EZ100 PC/SC Series
Smart Card Reader
User' s Manual
V1.3

Version: 1.3
Date: December 04, 2000

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WARNING

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ABOUT THIS MANUAL

This manual describes the features, specification and installation of PC/SC driver for EZ100PK/PR PC/SC IC card reader.

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1. Introduction

The EZ100PK/PR PC/SC IC card reader/writer is an interface for the communication between a personal computer and an IC card.

EZ100PK/PR PC/SC provides a uniform and simple interface to the computer, Through the interface, it becomes much easier for an application software programmer to process different types of IC cards.

Users who are using the EZ100PK/PR PC/SC don' t need to know the detail of the communication protocol and physical layer of cards. However, They do need to know the command set of a specific smart card or the memory organization of a memory card in order to write their particular application software.

The EZ100PR PC/SC reader is connected to the COM port of the computer through its RS232 interface for the data communication. And it also has a cable to be connected to the keyboard port of the computer to get its power. Whereas, the EZ100PK PC/SC reader has only one cable connected to the keyboard port for both data communication and power.

The PC/SC Workgroup, a joint effort of Bull CP8, Gemplus, Hewlett-Packard, IBM Corporation, Microsoft, Schlumberger, Siemens Nixdorf, Sun Microsystems, Toshiba and VeriFone was initiated to develop a specification that can facilitate the interoperability necessary to allow Integrated Circuit Card (ICC) technology to be effectively utilized in the PC environment. In addition to development of the specification, the PC/SC Workgroup members are committed to implementation of both hardware devices and PC system components necessary to validate the design efforts. This is deemed a critical step in the process of moving toward accepted standards and will provide a base of experience from which to further refine and/or enhance this specification. For more information, please reference the PC/SC Workgroup web site : http://www.pcscworkgroup.com/.

Note: All the EZ series IC card readers can do both read and write functions to IC cards. However, the term "card reader" or "reader" is usually and commonly in use for this kind of devices.

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2. Features

- ISO7816-1/2/3 compatible IC card interface
- Support most common used memory-based IC cards
- Support T=0 or T =1 CPU-based smart cards
- Automatic detection for memory card or smart card
- IC card interface short circuit protection
- Push-Pull type IC card acceptor, insertion cycle >= 200,000.
- LED indicator indicates reader' s status.

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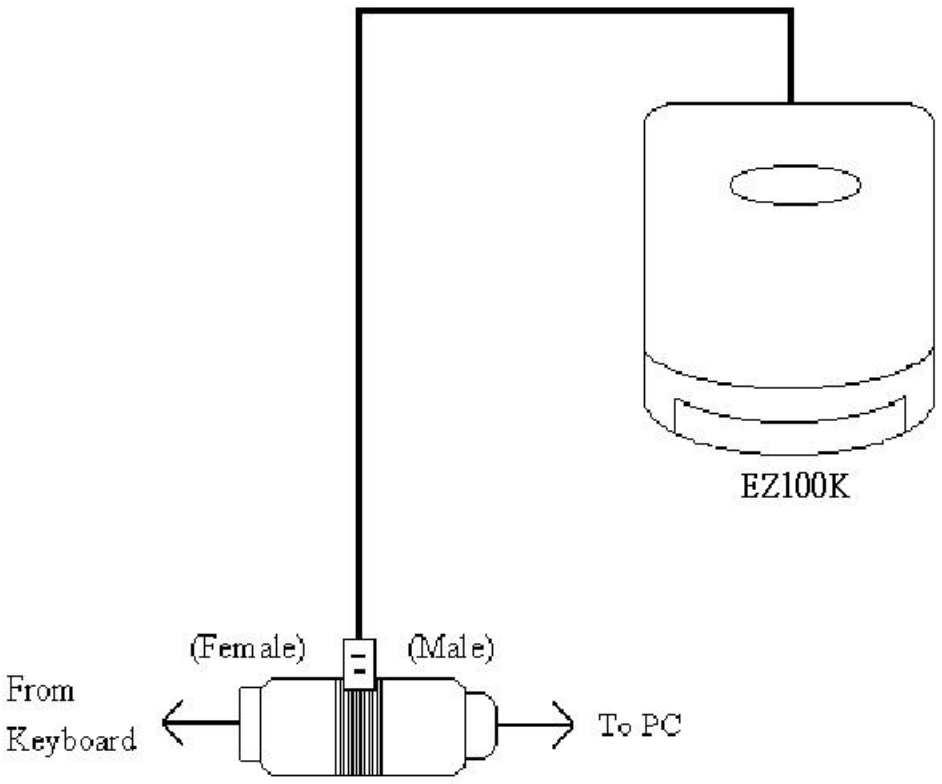
3. Hardware Installation

A. Cable Connection

K-TYPE



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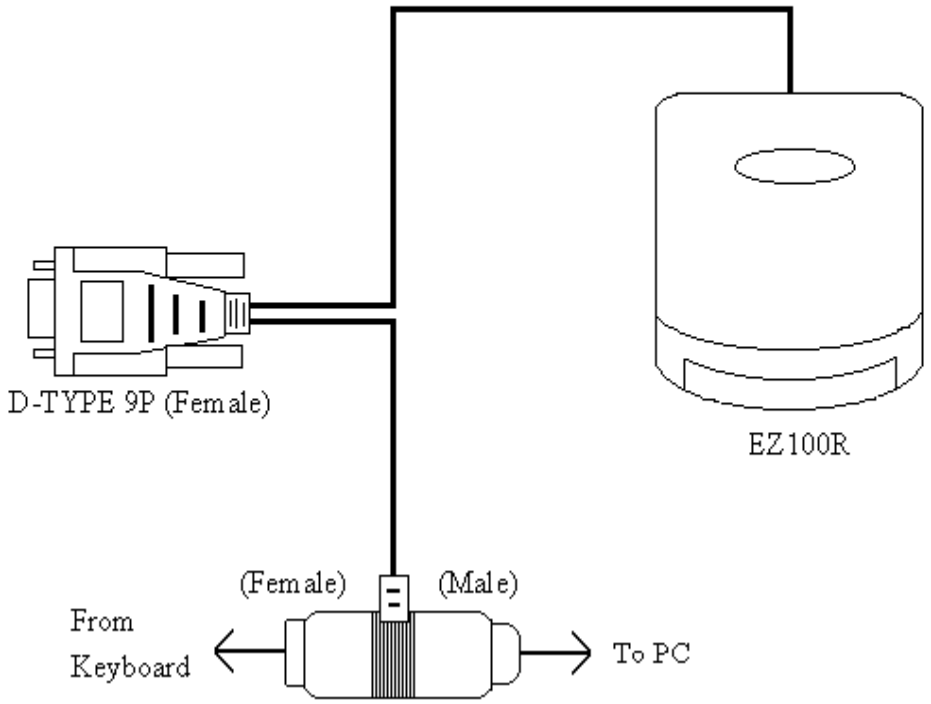
R-TYPE



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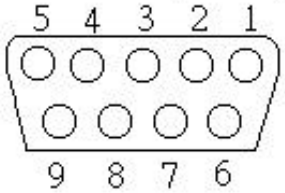
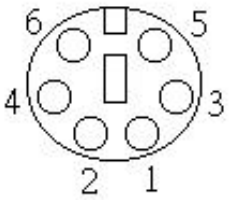
B. Pin Assignment

D-TYPE 9P (Female)

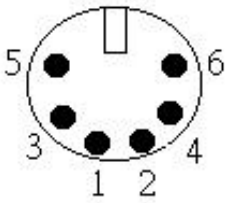


2. TXD
3. RXD
5. GND
7. CLS
8. DTR
*1、4、6、9 Short

MINI DIN 6P (Female)

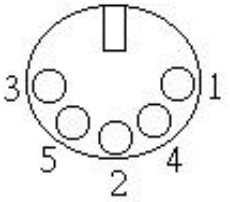


MINI DIN 6P (Male)

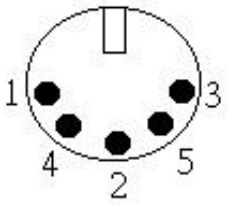


1. KBD DATA
2. Reserved
3. GND
4. +5V
5. KBD CLK
6. Reserved

DIN 5P (Female)



DIN 5P (Male)



1. KBD CLK
2. KBD DATA
3. Reserved
4. GND
5. +5V

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4. IC Card Interface

A. IC Card Power Supply VCC

The EZ100PK/PR PC/SC reader supplies power to cards. The maximum current consumption of an IC card should not exceed 50mA.

B. Programming Voltage VPP

Since all common IC cards currently being used in the market have an internal charge pump to supply the Vpp from the Vcc for writing/erasing internal EEPROM. The Vpp is not needed any more. Therefore, The EZ100PK/PR PC/SC reader connects this pin to Vcc always to avoid floating.

C. Card Acceptor

The EZ100PK/PR PC/SC reader provides a push-pull type of card acceptor. It has guaranteed 200,000 insertion cycles.

D. Card Insertion Detection

There is a card detecting switch in the IC card acceptor to detect the card is present or absent.

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E. LED Indicator

Dual colors LED indicates the power On/Off status of the IC card interface

Red color:

1. Light steadily: The power supply to the IC card is switched on.
2. Blinking: Data is exchanging between the reader and card. Do **not** withdraw the card at this stage.

Green color:

The power supply to the IC card is switched off. Users can insert or remove the IC card at this stage.

F. Card Tearing Protection

To avoid any unexpected damage to the card, the card should be remained in the reader while it is powered on (LED is red). Once the card being withdrawn during the power-on state, the EZ100PK/PR PC/SC reader will automatically shutdown the power supply to the card and deactivate all interface connection to the 8 pins to protect both the card and reader itself.

It is absolutely prohibited to withdraw the card while the red LED is blinking, Otherwise the data inside the card may be incorrect.

G. Short Circuit Protection

The EZ100PK/PR PC/SC reader provides a mechanism to protect itself from being damaged by the short circuit caused by a bad card or other objects. The current limit mechanism will shutdown the card interface once it detects an over-current.

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5. Supported Card Types

The EZ100PK/PR PC/SC reader supports most common used memory cards and CPU based smart cards. The smart card must comply with ISO7816-3 T=0 or T=1 asynchronous transmission protocol.

The application software must send a power on card command to the reader at first before sending any other commands related to the card. Upon receiving the power on card command and the EZ100PK/PR PC/SC reader detects there is a card inserted, it will reset the card according to ISO7816. While resetting the card, a smart card will send out its ATR contents to the reader. If it is a memory card, the reader will send clock to the card and read out its first 4 bytes of data.

Memory Cards (Synchronous interface)

- Simens SLE4404 compatible memory cards
  Gemplus GPM416
- Simens SLE4406/4436/5536 compatible memory cards
  Gemplus GPM103
  SGS-Thomson ST1305
  ATmel AT88SC06
- Simens SLE4418/4428 compatible memory cards
- Simens SLE4432/4442 compatible memory cards
  Philips 2042
- I^2C memory cards
  ATmel AT88SC153, AT88SC1604, AT88SC1608, AT24CXX
  SCS-Thomson ST14C02C, ST14C04C
  Xicor X24026, X24165, X24645

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A. Smart Cards(Asynchronous interface)

The EZ100PK/PR PC/SC READER supports ISO7816-3 T=0 or T=1 protocol CPU-based smart cards with the following restrictions.

1. Not support Vpp. PI1 = 0 or 5, II = 00 or 01. Where PI and II are coded in TB2 of the ATR contents.
2. Support PTS(Protocol Type Selection) communication baud rate between the reader and card, can be up to 38,400 baud. The bit rate supported types are as below. (FI and DI are coded in TA1 of ATR, please refer to ISO7816-3).

F (CODED BY FI)	D (CODED BY DI)
0000 Internal	1,2,4,1/2,1/4
0001-372	1,2,4,1/2,1/4
0010-558	1,2,1/2
0011-744	1,2,4,8,1/2
0100-1116	1,2,4
0101-1488	1,2,4,8,16
0110-1860	2,4,8
1001-512	1,2,1/2
1010-768	1,2,4,8,1/2
1011-1024	1,2,4
1100-1536	1,2,4,8,16
1101-2048	2,4,8

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6. Interface

R-TYPE

The EZ100PR PC/SC is connected to a computer through a serial asynchronous interface following the RS-232 standards

Communication Parameters

The following communication parameters are used by EZ100PR PC/SC

Transmission protocol	:	Serial asynchronous
Start Bits	:	1
Parity	:	none
Data Bits	:	8
Stop Bits	:	1
Baudrate	:	19200bps

K-TYPE

EZ100PK PC/SC uses standard IBM® PS/2 compatible interface.

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7. SOFTWARE INSTALLTION

Before installation (Important!):

For Windows 95/98/NT4.0:

You should install the Smart Card Base Component (filename: SCBASE.EXE) and update the Smart Card Library (filename: SMCLIB.EXE) in windows before installing EZ100PK/PR PC/SC driver.

Note:

The Smart Card Base Component will install the smart card library into the computer (" **smclib.vxd**" in windows\system for Windows 95/98 or " **smclib.sys**" in windows\system32/drivers for Windows NT4.0). The driver will not function correctly without smart card library.

The Smart Card Base Component is not plug and play, so after installing the EZ100PK/PR driver, you should restart the system to get the whole Smart Card system work, then insert the card, the LED of reader should appear red color.

For Windows 2000:

Windows 2000 fully supports Smart Card supported. After installing the EZ100PK/PR PC/SC driver, in order to work properly, you need to start the Smart Card Resource Manager in Windows 2000.

To start the resource manager:

1.Login with Administrator.

2.Enter MyComputer / Control Panel / Administrator Tools / Services

3.Find " **Smart Card**" service and Start it.

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A. EZ100PR PC/SC Driver Installation Step-by-Step

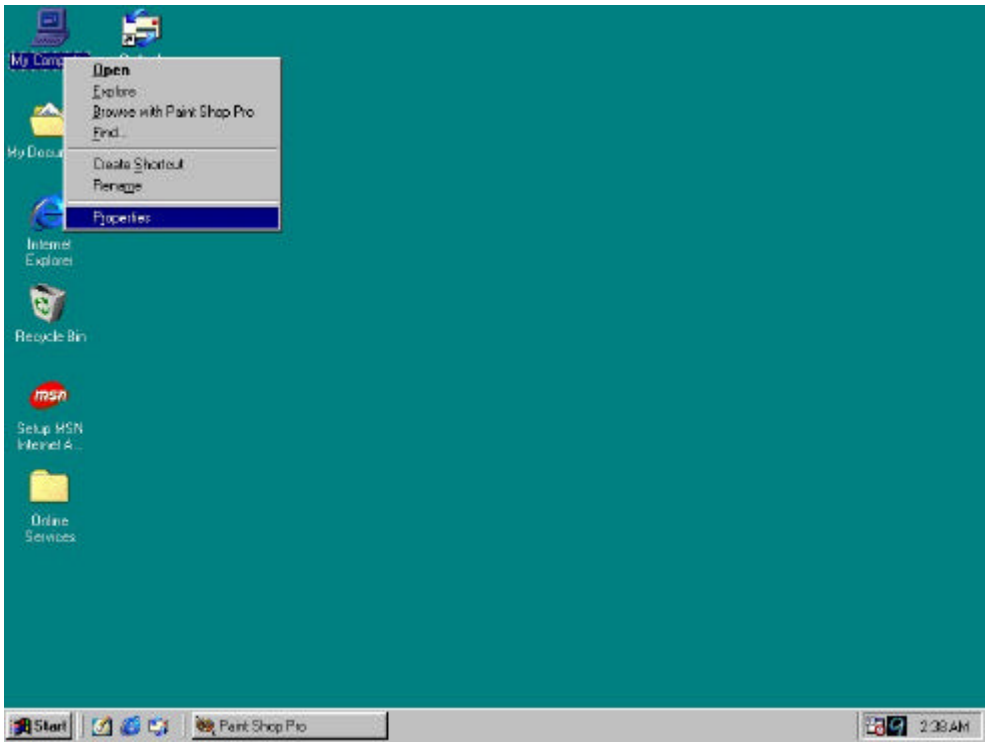
Windows 95/98:

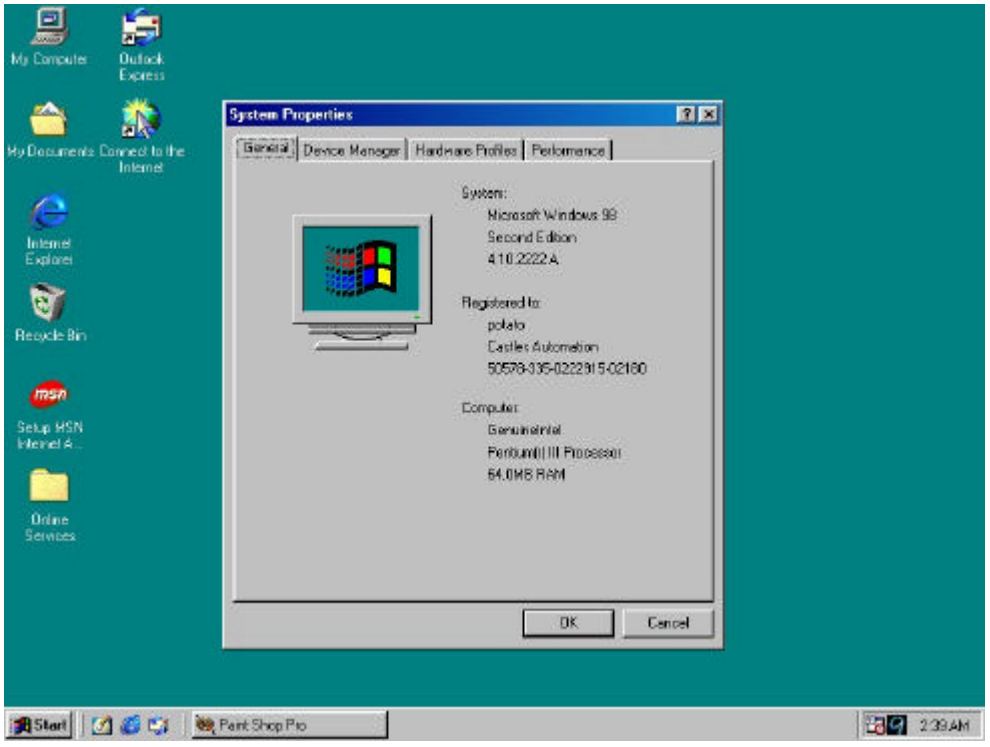
Step1:

Plug the reader into a serial port.

