ADSP-21020 EZ-ICE Emulator User's Guide

(For Use with VisualDSP++ Release 2.0 or Higher)

First Edition, Revision 1.0, October 2002

ANALOG DEVICES

Limited Warranty

The EZ-ICE emulator is warranted against defects in materials and workmanship for a period of one year from the date of purchase from Analog Devices or from an authorized dealer.

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Regulatory Compliance

The ADSP-21020 EZ-ICE has been certified to comply with the essential requirements of the European EMC directive 89/336/EEC (inclusive 93/68/EEC) and therefore carries the **CE** mark.

The ADSP-21020 EZ-ICE had been appended to the Technical Construction File referenced '**DSPTOOLS1**' dated December 21, 1997 and was awarded CE Certification by an appointed European Competent Body as listed below.

Technical Certificate No: Z600ANA1.005

Issued by: Technology International (Europe) Limited
                     41 Shrivenham Hundred Business Park
                     Shrivenham, Swindon, SN6 8TZ, UK

Important!   The ADSP-21020 EZ-ICE contains ESD (electrostatic discharge) sensitive devices. Electrostatic charges readily accumulate on the human body and equipment and can discharge without detection. Permanent damage may occur on devices subjected to high-energy discharges. Proper ESD precautions are recommended to avoid performance degradation or loss of functionality. Store used EZ-ICE in the protective shipping package.

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1   INTRODUCTION

The ADSP-21020 EZ-ICE emulator system provides emulation and support for the Analog Devices ADSP-21020 DSP. It provides a controlled environment for observing, debugging, and testing activities in a target system by connecting directly to the target processor through the JTAG interface.

Features of the ADSP-21020 EZ-ICE system are as follows:

- Runs on Windows®95/98/2000 and Windows NT 4.0 platforms.
- Emulation for the industry-standard Analog Devices ADSP-21020 DSP.
- Rugged JTAG emulation pod.

1.1   For More Information About Analog Devices Products

Analog Devices can be accessed on the Internet at http://www.analog.com. You can directly access the DSP Web pages at http://www.analog.com/dsp, which provides access to DSP specific technical information and documentation, product overviews, and product announcements. For specific information about DSP tools, go to http://www.analog.com/dsp/tools.

You may also obtain additional information about Analog Devices and its products in any of the following ways:

- FAX questions or requests for information to (781)-461-3010.

- Access the Computer Products Division File Transfer Protocol (FTP) site at ftp://ftp.analogdevices.com/ or ftp://137.71.25.69 or ftp://ftp.analog.com.

1.2   For Technical or Customer Support

You can reach our Customer Support group in the following ways:

- E-mail DSP Tools questions to:
      dsptools.support@analog.com

- DSP Tools Tech Support Form
      http://www.analog.com/industry/dsp/tools/form_techsupport.html

- Contact your local Analog Devices sales office or an authorized Analog Devices distributor.
- Call: (800)-ANALOGD
- E-mail general DSP questions to:
  - dsp.support@analog.com
  - dsp.europe@analog.com (European customer support)

1.3 Purpose of This Manual

The *ADSP-21020 EZ-ICE Emulator* U*ser's Guide* provides directions for installing the hardware and software on your PC.

1.4 Intended Audience

This manual is a user's guide and reference to the ADSP-21020 EZ-ICE emulator. DSP programmers who are familiar with Analog Devices ADSP-21020 DSP architecture, operation, and programming are the primary audience for this manual.

DSP programmers who are unfamiliar with Analog Devices DSPs can use this manual in conjunction with the *ADSP-21020 User's Manual*. DSP programmers who are unfamiliar with VisualDSP++ should refer to the VisualDSP++ Help menu and the *VisualDSP++ User's Guide*. For the locations of these documents, refer to Section 1.6.

1.5 Manual Contents

This manual contains the following information:

- Chapter 1 — INTRODUCTION
  Provides manual information and Analog Devices contact information.

- Chapter 2 — REQUIREMENTS
  Provides PC system requirements and package information.

- Chapter 3 — HARDWARE INSTALLATION AND CONFIGURATION
  Provides information on installing the ADSP-21020 EZ-ICE.

- Chapter 4 — SOFTWARE CONFIGURATION AND INSTALLATION
  Provides information on installing the EZ-ICE software.

1.6   On-line Help

Your software installation kit includes online Help as part of the Windows$^{®}$ interface. These Help files provide information about VisualDSP++ and the ADSP-21020 EZ-ICE emulator.

To view the VisualDSP++'s Help, click on the **Help** menu item or go to the Windows task bar and select Start\Programs\VisualDSP\VisualDSP++ Help.

The documents in the following two tables can be found through online help or in the Docs folder of your VisualDSP++ installation.

For more documentation, please go to http://www.analog.com/dsp/tech_doc

Table 1-1: Related DSP Documents

Document Name	Description
ADSP-21020 User's Manual	General functional description, pinout, and timing.
ADSP-21000 Family Application Handbook Volume 1	Quick start in developing DSP applications with ADSP-21000 family digital signal processors.

Table 1-2: Related VisualDSP++ Documents

Document Name	Description
VisualDSP++ Users Guide for ADSP-21xxx DSPs	Detailed description of VisualDSP++ features and usage.
VisualDSP++ Preprocessor and Assembler Manual for ADSP-21xxx DSPs	Description of the assembler function and commands for ADSP-21xxx family DSPs.
VisualDSP++ C/C++ Compiler and Library Manual for ADSP-21xxx DSPs	Description of the compiler function and commands for ADSP-21xxx family DSPs.
VisualDSP++ Linker and Utilities Manual for ADSP-21xxx DSPs	Description of the linker function and commands for the ADSP-21xxx family DSPs.

