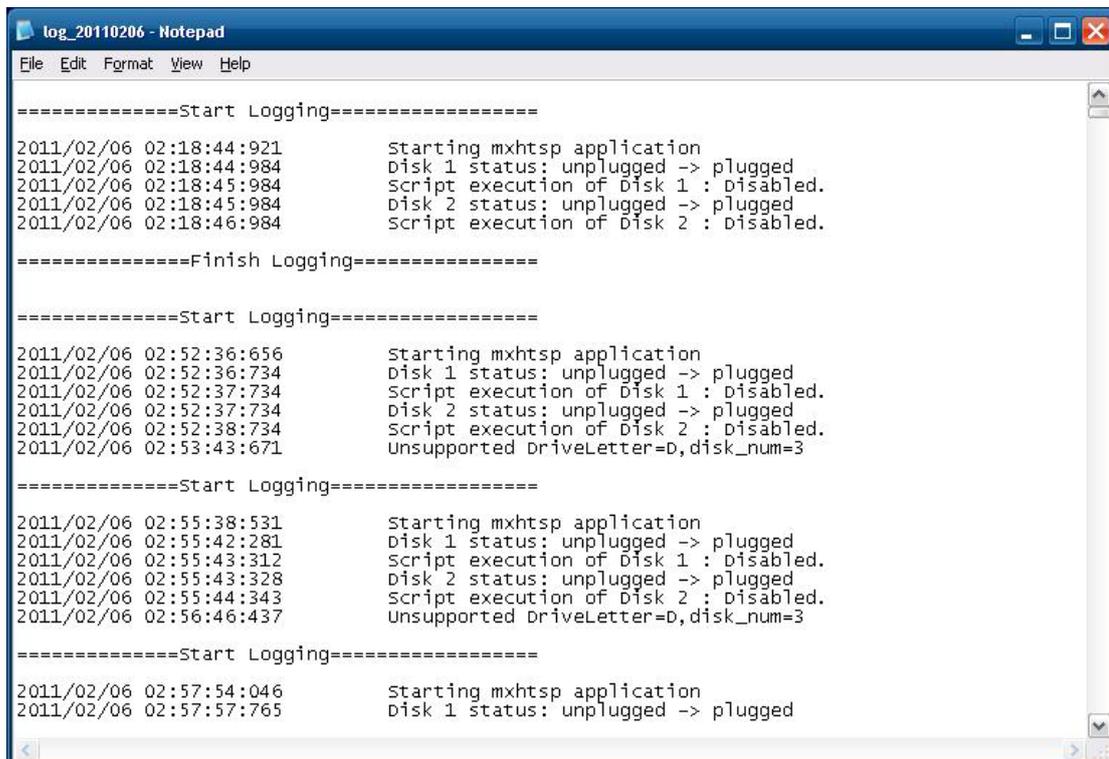
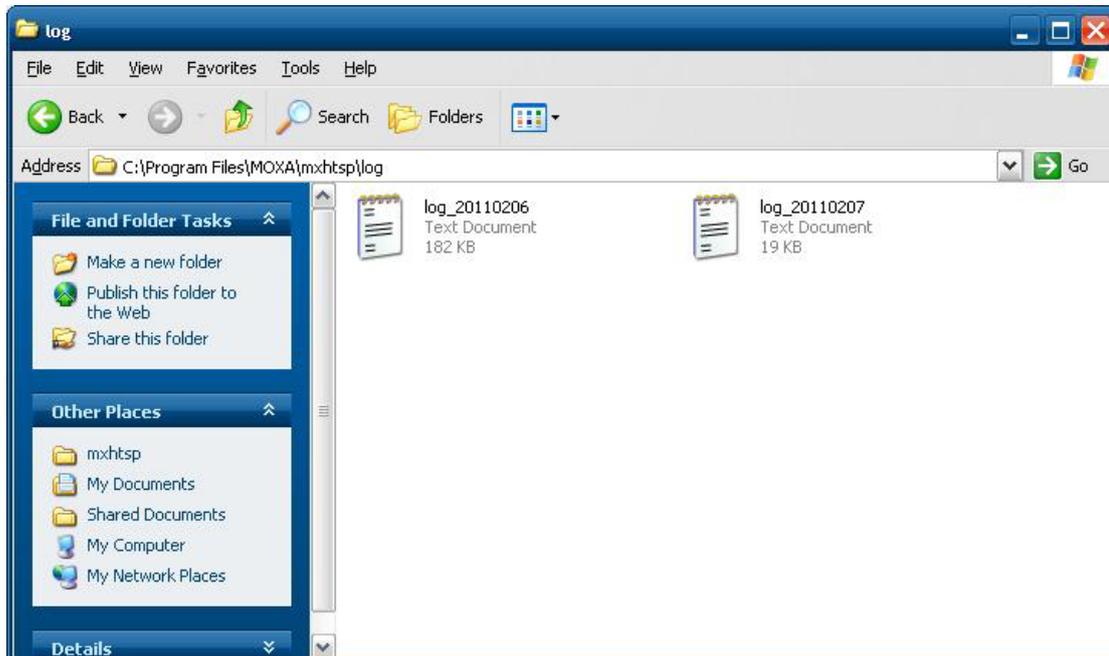
**action\_disk2\_plugged.vbs:** This script is executed when Disk 2 is plugged; the default action of this script is to blink the LED 1 three times.

**action\_over\_usage\_D.vbs:** This script is executed when the storage capacity of Disk D has been used over the setting in "mxhtspd.conf" under the "config" directory; the default action of this script is to blink the LED 1 three times. You should change the script file name at the same time when you change the disk name.

**action\_over\_usage\_E.vbs :** This script is executed when the storage capacity of Disk E has been used over the setting in "mxhtspd.conf" under the "config" directory; the default action of this script is to blink the LED 1 three times. If you change the disk drive letter, you should also change the corresponding script file name.

## Checking the Log File

The event of status or error will be logged into the log file in the directory **C:\Program Files\MOXA\mxhtsp\log**. Each log file is tagged with date, and the events are logged with date and time.



## Management Tools

---

The V2416-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 V2416-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.

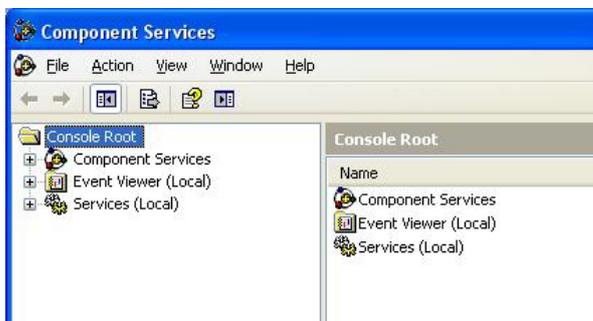
You can also check services in the Computer Management window.