Step2:

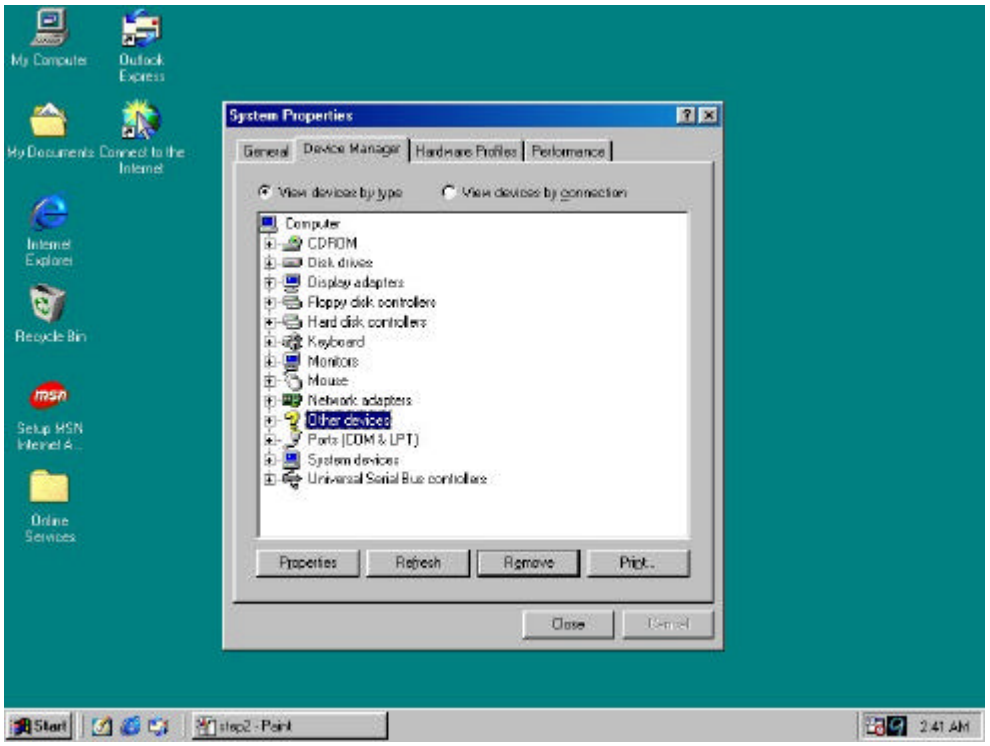
Start the **Device Manager**(right-click **MyComputer**, select **Properties** select **Device Manager** tab).





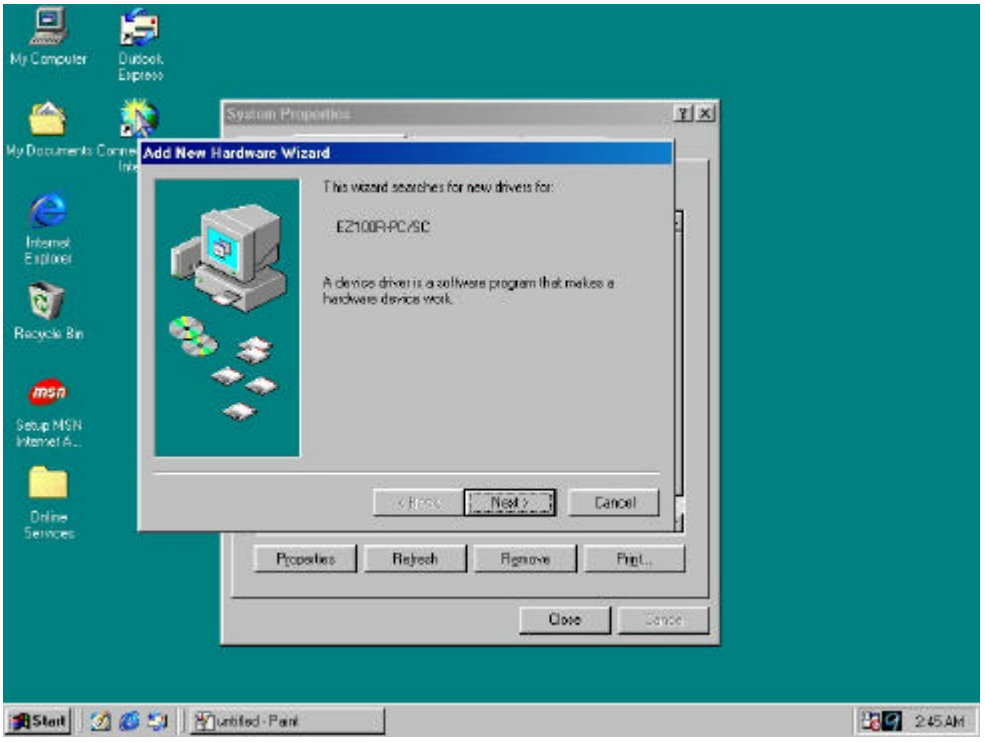
Step3:

Click <**Refresh**>.button



Step4:

The **AddNewHardwae Wizard** will appear, then click <**Next**>



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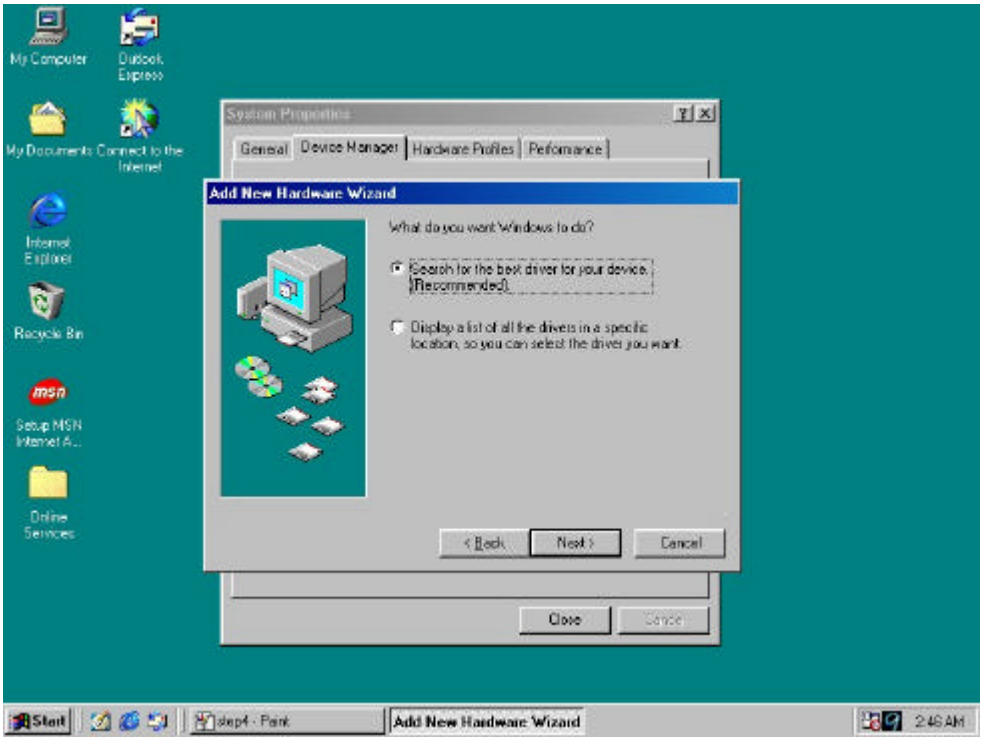
Step5:

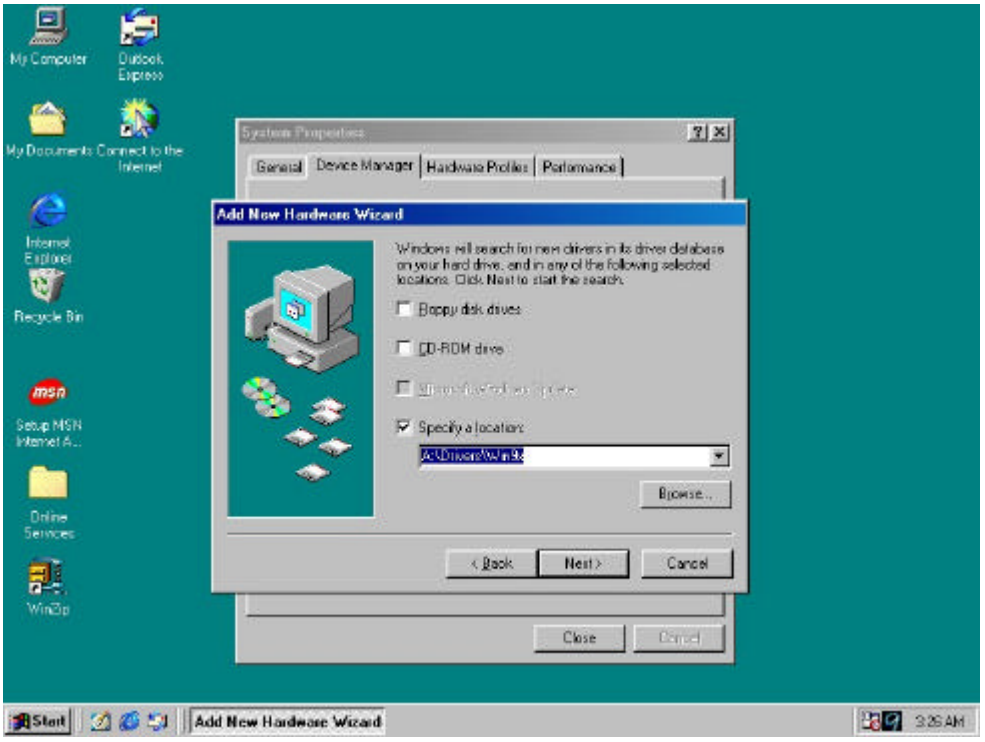
Insert the Driver-CD into a CD-ROM Drive. Select "Search for the best driver for your device" then click <**Next**>.



Step6:

Specify a location for wizard to search.

Specify the path to "**(CD-Rom Drive):\Drivers\EZ100PR\Win9x**".



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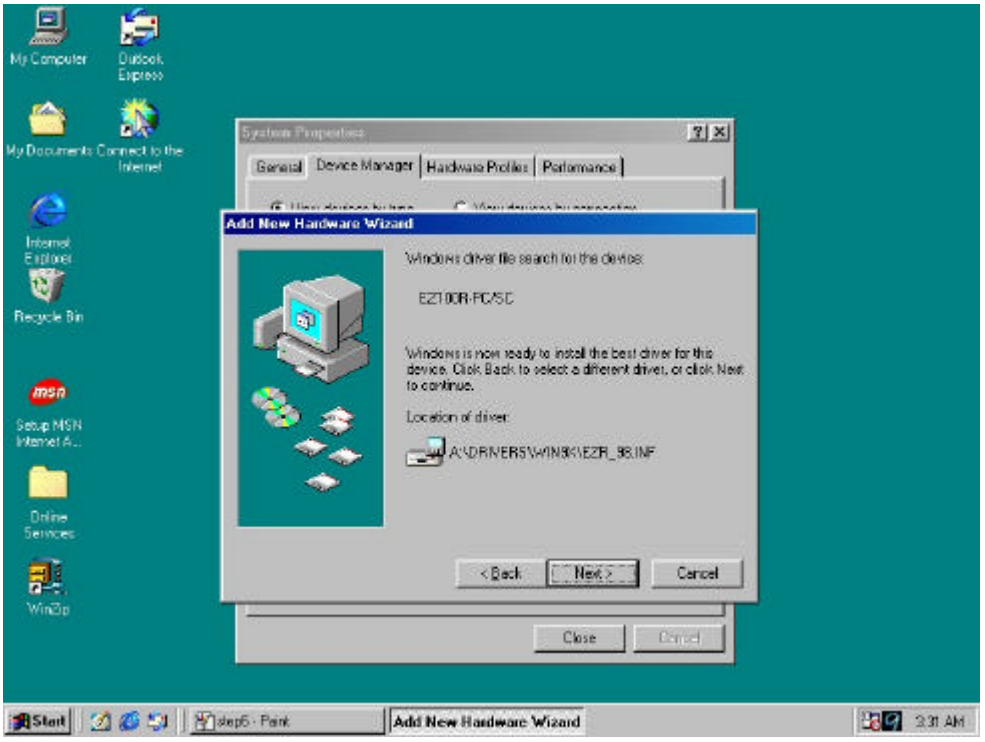
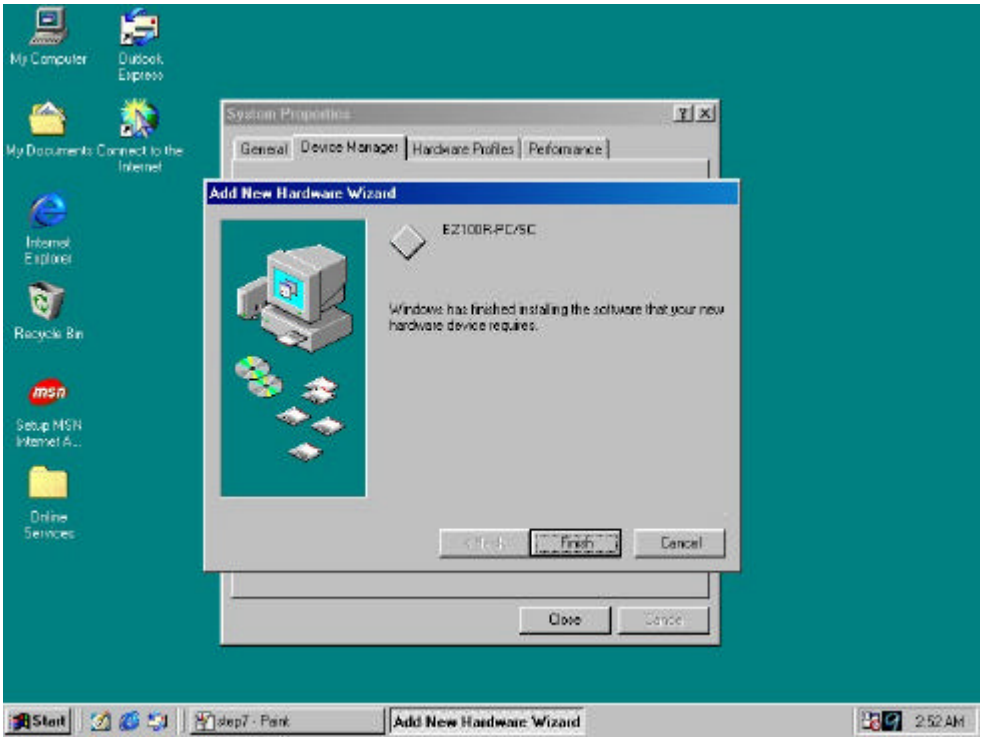
Step7:

Installation Wizard will find "**ezpr_98.inf**" in the location, then click <**Next**>.



