Video Decoder EI3 Extender Board Support Package (BSP) v1.0.1 Release Notes

These release notes subsume the release notes for previous updates. Release notes for previous updates can be found at the end of this document.

Release Dependencies

Release 1.0.1 requires Cross Core Embedded Studio (CCES) Patch Release version 1.0.1.1. The download link can be found in the "Product Downloads" section of www.analog.com/cces .

Some of the examples also require Video Encoder EI3 Extender Board and its BSP, which can be found in the "Product Downloads" section of www.analog.com/EX3-VidEncoder.

This release was tested with:

- ADSP-BF609 EZ-Board Rev 1.0 BOM Rev 1.2
- Video Decoder EI3 Extender Rev 1.0 BOM Rev 1.1
- Video Encoder EI3 Extender Rev 1.0 BOM Rev 1.1
- Video Encoder EI3 Extender Board Support Package (BSP) v1.0.1

New features and examples in this release

Video Class Driver support for the ADV7842 video decoder has been added. Please note that video class driver always uses 256 bit DMA and hence video buffers must be aligned to 32 byte boundary. The Video Class Driver APIs are documented in Cross Core Embedded Studio in the following help section:

```
CrossCore® Embedded Studio 1.0.1 > System Run-Time Documentation > System
Services and Device Drivers > Device Drivers User Guide > 6 High-Level Class
Drivers > 6.2 Video Codec Class Drivers
```

Two new examples have been added to demonstrate the video class driver for the ADV7842:

Example: FrameCapture_ClassDriver
This example demonstrates how to configure the Video class driver for ADV7842 decoder to receive video on a selected input port and transmit RGB888 or UYVY422 video data to the processor over PPI.

Example:VideoLoopback_ClassDriver
This example demonstrates how to configure the ADV7842 decoder to receive video on a selected input port, transmit video data in UYVY422 format to the processor over PPI, and loop back the video via ADV734x or ADV7511 video encoder using Video Class drivers.

As the video loopback example relies on both Video Decoder and Video Encoder products, both Board Support Packages should be installed for the example to work.

Documentation

A new API has been added to the ADV7842 driver. The new API documentation can be found in CCES Help under:

```
Video Decoder EI3 Extender Board Support Package 1.0.1
```

Specifically, the API `adi_adv7842_SetPpiDmaTransferSize()` has been added to set the PPI DMA transfer size to 32, 64, 128 or 256 bit.

New enumeration entries have been added to video frame type (`ADI_ADV7842_VIDEO_FRAME`) to support D1 and DV video formats for interlaced video.

Software issues addressed in this release

The following software anomalies have been addressed in this release in this release:

- In release 1.0.0 the ADV7842 video decoder drivers only support 32 bit DMA transfers. In release 1.0.1 a new API has been added to these drivers to allow DMA transfers of 32, 64, 128 or 256 bits.
- Release 1.0.1 now supports NTSC D1 requirement of 487 lines of active video for analog video input only. HDMI only supports DV (Digital Video) format video frame, whereas analog supports both D1 and DV. PAL video resolution is 720 x 576 for both D1 and DV format. NTSC video resolution for D1 format is 720 x 487 and for DV it is 720 x 480.
  Due to this difference in NTSC D1 and DV frame resolution, the video loopback and video loopback class driver examples do not support loopback for Analog input (NTSC D1 480i on the Composite, Svideo and Component connectors) to HDMI (DV) output. Likewise, HDMI input to Analog output is not supported.
- The video loopback example in release 1.0.0 had Field 1 and Field 2 out of sync for NTSC video sourced from Composite/S-Video/Component input to Composite/S-Video/Component output. This issue has been fixed in release 1.0.1.

Upgrading Projects to use New Version of the Add-Ins

Projects that currently use version 1.0.0 of the Add-Ins need to be upgraded to use version 1.0.1. In CCES Project Explorer window, select the project and click on 'system.svc'. In the 'Overview' tab, review all Add-Ins and click on the 'Upgrade' button. For dual-core projects, system.svc must be reviewed for each core.

Known issues.

- Video Class driver for ADV7842 does not support interlaced video input(NTSC/PAL) through HDMI port.
- TAR-49994: IDE should offer to upgrade add-ins when opening examples

Video Decoder EI3 Extender Board Support Package (BSP) v1.0.0 Release Notes

Thank you for installing the Video Decoder EI3 Extender Board Support Package (BSP). The BSP provides software and documentation in support of the Video Decoder EI3 Extender Board.

The Video Decoder EI3 Extender Board connects to an Analog Devices EZ Board by means of the Expansion Interface 3 (EI3). The EZ Board 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 ADSP-BF609 EZ Board, please visit www.analog.com/BF609EZBoard.

The Video Decoder EI3 Extender BSP provides comprehensive software support for the Video Decoder EI3 Extender Board. Specifically, drivers, examples and code sketches are included for the following components:

- ADV7842 Multi-format Video Decoder.

HDMI connectors on the Video Decoder EI3 Extender Board that does not have hardcoded keys to decode content protected data cannot be connected to any consumer electronics equipment that adheres to High-bandwidth Digital Content Protection (HDCP) technology. Keyed-in parts are available only to HDCP licensors.

- ADZS-DECODE-EX3 - Video Decoder EI3 Extender Board that does not have key.
- ADZS-DECODEK-EX3 - Video Decoder EI3 Extender Board with hardcoded keys to decode content protected data.

