Regulatory Compliance

The Blackfin/SHARC USB EZ-Extender is designed to be used solely in a laboratory environment. The board is not intended for use as a consumer end product or as a portion of a consumer end product. The board is an open system design which does not include a shielded enclosure and therefore may cause interference to other electrical devices in close proximity. This board should not be used in or near any medical equipment or RF devices.

The Blackfin/SHARC USB EZ-Extender is currently being processed for certification that it complies with the essential requirements of the European EMC directive 89/336/EEC amended by 93/68/EEC and therefore carries the “CE” mark.

The Blackfin/SHARC USB EZ-Extender board 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 unused extender boards in the protective shipping package.
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BLACKFIN/SHARC USB EZ-EXTENDER BILL OF MATERIALS

BLACKFIN/SHARC USB EZ-EXTENDER SCHEMATIC

INDEX
Thank you for purchasing the Blackfin/SHARC USB EZ-Extender®, Analog Devices, Inc. extender board to the EZ-Board® evaluation system for the ADSP-BF518F, ADSP-BF526 Blackfin®, and ADSP-21469 SHARC® processors.

Blackfin processors are embedded processors that support a Media Instruction Set Computing (MISC) architecture. This architecture is the natural merging of RISC, media functions, and digital signal processing characteristics towards delivering signal processing performance in a microprocessor-like environment.

SHARC processors are based on a 32-bit super Harvard architecture that includes a unique memory architecture comprised of two large on-chip, dual-ported SRAM blocks coupled with a sophisticated IO processor, which gives a SHARC processor the bandwidth for sustained high-speed computations. SHARC processors represents today’s de facto standard for floating-point processing, targeted toward premium audio applications.

The EZ-Board and Blackfin/SHARC USB EZ-Extender are designed to be used in conjunction with the CrossCore® Embedded Studio (CCES) and VisualDSP++® software development environments. The development environment facilitates advanced application code development and debug, such as:

- Create, compile, assemble, and link application programs written in C++, C, and Blackfin/SHARC USB EZ-Extender assembly
- Load, run, step, halt, and set breakpoints in application programs
Product Overview

- Read and write data and program memory
- Read and write core and peripheral registers
- Plot memory

To learn more about Analog Devices development software, go to http://www.analog.com/processors/tools.

Product Overview

The Blackfin/SHARC USB EZ-Extender is a separately sold extender board that plugs onto the expansion interface of the ADSP-BF518F, ADSP-BF526, and ADSP-21469 EZ-Board evaluation systems. The extender board aids the design and prototyping phases of the ADSP-BF518F, ADSP-BF526, and ADSP-21469 processor targeted applications.

The board extends the capabilities of the evaluation system by providing a connection between the asynchronous memory bus of the Blackfin/SHARC processor and a USB 2.0 device.

Please visit www.analog.com/EX2-USB for additional information, including CCES support.

The following is a list of the Blackfin/SHARC USB EZ-Extender interfaces.

- USB 2.0 interface:
  - PLX Technology NET2272 device
  - USB driver and application code
  - No power supply required: derives power from the EZ-Board
  - CE certified
Before using any of the interfaces, follow the setup procedure in “Blackfin/SHARC USB EZ-Extender Setup” on page 1-1.

Example programs are available to demonstrate capabilities of the Blackfin/SHARC USB EZ-Extender board.

**Purpose of This Manual**

The *Blackfin/SHARC USB EZ-Extender Manual* provides instructions for installing the product hardware (board). The text describes operation and configuration of the board components. Finally, a schematic and a bill of materials are provided as a reference for future designs.

**Intended Audience**

The primary audience for this manual is a programmer who is familiar with Analog Devices processors. This manual assumes that the audience has a working knowledge of the appropriate processor architecture and instruction set.

Programmers who are unfamiliar with Analog Devices processors can use this manual but should supplement it with other texts that describe your target architecture. For the locations of these documents, see “Related Documents”.

Programmers who are unfamiliar with CCES or VisualDSP++ should refer to the online help and user’s manuals.
Manual Contents

The manual consists of:

- Chapter 1, “Blackfin/SHARC USB EZ-Extender Interfaces” on page 1-1
  Provides basic board information.

- Chapter 2, “Blackfin/SHARC USB EZ-Extender Hardware Reference” on page 2-1
  Provides information on the hardware aspects of the board.