Step8:

Installation Wizard will start the driver automatically, then click <**Finish**>



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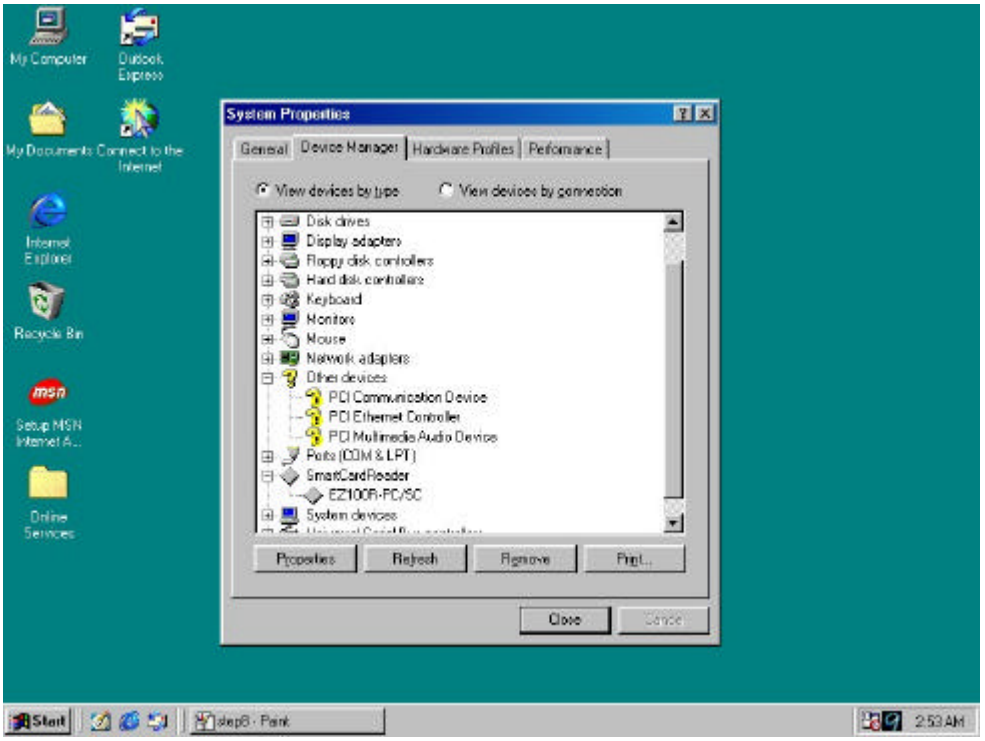
Finish:

EZ100PR-PC/SC is shown in **Device Manager**, in the SmartCardReader category.



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Windows NT4.0:

Step1:

Execute "(***CD-Rom Drive):\Drivers\EZ100PR\NT4_0\ NT4Setup\Setup.exe***."

Step2:

Press <**Next**> when it shows the "**Welcome** " dialog.

Step3:

Press <**Next**> when it shows the "**Start Copying Files**" dialog.

Step4:

Press <**Finish**> when it shows the "**Setup Complete**" dialog.

Step5:

Choose the "**Yes, I want to restart my computer now**" to restart your computer.

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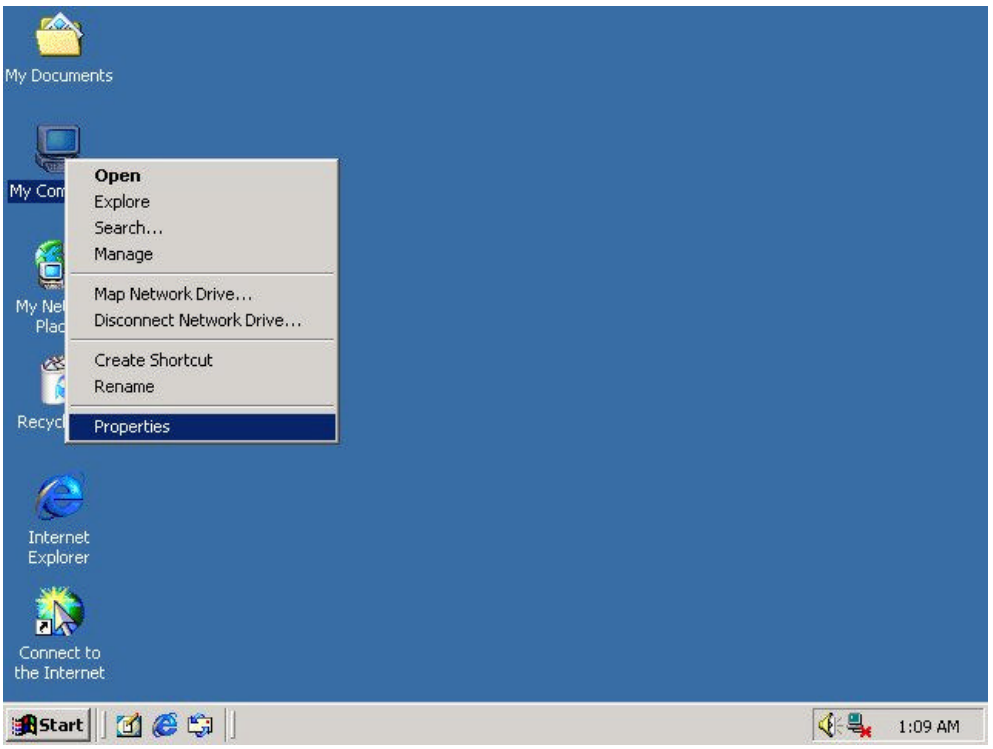
Windows 2000:

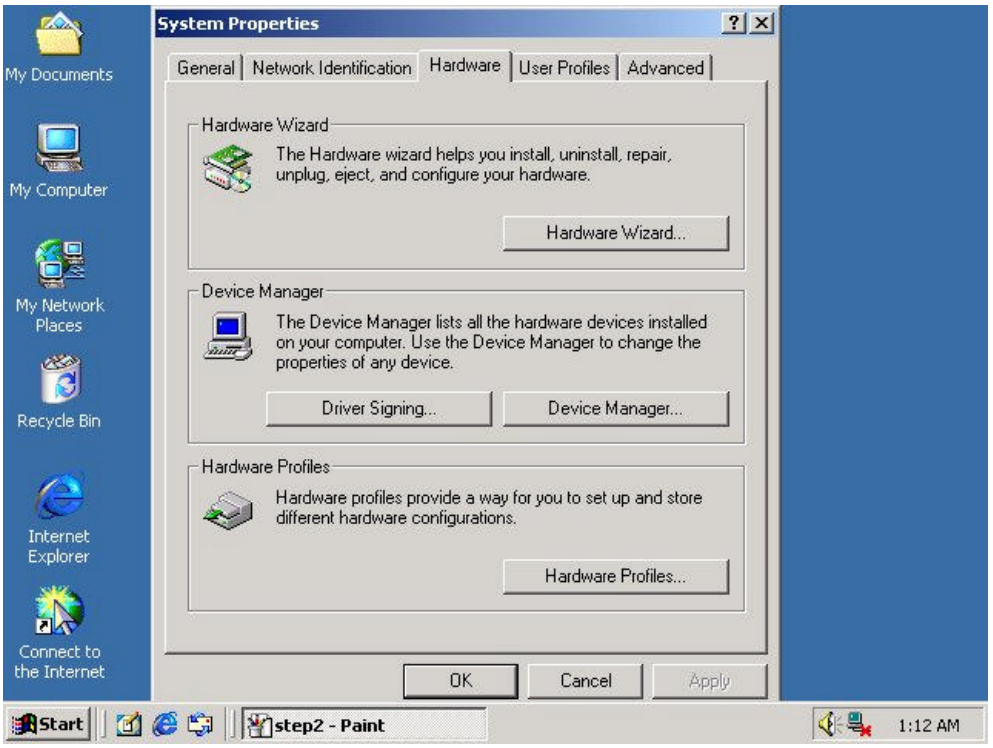
Step1:

Plug the reader into a serial port.

Step2:

Start the **Device Manager** (right-click **MyComputer**, select **Properties**, select **Hardware** tab, and click <**Device Manager**>).





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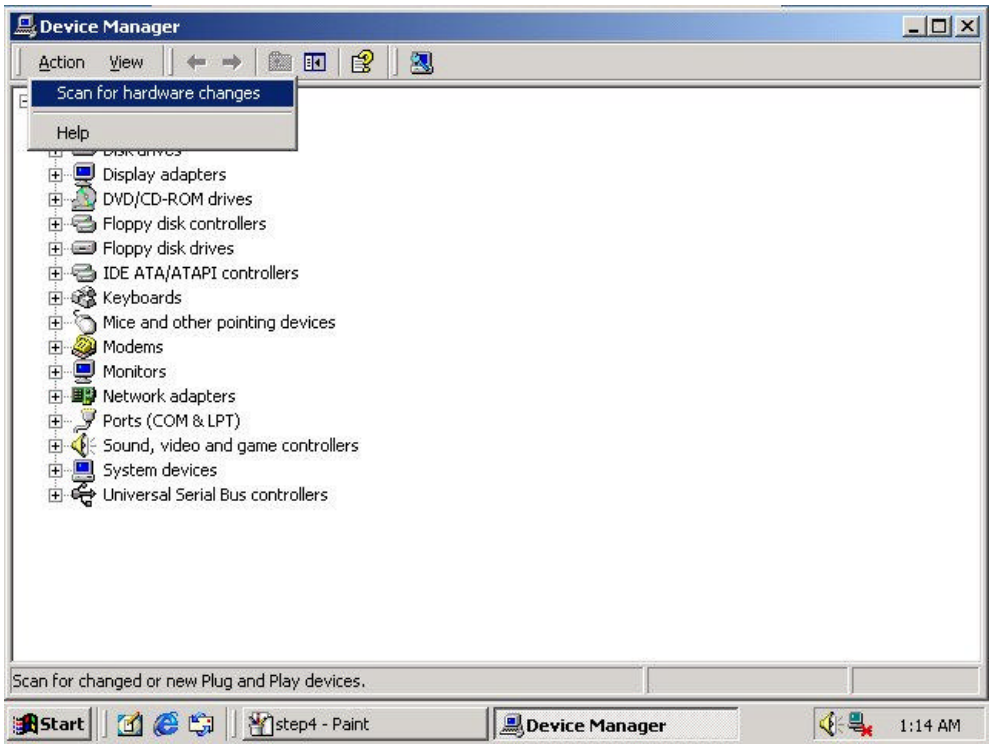
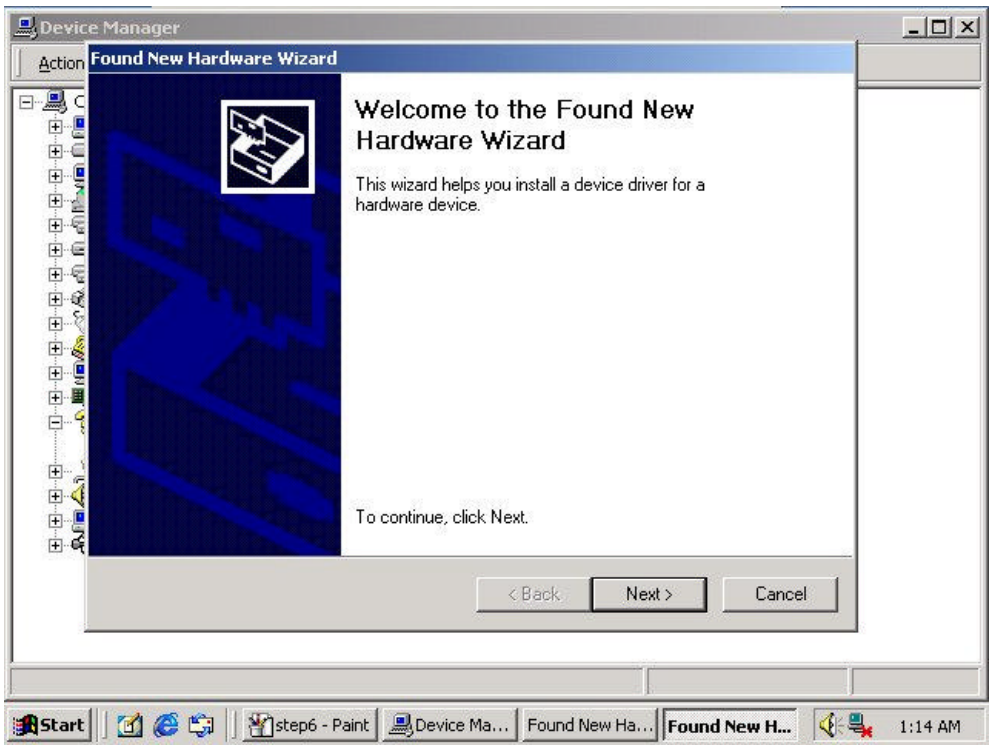
Step3:

Select **"Scan for hardware changes**" from the **Action** menu.



Step4:

The **Found New Hardware** wizard will appear, then click <**Next**>.



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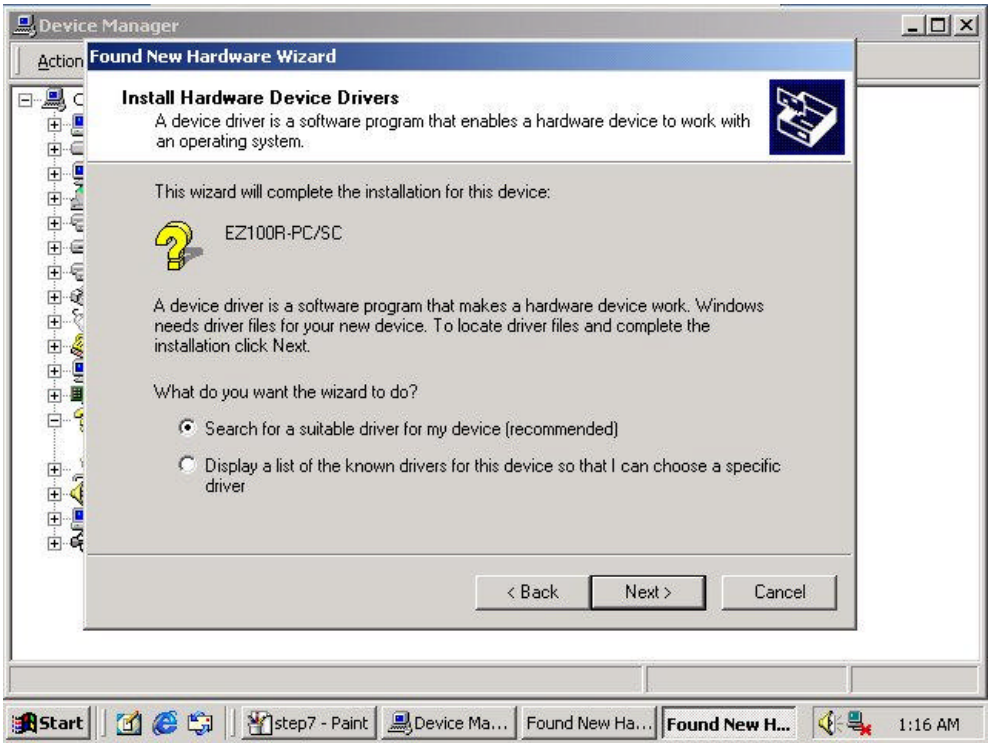
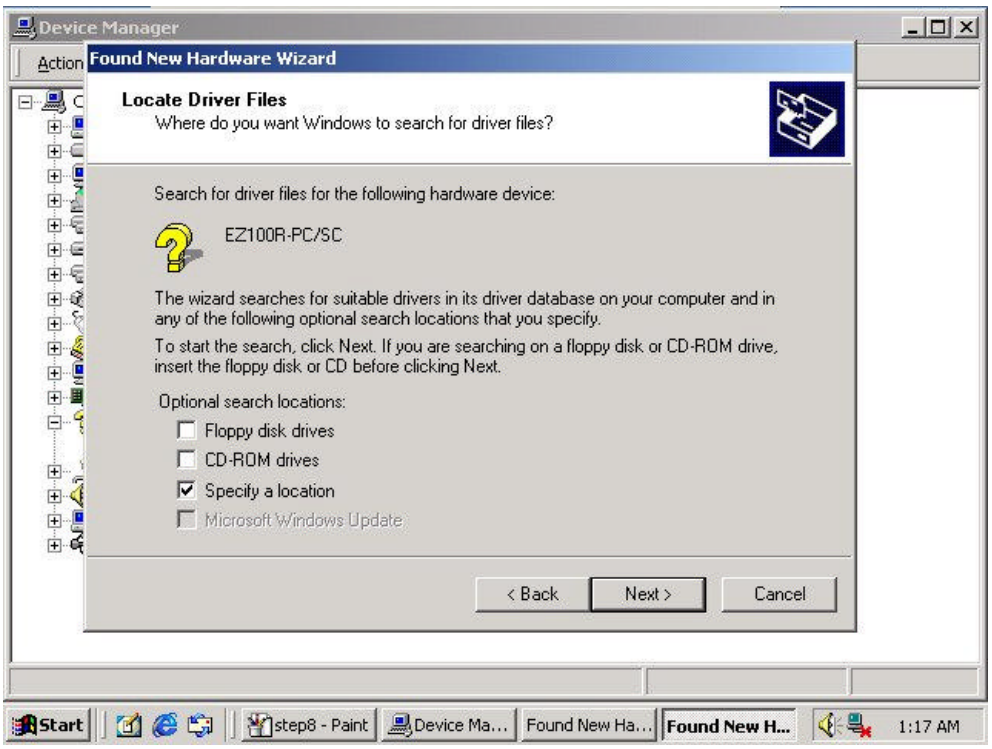
Step5:

Select "**Search for a suitable driver for my device**", then click <**Next**>.



