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Interfacing Blackfin® EZ-KIT Lite® Boards to CMOS Image Sensors

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Rev 1 – November 9, 2006

Introduction

This EE-Note describes the hardware and software configurations that are needed to interface various Micron® CMOS image sensors to Blackfin® processors. The CMOS image sensors discussed in this document are used for a variety of applications, ranging from security to entertainment.

The configuration settings given in this EE-Note were tested on EZ-KIT Lite® evaluation systems for ADSP-BF533 Blackfin processors (ADDS-BF533-EZLITE, Rev 1.2), ADSP-BF537 Blackfin processors (ADDS-BF537-EZLITE, Rev 1.3), and ADSP-BF561 Blackfin processors (ADDS-BF561-EZLITE, Rev 1.3). The code included with this document was verified using the VisualDSP++® 4.0 and 4.5 (Updated May 2006) tools suites for Blackfin processors.

Objective

When beginning the development of any imaging application comprising an embedded processor and a CMOS image sensor, it is important to identify the correct hardware and software configurations for your system. The goal of this document is to accelerate and simplify the connection between Blackfin processors and various Micron CMOS image sensors by describing the hardware and software configurations needed to interface these devices.

In addition to saving time and effort for the programmer, the configuration table presented in this EE-Note is also intended to simplify the debugging of an image sensor application by providing a set of known, reliable hardware and software settings that will prevent or remove errors originating from misconfigured devices in the system.

Usage

Unpack the ZIP file^[1] associated with this application note. Open the `SensorTable.htm` file using any HTML-enabled browser (i.e., Internet Explorer, Netscape Navigator, Mozilla Firefox, etc.). The initial screen shows a table with an X in each cell. Select the X in the cell that corresponds to the EZ-KIT Lite and sensor combination of interest. The resulting page contains all the basic hardware and software configuration information, settings, and code necessary to run an application in the context of the selected platforms. The information in these pages can also be found in text files located in the `data` folder of the compressed archive.

Each of these configuration pages contains the following information for any given platform:

- EZ-KIT Lite switch and jumper settings
- A/V EZ-Extender board populated jumpers
- Sensor output image format
- Sensor basic configuration
 - Switch and jumper settings
 - Configuration register values
- Blackfin processor software configuration
- Part revisions for which these configurations apply



The settings in this EE-Note are provided as a guideline configuration for the system and are intended for a basic image sensor application. The desired application may require a slightly different configuration. Consult the appropriate processor and EZ-Kit Lite manuals for the system used.

References

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- [2] *ADSP-BF533 Blackfin Processor Hardware Reference*. Rev 3.2, July 2006. Analog Devices, Inc.
- [3] *ADSP-BF561 Blackfin Processor Hardware Reference*. Rev 1.0, July 2005. Analog Devices, Inc.
- [4] *ADSP-BF537 Blackfin Processor Hardware Reference*. Rev 2.0, December 2005. Analog Devices, Inc.
- [5] *ADSP-BF533 EZ-KIT Lite Evaluation System Manual*. Rev 3.0, June 2006. Analog Devices, Inc.
- [6] *ADSP-BF561 EZ-KIT Lite Evaluation System Manual*. Rev 3.0, June 2006. Analog Devices, Inc.
- [7] *ADSP-BF537 EZ-KIT Lite Evaluation System Manual*. Rev 2.0, June 2006. Analog Devices, Inc.
- [8] *Blackfin A-V EZ-Extender Manual*. Rev 2.0, April 2006. Analog Devices, Inc.
- [9] *Micron MT9V022 - 1/3-Inch Wide-VGA Digital Image Sensor Data Sheet*. Rev B, June 2005. Micron Technology, Inc.
- [10] *Micron MT9V111 - 1/4-Inch SOC VGA Digital Image Sensor Data Sheet*. Rev G, January 2005. Micron Technology, Inc.
- [11] *Micron MT9V125: SOC VGA Digital Image Sensor Data Sheet*. Rev B, November 2005. Micron Technology, Inc.

Document History

Revision	Description
<i>Rev 1 – November 9, 2006 by Bob Nakib</i>	Initial Draft Release