

Blackfin Audio (EI1) EZ-Extender Board Support Package (BSP) v1.0.0 Release Notes

Thank you for installing the Blackfin Audio (EI1) EZ-Extender Board Support Package (BSP). The BSP provides software and documentation in support of the Blackfin Audio (EI1) EZ-Extender.

The Blackfin Audio (EI1) EZ-Extender BSP is designed for use with CrossCore® Embedded Studio (CCES) for Analog Devices Processors software development tools. The CCES development environment aids advanced application code development and debug, such as:

- Create, compile, assemble, and link application programs written in C++, C, and assembly
- Load, run, step, halt, and set breakpoints in application programs
- Read and write data and program memory
- Read and write core and peripheral registers
- Plot memory

For more details on CCES, please visit www.analog.com/cces. For more on the Blackfin Audio (EI1) EZ-Extender, please visit <http://www.analog.com/EX1-Audio>.

The Blackfin Audio (EI1) EZ-Extender BSP provides comprehensive software support for the Blackfin Audio (EI1) EZ-Extender. Specifically, drivers, examples and code sketches are included for the following components:

- AD1938 Multi-channel Audio codec.
- ADAV801 Audio Codec

The BSP also provides comprehensive examples which demonstrates the off-chip drivers. It is used in conjunction with the the following EZ-KIT's

- ADSP-BF533 EZ-KIT Lite®.
- ADSP-BF537 EZ-KIT Lite®.

The CCES Help environment provides complete hardware and software documentation.

License Checking

There are no license requirements for the Blackfin Audio (EI1) EZ-Extender BSP.

Installation Logging

The installer does not create a log file by default. If you encounter installation issues, you can generate an installation log file by running the installer from the command prompt.

Change to the directory containing downloaded installer executable and run the following from the command prompt:

```
ADI_Audio_EI1_EZExtender-Rel1.0.0 /v"/1*v c:\temp\installer.log"
```

Support and Assistance

There are several options for contacting support:

- Submit your questions online at:

<http://www.analog.com/support>

- E-mail your Processor and DSP software and development tools questions from within CrossCore Embedded Studio:

Go to “Help->E-mail Support...”. This will create a new e-mail addressed to processor.tools.support@analog.com, and will automatically attach your CrossCore Embedded Studio version information (ProductInfo.html).

- E-mail your Processors and DSP applications and processor questions to:
 - processor.support@analog.com OR
 - processor.china@analog.com (Greater China support)
- Post your questions in the Processors and DSP online technical support community in Engineer Zone at:

<http://ez.analog.com/community/dsp>

Software Requirements

To build the example projects included in the Blackfin Audio (EI1) EZ-Extender BSP, CrossCore Embedded Studio version 1.0.1 or later is required.

Test Configurations

The software versions used to test are:

CrossCore® Embedded Studio version 1.0.1 with Blackfin Audio (EI1) EZ-Extender BSP version 1.0.0.

At the time of release, the tested hardware revisions include:

- ADSP-BF533 EZ-KIT Lite® PCB Revision 2.2, BOM Revision 4.8, Silicon Revision 0.6.
- ADSP-BF537 EZ-KIT Lite® PCB Revision 2.2, BOM Revision 4.0, Silicon Revision 0.3.
- Blackfin Audio (E11) EZ-Extender PCB Revision 1.2, BOM Revision 1.5

Getting Started

Adding a Driver to a Project

When adding an Blackfin Audio (E11) EZ-Extender Driver to your project, the IDE will add the sources for the driver to the CCES Project folders, starting at "system". There will be a folder specific to the driver(s) or service(s) you have added under this folder.

Creating a project which includes a Blackfin Audio (E11) EZ-Extender driver

In order to create a project you should follow the instructions provided in the CrossCore Embedded Studio help. As part of the project creation, the page "Add-in selection" contains a list of all the available add-ins for the project that you are creating based on the installed products and the project's chosen processor and type. You can see the drivers in support of the Blackfin Audio (E11) EZ-Extender under the "Device Drivers and System Services" category. Within this category you will see "Blackfin Audio (E11) EZ-Extender" which contains the drivers for the on-board and off-board peripherals. The on-chip peripheral drivers will be listed in "On-chip peripheral drivers" folder and the system services are listed in the "System Services" folder.