Step6:

Select "**Specify a location**", then click <**Next**>.



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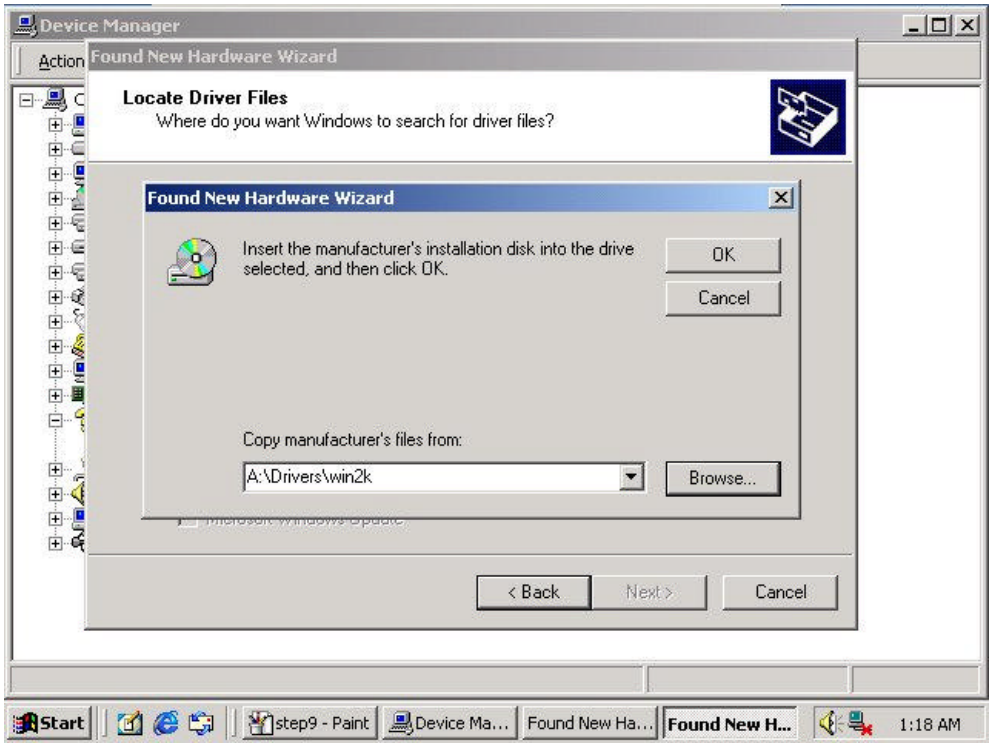
Step7:

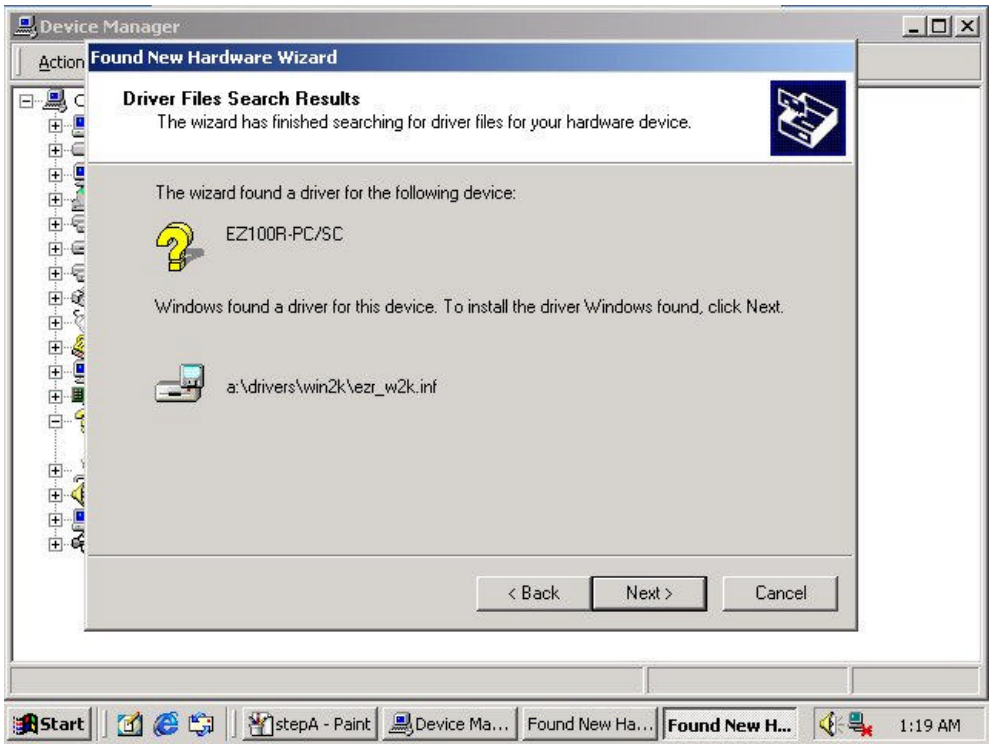
Specify a location to where the driver located.

Specify the path to "**(CD-Rom Drive):\Drivers\EZ100PR\Win2k**".



Step8:

Wizard will find the **ezpr_w2k.inf** and start to install the driver, then click <**Next**>.



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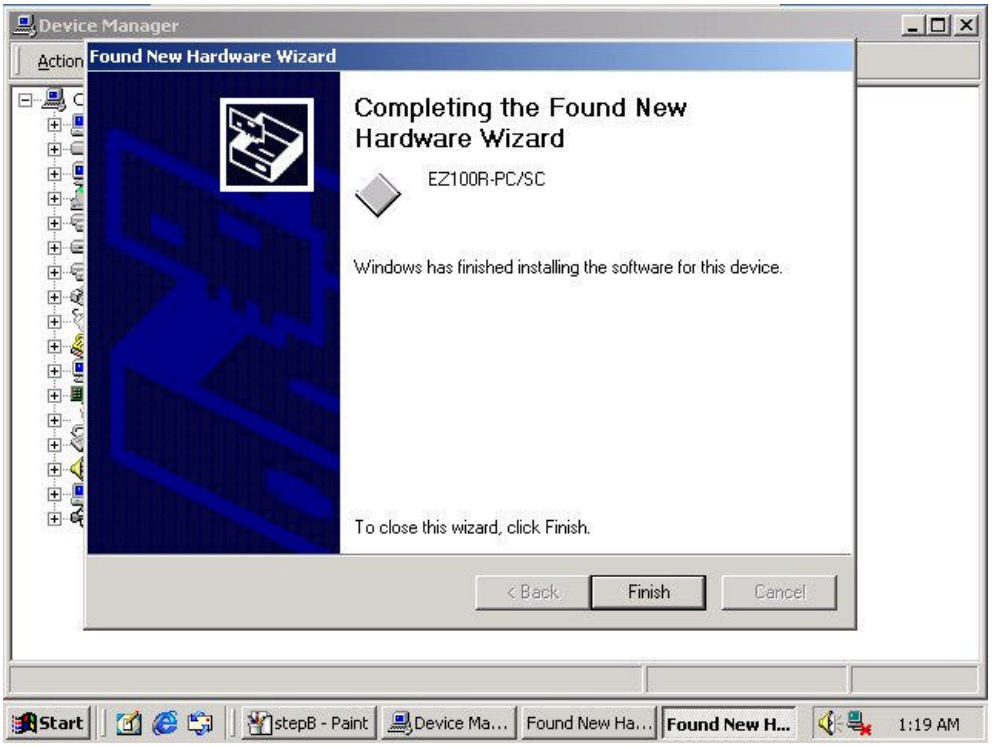
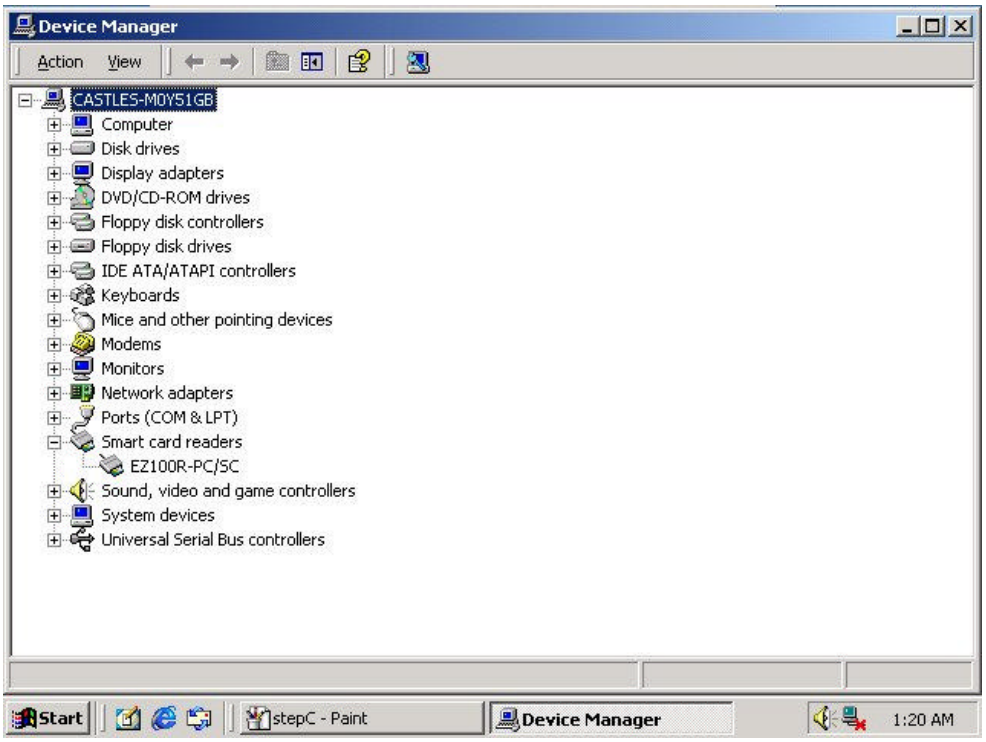
Step9:

Wizard will start the driver automatically, then click <**Finish**>



Finish:

EZ100PR-PC/SC is shown in **Device Manager**, in the SmartCardReaders category.



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B. EZ100PK PC/SC Driver Installation Step-by-Step

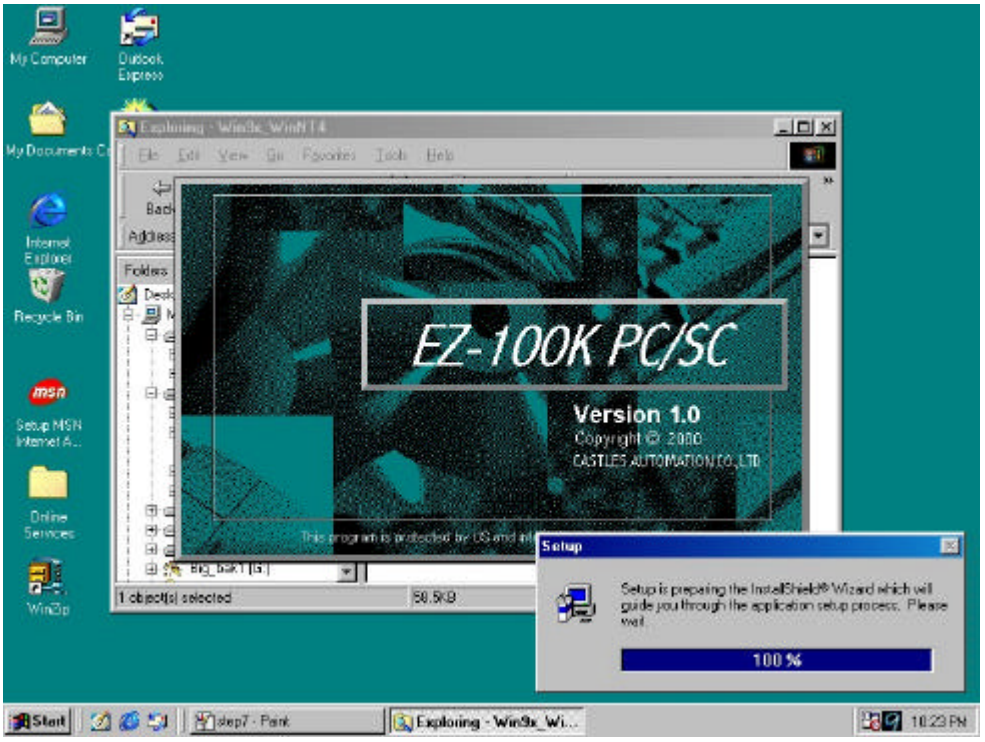
Windows 95/98:
Windows NT4.0:

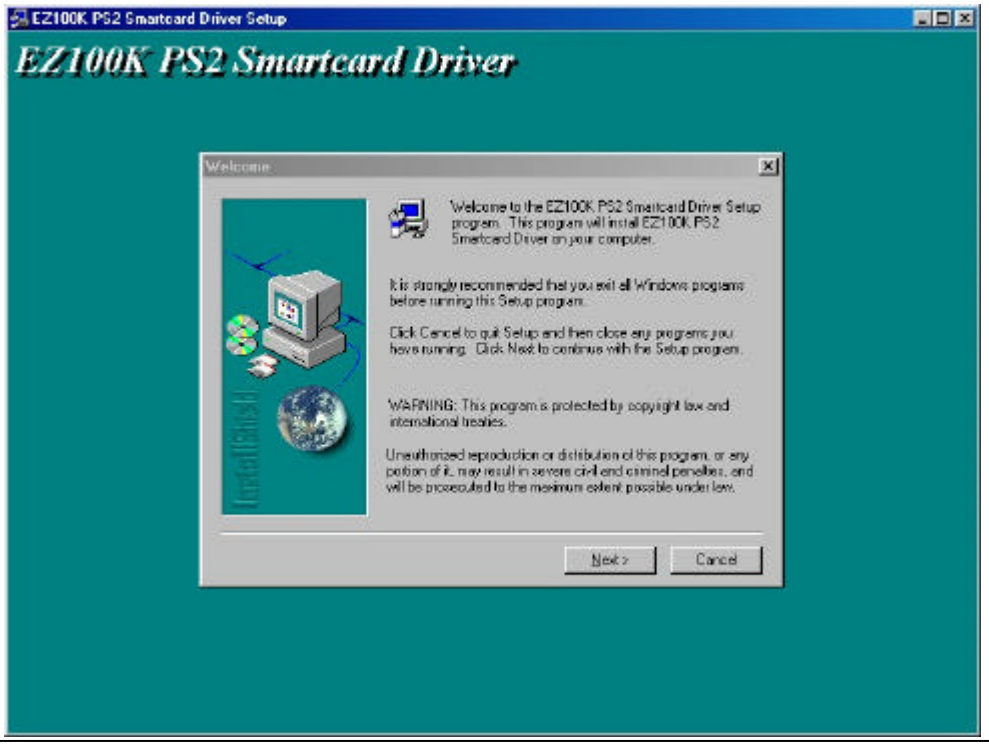
Step1:

Plug the reader into PS/2 port.