- Appendix A, “Blackfin/SHARC USB EZ-Extender Bill of Materials” on page A-1
  Provides a list of components used to manufacture the EZ-Extender board.

- Appendix B, “Blackfin/SHARC USB EZ-Extender Schematic” on page B-1
  Provides the resources to allow EZ-Board board-level debugging or to use as a reference design.

What’s New in This Manual

This is revision 1.1 of the Blackfin/SHARC USB EZ-Extender Manual. The manual has been updated to include CCES information. In addition, modifications and corrections based on errata reports against the previous manual revision have been made.

For the latest version of this manual, please refer to the Analog Devices Web site.
Technical Support

You can reach Analog Devices processors and DSP technical support in the following ways:

- Post your questions in the processors and DSP support community at EngineerZone®:
  http://ez.analog.com/community/dsp

- Submit your questions to technical support directly at:
  http://www.analog.com/support

- E-mail your questions about processors, DSPs, and tools development software from CrossCore Embedded Studio or VisualDSP++:

  Choose Help > Email Support. This creates an e-mail to
  processor.tools.support@analog.com and automatically attaches
  your CrossCore Embedded Studio or VisualDSP++ version inform-
  mation and license.dat file.

- E-mail your questions about processors and processor applications to:
  processor.support@analog.com or
  processor.china@analog.com (Greater China support)

- In the USA only, call 1-800-ANALOGD (1-800-262-5643)

- Contact your Analog Devices sales office or authorized distributor. Locate one at:
  www.analog.com/adi-sales
Supported Products

The Blackfin/SHARC USB EZ-Extender is designed as an extender board to the ADSP-BF518F, ADSP-BF526, and ADSP-21469 EZ-Board evaluation systems.

Product Information

Product information can be obtained from the Analog Devices Web site and the online help.

Analog Devices Web Site


To access a complete technical library for each processor family, go to http://www.analog.com/processors/technical_library. The manuals selection opens a list of current manuals related to the product as well as a link to the previous revisions of the manuals. When locating your manual title, note a possible errata check mark next to the title that leads to the current correction report against the manual.
Also note, MyAnalog is a free feature of the Analog Devices Web site that allows customization of a Web page to display only the latest information about products you are interested in. You can choose to receive weekly e-mail notifications containing updates to the Web pages that meet your interests, including documentation errata against all manuals. MyAnalog provides access to books, application notes, data sheets, code examples, and more.

Visit MyAnalog to sign up. If you are a registered user, just log on. Your user name is your e-mail address.

**EngineerZone**

EngineerZone is a technical support forum from Analog Devices. It allows you direct access to ADI technical support engineers. You can search FAQs and technical information to get quick answers to your embedded processing and DSP design questions.

Use EngineerZone to connect with other DSP developers who face similar design challenges. You can also use this open forum to share knowledge and collaborate with the ADI support team and your peers. Visit http://ez.analog.com to sign up.
Related Documents

For additional information about the product, refer to the following publications.

<table>
<thead>
<tr>
<th>Title</th>
<th>Description</th>
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<td>• ADSP-BF512/ADSP-BF514/ADSP-BF516/ADSP-BF518(F) Blackfin Embedded Processor Data Sheet</td>
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<td>• ADSP-214xx SHARC Processor Hardware Reference</td>
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<tr>
<td>• Blackfin Processor Programming Reference</td>
<td>Description of all allowed processor assembly instructions</td>
</tr>
<tr>
<td>• SHARC Processor Programming Reference</td>
<td></td>
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</table>
1 BLACKFIN/SHARC USB EZ-EXTENDER INTERFACES

This chapter provides the setup procedures for both the Blackfin/SHARC USB EZ-Extender and EZ-Board (ADSP-BF518F, ADSP-BF526, or ADSP-21469) and describes the interfaces the extender supports.

The information is presented in the following order.

- “Blackfin/SHARC USB EZ-Extender Setup” on page 1-1
- “USB 2.0 Interface” on page 1-2

Blackfin/SHARC USB EZ-Extender Setup

It is very important to set up all components of the system containing the Blackfin/SHARC USB EZ-Extender, then apply power to the system. The following procedure is recommended for correct setup.

Power your system after these steps are completed:

1. Read the applicable design interface section in this chapter—the text provides an overview of the interface capabilities.

2. Read “System Architecture” on page 2-2 to understand physical connections of the extender board. For detailed information, refer to “Blackfin/SHARC USB EZ-Extender Schematic” on page B-1.