# Component Services

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

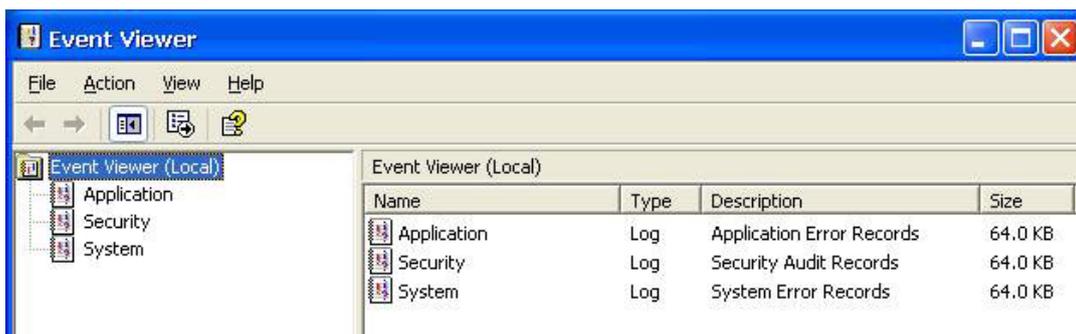
You can install/view/remove COM components with this tool.



# Event Viewer

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

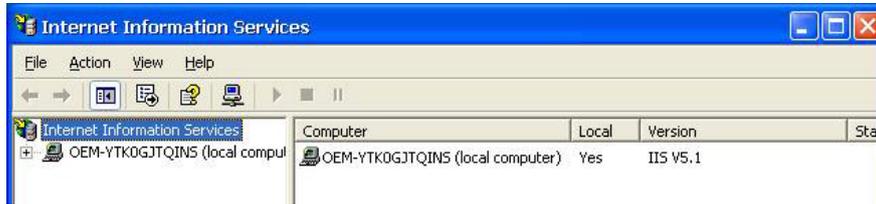
Every V2416-XPE event, including system, applications, and security events are logged in this event database.



# Internet Information Services (Web/FTP)

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

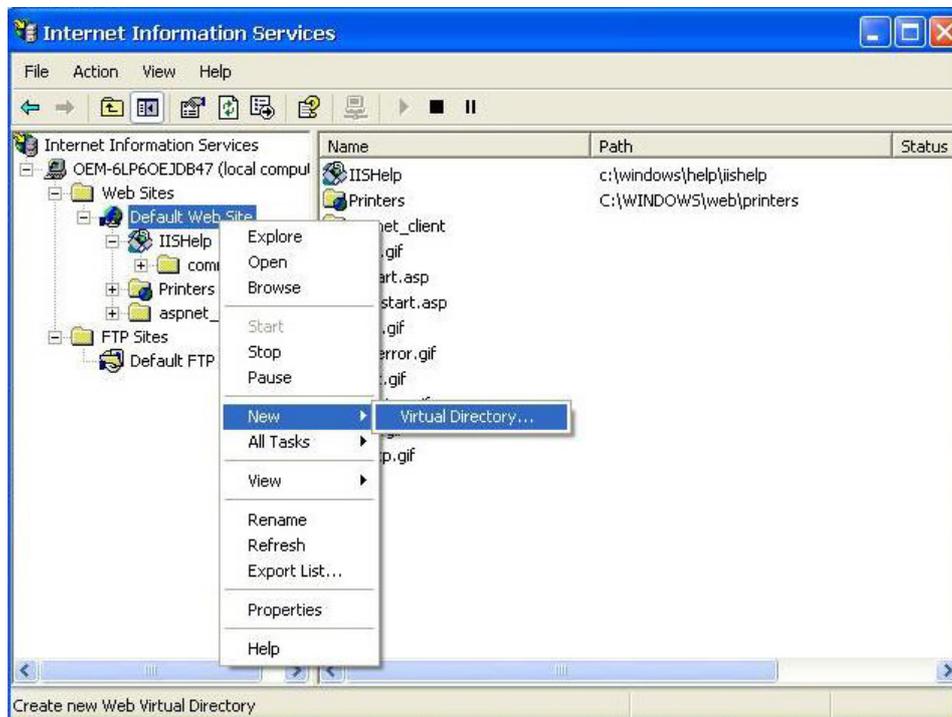
If you need to set up Web or FTP, you must use this tool for configuration purposes, and you can also start/stop HTTP/FTP services.



A default web page is located in the directory **c:\Inetpub**. Use this default page to test your web server.

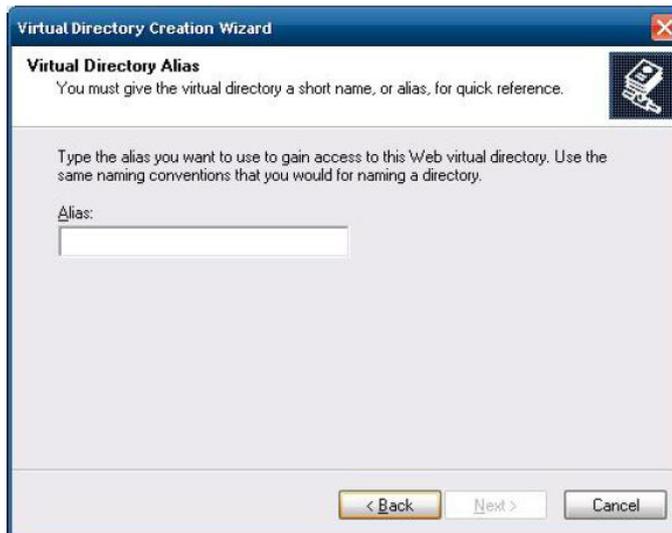
Follow the steps shown below to create the virtual directory.