Step2:

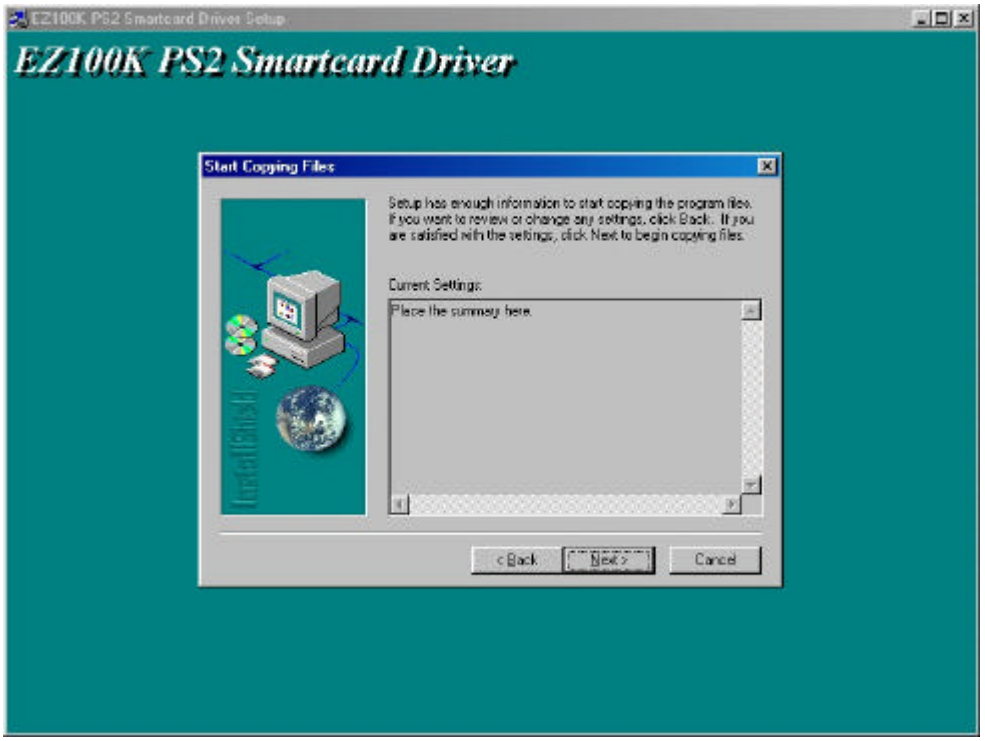
Execute "**(CD-Rom Drive):\Drivers\EZ100PK\Win9x_WinNT4\Setup.exe**"





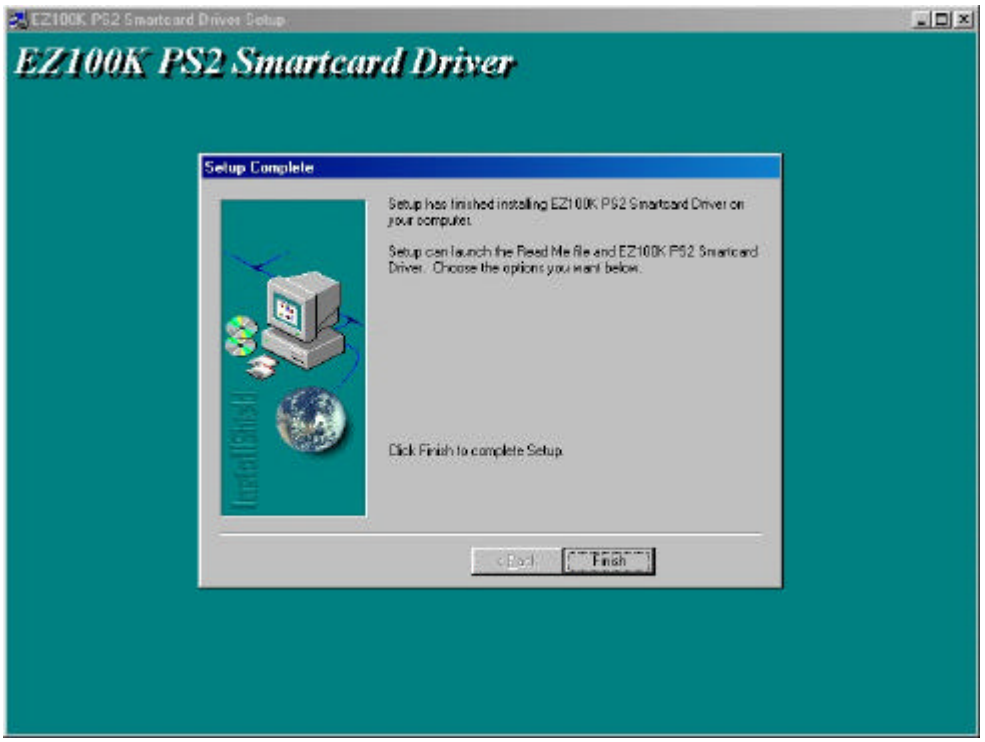
Step3:

Click <**Next**>.



Step4:

Click <**Finish**>.



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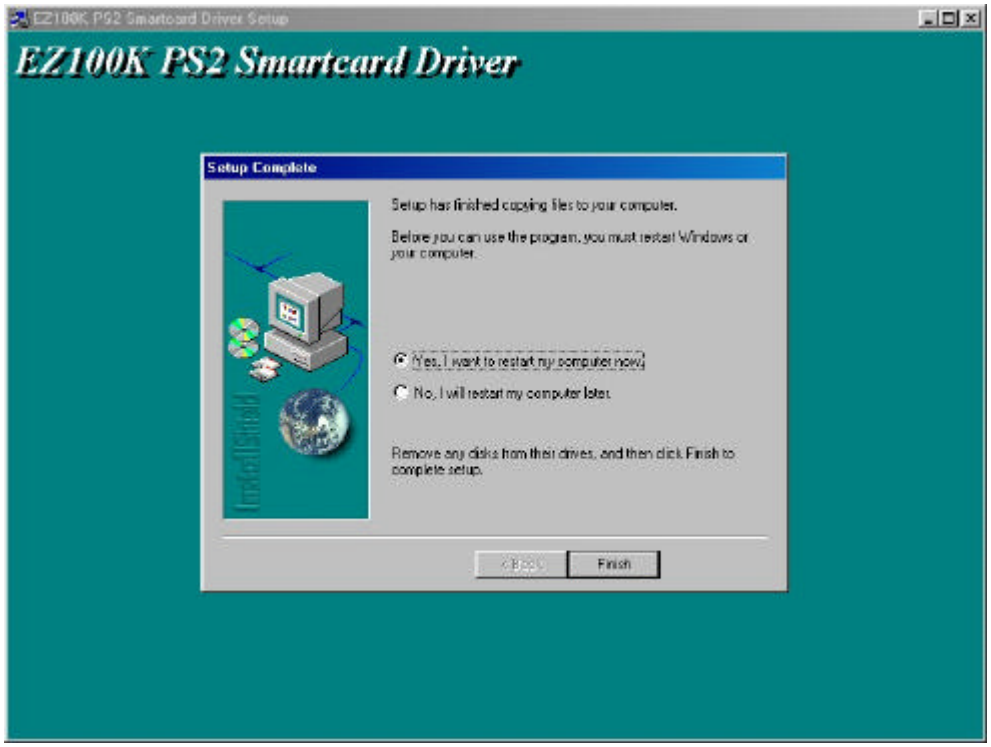
Finish:

Driver will need system to be restart in order to work properly, so choose "**Yes,I want to restart computer now**" to restart the system, or choose "**No,I will restart my computer later**" to finish the installation.

Note : We suggest to click <**Finish**> directly to restart the system.



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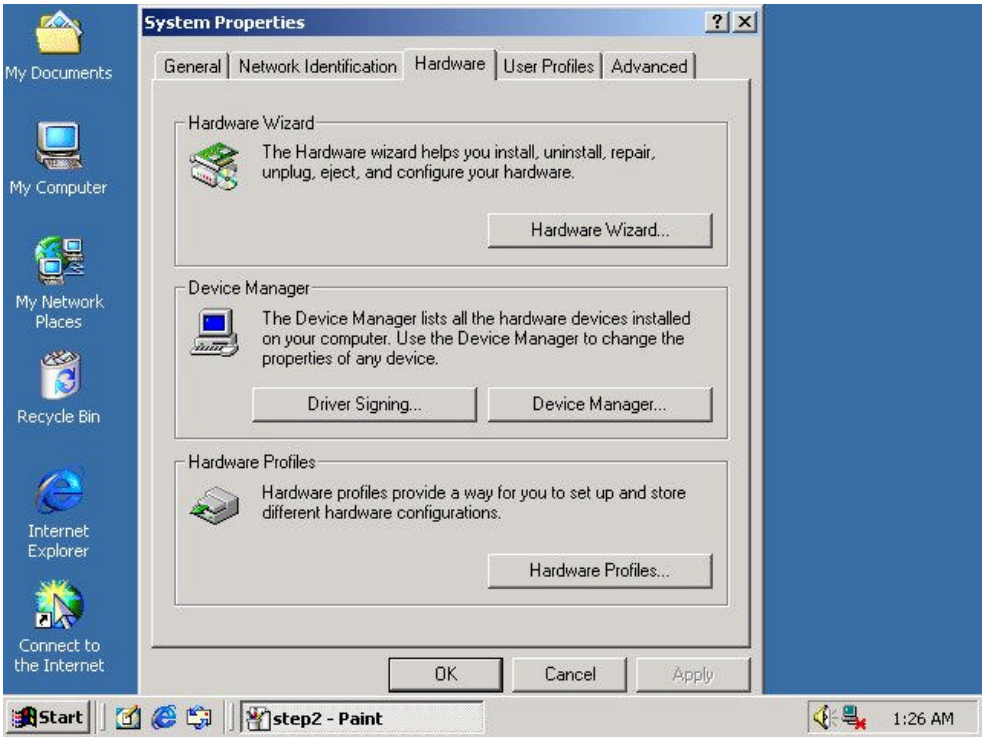
Windows 2000:

Part 1:

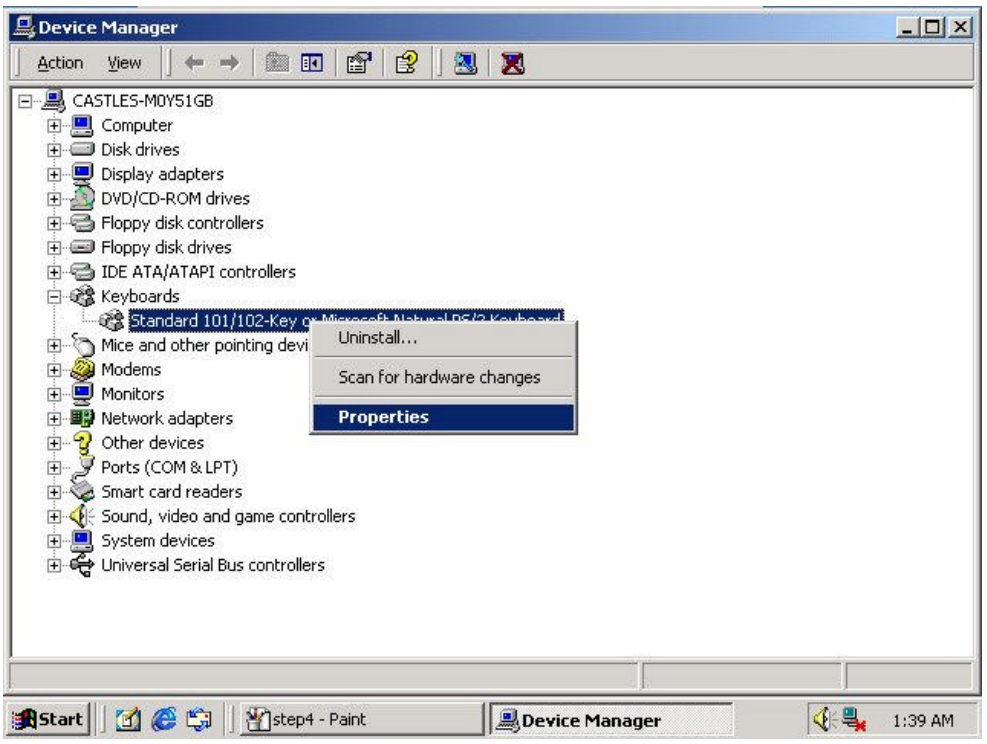
Step1:

Start the "**Device Manger**"(right-click **MyComputer**, select **Properties**, select **Hardware** tab, and click <**Device Manger**>)



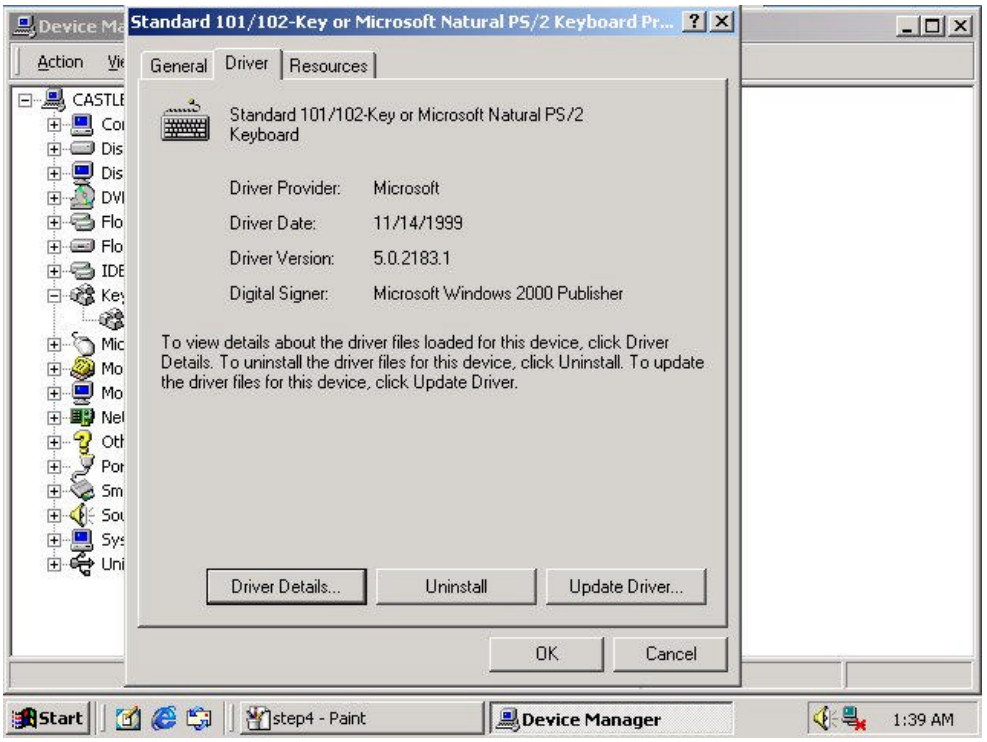
Step2:

Select **Keyboard** category, right click the keyboard installed, and select **Properties**.