2 REQUIREMENTS

2.1 Overview

This chapter provides you with the information you need to begin using ADSP-21020 EZ-ICE emulator. Install your software and hardware in the order presented in Section 3 and Section 4 for correct operation. This chapter has the following sections:

- Contents of your EZ-ICE Package (Section 2.2)
  Provides a list of the components that are shipped with this EZ-ICE.

- PC Configuration (Section 2.3)
  Describes the minimum requirement for the PC to work with the EZ-ICE.

2.2 Contents of your EZ-ICE Package

Your ADSP-21020 EZ-ICE Emulator package contains the following items.

- Emulator Tools CD, containing:
  - o ADSP-21020 specific debug software
  - o *ADSP-21020 EZ-ICE Manual* (this document)
- PC Plug-in card, probe and connecting cable
- ADSP-21020 data sheet and anomaly list
- Registration card - please fill out and return

If any item is missing, contact the vendor where you purchased your EZ-ICE or contact Analog Devices, Inc.

The ADSP-21020 EZ-ICE contains ESD (electrostatic discharge) sensitive devices. Electrostatic charges readily accumulate on the human body and equipment and can discharge without detection. Permanent damage may occur on devices subjected to high-energy discharges. Proper ESD precautions are recommended to avoid performance degradation or loss of functionality. Store used EZ-ICE in the protective shipping package.	WARNING! ESD SENSITIVE DEVICE

2.3 PC Configuration

For correct operation of the VisualDSP++ software and the EZ-ICE, your computer must have the minimum configuration shown in Table 2-1.

Table 2-1: Minimum PC Configuration

Windows® 95, 98, NT and Windows® 2000 or later
Intel (or comparable) 166MHz processor
VGA Monitor and color video card
2-button mouse
50 MB free on hard drive
32 MB RAM
ISA Slot
CD-ROM Drive

3   HARDWARE INSTALLATION AND CONFIGURATION

This section provides all the information required to install the ADSP-21020 EZ-ICE card and pod into your PC.

For specific instructions on installing an I/O card in your computer, consult the operation manual for that computer. In general, you should be able to use the following instructions.

> *Important!* The ADSP-21020 EZ-ICE contains ESD (electrostatic discharge) sensitive devices. Electrostatic charges readily accumulate on the human body and equipment and can discharge without detection. Permanent damage may occur on devices subjected to high-energy discharges. Proper ESD precautions are recommended to avoid performance degradation or loss of functionality. Store used EZ-ICE in the protective shipping package.

3.1   Unpacking the Emulator

Remove the ADSP-21020 EZ-ICE board and pod from the package. Care should be taken when handling to avoid discharge of static electricity that may damage some components. The ADSP-21020 EZ-ICE board must first be installed in your computer. Put the pod aside.

3.2   Removing the Cover from Your Computer

Make sure the PC's power is off and all power cords are disconnected. Disconnect any other cables and externally attached devices from the main unit of the computer. Remove the screws or clips that secure the cover to the unit and carefully remove the cover. The operation manual for your computer should contain detailed instructions for removing the cover.

3.3   Setting the I/O Base Address

The I/O base address is factory configured for 340h. Ensure that any expansion boards installed in your computer do not use this address. If this address is already used by another device, change the I/O base address of that device or of the ADSP-21020 EZ-ICE board. If you wish to change this factory setting, use Table 3-1 to determine the proper switch settings for some recommended PC-AT I/O addresses.

Table 3-1 I/O Base Address Switch Setting Examples

Hex Addr.	A9	A8	A7	A6	A5	A4	A3	A2	A1	A0
210 - 21F	1	0	0	0	0	1	X	X	X	X
220 - 22F	1	0	0	0	1	0	X	X	X	X
230 – 23F	1	0	0	0	1	1	X	X	X	X
240 – 24F	1	0	0	1	0	0	X	X	X	X
250 – 25F	1	0	0	1	0	1	X	X	X	X
260 – 26F	1	0	0	1	1	0	X	X	X	X
300 – 31F	1	1	0	0	0	X	X	X	X	X
320 – 32F	1	1	0	0	1	0	X	X	X	X
330 – 34F	1	1	0	0	1	1	X	X	X	X
*340 – 34F	**1**	**1**	**0**	**1**	**0**	**0**	**X**	**X**	**X**	**X**
350 – 35F	1	1	0	1	0	1	X	X	X	X

*Denotes Factory Setting

3.4   Installing the ADSP-21020 EZ-ICE Board in Your Computer

After selecting a free expansion slot for the ADSP-21020 EZ-ICE board, remove the cover plate from the back of the expansion slot. Hold the ADSP-21020 EZ-ICE board firmly at the top and press it carefully into the expansion slot making sure that a good connection is made. Secure the ADSP-21020 EZ-ICE board to the computer chassis using the screw and hole used for holding the expansion cover plate. Replace the cover to the computer's main unit and reconnect all cables and devices.

3.5   Connecting the Pod to the ADSP-21020 EZ-ICE Board

The pod connects to the ADSP-21020 EZ-ICE board through a shielded ribbon cable and a 25-pin connector. Connect the pod to the ADSP-21020 EZ-ICE before applying power to the PC.   The JTAG header on the opposite side of the pod can be connected/disconnected to a live (as well as unpowered) target system without damaging the pod system.

