

DIAPLOUS

COMPONENTS FOR VISUAL PERCEPTION

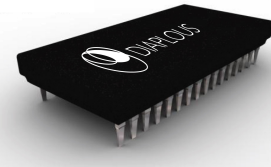
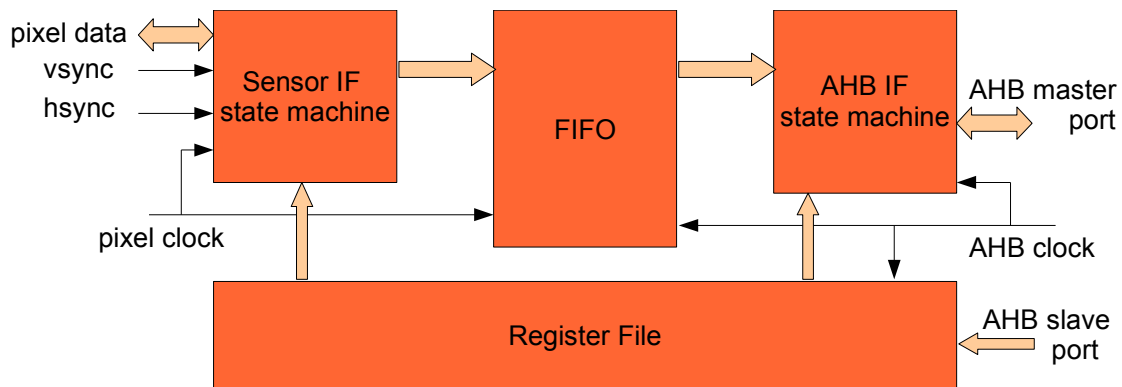


Image Sensor Interface

Product Outline

CMOS Image Sensor Readout Module

The Diaplous Sensor Interface module is an AMBA® 2 AHB™ compliant interface for connecting CMOS image sensors. It handles all required synchronisation with the sensor chip and reads data into a FIFO memory for clock decoupling. The pixel data can then be transferred over the AHB bus to a on-chip or external memory for further processing. This makes Diaplous Sensor Interface an ideal solution for demanding applications like machine vision, surveillance and high-speed network cameras.

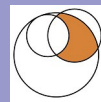


Sensor Interface State Machine: Assembles the Bayer pattern data received from the sensor port to true color information (24-bits per pixel) and feeds them to the FIFO block.

FIFO: A memory block that decouples the clocks of the sensor and the AMBA bus. It can also store multiple pixel rows before they are used by the Pixel Push Master for image preprocessing.

AHB Interface State machine: An AHB master device that transfers pixels in burst mode to a memory device via the AHB bus.

Register File: A simple AHB slave that can be used for controlling the operation of the other blocks (e.g. Image dimensions, Preprocessing types, RGB conversion etc.)



Features:

- AHB2.0 master device for connecting to a CMOS sensor. True Color Resolution: 1024x768 (Bayer pattern: 2048x1536)
- Supports Single 32-bit transactions
- Image data pushed on a programmable memory space
- Supports color (bayer pattern) sensors with parallel data output in sensor master mode.
- Supports conversion of bayer-pattern to RGB
- Frame start/end signals
- Enable/Disable Capability
- Two-wire interface for sensor programming
- Sensor configuration can be done by using an I2C interface like the I2C code from opencores (available with minor modifications to attach on the AHB bus).

Target Applications:

- Industrial Vision Cameras
- Surveillance Systems
- IP cameras etc.

Interfaces:

- 32bit AHB Master
- Sensor Port (Sensor signals: Hsync, Vsync, Pixel Data).
- Status Bits, Control Bits through AHB

Software:

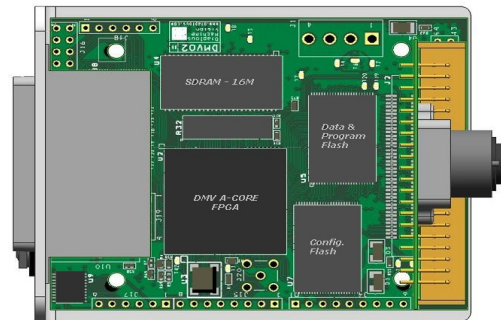
- C library for: Frame Capture, Sensor Programming, Region of Interest / Skip / Bin, Sensor programming etc.
- PC based application for quick setup and view of captured images through ethernet 10/100 (live video) or RS232 (still images).

Note: The C library is for the embedded firmware running on the evaluation FPGA chip. The PC applications are two: one on Windows XP and the other on Linux.

Status: Working FPGA Implementation.

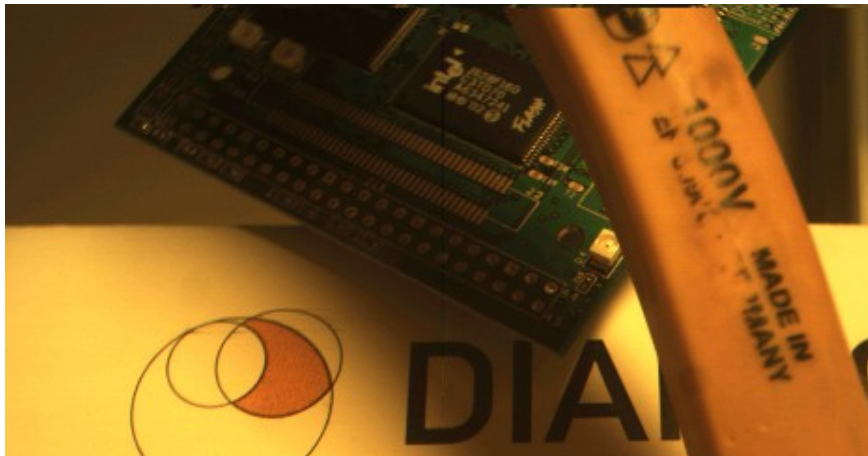
Evaluation:

Development board including:



- FPGA with RISC Core, Ethernet 10/100 MAC, Sensor Interface, I2C, Memory Interface
- Memories (SDRAM & Flash)
- Ethernet Phy & Connector
- 3Mpixel Color Image Sensor

Example Image Aquired using the Diaplous Sensor Interface module attached to a Micron CMOS sensor:



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