



Blackfin Starter Kit and SDK Quick Start SDK Rel 3.10 – August 2008

Welcome to release 3.10 of the Analog Devices, Inc. (ADI) Blackfin® Starter Kit and Blackfin Software Development Kit (SDK). This software provides users with working examples of platform like applications. New in release 3.10 is the Media Player Starter Kit for the ADSP-BF527. This release supports all those processors that were previously supported as well as the latest hardware revision of the EZ-KIT Lite® as shown in the table below.

The SDK includes a host of multimedia and audio related applications that are fully functional and work with off-the-shelf devices. The kit is designed to accelerate the development process, shortening the learning curve and providing a quicker time to market.

Pre-requisites for using the SDK

1. VisualDSP++® 5.0 update 3

The SDK only works with VisualDSP++ 5.0 - update 3, however we expect that it will work with later updates of VisualDSP++ 5.0. If no instance of VisualDSP++ 5.0, update 3 or later, is found on the system, the SDK installation will be terminated as none of the provided projects will build be able to build.

2. Additional Hardware Requirements

The following is a list of ADI hardware and third-party software (included) to run specific applications:

Media Player Starter Kit

- ADSP-BF527 EZ-KIT Lite or ADSP-BF548 EZ-KIT Lite
- Uses Micrium's uC/OS-II RTOS
- Uses onboard LCD, HDD (for ADSP-BF548 EZ-KIT Lite), Keypad and Thumbwheel
- Uses memory devices such as SD or USB memory as supported by the EZ-KIT Lite.

Multimedia Starter Kit

- ADSP-BF533 EZ-KIT Lite or ADSP-BF561 EZ-KIT Lite
- A-V EZ-Extender® daughter board
- USB-LAN EZ-Extender daughter board

Audio Starter Kit

- ADSP-BF537 EZ-KIT Lite
- Audio EZ-Extender daughter board
- USB-LAN EZ-Extender daughter board

3. Approved Hardware Revisions

The approved hardware revisions are listed in the table below:

Supported Hardware	Board Rev	BOM Rev	Silicon Rev
BF527 EZ-KIT Lite	1.50	1.90	0.1
BF533 EZ-KIT Lite	2.20	4.40	0.5
BF537 EZ-KIT Lite	2.20	4.00	0.3
BF548 EZ-KIT Lite	1.40	1.80	0.1
BF561 EZ-KIT Lite	2.30	3.10	0.5
Audio EZ-Extender	1.20	1.50	N/A
A-V EZ-Extender	2.00	1.80	N/A
USB-LAN EZ-Extender	2.10	1.80	N/A

The board revision is silk screened on the front of the hardware board and the BOM revision is a handwritten label on the back. Where applicable the silicon revision is printed on the Blackfin processor on the board.

Although we expect that all applications will run on future revisions of the above hardware please note that the above revision set was the one used to test this release.

Note: It is recommended that an emulator be used although all applications when built will run using the “Debug Agent” to connect to the EZ-KIT Lite. For more information consult the VisualDSP++ 5.0 documentation and Analog Devices web site for product information.

Installation procedure:

- 1) Follow the instructions in EZ-KIT Lite manual for installation of VisualDSP++ 5.0 and EZ-KIT Lite software.

NOTE: You will need to go to www.analog.com/visualdsp/bfupdate and download the “Update 3” release.

- 2) After installation of VisualDSP++ 5.0 update 3 and EZ-KIT Lite software proceed to install the SDK CD.

SDK directory structure

The release is installed by default into “C:\Program Files\Analog Devices\BlackfinSDK-3.10”.

NOTE: This does not install over the previous release directory of the SDK, thus preventing any previous work to be inadvertently modified and overwritten.

The SDK directory structure is as follows:

- Algorithms – Contains all algorithm source code and the project files needed to build them.