3. Set the jumpers on the Blackfin/SHARC USB EZ-Extender board. Use the block diagram in Figure 2-1 on page 2-2 in conjunction with “Jumper Settings” on page 2-2.
4. Set the switches and jumpers on the EZ-Board. If not already, familiarize yourself with the EZ-Board documentation and schematic drawings (see “Product Information”).

Compare the expansion interface signals of the Blackfin/SHARC USB EZ-Extender board with the EZ-Board signals to ensure there is no contention. For example, it may be necessary to disable other devices connected to the expansion interface of the processor and disable peripherals on the EZ-Board.

5. Install the Blackfin/SHARC USB EZ-Extender on the EZ-Board via the high speed expansion interface.

**USB Software**

For information about USB software, refer to the readme text files in the Examples folder of the installation directory.

**USB 2.0 Interface**

The Blackfin/SHARC USB EZ-Extender enables a connection between a USB 2.0 chip and Blackfin/SHARC processor without any other programmable logic. The PLX Technology’s NET2272 controller ties directly to the asynchronous memory bus of the Blackfin or SHARC processor. You can read from and write to the USB 2.0 controller by addressing the named memory bank directly.

You can reset the NET2272 controller by asserting LOW one of the four GPIO signals of the expansion interface. Refer to the appropriate EZ-Board manual to learn how the GPIO signals connect to the processor.

The USB IR0 signal of the NET2272 controller connects to one of the four GPIO signals on the expansion interface. Refer to the appropriate
EZ-Board document to learn how the GPIO signals connect to the processor.

The USB CS signal of the NET2272 controller connects to one of the four AMS signals on the expansion interface. Refer to the appropriate EZ-Board manual to learn how the AMS signals connect to the processor.

The jumper settings required for each of the respective EZ-Boards are described in the readme text files in the Examples folder of the installation directory. The readme file describes the USB software, source code, drivers, and explains how to run a USB-based application.
USB 2.0 Interface
This chapter describes the hardware design of the Blackfin/SHARC USB EZ-Extender.

The following topics are covered.

- “System Architecture” on page 2-2
  Describes the board configuration and explains how the board components interface with the processor and EZ-Board.

- “Jumper Settings” on page 2-2
  Describes the on-board configuration jumpers.
System Architecture

A block diagram of the Blackfin/SHARC USB EZ-Extender is shown in Figure 2-1.

Jumper Settings

Before using the Blackfin/SHARC USB EZ-Extender, follow the setup procedure in “Blackfin/SHARC USB EZ-Extender Setup” on page 1-1.

Figure 2-2 shows the locations of all jumper headers. A two-pin jumper can be placed on the respective jumper header for different functionality. The following sections describe all possible jumper settings and associated functionality.
USB Chip Select Jumper (JP1)

The USB chip select jumper (JP1) connects an AMS signal from the EZ-Board to the chip select input on the NET2272 controller. The AMS0-3 signals are available. By default, the jumper is installed on pins 7 and 8, which connect AMS3 to the chip select signal.

USB IRQ Jumper (JP2)

The USB IRQ jumper (JP2) connects a general-purpose IO signal from the EZ-Board to the interrupt output on the NET2272 controller. The GPIO1-4 signals are available. By default, the jumper is installed on pins 1 and 2, which connect GPIO1 to the interrupt signal.

USB Soft Reset Jumper (JP3)

The soft reset jumper (JP3) connects a general-purpose signal from the EZ-Board to the reset input on the NET2272 controller. GPIO1-4 are available. By default, the jumper is installed on pins 7 and 8, which connect GPIO4 to the reset signal.
The bill of materials corresponds to “Blackfin/SHARC USB EZ-Extender Schematic” on page B-1.

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BLACKFIN USB-LAN EZ-EXTENDER
SCHEMATIC
POWER OVER ETHERNET CIRCUITRY
FOR USE WITH ADSP-BF537 EZ-KIT LITE ONLY

MII INTERFACE

WARNING: THE EZ-KIT LITE MUST NOT BE POWERED WHEN THESE JUMPERS ARE POPULATED.

SOURCE OF 5V PWR

JP1 and JP2

JP2 and JP3

ADSP-BF537 EZ-KIT LITE ONLY

*DENOTES DEFAULT SETTING

WARNING: THE EZ-KIT LITE MUST NOT BE POWERED WHEN THESE JUMPERS ARE POPULATED.
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