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

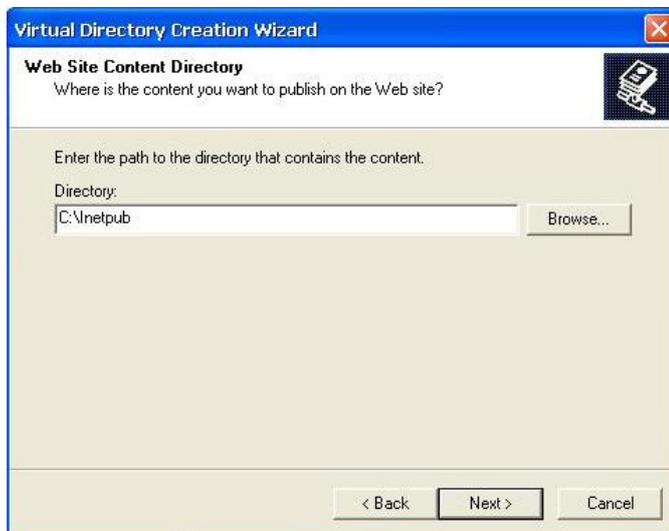
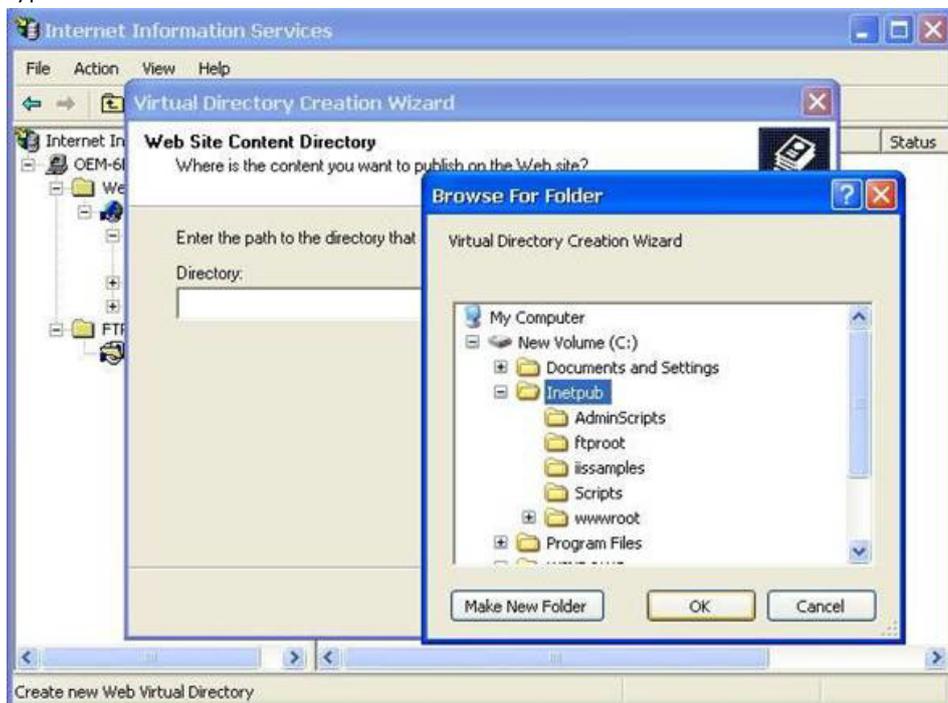


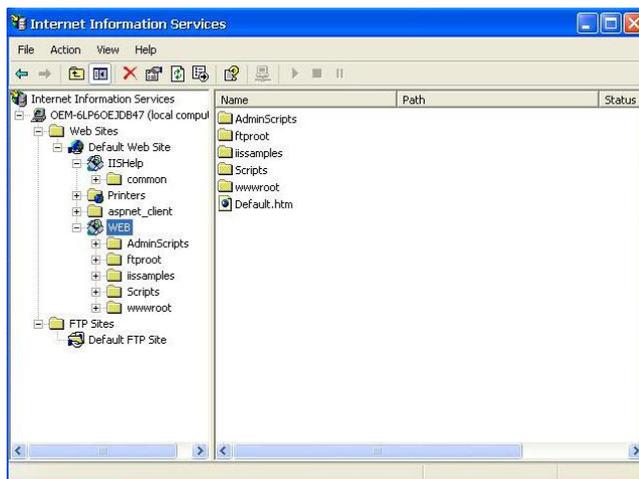
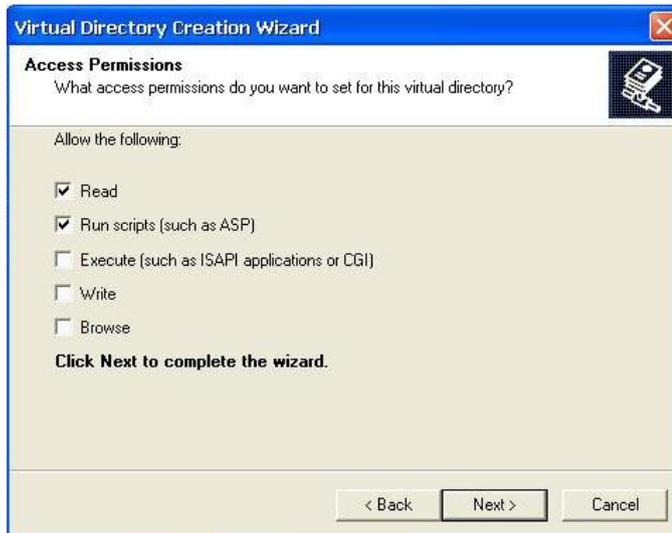
2. Follow the virtual directory creation wizard and complete the steps to create the virtual directory **c:\Inetpub**.





- 3. Type the alias into the text box. Click **Next** to continue.