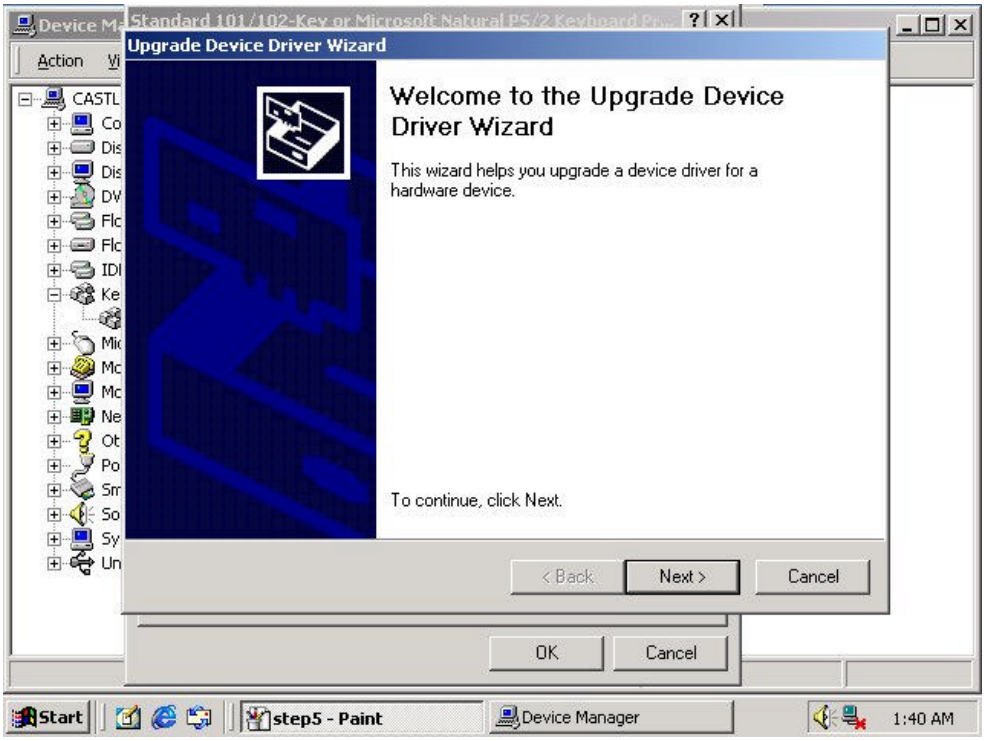
Step3:

Select the **Driver** tab, and click <**Update Driver**>.



Step4:

When the welcome message shows, click <**Next**> to continue.



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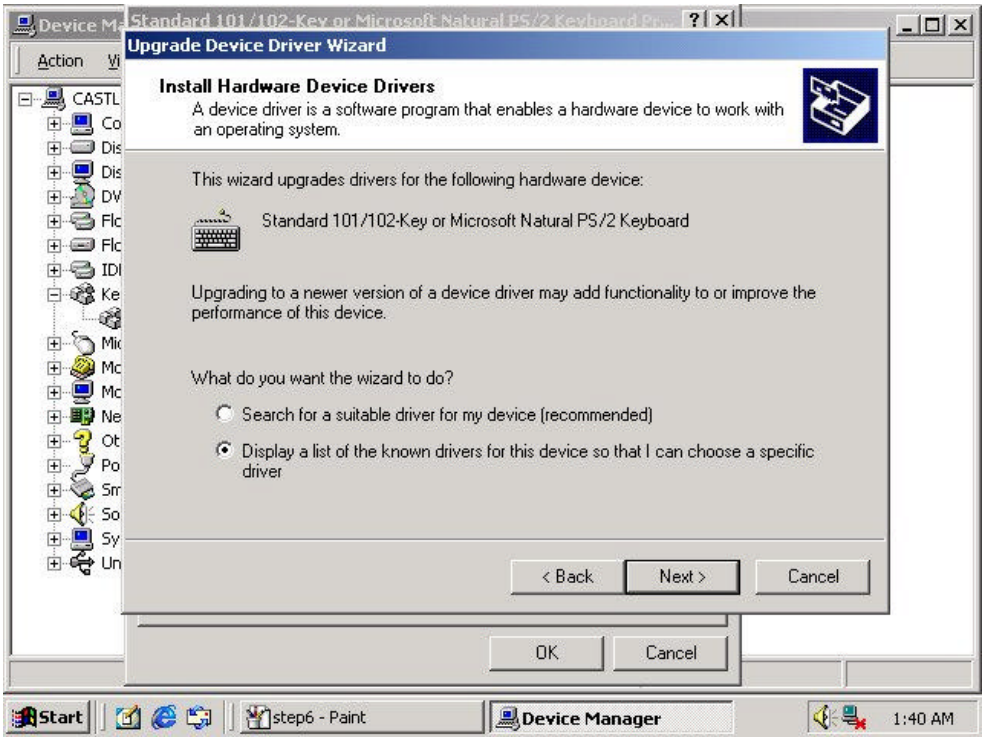
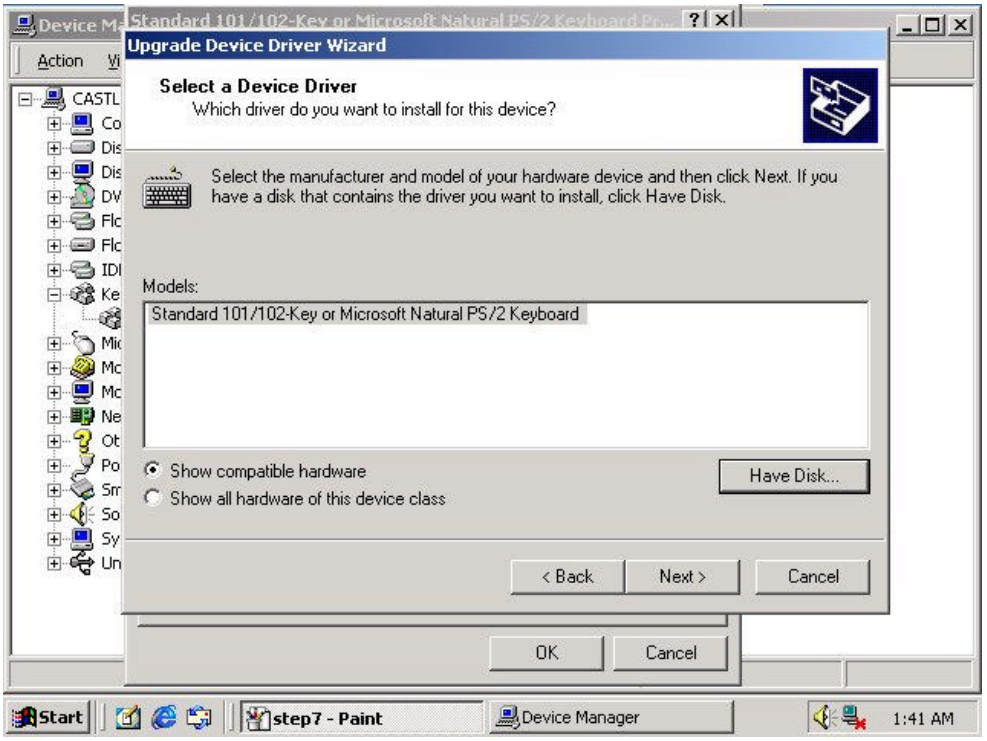
Step5:

Select '**Display a list of the known drivers for this device so that I can choose a specific driver**", then click <**Next**>.



Step6:

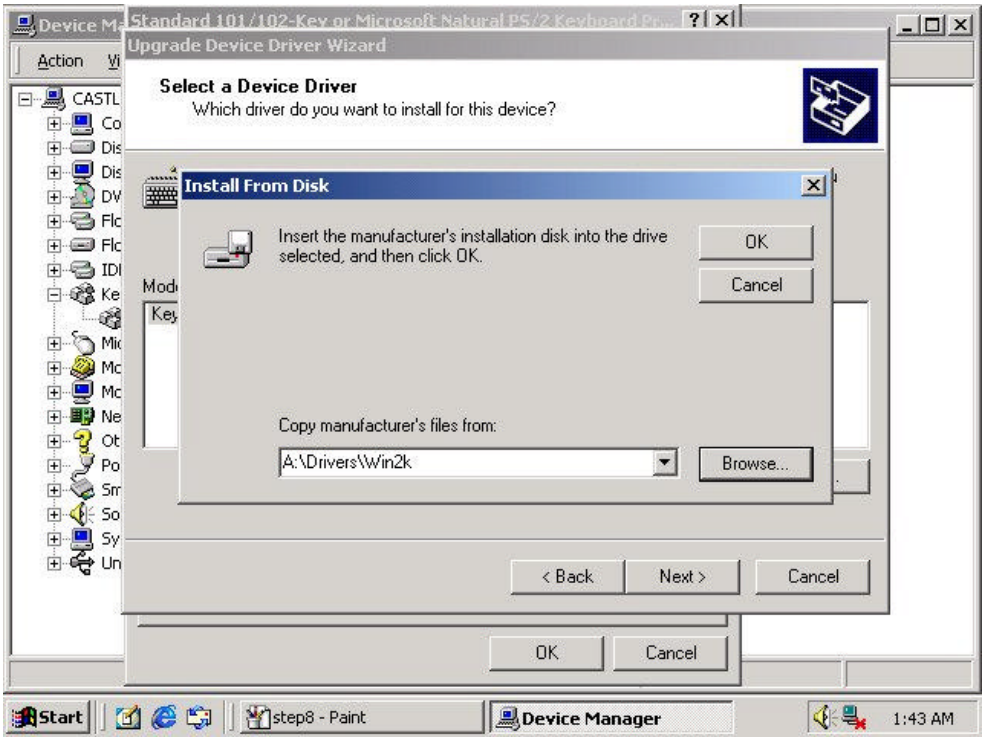
Select "**Show compatible hardware**", and click <**Have Disk**> to specify where the driver is.



Step7:

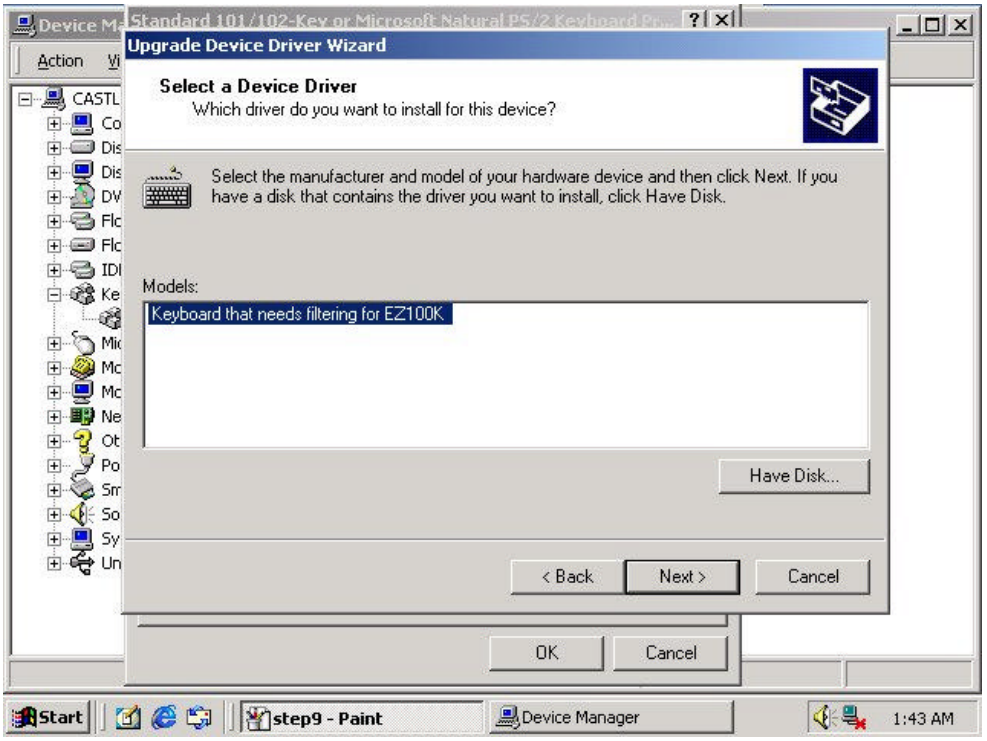
Specify a location for wizard to search.

Specify the path to "**(CD-Rom Drive):\Drivers\EZ100PK\Win2k**".



Step8:

Select "**Keyboard that needs filtering for EZ100PK**", then click <**Next**>.



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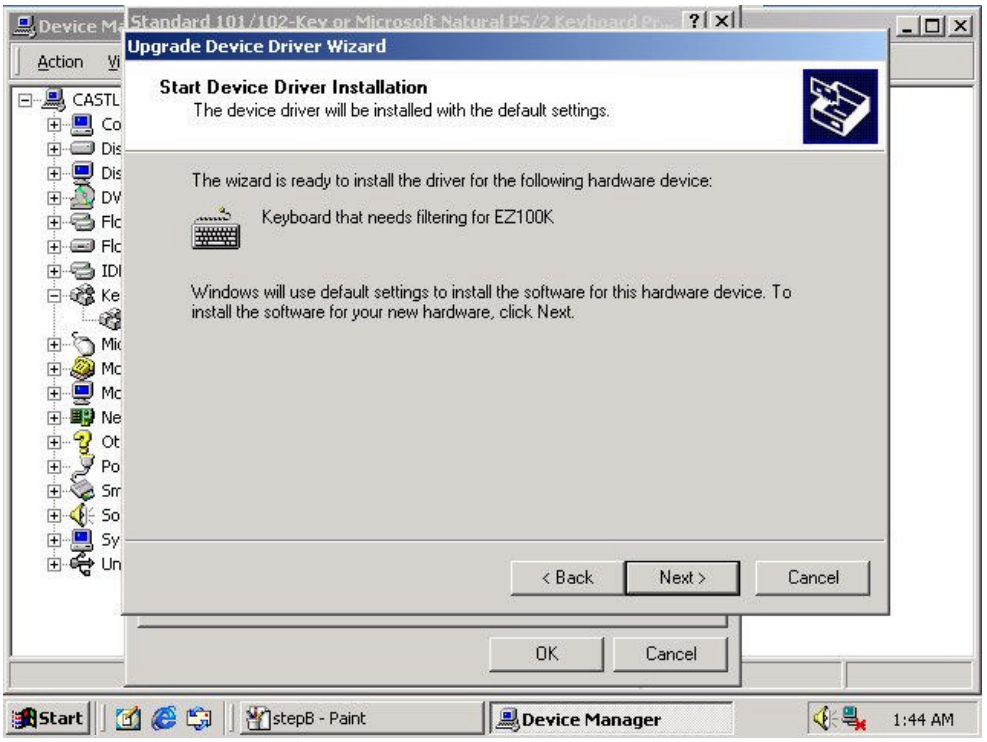
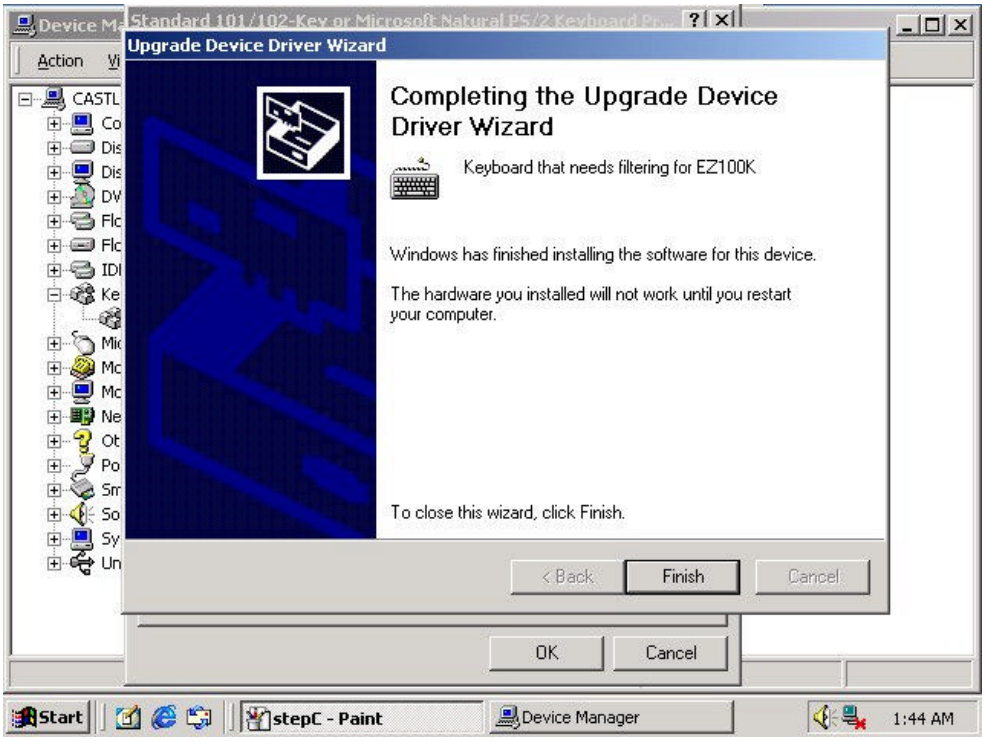
Step9:

Click <**Next**> to continue.



Step10:

Click <**Finish**> to complete the upgrade driver.