> *Important!* Connect/disconnect the remote pod to/from the emulator card *only* with the power turned off. Failure to follow this precaution may result in damage to the pod or board.

3.6 Connecting the Pod to Your Target System

The pod connects to the target processor through the JTAG interface. The target board must be built with an appropriate JTAG connector. Note the position of the key pin. The key pin should be used as a guide to connect the pod to the target. Included with the ADSP-21020 EZ-ICE system are two extender connectors. These extenders are used to connect the ADSP-21020 EZ-ICE system to a target, which was designed for use with the ADI ICEPAC™. These extenders allow connection to the JTAG pins on the ICEPAC header.

4   SOFTWARE CONFIGURATION AND INSTALLATION

4.1   Windows 95/98 Driver Installation

There is no required driver installation for Windows 95/98.

4.2   Windows NT Driver Installation

Before using the ADSP-21020 EZ-ICE Emulator for the first time, run the emulator Tools installation and be sure to select 21020 as the emulator to install. The install will place the driver in the appropriate folder so that the driver is installed properly.

4.3   Windows 2000 Driver Installation

Administrator privileges are required to install and/or configure this driver under Windows 2000.

4.3.1 Installing the Driver

The following procedure installs the Windows 2000 drivers.

1. Follow the instructions on how to install the ADSP-21020 EZ-ICE emulator in Section 3, Hardware Installation and Configuration.
2. From the Windows 2000 Start Menu, choose **Settings**, **Control Panel**.
3. Click **Add/Remove Hardware**.
4. The **Welcome to the Add/Remove Hardware Wizard** dialog box appears as shown in Figure 4-1.
5. Click **Next**.

Figure 4-1 Welcome to the Add/Remove Hardware Wizard

6. In the **Choose a Hardware Task** dialog box shown in Figure 4-2, select **Add/Troubleshoot a device** and click **Next**.
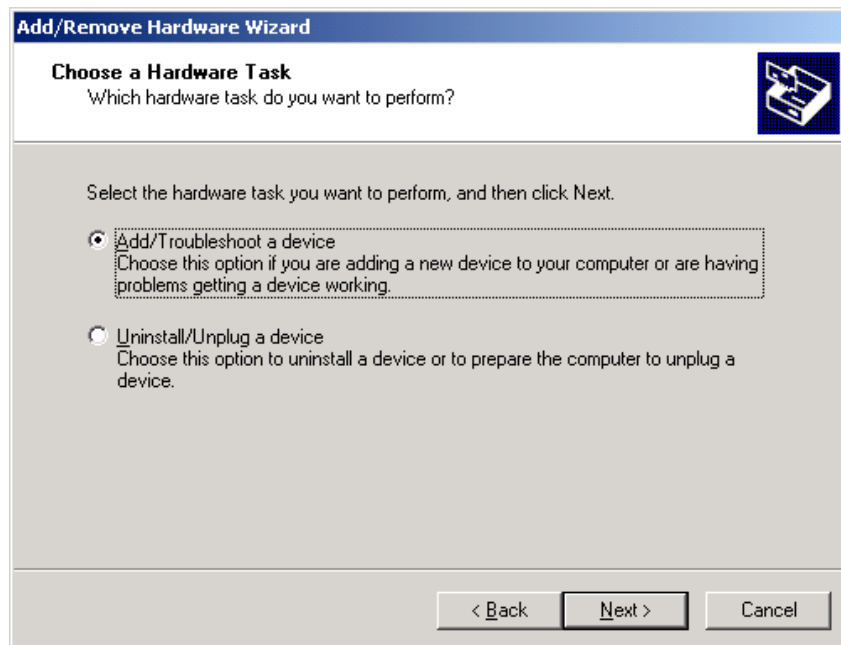
Figure 4-2 Choose a Hardware Task

7. Windows 2000 will search for plug-and-play hardware on your machine. When it has finished you will see the **Choose a Hardware Device** dialog box shown in Figure 4-3.
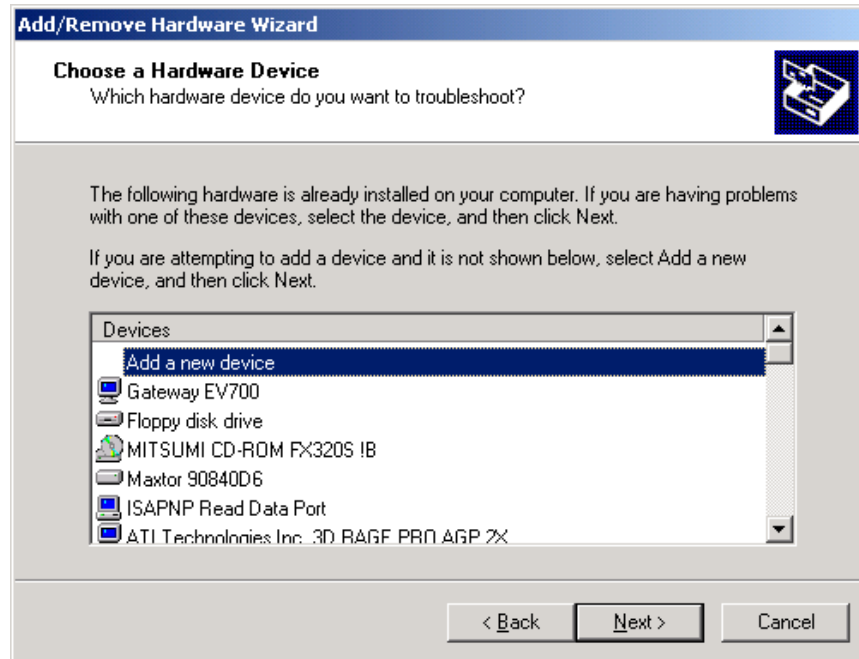
8. Select **Add a new device** and click **Next**.