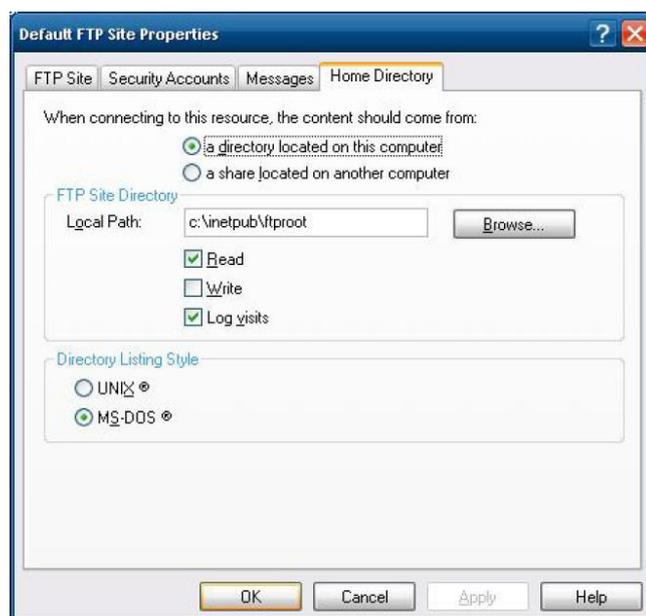
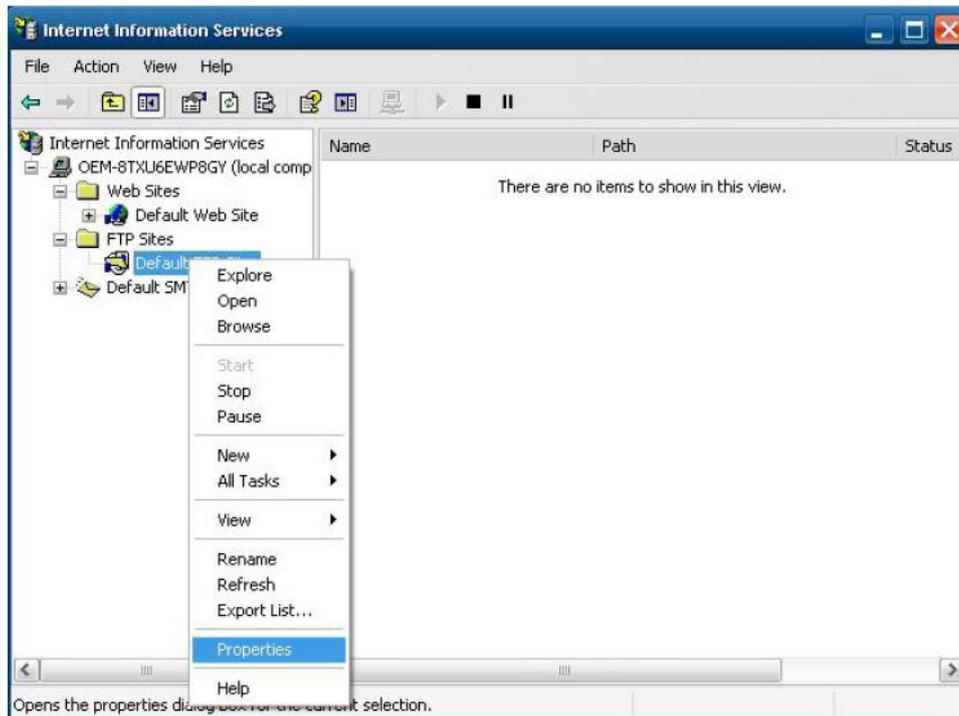




4. When you complete the steps, the virtual directory **WEB** will appear under **Default WEB Site**.
5. On your desktop, type **[IP Address]/WEB/Default.htm** (e.g., 192.168.1.127/WEB/Default.htm). The following message will appear. The steps are indicated in the following sequence of diagrams.



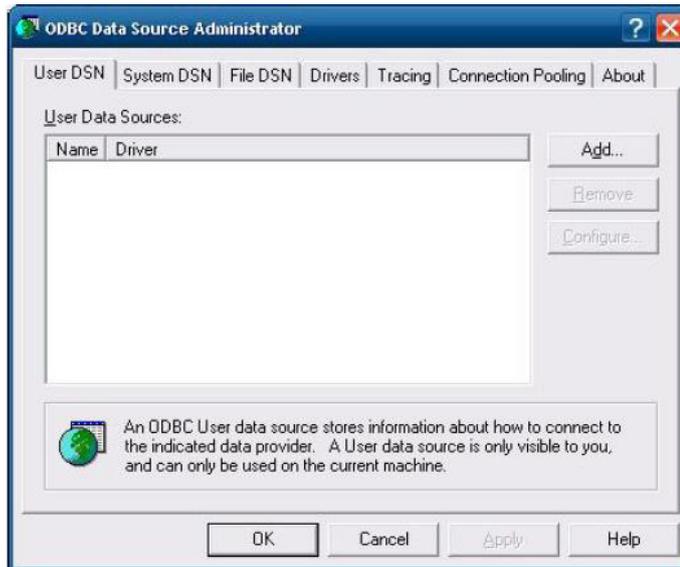
6. If you need to use the FTP server, you must create the default password for your account and turn on the write permission on your home directory located in **c:\intepub\ftproot**. Select **FTP Sites → Default FTP Site → Properties → Home Directory**, and checkmark the **Write** checkbox. You should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



## ODBC Data Source Administrator

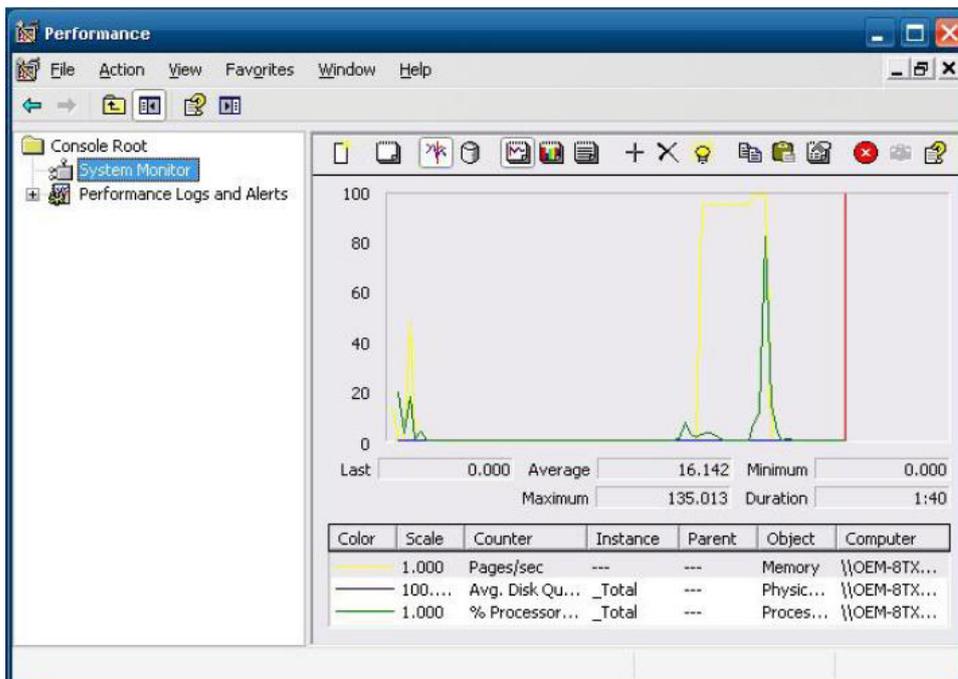
[Control Panel] → [Administrative Tools] → Data Sources (ODBC)