The Blackfin Audio (E11) EZ-Extender add-in generates a call to `adi_initComponents()`. For more information on `adi_initComponents()`, please refer to the CCES help section:

CrossCore® Embedded Studio 1.0.0 > Graphical Development Environment > System Configuration

Adding a Blackfin Audio (E11) EZ-Extender driver to an existing project

Every CrossCore Embedded Studio project contains a System Configuration file called `system.svc` which is located in the root of the project. The file is the IDE's interface for managing the various pre-written software components used in the "system" implemented by a project. Double-clicking any `system.svc` file in a navigation view opens that file in the System Configuration Utility which allows you to see the add-ins that you currently have in your project. Click on "Add..." and select the Blackfin Audio (E11) EZ-Extender Drivers add-in which is under the "Device Drivers and System Services". For adding on-chip peripherals drivers select the "On-chip peripheral drivers" and for the system services select the "System Services".

Notes:

- If the IDE detects that `adi_initComponents()` is not yet present in `main()`, it prompts you to add it and offers to insert it for you.

Configuration

There are no Blackfin Audio (E11) EZ-Extender driver configuration options available in the IDE.

Interrupts

CrossCore Embedded Studio provides a coherent interrupt management mechanism which allows for the same interface to be used in RTOS and non-RTOS applications. This means that interrupt service routines in all applications must be written in C and use the `adi_int` interface. Any thread-safety requirements or interactions with tasks are handled by the `adi_int` interface. For more information on the `adi_int` API, in CrossCore Embedded Studio go to Help > Search and enter `adi_int`.

Examples of the usage of this interrupt management mechanism are the System Services and Device Drivers provided with Crosscore Embedded Studio. By using the `adi_int` interface, the same services and drivers can be used in all applications regardless of whether an operating system is used.

Sketches and Examples

Sketches

CrossCore Embedded Studio provides a mechanism by which small code fragments, called sketches, can be generated with parameterized input provided by the user. The resulting code can then be copied and pasted to a project. Sketches for the on-board peripherals on the Blackfin Audio (E11) EZ-Extender are provided in the BSP. To locate the sketches specific to the Blackfin Audio (E11) EZ-Extender BSP, open up the example browser (Help -> Browse Examples) and then select Blackfin Audio (E11) EZ-Extender product in the "Product:" pulldown. The sketches for the on-chip drivers and system services can be located by selecting the CrossCore Embedded Studio product in the "Product" pulldown.

Examples

In addition to the code sketches, the Blackfin Audio (E11) EZ-Extender BSP provides the following examples.

EXAMPLES FOR OFF-CHIP DRIVERS:

1. With the ADSP-BF533 EZ-KIT Lite®, Audio Loopback to demonstrate audio streaming via AD1938 Device B, and MCLK configuration using ADAV801.
2. With the ADSP-BF537 EZ-KIT Lite®, Audio Loopback to demonstrate audio streaming via AD1938 Device A, and MCLK configuration using ADAV801.

Location

In order to locate the Blackfin Audio (EI1) EZ-Extender BSP examples and sketches open CrossCore Embedded Studio's Example Browser which can be found in CrossCore Embedded Studio under Help. Select in the Product section "Blackfin Audio (EI1) EZ-Extender v1.0.0" for a full list of examples and sketches.

Documentation

API documentation for the drivers included in the Blackfin Audio (EI1) EZ-Extender BSP can be found in CCES Help.

General information on the driver model can be found in CCES help under

CrossCore® Embedded Studio 1.0.1 > System Runtime Documentation > System Services and Device Drivers

MISRA-C Support

MISRA C is a software development standard for the C programming language developed by the Motor Industry Software Reliability Association (MISRA). Its aims are to facilitate code safety, portability, and reliability in the context of embedded systems, specifically those systems programmed in ANSI C. The compiler detects violations of the MISRA rules at compile-time, link-time, and run-time.

System Services and Device Driver Thread Safety

All system services and device drivers (SSDD) use mutexes and semaphores to ensure thread-safety. If an RTOS is present then the SSDD will use the RTOS mutex and semaphores. If an RTOS is not present then the SSDD will use a non-RTOS implementation of mutexes and semaphores (spin locks).

Known issues with the Blackfin Audio (EI1) EZ-Extender Support Package (BSP)

- Occasional noise with the ADSP-BF533 EZ-KIT Lite® Audio loopback and ADSP-BF537 EZ-KIT Lite® Audio loopback examples. Hardware power cycle or hard reset before loading the executable file will fix this issue.