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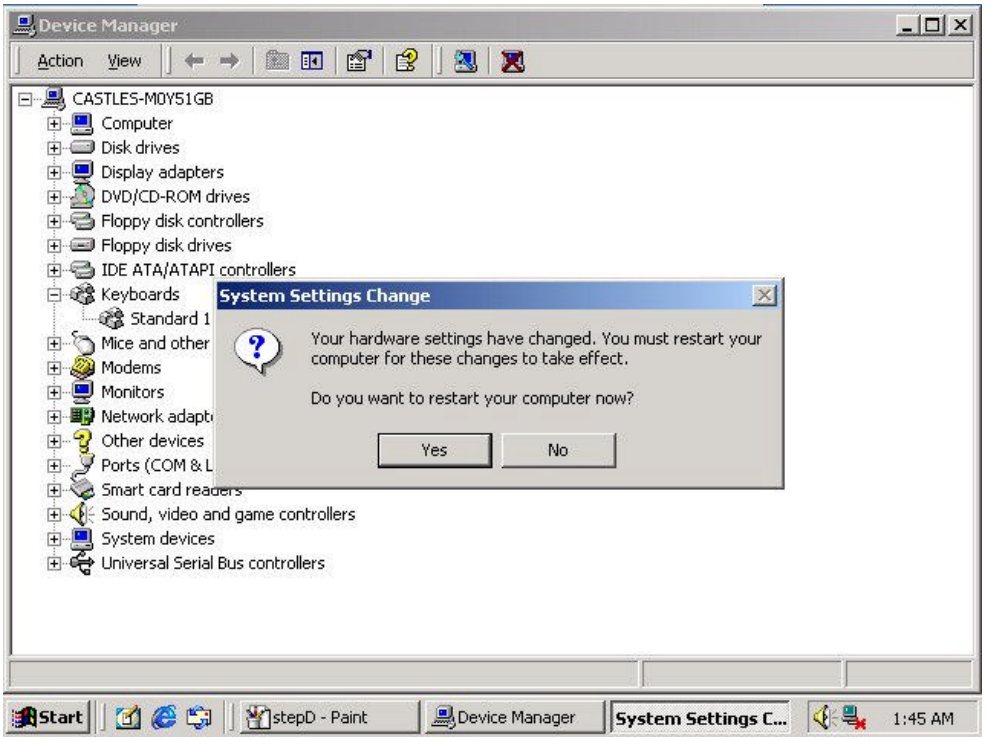
Step11:

System will ask to restart the system, click <**Yes**> to restart.(Driver needs to restart system in order to work properly).



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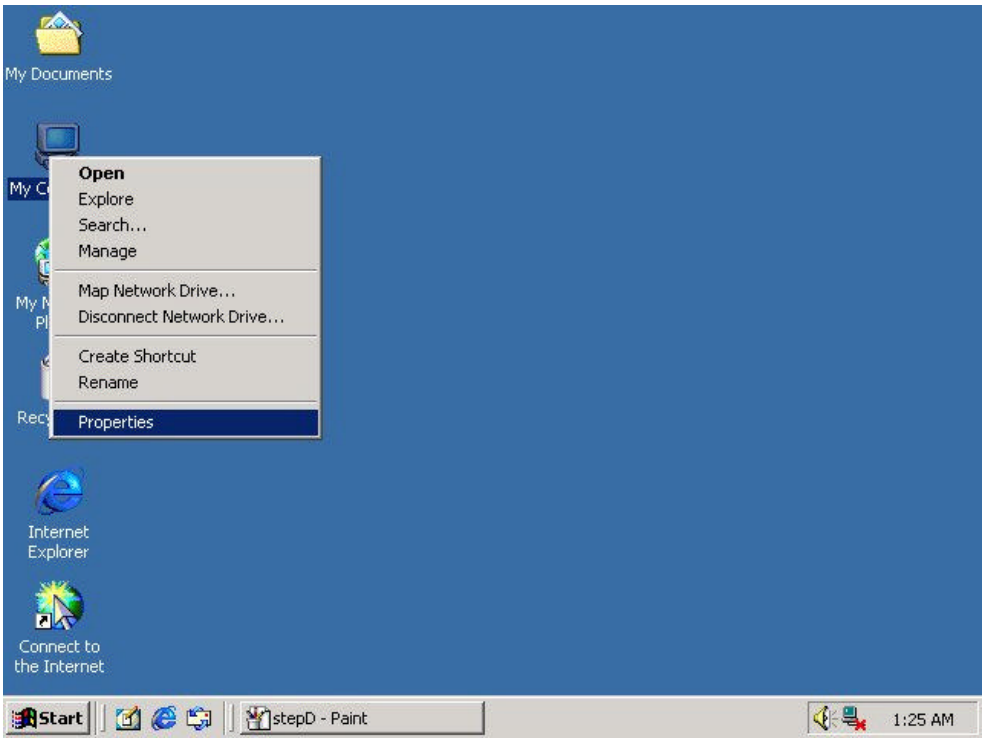
Part 2:

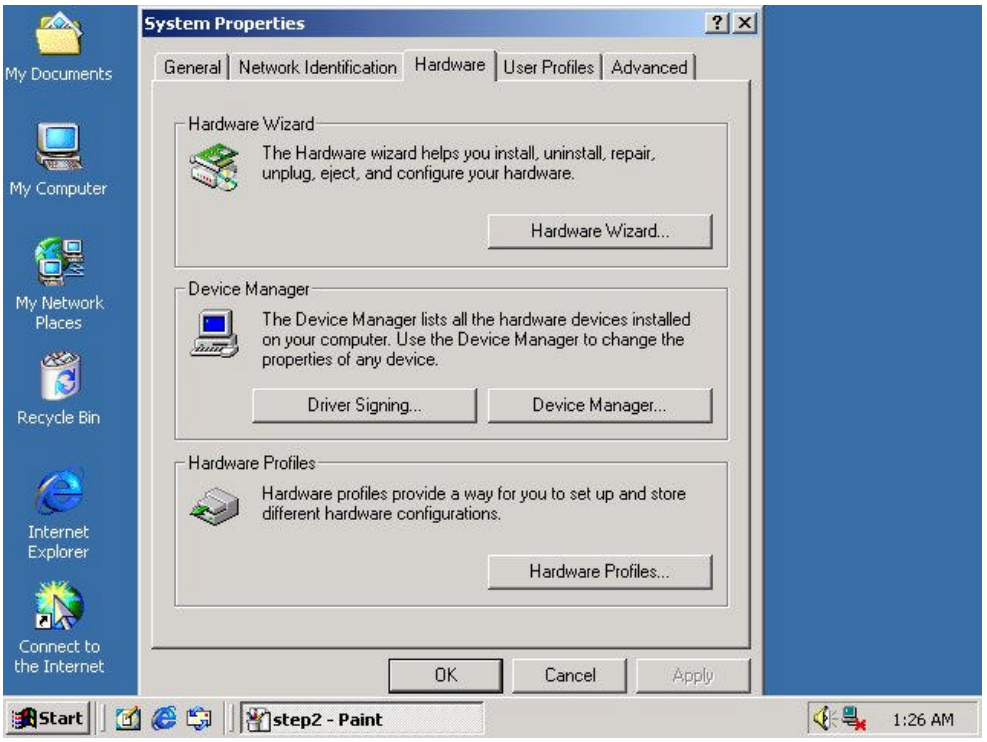
Step1:

Plug the reader to PS/2 port.

Step2:

Start the "**Hardware Wizard**"(right-click **MyComputer**, select **Properties**, select **Hardware** tab, and click <**Hardware Wizard**>)





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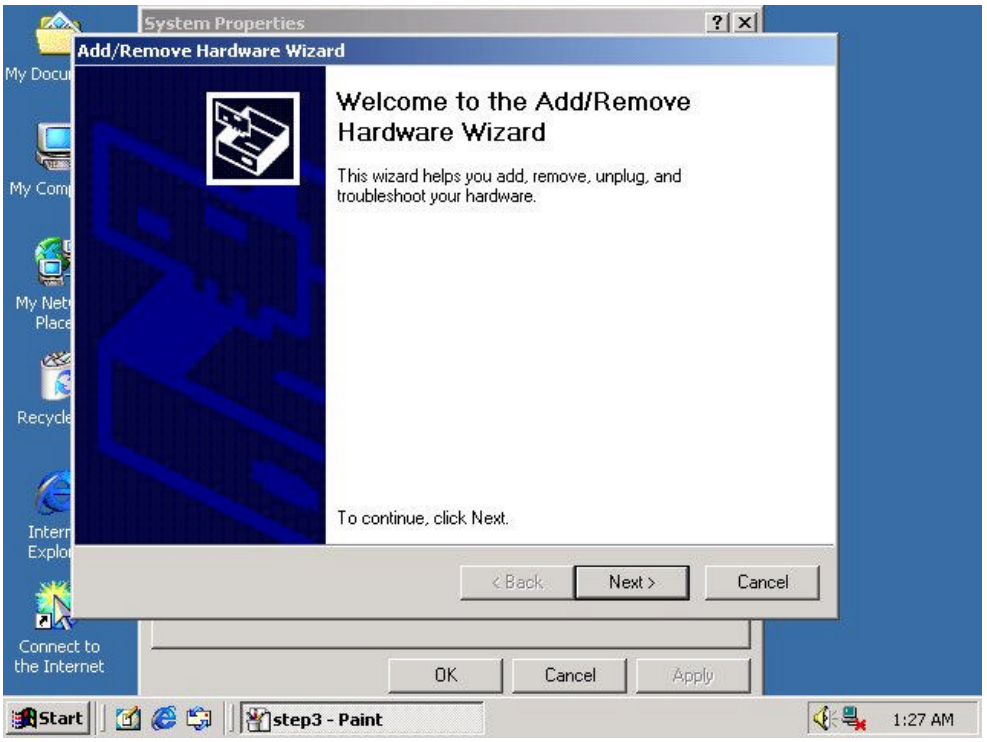
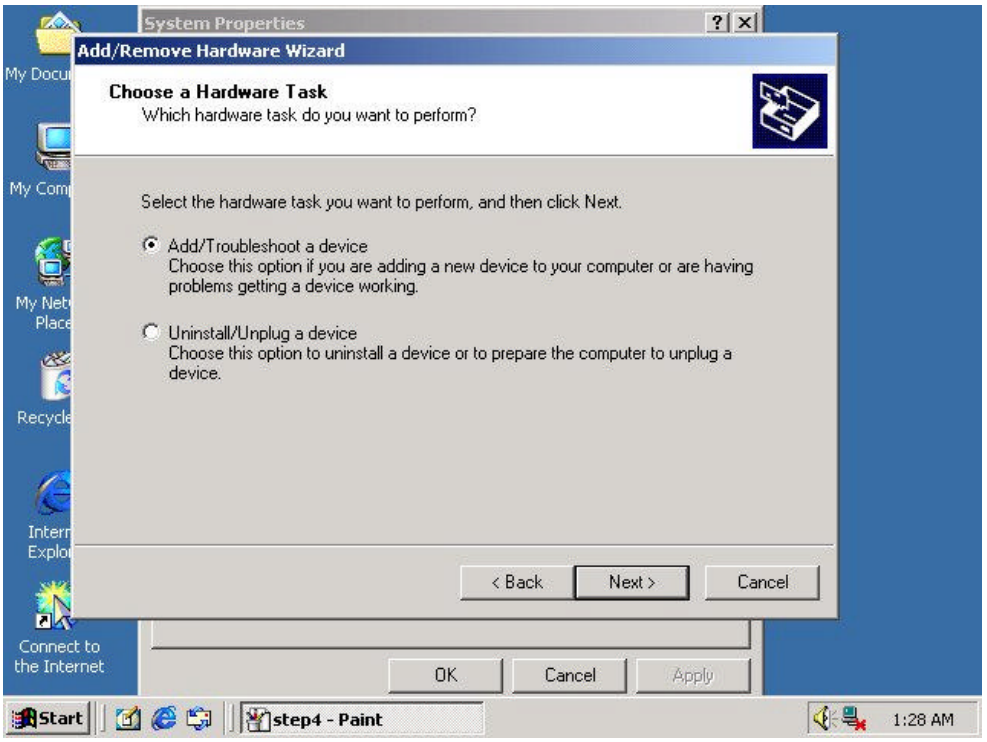
Step3:

When the welcome message shows, click <**Next**> to continue.



Step4:

Select "**Add/Troubleshoot a device**", then click <**Next**>.



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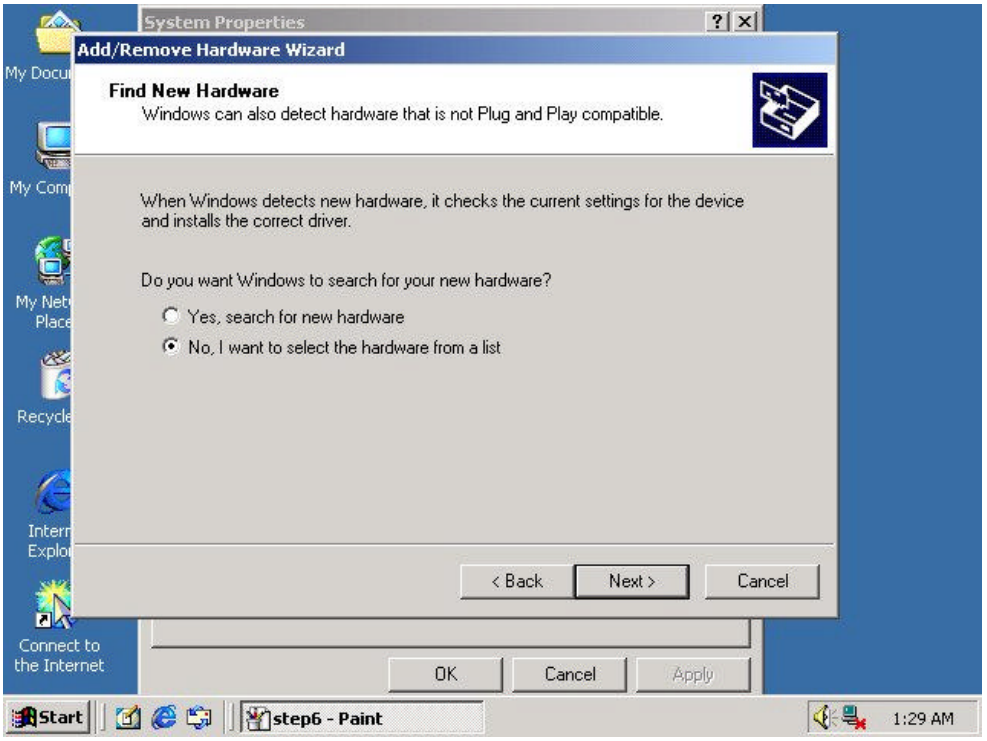
Step5:

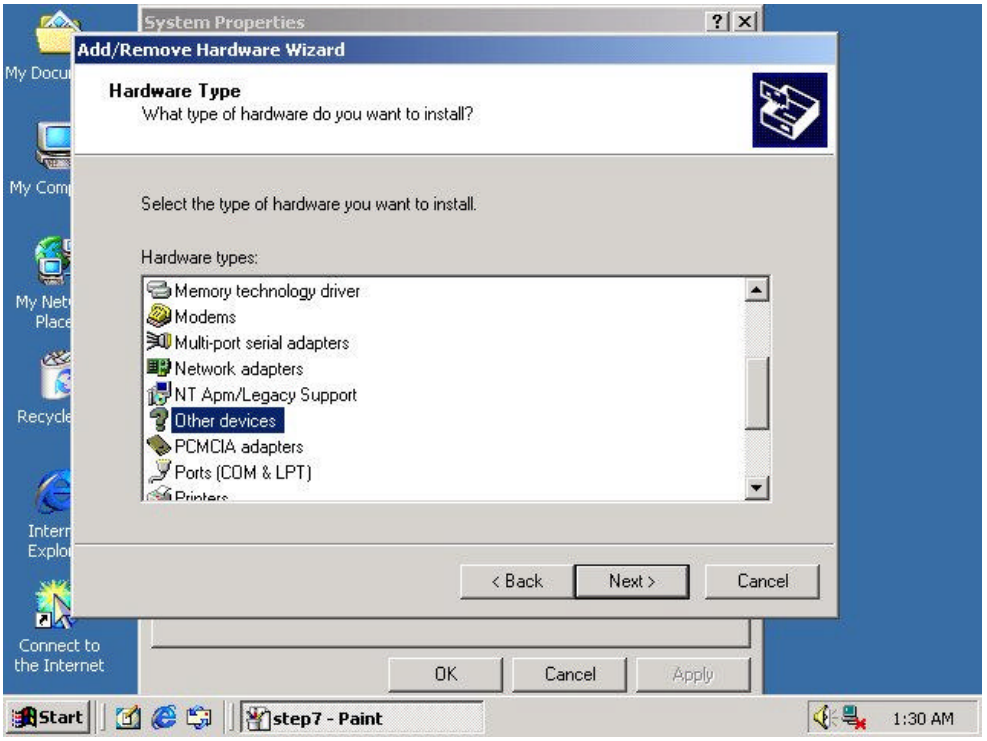
Select **"Add a new device"** , then click <**Next**>.