The CCES Help environment provides complete hardware and software documentation.

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_Video_Decoder_EI3_Extender_Board-Rel1.0.0.exe /v"/l*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

Supported Processors

Although the Video Decoder EI3 Extender Board is designed to work with any EZ-BOARD that supports the Expansion Interface 3, this release of the BSP supports only the ADSP-BF60x family of Blackfin processors.

Software Requirements

To build the projects included in the Video Decoder EI3 Extender BSP, CrossCore Embedded Studio version 1.0.0 or later is required. Some of the examples also require Video Encoder EI3 Extender Board and its BSP.

Getting Started with a Project that Uses the RTOS

Adding a Driver to a Project

When adding a Video Decoder EI3 Extender Board driver to your project, the IDE will add the sources for the driver to the CCES Project folders, starting at "system/Video_Decoder_EI3". There will be a folder specific to the driver(s) you have added under this folder.

Creating a project which includes a Video Decoder EI3 Extender Board 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 Video Decoder EI3 Extender Board under the "Device Drivers and System Services" category. Within this category you will see "Video Decoder EI3 Extender Board Drivers".

The Video Decoder EI3 Extender Board 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 Video Decoder EI3 Extender Board 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. Clicking on "Add" and selecting the driver(s) you wish to add from the Video Decoder EI3 Extender Board Drivers add-in (which is under the "Device Drivers and System Services" category) adds the selected driver source to your project.

Note:

- 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 Video Decoder EI3 Extender Board 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. Video Decoder EI3 Extender BSP related sketches are provided. To locate the sketches specific to the Video Decoder EI3 Extender BSP, open up the example browser (Help -> Browse Examples) and then select the appropriate product name in the "Product:" pulldown.

Examples

In addition to the code sketches, the Video Decoder EI3 Extender BSP provides examples which show how to use each of the drivers included in the BSP.

The following examples are available in this release: (For more information on the examples see the README file.)

1. FrameCapture Example
2. PostDecoderEncoder (Power-On Self Test for Video Decoder EI3 Extender and Video Encoder EI3 Extender, also requires Video Encoder EI3 Extender Board and its BSP)
3. VideoLoopback Example (also requires Video Encoder EI3 Extender Board and its BSP)
4. FrameCapture with Class driver Example
5. VideoLoopback with class driver Example (also requires Video Encoder EI3 Extender Board and its BSP)

Note:

- Double-clicking on an example from the example browser or the system overview page opens the project in the installation folder without copying it to your workspace. If you want to modify the example in any way, it is recommended that you copy it to your workspace.

Location

In order to locate Video Decoder EI3 Extender BSP examples and sketches, you can use the following:

- Open CrossCore Embedded Studio's Example Browser which can be found in CrossCore Embedded Studio under Help. Select in the Product section "Video Decoder EI3 Extender Board v1.0.0 [1.0.0]" for a full list of examples and sketches.
- Import projects located in your Video Decoder EI3 Extender BSP installation folder under the example directory in product installation `(<installation_root>\Blackfin\Examples\ADSP-BF609)`.

Documentation

API documentation for the drivers included in the Video Decoder EI3 Extender BSP can be found in CCES help under:

Video Decoder EI3 Extender Board Support Package 1.0.0 > Video Decoder EI3 Extender Board API Reference

Video Decoder EI3 Extender Board Manual can be found in CCES help under:

Video Decoder EI3 Extender Board Support Package 1.0.0 > Video Decoder EI3 Extender Board Manual

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

CrossCore® Embedded Studio 1.0.0 > System Runtime Documentation > System Services and Device Drivers

Integration with CrossCore Embedded Studio

System View

CrossCore Embedded Studio provides the System View which is used by the Video Decoder EI3 Extender BSP. Use the System Configuration Overview tab to add Video Decoder EI3 Extender BSP driver sources into a CrossCore Embedded Studio project.

To access the System Configuration Overview tab, do one of the following:

- In a navigation view, double-click the `system.svc` file of a project. The System Configuration utility appears with the overview tab selected.
- If the utility is already open, select the Overview tab.

As well as being able to add, remove and upgrade add-ins from this window, you will also be provided a list of examples and sketches associated with the selected add-in.

For more information about the System Configuration utility, see the CrossCore Embedded Studio help.

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.

As of release 1.0.0 the header files for Video Decoder EI3 Extender BSP drivers are MISRA-C compliant (the specific suppressions are listed in the header files).

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 Video Decoder EI3 Extender Board Support Package (BSP)

1. When importing the FrameCapture or VideoLoopback project with the "Copy project into workspace" option checked, CrossCore® Embedded Studio 1.0.0 does not copy over files not contained within immediate the project hierarchy. For instance "SoftConfig_BF609.c", "SoftConfig_Decoder.c", "SoftConfig_Encoder.c". The project will fail to build unless these are copied over manually.
2. Audio over HDMI is not supported.
3. In VideoLoopback example, Field 1 and Field 2 are out of sync for NTSC video sourced from Composite/S-Video/Component inputs of the decoder and/or displayed over Composite/S-Video/Component outputs of the encoder.

4. In VideoLoopback example, playing a static image in interlaced video mode (NTSC/PAL) over analog video ports (Composite/S-Video/Component) may look blurry due to the number of A/D and D/A conversions involved. Conversions could happen at the video source (DVD player), in the decoder and encoder space, and finally in the display unit (TV). This behavior may not be noticeable while playing a video file.