Blackfin SDK Release Note
Release 4.11– September 2011

Welcome to release 4.11 of the Analog Devices, Inc. (ADI) Blackfin® Starter Kit and Blackfin Software Development Kit (SDK).

Release 4.11 is functionally equivalent to release 4.10 with the exception that the installer will install on VisualDSP++ 5.0 Update 9 and greater. Release 4.10 only installs on VisualDSP++ 5.0 Update 9.

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.

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

Supported Hardware	Board Rev	Silicon Rev	BOM Rev
BF527 EZ-KIT Lite	2.20	0.2	3.30
BF533 EZ-KIT Lite	2.20	0.6	4.80
BF537 EZ-KIT Lite	2.20	0.3	4.11
BF548 EZ-KIT Lite	1.40	0.4	2.20
BF561 EZ-KIT Lite	2.30	0.5	3.30
A-V EZ-Extender	2.00	N/A	1.90
USB-LAN EZ-Extender	2.10	N/A	1.90

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 10. If no instance of VisualDSP++ 5.0 - update 9 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.

The SDK 4.11 quick start guide, "BlackfinSDK-QuickStartNote.pdf", provides additional information about the SDK release. It can be found in the "Documents" directory

New in Release 4.11 and Release 4.10

The highlight of the SDK 4.11 and SDK 4.10 release is the addition of the Video Object Detection application which runs on the ADSP-BF561 processor. The Video Object Detection Module is designed to be used in Video Surveillance Systems. The technology focus of Video Object Detection is to provide Foreground Objects/Blob Detection which can be used by applications for Left/Removed Object Detection and Intrusion Detection. This application runs on the ADSP-BF561 using the Video Input and Output Class Drivers. It supports both NTSC and PAL video format. It runs on both cores of the ADSP-BF561. The 2D graphics module is used to mark the new object detected.

The Video Input Class Driver is a new addition to the release and it joins the Audio Codec Class Driver and the Video Output Class Driver, which were previously released in SDK 4.00. The class drivers provide a functional interface to the underlying drivers and they provide all buffering and queueing that are needed by an application, removing the burden of managing these buffers from the application.

SDK Directory Structure Changes

The release is installed by default into the "`C:\Program Files\Analog Devices\BlackfinSDK-4.11`". This does not install over the previous release directory of the SDK, thus preventing modification of any prior work.

Video Object Detection can be found in the "`C:\Program Files\Analog Devices\BlackfinSDK-4.11\Multimedia\VideoObjectDetection`" folder.

VisualDSP++ Update 9 or greater Added/Modified Files

The release adds "*device_class*" to the VisualDSP++ Update installation as follows where `$VDSP` represents the VisualDSP++ 5.0 Update installation path. The installation replaces the file "**adi_dev.c**" located at \Blackfin\lib\src\drivers. This file is modified to support the class drivers.

- Audio Class drivers
    - $VDSP\Blackfin\include\drivers\device_class\audio\
    - $VDSP\Blackfin\docs\class_drivers\
    - $VDSP\Blackfin\lib\src\drivers\device_class\audio\
- Video Out Class drivers
    - $VDSP\Blackfin\include\drivers\device_class\video_out\
    - $VDSP\Blackfin\docs\class_drivers\
    - $VDSP\Blackfin\lib\src\drivers\device_class\video_out
- Video In Class drivers
    - $VDSP\Blackfin\include\drivers\device_class\video_in\

- o $VDSP\Blackfin\docs\class_drivers\
- o $VDSP\Blackfin\lib\src\drivers\device_class\video_in

- Header files associated with the class drivers
    - o $VDSP \Blackfin\include\drivers\device_class\

- Examples

    - o $VDSP \Blackfin\Examples\Drivers\device_class\audio\audio_loopback_no_copy\
    - o $VDSP \Blackfin\Examples\Drivers\device_class\audio\audio_loopback_with_copy\

    - o $VDSP \Blackfin\Examples\Drivers\device_class\video_in\video_loopback\

    - o $VDSP \Blackfin\Examples\Drivers\device_class\video_out\color_change\

- Documentation
    - o $VDSP \Blackfin\docs\class_drivers\Audio Codec Class Drivers Users Guide.pdf

    - o $VDSP \Blackfin\docs\class_drivers\Video Output Class Drivers Users Guide.pdf

    - o $VDSP \Blackfin\docs\class_drivers\Video Input Class Drivers Users Guide.pdf

Modules Used in this Release

SDK 4.11/4.10 uses the following Blackfin Modules which can be found on the ADI website:
www.analog.com/blackfinmodules

Application	Module	Version	Production or Evaluation Version
JPEG-MJPEG	JPEG Decoder	3.1.1	P
	JPEG Encoder	3.1.1	P
JPEGImageEdgeDetection	JPEG Decoder	3.11	P
Media Player	JPEG Decoder	3.1.1	P
	MPEG-4 HE-AAC v2 Decoder	5.3.3	E
	MP3 Decoder	3.1.1	P
	ID3 (MP3 parser from the MP3 Decoder module)	3.1.1	P
	uC/OS-II (not controlled)	2.86	N/A
AVSync	MPEG-4 HE-AAC v2 Decoder	5.3.3	E

Application	Module	Version	Production or Evaluation Version
	MPEG-4 SP/ASP Decoder	3.4.0	P
	Multimedia Format Processing Library	1.4.0	P
	uC/OS-II (not controlled)	2.86	N/A
Video Object Detection	Blackfin Image Processing Toolbox	1.4.0	P
	Blackfin 2D Graphics Library	2.3.0	P
	Video Analytics Toolbox	1.1.0	P

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.

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Known issues fixed in this release

- The JPEG/MJPEG application when run on a BF533 or BF561 EZ-KIT Lite has occasional screen flickers when en/decoding MJPEG contents. This is issue is currently under investigation.

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 is impaired in Debug mode.

- 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.

- Note that when using ADSP-BF561 with the USB-LAN EZ-Extender board, the SCLK must not be set higher than 100MHz. Both the JPEG-MJPEG and the JPEGEdgeDetection applications are affected by this limitation.

- In the AVSync application, using the up arrow (after modifying movie_list.txt, please see the README for more information) sometimes causes an "Exception!" message and/or a beeping STDIN window to pop-up.