Select '**No, I want to select the hardware from a list**", then click <**Next**>.



Step6:

In "**Hardware Type** " page, select "**Other devices**", then click <**Next**>.



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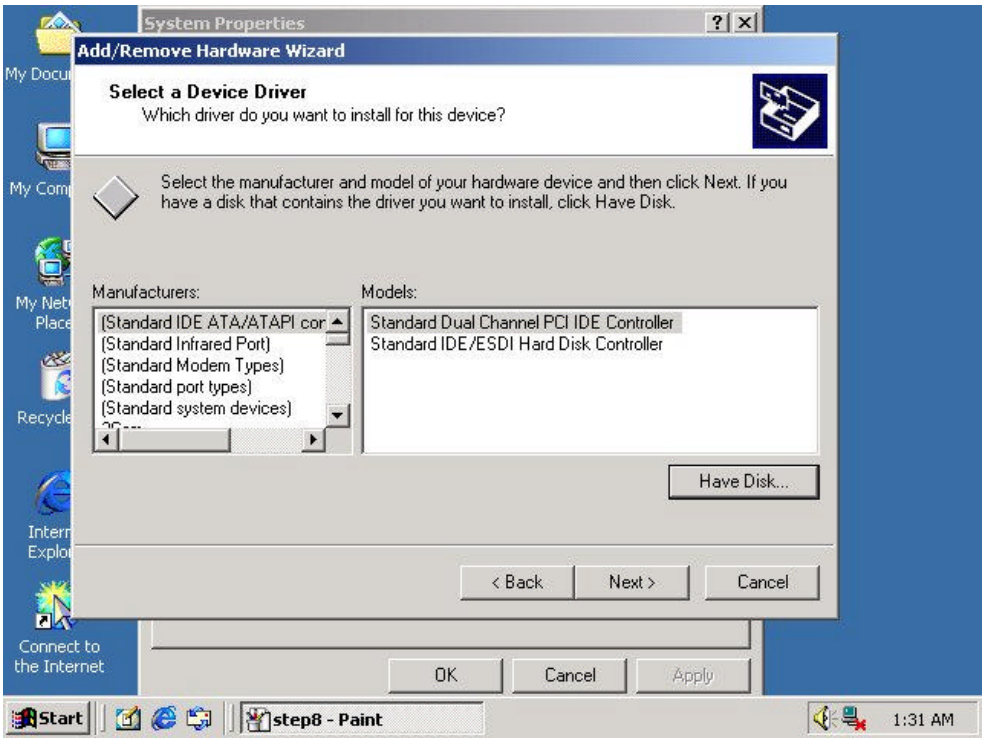
Step7:

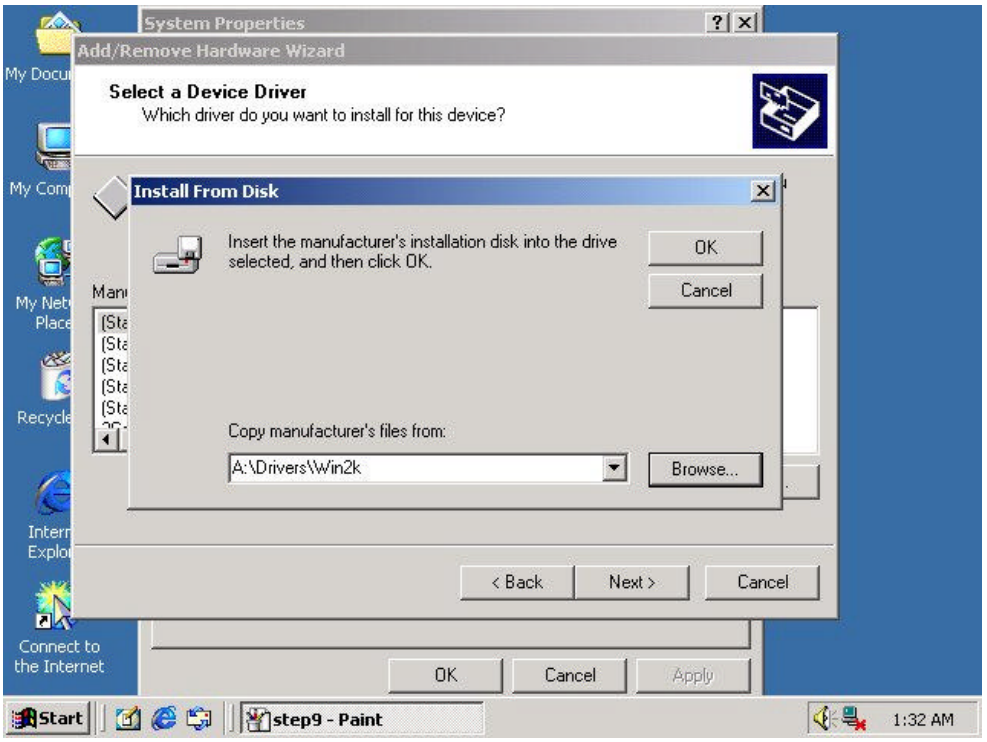
Click <**Have Disk**> to specify where the driver is.



Step8:

Specify a location for wizard to search.

Specify the path to "**(CD-Rom Drive):\Drivers\EZ100PK\Win2k**" then click "**OK**"



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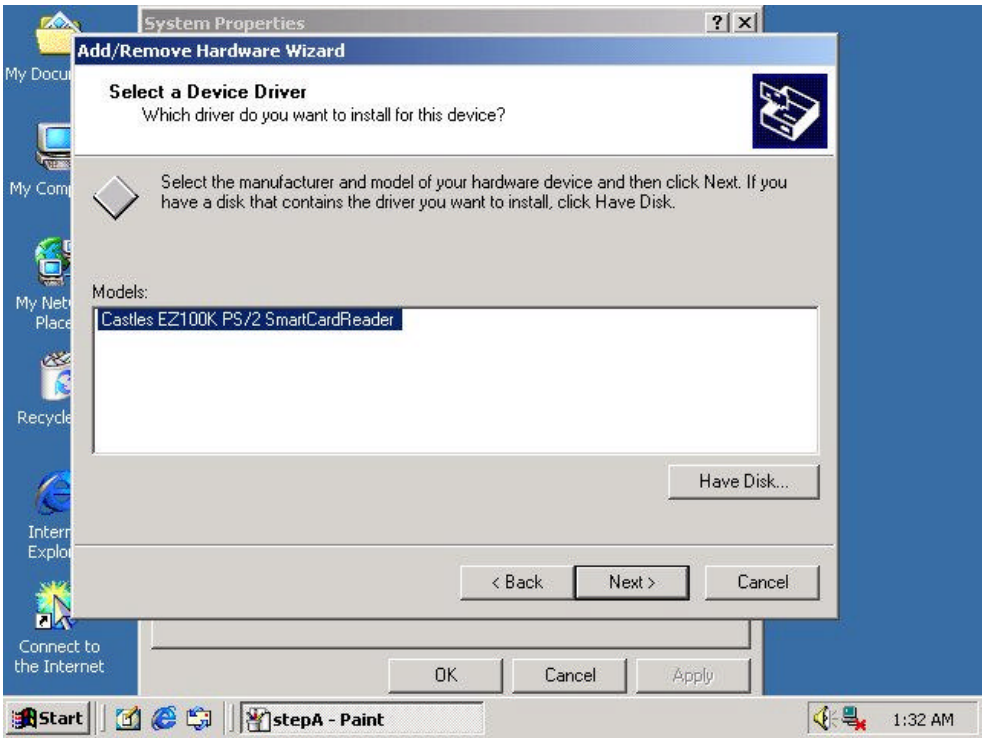
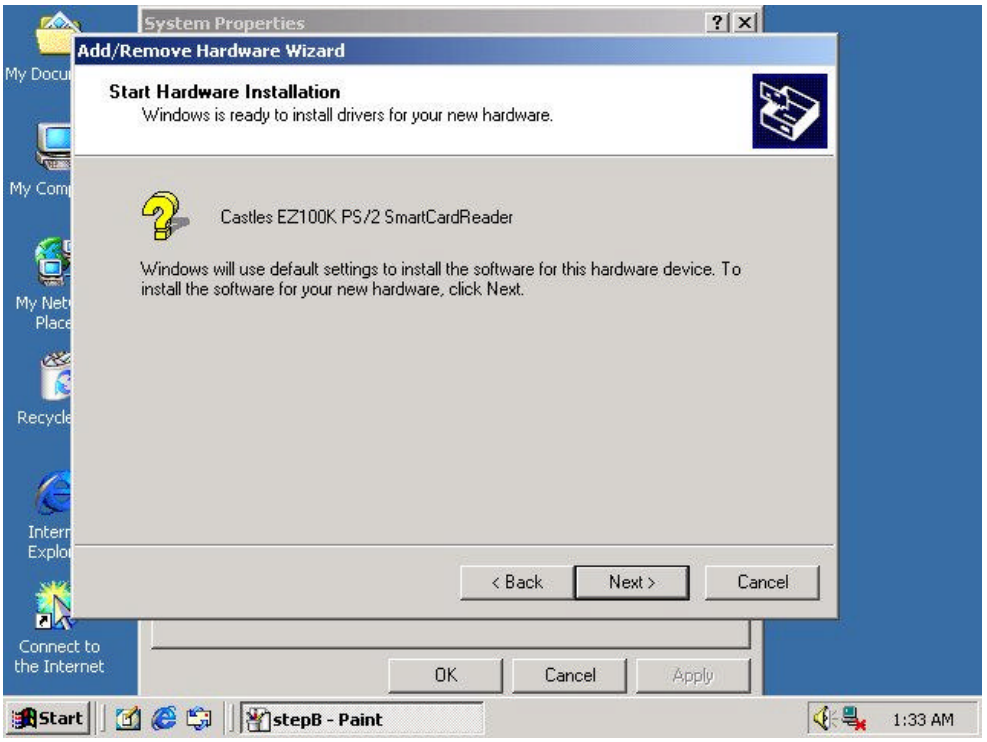
Step9:

Select "**EZ100PK PC/SC Smart Card Reader**", then click <**Next**>.



Step10:

Click <**Next**> to continue, and follow the instruction shown in wizard.



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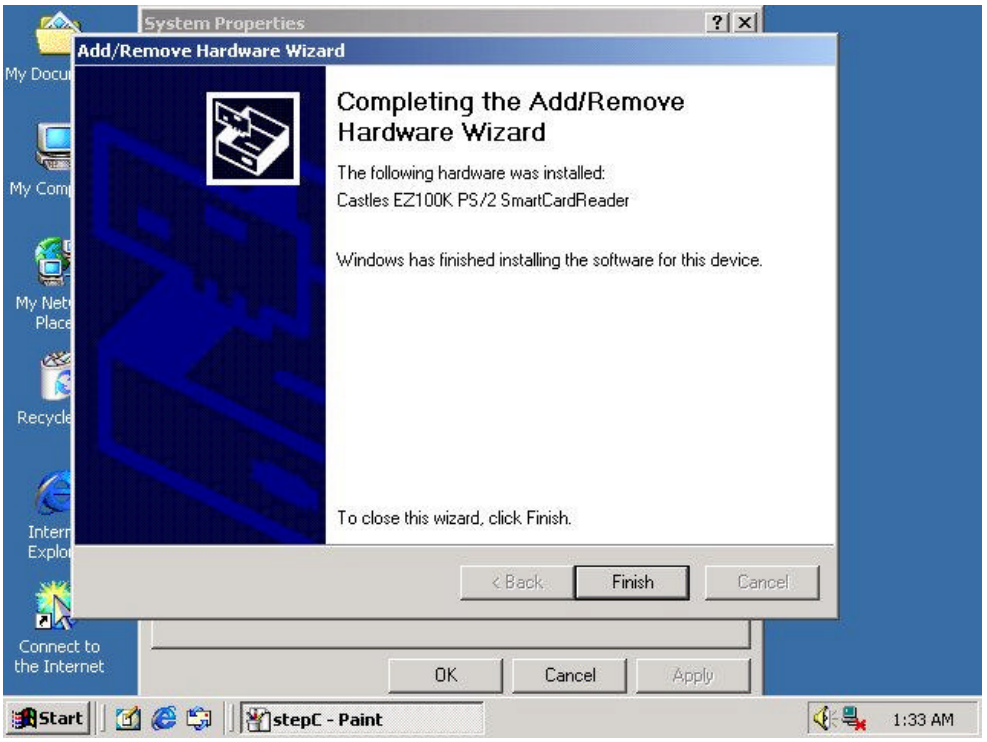
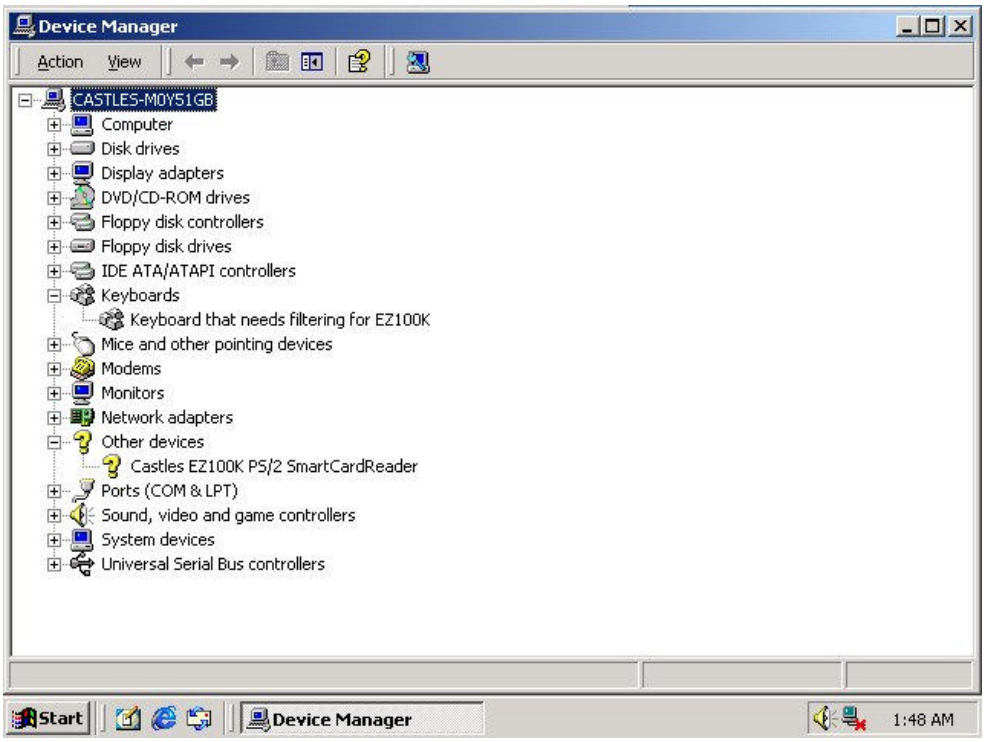
Finish:

Click <**Finish**> to finish the part 2 installation.



After finishing the installation, Device Manager will look like the picture below.



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Appendix A:

◆ Technical Specifications

Dimension	**85mm(L)´ 72mm(W) ´ 17mm(H)**
Weight	**Approx. 115gm.**
Housing	**ABS**
Power Supply	**Max. 60mA@+5V±%5, excluding card power.**
Card Connector	**Push-Pull type with 200,000 insertion cycles**
Card Interface	**ISO7816/3 T=0 and T=1 asynchronous protocol,** **Memory Card (SLE4432/4442, SLE4418/4428, SLE4404, SLE4406/4436/5536, I^2C)**
Cable	**EZ100PK: T-type cable with female/male Mini-DIN6 connector.** **EZ100PR: Y-type cable with female D-SUB 9 pin connector and combined with a T-type cable for power**
O.S. Supported	**Windows NT4.0,Windows 2000,Windows95/98,Windows ME**
Environmental	**Operating Temperature：0~50°C** **Storage Temperature：-35~70°C** **Operating Humidity：20%~90%**

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