Figure 4-3 Choose a Hardware Device

9. In the **Find New Hardware** dialog box shown in Figure 4-4, select **No, I want to select the hardware from a list** and click **Next**.
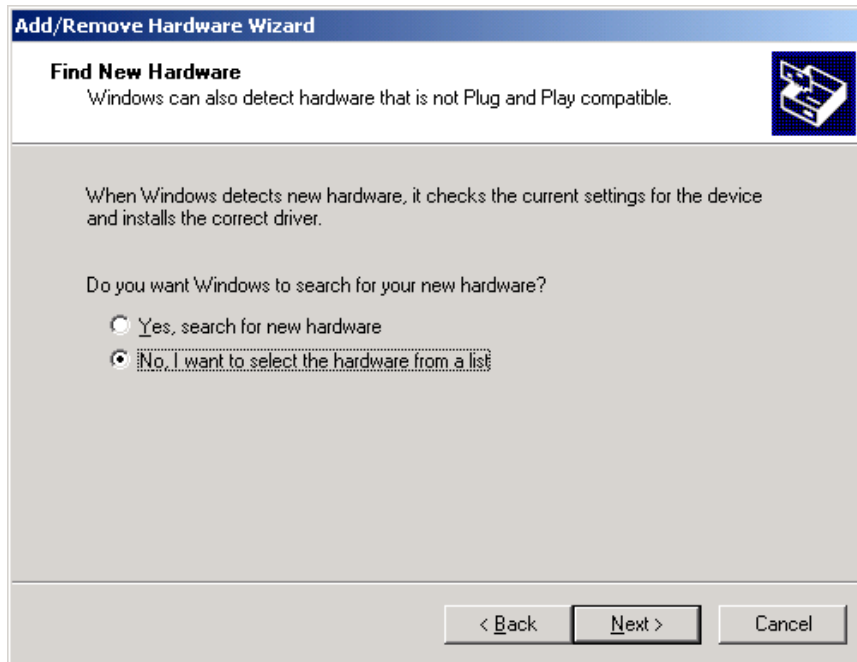
Figure 4-4 Find New Hardware

10. In the **Hardware Type** dialog box shown in Figure 4-5, select **Other devices** and click **Next**.
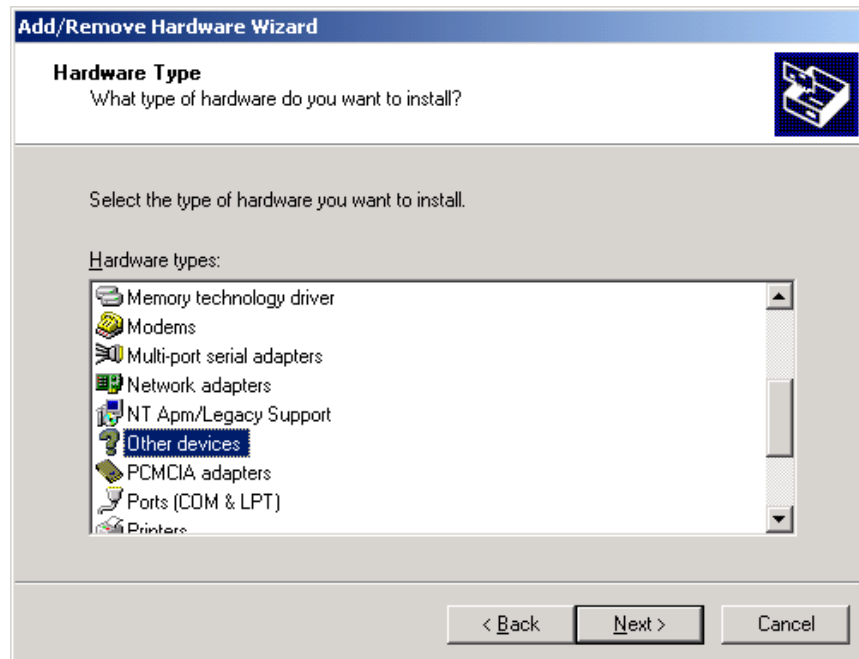
Figure 4-5 Hardware Type

11. In the **Select a Device Driver** dialog box shown in Figure 4-6, click **Have Disk.**
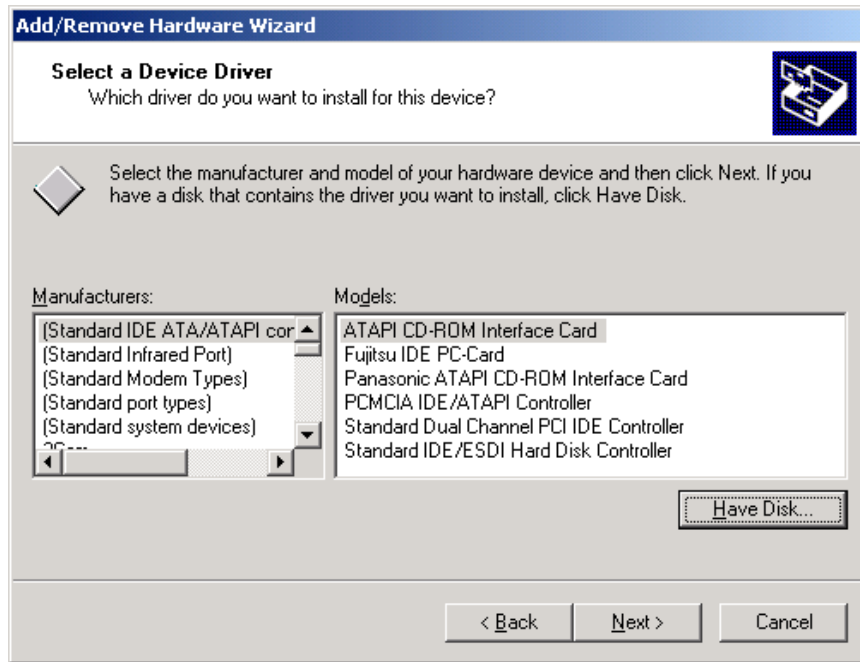
Figure 4-6 Select a Device Driver