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



## Performance Monitor

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

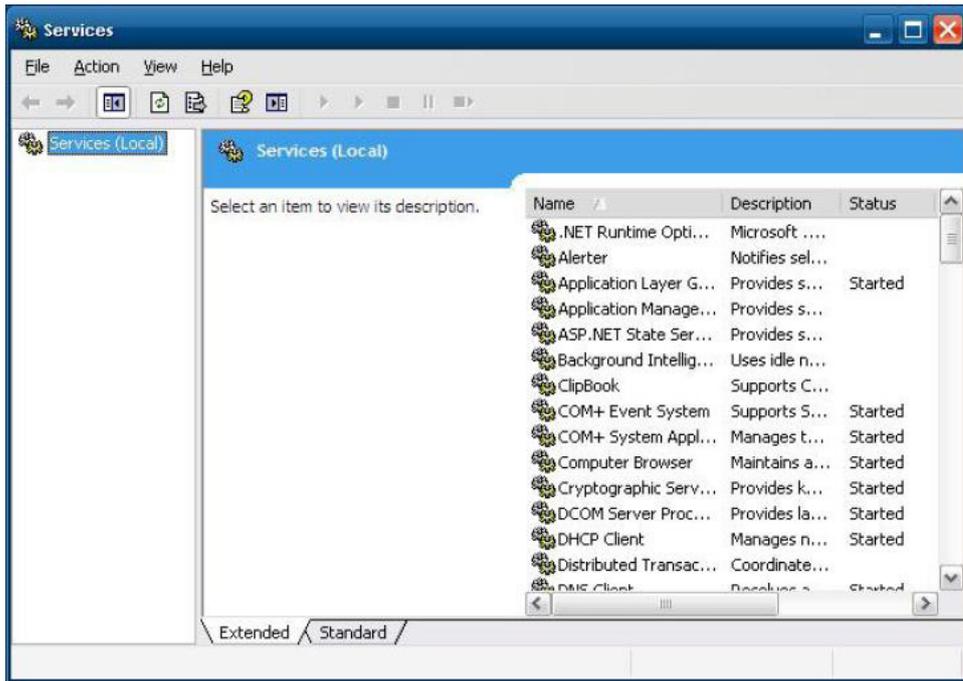


## Services

[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

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The V2416-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**

# Recovery Environment

The environment includes a V2416-XPE embedded computer and a bootable USB disk with the recovery programs and system image file.

## Hardware

The hardware used includes a PC, a V2416-XPE computer and a USB disk with the recovery programs. **(Note: The USB disk should be at least 2GB.)**



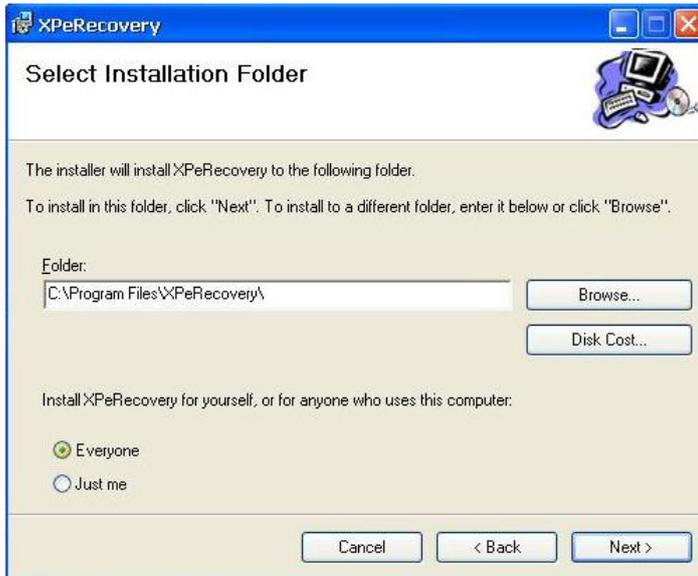
# Recovery Procedure

## Step 1: Install XPE Disk Recovery

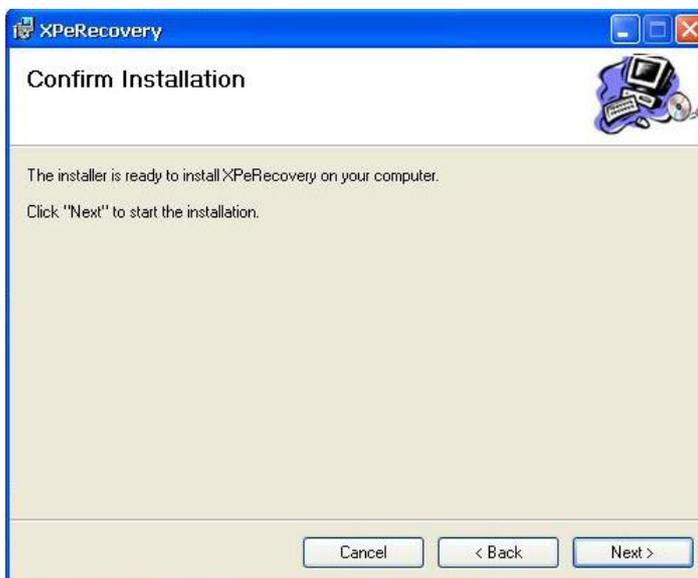
Insert the software CD (in your package) into your computer and find **XPeRecovery.msi** in the **recovery** folder. Double-click **XPeRecovery.msi** to start the setup process and click **Next**.



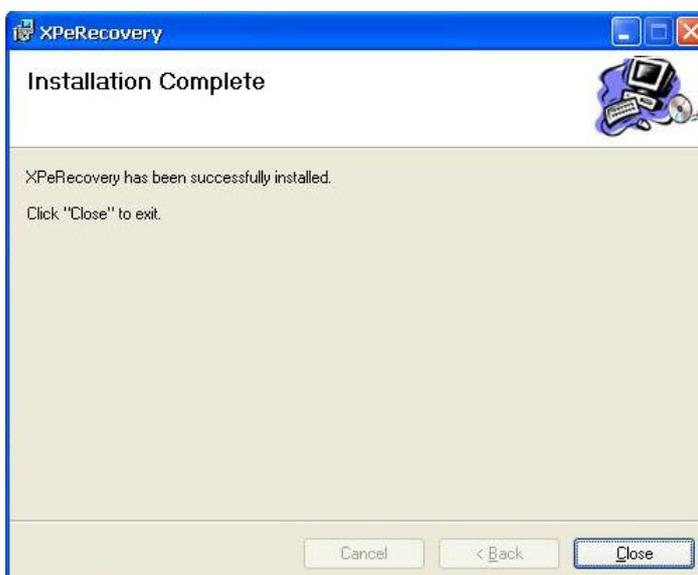
Click **Browse** and select the folder you wish to install to and then click **Next**.



