Introduction

This feature rich FPGA board has been designed to implement various challenging applications with a special focus on Video Acquisition, Processing, Displaying, and/or Streaming over Ethernet. For example, one or several AVDB boards can be plugged in a PC as a video I/O + video processing board for building COTS Servers.

This industry-first board is propelled by an FPGA: the largest and fastest device from the low-cost 28 nm Altera Cyclone V GT family, which includes twelve 6.144 Gigabits transceivers, over 680 multipliers and over 12 megabits of internal memory. Combined with IPs available from Altera: “VIP” (Video IP suite) or from ALSE, this board can address the most recent: protocols, processing and video formats, with unprecedented performance. Video transformation, compression, decompression, format / rate changing or other complex algorithms can be implemented in the FPGA and run in real-time, outperforming the most powerful CPUs and associated software.

This State-of-the Art High-End board is an excellent choice for Professional A/V Developers and Manufacturers. Moreover, its affordable price and its ability to fit in just any PC opens a realm of possibilities for creating and marketing very quickly new products and innovative solutions.

Versatile Video Input & Output Formats

Video input connectors:
- 1 x HDMI 1.4a
- 1 x full size Display Port 1.2

Video output connector:
- 1 x Full size Display Port 1.2 usable also as HDMI output. This combination, with simple cable adapters can connect to most recent video sources or displays.


Fan-less and Low power

The efficient supply regulators and the low global power consumption (< 15W) is a huge advantage for cooling, silence and industrial solutions, especially compared to voracious GPUs and graphic accelerator cards.

Power can be provided by the PCIe connector only, without using the Jack connector.

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AVDB FPGA Board Data Sheet

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Stand-alone Use

A separate 12V supply connector (Jack) and high performance on-board power supply regulators allow you to use AVDB outside and without a PC. The board can be controlled through Ethernet (or even RS232).

High Bandwidth Local Memory

The fastest memory is the 12.2 Mbits available inside the FPGA. This is complemented by high-bandwidth DDR3 chips running at 2x400 MHz for a raw bandwidth of 25.6 Gigabits/s. This memory can be used for Complex Video Signal Processing, for buffering, or for any task requiring extreme R/W bandwidth and large storage capacity.

Local non volatile Memory

A high performance 32 Gigabits NAND Flash can store up to 4 Gbytes of data or video, for all kinds of applications. This is complemented with a 256 Mbits Quad-SPI Flash.

Audio Codec

The on-board Analog Device Audio Codec with associated audio connectors (on top) is a nice add-on, for example to listen to audio tracks, or mix external audio sources into multimedia streams.

USB – Uart

The mini USB connector with FTDI UART chip is a nice touch for system bring-up, monitoring, control, debugging...

High Speed Debugging

The on-board USB-Blaster II hardware with USB II performance will facilitate the development and debug phase. Extra debugging pins (USB-Debug Master) provide up to 384 Mbits/s data bandwidth with the PC. This facilitates internal video stream monitoring and debugging for example.

Flexible Configuration

A Quad-Serial Flash is dedicated to automatic configuration of the FPGA at power up. This Configuration Flash can be updated through Ethernet (or PCIeexpress) with factory default (Safe) and User sections. Configuration during development and debug can be performed using the on-board USB-Blaster II.

Intellectual properties

ALSE has developed IP blocks (to be purchased separately, if needed) for all the board's functions, including:
- PCI Express and software driver,
- Ultra High performance Gigabit Ethernet communication hardware stack (GEDEK),
- multi-format HDMI out (up to Ultra-HD / 4K) with sound,
- HDMI in,
- JPEG real time Coder + Decoder,
- Wavelet real time Coder + Decoder
- NAND Flash controller with BCH ECC,
- Quad SPI Flash controller,
- and all kinds of Video Processing blocks.

The Altera Video IP (VIP) suite can also be used on ADVB!
Contact Altera to get a special discount as an ADVB user.

Custom applications / products

ALSE can also develop very rapidly custom applications using internal know-how and IPs, thus offering a ready-to-use bundle under the form of customized FPGA boards, ready to plug and play.

Reference Designs

The board comes with a “Golden Top” entity and a Reference Design project with all the external devices connected. This is a solid base for deriving easily all kinds of applications, in mere hours. A lot of other Reference Designs are available.

Frameworks

Several ready-made applications are available as options for developers who want to focus on the internal processing while controlling the application through Ethernet and using UDP streaming. Please contact ALSE for more information.

Typical Applications

- Video broadcasting.
- Real time video enhancement.
- Real time video capturing and / or processing.
- Industrial Imaging, very high frame rate processing.
- Real time video compression / decompression.
- Real time Video Format changer.
- Ultra high speed network card.
- Your imagination is the limit!

Technical specifications

FPGA: Cyclone V GT 301 kLEs (D9) FBGA 896
- 12.2Mbits internal ram, 684 multipliers,
- 12 x 6.144 Gbits/s transceivers.

PCI Express Gen2 x1

External on-board Ram: 1 Gbytes, DDR3, 2x400MHz
- 2 x Quad-SPI Flash: 256 Mbits config + 256 Mbits user
- Gigabit Ethernet PHY: Micrel KSZ9021GN
- 1 x SFP+ port

Audio Codec: Analog Device SSM2603

Power consumption < 15 W, PCIe or Jack connector (12V).

Fan-less operation possible. Temperature sensor.

Dimensions / form factor:180 x 106,65 mm PCIe Card

PCB: 12 layers.

Availability

AVDB is available for purchase since 2014. Contact A.L.S.E or ReFLEX CES.

Contact

A.L.S.E
8 passage Barrault
75013 – PARIS – France
tel +33 1 84 16 32 32
mailto:info@alse-fr.com
www.FPGA.fr

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