12. When the **Install from Disk** dialog box appears shown in Figure 4-7, insert the **Emulator Drivers CD**, choose your CD drive letter, and click **OK**.
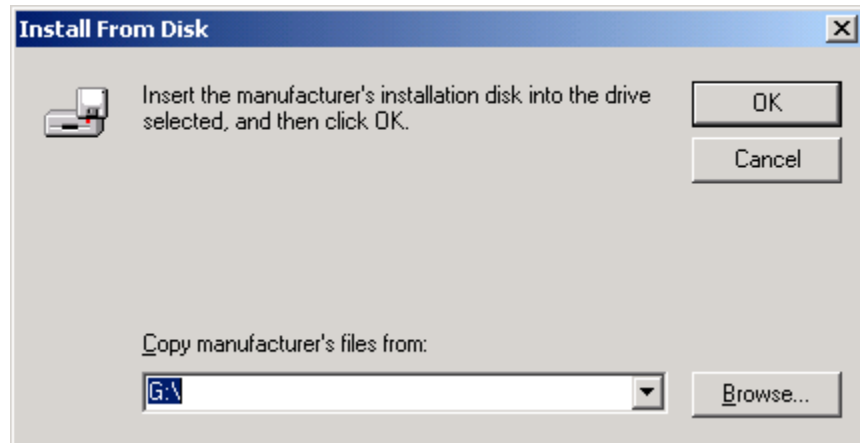
Figure 4-7 Install From Disk

13. When the **Select a Device Driver** dialog box appears, shown in Figure 4-8, select **EZICE 21020-ICE ISA Emulator** and click **Next**.
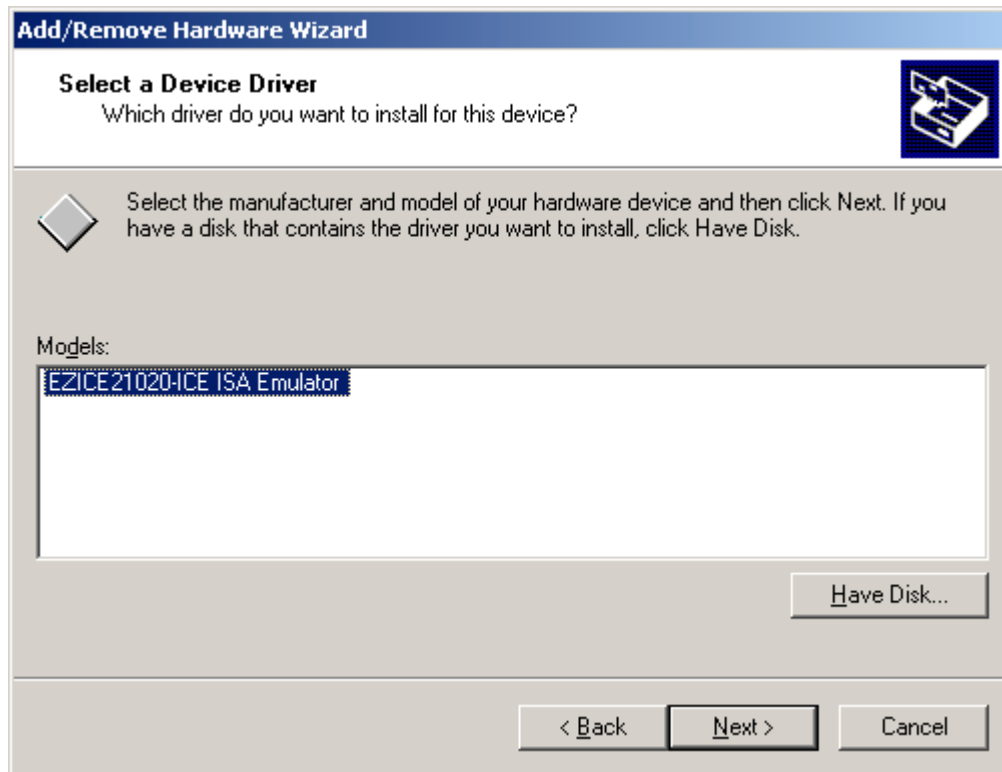
Figure 4-8 Select a Device Driver

14. A **Warning** stating that Windows could not detect the settings for this device will appear, shown in Figure 4-9. Click **OK**.