Click **Next** to start the installation.

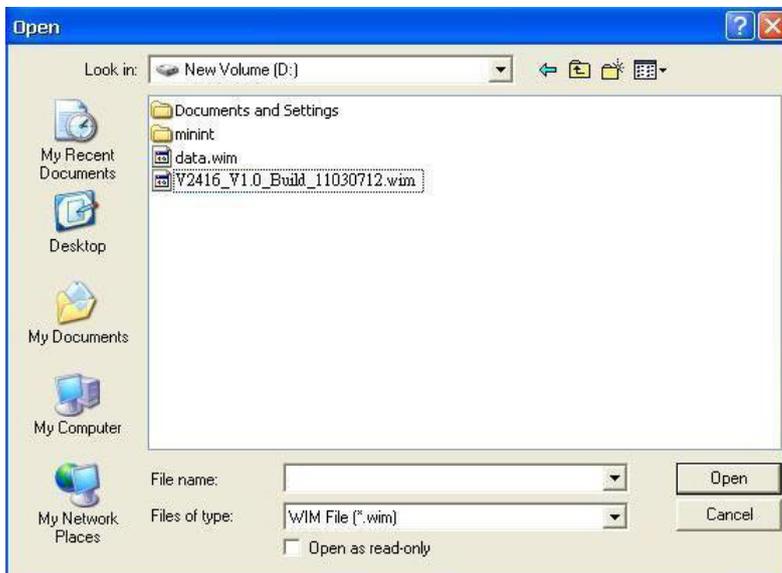
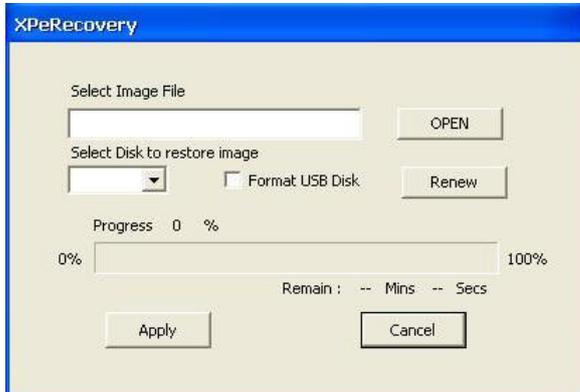


Click **Close** to finish.



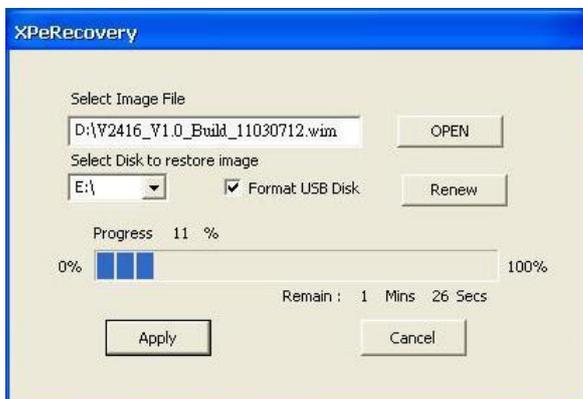
**Step 2: Extract Recovery Image from PC to USB disk**

After the installation is complete, you will see the **XPeRecovery** shortcut on your desktop. You can start the USB disk recovery utility by opening this shortcut. Double-click the shortcut then click **OPEN** to select the image file. This file is located on the software CD in the **recovery** folder, and the filename is **V24xx\_V1.0\_Build\_yymmddhh.wim**. You may also copy this file to your PC. In the following example, we have already copied the image file to the D drive of the PC.

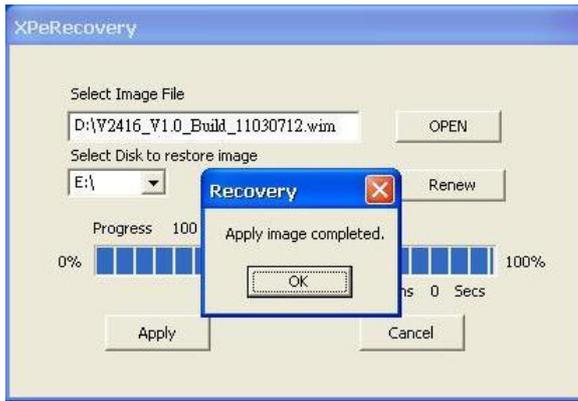


Click the drop-down list and select your USB disk drive letter (in this example, it is the E drive), and check **Format USB Disk**.

Click **Apply** to start the process; the utility will display the progress and time remaining

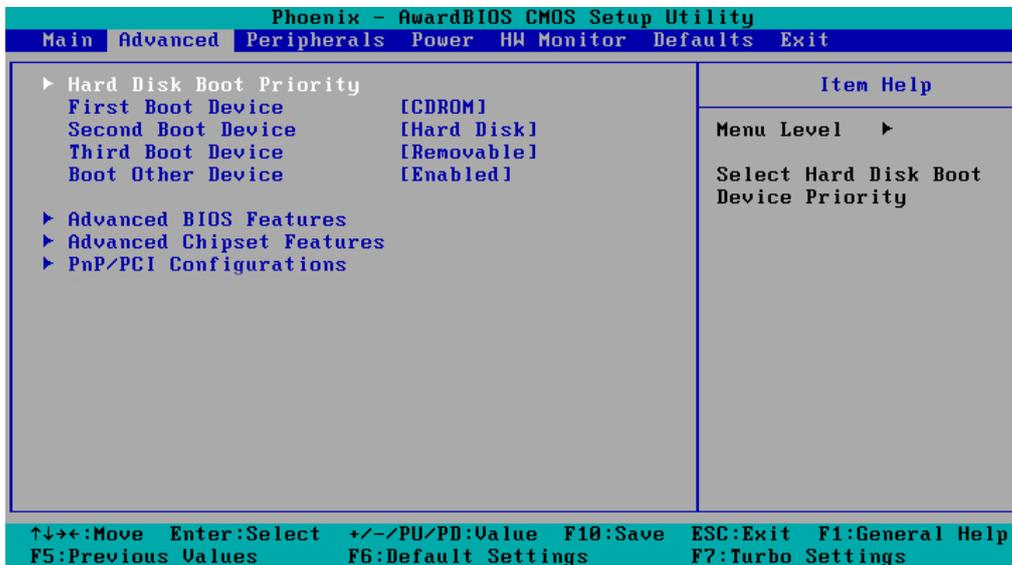


This message will appear when the process is complete. Click **OK**.