- Audio – Contains all the source code and project files required for building and executing the installed audio applications.
- BFinUtils – Contains various utility source code files used by the installed applications and by end user applications.
- Bin – Contains general PC based executables that are used to demonstrate and work with the installed applications.
- Documents – Contains all the technical documentations provided for use with the various applications and algorithms. Additionally, it contains all the legal notices and instructions on how to apply and receive production license software if applicable.
- Include – Contains all common include files to be used by installed applications and algorithms and by the end user applications. Include files typically contain application interface function prototypes, external references and commonly used defines.
- Lib – Contains all common pre-built libraries to be used by the installed applications and by end user applications. These libraries have both debug and release versions. Debug versions are identified by the “d” suffix in the library name. These libraries may be rebuilt using project files in the “Algorithm” folder.
- Media – Contains all media content used with the multimedia or audio applications.
- Multimedia – Contains all the source code and project files required for building and executing the multimedia applications.
- Platforms – Contains all the source code and project files required for building and executing the media player applications.
- Tools – Contains the Blackfin USB driver used to interface the PC to the development hardware.

Getting Started

After the SDK is successfully installed, the developer should start the VisualDSP++ 5.0 development environment from the “Start” menu button. Once VisualDSP++ is up and running, select “File -> Open -> Project...” or select “File -> Open -> ProjectGroup...” to open the desired application project file.

For example, to open the application project for “VideoInLcdOut” do the following:

1. Selecting menu “File->Open->Project...” will bring up the “Open Project” dialog.
2. Using “Look in:” drop down tree list control of the “Open Project” dialog box, change the folder location to “c:\Program Files\Analog Devices\BlackfinSDK-3.10\Multimedia\VideoInLcdOut\ADSP-BF561”
3. Select “VideoInLcdOut.dpj” from the display list of files.

Each application comes with its own “readme.txt” file which is part of the project or project group. Open the readme file for further instructions on how to do the following:

1. Required hardware for the application
2. How to configure the hardware
3. How to build the application
4. How to run the application

Additionally, each readme provides an overview of the application, what it does and how it runs.

Identifying which SDK release is currently installed on your system

The SDK release number is identified in a file inside the SDK installation folder “...\Tools\BlackfinSDK.ini”, in the “Version” key.

Latest SDK release information is located: www.analog.com/sdk/downloads

Technical Support: www.analog.com/processors/technicalsupport

Restricted Software

Some software algorithms provided within this release are crippled and require further action to receive production versions. The crippled versions function fully and appropriately for the purpose of engineering development and testing. They play un-impaired for the first 10 minutes and then the rendered output is embedded with a periodic beep or similar anomaly. Instructions on how to receive production versions are provided in the installation directory “Documents”. Please refer to the “Production Agreement.pdf” document.

The restricted software list includes:

- MP3 Decoder
- AAC Decoder

Note: Analog Devices offers a port of the light weight TCP/IP (lwIP) stack for the Blackfin family of embedded processors. Although the lwIP stack on the Blackfin processors can be used to develop an embedded networking application, it has not been integrated with the applications offered by the Blackfin SDK. If you want to integrate the lwIP example with the starter kits SDK applications, one must understand which system resources are used (interrupts, DMA channels, bandwidth and memory) before any code is written. Several steps are necessary for the integration process in order to produce a highly efficient and robust application. Please refer to EE-312 for more details on developing lwIP based applications.

Known issues as of this release

- BF561 SensorCapture and BF561 SensorStream project files are configured for Release mode not Debug mode. This is because a speed restriction in the BF561 EZ-KIT Lite which prevents operation at 600 MHz without an external regulator. The performance of these applications are impaired in Debug mode.
- The JPEG/MJPEG application when run on a BF533 EZ-KIT Lite has occasional screen flickers when en/decoding MJPEG contents. This issue is currently under investigation.
- The JPEG/MJPEG library causes applications to stall when a corrupted JPEG file is decoded. Additionally, the library may cause the applications to hang when decoding other than YUV 420 content.
- Occasionally, when the build configuration is switched between “debug” and “release”, the project may not build. The project dependencies should be updated using the menu “Project ->Update Dependencies” option.

- Audio crackling is occasionally heard on the speakers. This occurs sometimes with AAC_Player and MP3_Player applications when using the BF537 EZ-KIT Lite, the Audio EZ-Extender and the USB-LAN EZ-Extender. Additionally this may occur when Vorbis data on the BF561 EZ-KIT Lite as well as BF533 EZ-KIT Lite.
- VorbisPlayer – The BF533 version using the debug agent causes error messages to be displayed on the VisualDSP++ Console output tab while the Vorbis file content is being read into memory. The data is successfully read and does play despite the messages seen during the data copying stage.

The error messages seen:

Unspecified error –
FlushDataCacheOpcode failed.

Unspecified error –
FlushInstrCacheOpcode failed.