Figure 4-9 Windows Warning Message

15. In the **Add New Hardware Wizard Properties** dialog box shown in Figure 4-10, select the **Input/Output Range** resource type and click **Change Setting.**
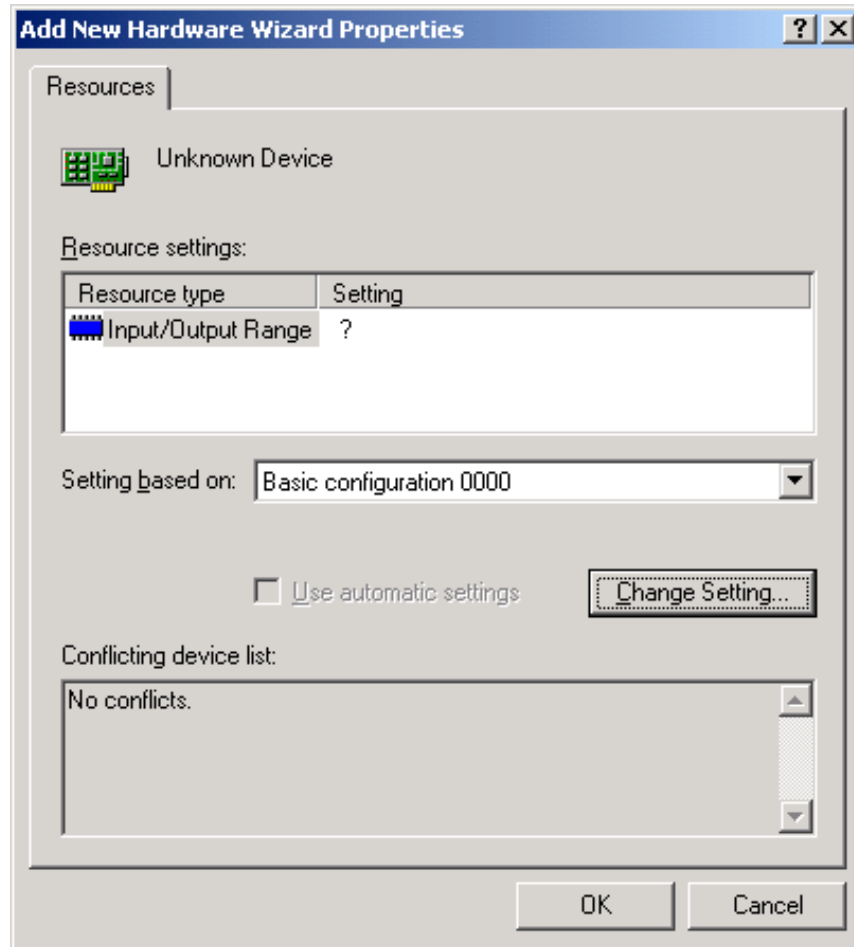
Figure 4-10 Add New Hardware Wizard Properties

16. The **Edit Input/Output Range** dialog box as shown in Figure 4-11 will appear. In **Value,** scroll through all the possible address ranges available on the ADSP-21020 EZ-ICE emulator. Select a range that does not show conflicts in the **Conflict Information** box and click **OK**.

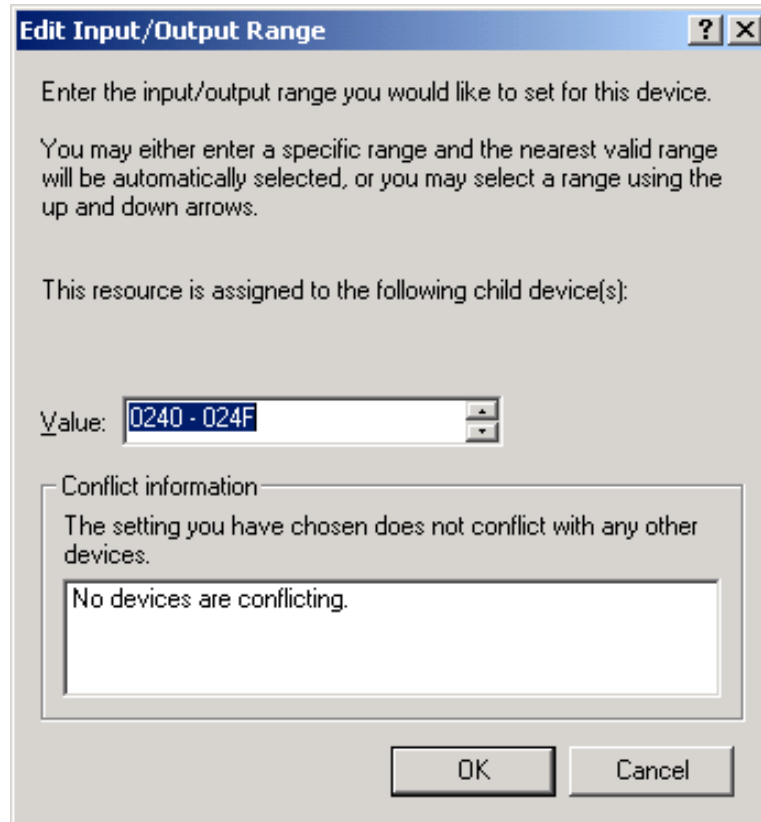➢ **Note: You must change the switch settings on the ADSP-21020 EZ-ICE board to match this value the next time you power down your machine if they are not already matched.**