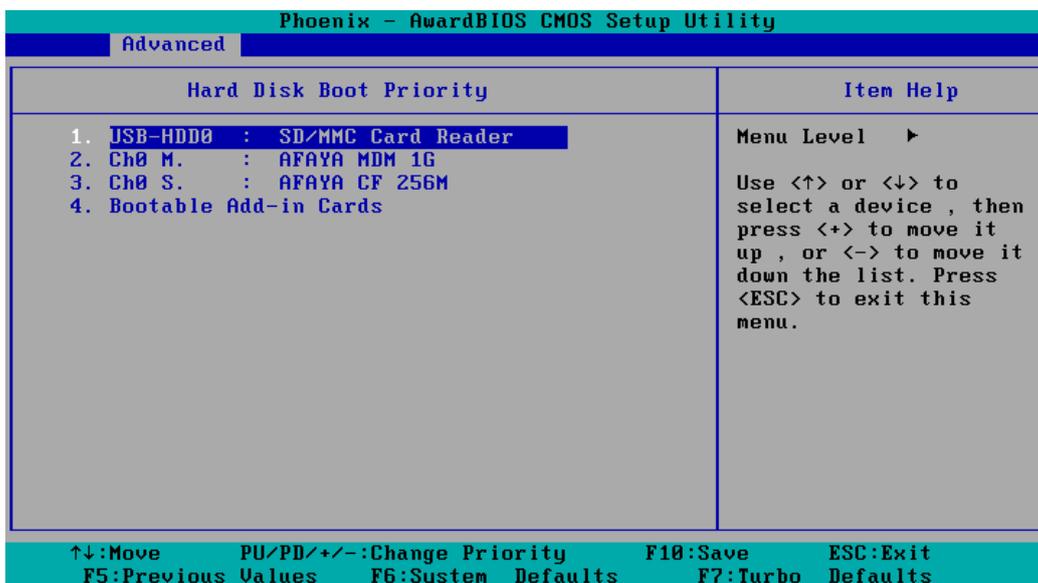


**Step 3: Change the BIOS Settings**

On the V2416-XPE computer, you need to change the BIOS settings to boot from USB disk. Turn on the computer and press **DEL** to enter the BIOS setup menu. Select **Hard Disk Boot Priority** and press **Enter**.



Select USB disk and then press "+" to make it the first boot device. **Warning: Incorrect boot disk priority will lead to recovery failure.**



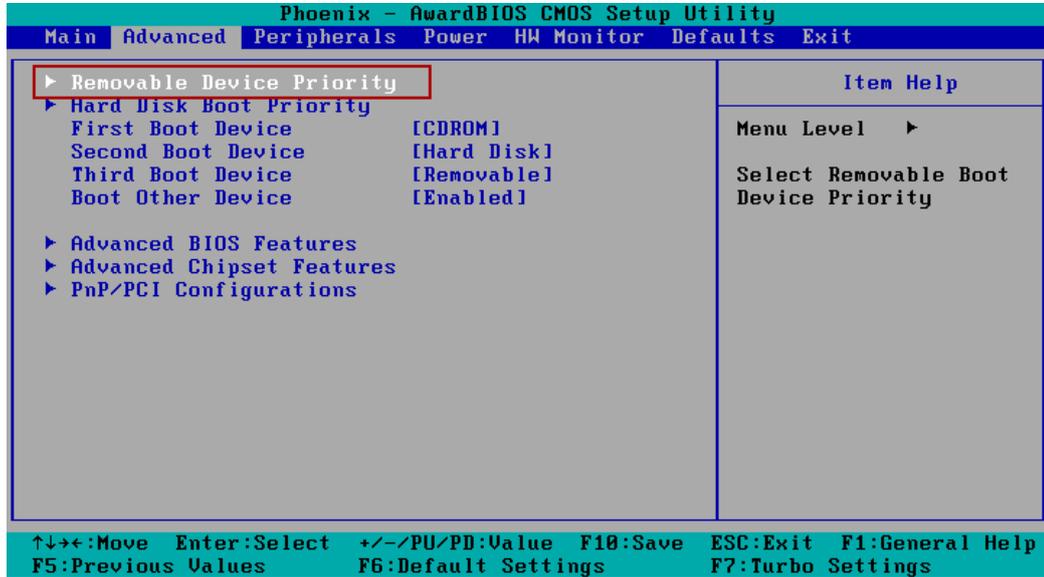
Press **F10** and then press **Enter** to save and leave the BIOS setup.



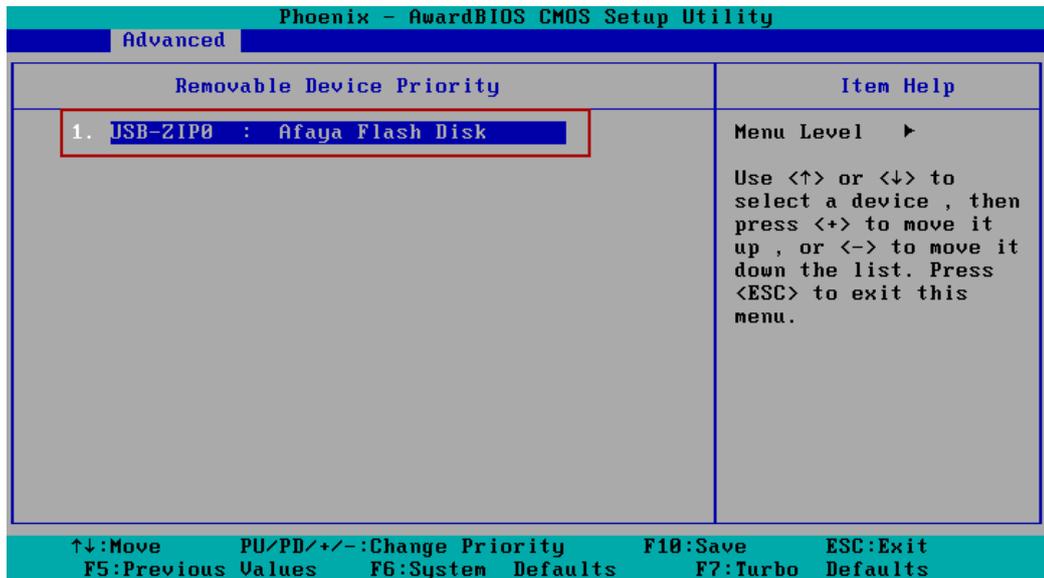
**ATTENTION**

Please note that some USB disks will be regarded as the **Removable Device**. If it happens, see the following steps.

