

Blackfin SDK Release Note

Rel 3.11– June 2009

Welcome to release 3.11 of the Analog Devices, Inc. (ADI) Blackfin® Starter Kit and Blackfin Software Development Kit (SDK). Release 3.11 has been ported to VisualDSP++ 5.0 Update 6 which is the latest release of VisualDSP++. 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

This version of the SDK supports the following hardware revisions currently shipped by ADI:

Supported Hardware	Board Rev	BOM Rev	Silicon Rev
BF527 EZ-KIT Lite	2.00	2.10	0.2
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	2.00	0.2
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 EZ-KIT Lite 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.

This SDK release was tested using the hardware revisions listed in the table above and using the latest release of VisualDSP++ 5.0 – update 6. If no instance of VisualDSP++ 5.0 - update 6 or later is found on the system, the SDK installation will be terminated and exit since none of the provided applications and algorithms will build successfully.

SDK Directory Structure Changes

The release is installed by default into the “C:\Program Files\Analog Devices\BlackfinSDK-3.11”. This does not install over the previous release directory of the SDK, thus preventing any prior work to be modified or overwritten inadvertently.

Applications Included in this Release

This release contains the following applications:

Application	Description	BF527	BF533	BF537	BF548	BF561
Audio_Player	Plays audio specific coded content found on a PC to attached speakers. Requires use of a host application for finding and moving file content to be played. Supported audio compressions: AAC and MP3		x	x		
FrameCapture	Captures single frames from a video input and converts them to RGB565 to output video frame.			x		
FrameCaptureLcdOut	Captures single frames from a video input and converts them to RGB565 for display to LCD.		x			x
FrameCaptureVideoOut	Captures single frames from a video input and displays it on a video monitor. Supports NTSC and PAL modes.		x			x
FrameDisplay	Displays outputs video frame to a video monitor. Supports NTSC and PAL modes.			x		
JPEGImageEdgeDetection	Decodes JPEG file content and then displays detected edges to video display. Supports both NTSC and PAL video modes.		x			x
JPEG-MJPEG	Decodes M/JPEG files found on a PC and displays it to a video monitor. Similarly, it captures a video input, encodes it and stores in on a PC. This application was previously named "JPEG-MJPEG_Demo".		x			x
MediaPlayer	Plays supported media files directly from the storage devices supported by the EZ-KIT Lite. Images are displayed to the onboard LCD display while the audio is played out to the onboard audio output jacks. It is a multithread application using an embedded RTOS, Micrium's uC/OS-II operating system. Supported media data include JPEG, MP3, AAC & WAV. Debug output is sent out over the UART port while user input is over the onboard keypad and thumbwheel. For the BF548 the onboard storage includes the hard disk drive (HDD), SD cards and USB sticks. For the BF527 only USB sticks are supported.	x			x	
SensorCapture	Captures single frames from an attached CMOS sensor and displays to either a video monitor or an LCD display. Supports NTSC, PAL and VGA modes.		x			x
SensorStream	Captures a stream from a CMOS sensor and output it to a video monitor or VGS display. Supports NTSC, PAL and VGA modes. This also shows dynamic overlays. This application was previously named					x

Application	Description	BF527	BF533	BF537	BF548	BF561
	“SensorDemo”.					
SpeexEcho	Takes in speech like stream and encodes it into Speex. It then decodes the data and plays it out to speakers. It also operates in pass through mode without encoding and decoding the input stream. This application was previously named “SpeexDemo”.		x			x
SRGP	Demonstrates a Blackfin port of the “Simple Raster Graphic Package” (SRGP).		x			x
VideoInEdgeDetection	Performs edge detection on incoming video and the displays detected edges to a video monitor. Supports NTSC and PAL display modes. This application was previously named “EdgeDetectionDemo”.		x			x
VideoInLcdOut	Video input data is converted to RGB565 and played out on an LCD monitor. Supports NTSC and PAL video input modes.					x
VideoInVideoOut	Video data from a video capture source is rendered using a video monitor. Supports NTSC and PAL video input modes.					x
VorbisPlayer	Decodes Vorbis encoded content and then plays it out using attached speakers. This application was previously named “VorbisDemo”		x			x

Restricted Software

Some software algorithms provided within this release have been crippled and require further action to receive production versions. However, they do function fully and appropriately for the purpose of engineering development and testing. They typically play un-impeded for the first 10 minutes and then the rendered output is embedded with a periodic beep or similar anomaly. Instructions have been provided in documents which were added to the installation directory “Documents”, providing further detail and a form to be filled out.

The list includes:

- MP3 Decoder
- AAC Decoder

Note(s):

1. Most pre-built binaries, such as the provided library modules, are built using 32-bit (single precision) double size. If your specific application requires using 64-bit (double precision) double size, then change the following as specified inside the “Project Options” of your project:

- [1] Select menu “Project->Project Options...” option.
- [2] Next select “Project->Compile->Processor (1)” from the tree list.
- [3] Click on the check box “Allow mixing of sizes”, thus enabling the selection.

[4] Click the “OK” accepting the desired changes and build your project.

2. 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.