Figure 4-11 Edit Input/Output Range

17. In the **Add New Hardware Wizard Properties** dialog box shown in Figure 4-10.
    Notice the **Input/Output Range** setting shows the newly chosen value. Click **OK**.
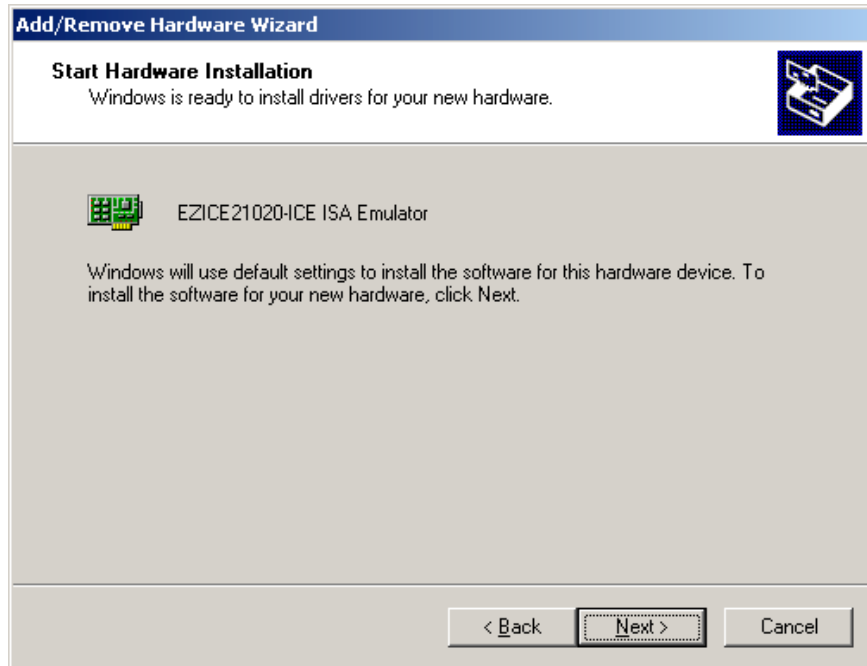18. In the **Start Hardware Installation** dialog box shown in Figure 4-12, click **Next**.

Figure 4-12 Start Hardware Installation

19. The driver files will copy to your machine and the **Completing the Add/Remove Hardware Wizard** dialog box will appear shown in Figure 4-13. Click **Resources** to view the resources again, or click **Finish** to complete the driver installation.
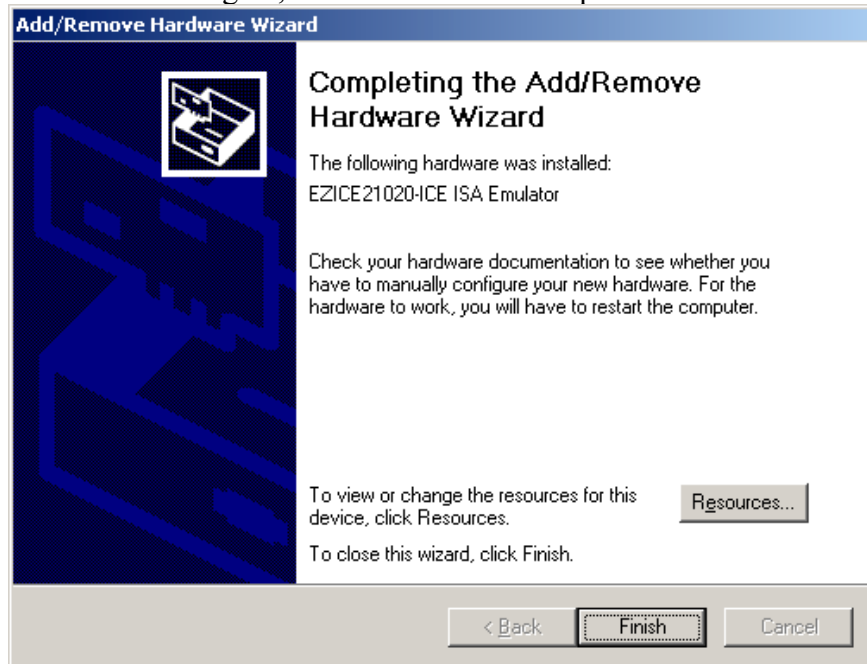

Figure 4-13 Completing the Add/Remove Hardware Wizard

20. A message stating that you must reboot your computer before the new settings will take effect will appear. Click **Yes** to restart your computer.

4.3.2 Viewing Emulator Configuration

1. Click on **Start** menu on the Windows 2000 task bar.
2. Choose **Settings** and click on **Control Panel**.
3. Click **System** to view the **System Properties** dialog box.
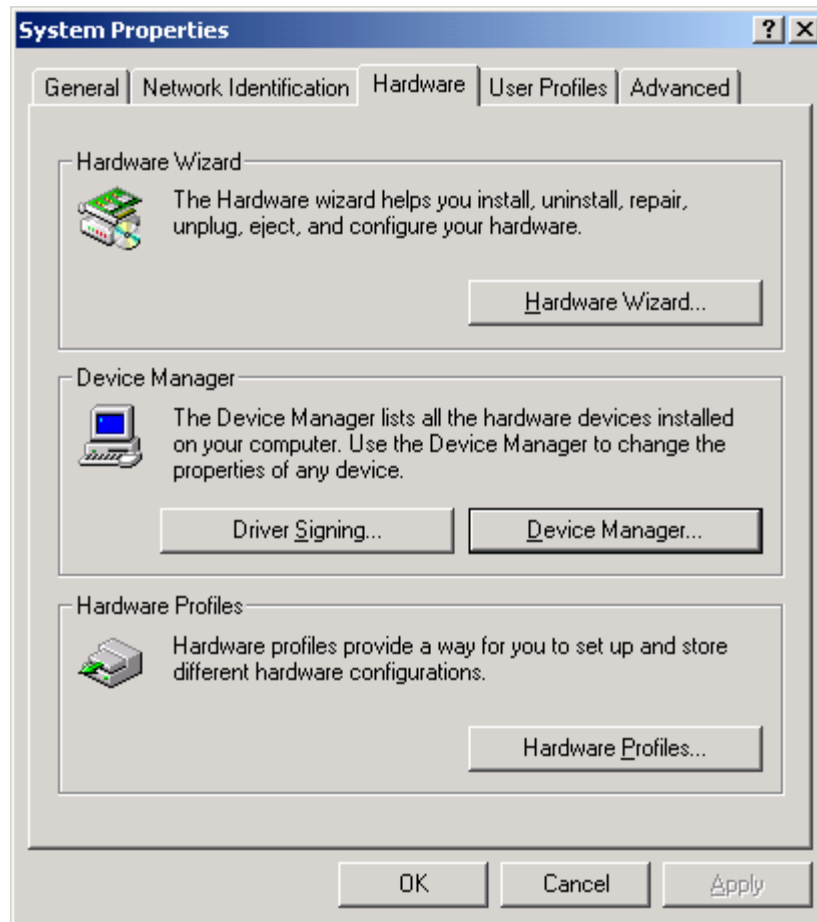4. Click the **Hardware** tab, and click **Device Manager** shown in Figure 4-14.

