# ADSP-21020 EZ-ICE Emulator User's Guide

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

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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<sup>®</sup>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 <u>http://www.analog.com</u>. You can directly access the DSP Web pages at <u>http://www.analog.com/dsp</u>, which provides access to DSP specific technical information and documentation, product overviews, and product announcements. For specific information about DSP tools, go to <u>http://www.analog.com/dsp/tools</u>.

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 <u>ftp://ftp.analogdevices.com/</u> or <u>ftp://137.71.25.69</u> or <u>ftp://ftp.analog.com</u>.

#### **1.2 For Technical or Customer Support**

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

- E-mail DSP Tools questions to: <u>dsptools.support@analog.com</u>
- DSP Tools Tech Support Form
   <u>http://www.analog.com/industry/dsp/tools/form\_techsupport.html</u>

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

#### 1.3 Purpose of This Manual

The *ADSP-21020 EZ-ICE Emulator* User'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<sup>®</sup> 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** 

<b>Document</b> 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

<b>Document</b> Name	Description
VisualDSP++ Users	Detailed description of VisualDSP++
<i>Guide for ADSP-21xxx</i>	features and usage.
DSPs	
VisualDSP++	Description of the assembler function and
Preprocessor and	commands for ADSP-21xxx family DSPs.
Assembler Manual for	
ADSP-21xxx DSPs	
VisualDSP++ C/C++	Description of the compiler function and
Compiler and Library	commands for ADSP-21xxx family DSPs.
Manual for ADSP-	
21xxx DSPs	
VisualDSP++ Linker	Description of the linker function and
and Utilities Manual	commands for the ADSP-21xxx family
for ADSP-21xxx DSPs	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:
  - ADSP-21020 specific debug software
  - 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 highenergy discharges. Proper ESD precautions are recommended to avoid performance degradation or loss of functionality. Store used EZ-ICE in the protective shipping package.



## 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.

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

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

\*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<sup>TM</sup>. 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.

Add/Remove Hardware Wizard					
	Welcome to the Add/Remove Hardware Wizard This wizard helps you add, remove, unplug, and troubleshoot your hardware.				
	< Back Next > Cancel				

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.

Remove Hardware Wizard						
Choose a Hardware Task Which hardware task do you want to perform?						
Select the hardware task you want to perform, and then click Next.						
<ul> <li>Add/Troubleshoot a device</li> <li>Choose this option if you are adding a new device to your computer or are having problems getting a device working.</li> </ul>						
<ul> <li>Uninstall/Unplug a device</li> <li>Choose this option to uninstall a device or to prepare the computer to unplug a device.</li> </ul>						
Careed						

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.

Add/Remove Hardware Wizard
Choose a Hardware Device Which hardware device do you want to troubleshoot?
The following hardware is already installed on your computer. If you are having problems with one of these devices, select the device, and then click Next. If you are attempting to add a device and it is not shown below, select Add a new device, and then click Next.
Devices         Add a new device         Gateway EV700         Floppy disk drive         MITSUMI CD-ROM FX320S IB         Maxtor 90840D6         ISAPNP Read Data Port         ATL Technologies Inc. 3D BAGE PBD AGP 2X
< <u>B</u> ack <u>N</u> ext > Cancel

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.

Add/Remove Hardware Wizard
Find New Hardware Windows can also detect hardware that is not Plug and Play compatible.
When Windows detects new hardware, it checks the current settings for the device and installs the correct driver.
Do you want Windows to search for your new hardware?
Yes, search for new hardware
No. I want to select the hardware from a list
<u> &lt; B</u> ack <u>N</u> ext > Cancel

Figure 4-4 Find New Hardware

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

Add/Remove Hardware Wizard	
Hardware Type What type of hardware do you want to install?	
Select the type of hardware you want to install.	
Hardware types:	
<ul> <li>Memory technology driver</li> <li>Modems</li> <li>Multi-port serial adapters</li> <li>Network adapters</li> <li>NT Apm/Legacy Support</li> <li>Other devices</li> <li>PCMCIA adapters</li> <li>Ports (COM &amp; LPT)</li> <li>Printare</li> </ul>	
< <u>B</u> ack <u>N</u> ext >	Cancel

## Figure 4-5 Hardware Type

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

Add/Remove Hardware Wizard	
Select a Device Driver Which driver do you want to install for this device?	
Select the manufacturer and model of your hardware device and then click have a disk that contains the driver you want to install, click Have Disk.  Manufacturers: Models:	Next. If you
(Standard IDE ATA/ATAPI cor         (Standard Infrared Port)         (Standard Modem Types)         (Standard port types)         (Standard system devices)         (Standard System devices)	dave Disk
< <u>B</u> ack <u>N</u> ext >	Cancel

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**.

Install Fro	om Disk		×
_	Insert the manufacturer's installation disk into the drive selected, and then click OK.	OK Cancel	
	Copy manufacturer's files from:	<u>B</u> rowse	

**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.

Add/Remove Hardware Wizard	
Select a Device Driver Which driver do you want to install for this	device?
Select the manufacturer and model of y have a disk that contains the driver you	our hardware device and then click Next. If you want to install, click Have Disk.
Models: EZICE21020-ICE ISA Emulator	
	<u>H</u> ave Disk
	< <u>B</u> ack <u>N</u> ext > Cancel

**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**.

Add/Rem	Add/Remove Hardware Wizard	
⚠	Windows could not detect the settings of the device. To use this device, you must enter its hardware settings. Consult the documentation that came with this device for information	
	()	

**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.

dd New Hardware Wizard Properties	
Resources	
Unknown Device	
<u>R</u> esource settings:	
Resource type Setting	
Input/Output Range ?	
Setting <u>b</u> ased on: Basic configuration 0000	
Use automatic settings     Change Setting	
Conflicting device list:	
No conflicts.	
OK Cancel	

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.

Edit Input/Output Range	?	×
Enter the input/output range you would like to set for this devi	ce.	
You may either enter a specific range and the nearest valid rar will be automatically selected, or you may select a range using up and down arrows.	nge the	
This resource is assigned to the following child device(s):		
Value: 0240 - 024F		
The setting you have chosen does not conflict with any othe devices.	er	
No devices are conflicting.		
OK Cance		

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 has shown in Figure 4.12, aligh Next.
- 18. In the Start Hardware Installation dialog box shown in Figure 4-12, click Next.

Add/Remove Hardware Wizard
Start Hardware Installation         Windows is ready to install drivers for your new hardware.
EZICE21020-ICE ISA Emulator Windows will use default settings to install the software for this hardware device. To install the software for your new hardware, click Next.
< <u>B</u> ack Cancel

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.

EZICE21020-ICE ISA Emulator Properties
General Driver Resources
EZICE21020-ICE ISA Emulator
Resource settings:
Resource type Setting
Input/Output Range 0340 - 034F
Setting based on: Current configuration
Use automatic settings Change Setting
Conflicting device list:
No conflicts.
OK Cancel

Figure 4-15 EZICE 21020-ICE ISA Emulator Properties

## 4.3.3 Changing Emulator Configuration

- 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.
- 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: <u>dsptools.support@analog.com</u>
- 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 <u>dsp.support@analog.com</u>.

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