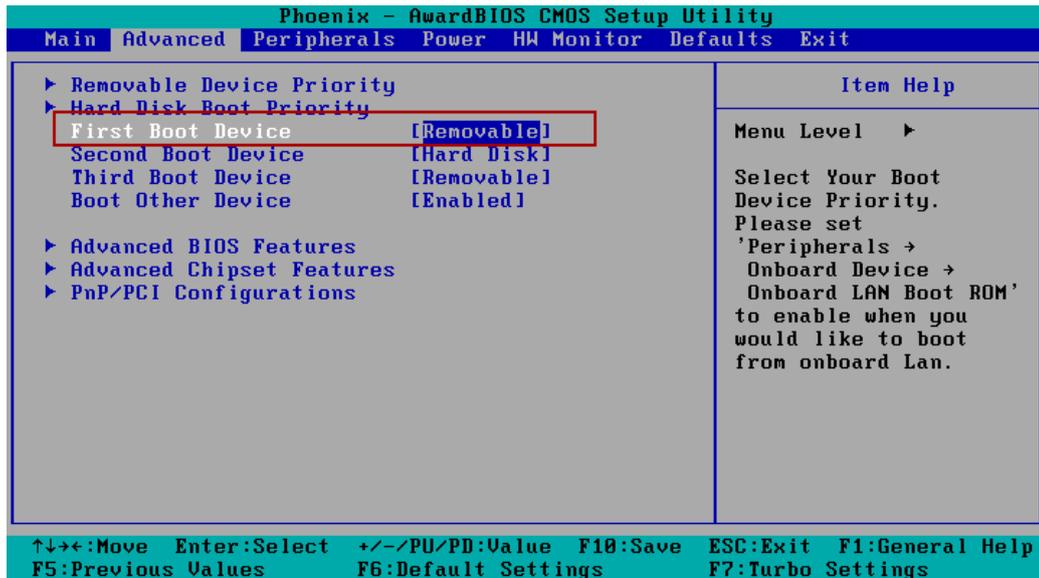
- a. Select **Removable Device Priority**.



- b. Make sure that the USB disk has been detected. Press **Esc** to exit.



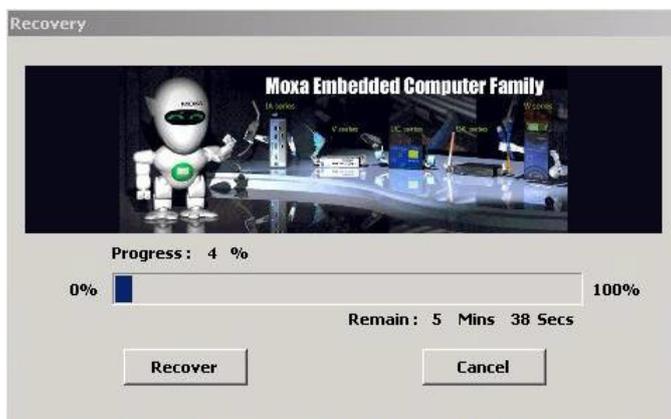
- c. Make sure that the **First Boot Device** is Removable. If not, select **First Boot Device**, press **Enter** and select it from the list.



- d. Select **Exit** → **Save & Exit Setup** and then press **Enter**.
- e. Choose **Y** to save to the CMOS and then exit.

**Step 4: Reboot the Computer and Start Recovery**

Insert the USB disk on any USB port of the V2416-XPE, and then reboot the computer. The system will boot from the USB disk and the Windows Pre-installation Environment and the recovery utility will appear. Click **Recover** to start system recovery.

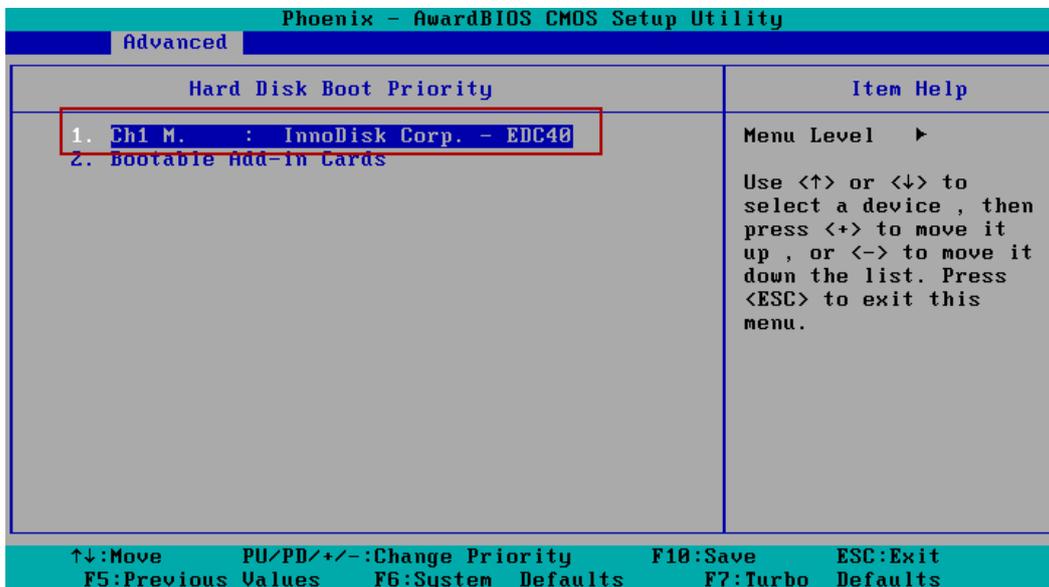


Click **OK** when the recovery process is complete and system will reboot.



**Step 5: Change the BIOS Setting to Boot from Original Disk.**

Now, you need to change the boot priority so that it can boot from the original disk. As the system reboots, press **DEL** to enter BIOS setup menu. Select **Hard Disk Boot Priority** and press **Enter**. Make sure that the hard disk has first boot priority.



Press **F10** and then press **Enter** to save and leave the BIOS settings.

**Step 6: Reboot the Computer.**

Remove the USB disk from the USB port before restarting and rebooting the V2416-XPE. You need to wait for about ten to fifteen minutes while the system recovers. **DO NOT power off or shut down the computer** during this time or the IIS service will be terminated. When the operating system has successfully launched, you need to restart your computer so that the new settings can be activated.