Figure 4-14 System Properties

5. Click **DSP Emulators** to expand this category.
6. Select specific emulator to view the emulator properties dialog box.
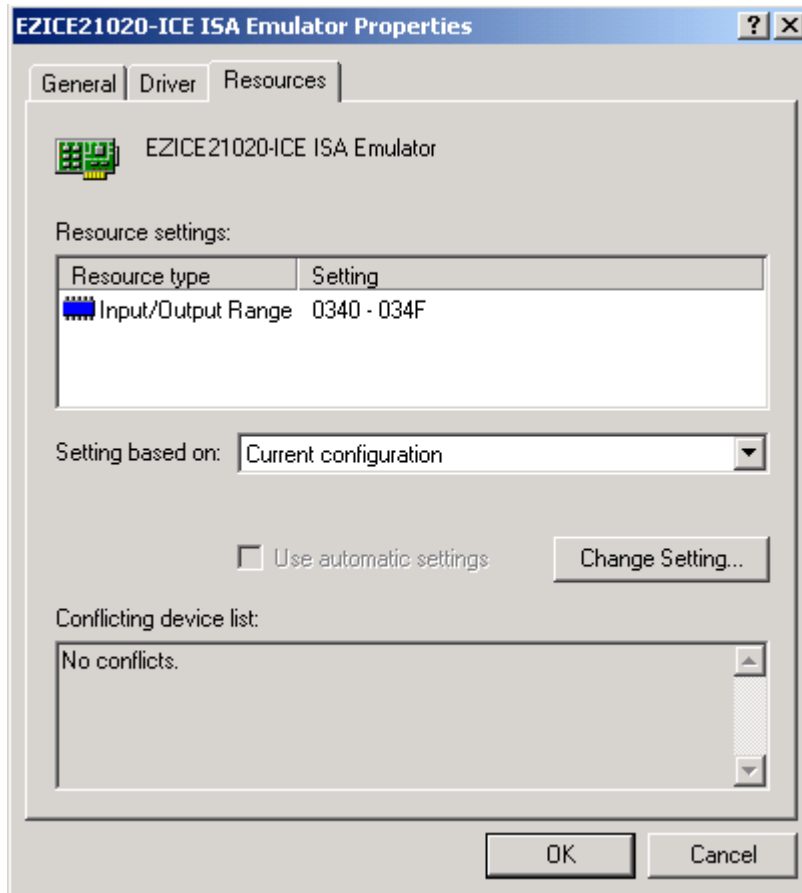7. Click the **Resources** tab to view the resources for this particular emulator shown in Figure 4-15.

Figure 4-15 EZICE 21020-ICE ISA Emulator Properties

4.3.3 Changing Emulator Configuration

1. From the **EZICE 21020-ICE ISA Emulator Properties** dialog box shown in Figure 4-15, select **Input/Output Range** under **Resource settings** and click **Change Setting.**

2. You will see the **Edit Input/Output Range** dialog box shown in Figure 4-11. In the **Value** box, scroll through the possible address ranges available on the ADSP-21020 EZ-ICE emulator. Select a range that does not show any conflicts in the **Conflict Information** box, and click **OK**.

   ➢ **Note: You must change the switch settings on the ADSP-21020 EZ-ICE board to match this value the next time you power down your machine if they are not already matched.**

3. Upon clicking **OK** on the **Emulator Properties** dialog box you will see the **System Settings Change** dialog box appears indicating you must restart your computer for the change to take effect. Click **Yes** to restart your computer now.

4.4 Debugger Software Installation and Operation

To install and operate the debugger software, refer to *the Software User's Guide* included with the software distribution.

5 Support

Analog Devices provides free technical support.

5.1 Technical Support

For technical support, you may contact the Analog Devices DSP Tools Technical Support group in any of the following ways:

- Fill out the DSP Tools Technical Support Web site form at:
  http://forms.analog.com/Form_Pages/DSP/tools/contactDSP.asp
- Send a description of the problem by e-mail to:
   dsptools.support@analog.com
- Call the customer support hotline at 1-800-ANALOG-D (1-800-262-5643 U.S.A. only)

For direct support of the Analog Devices' DSPs, call the Analog Devices' DSP Applications Engineering group at 1-800-ANALOG-D or email dsp.support@analog.com.

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