Image Signal Processor IP Core

Released new product SHSA-01001 core

with minimum functions for image processing.

SHSA-01 series

Overview

Compact ISP IP core

- Compatible with Bayer filters on image sensors
- Implementable on both ASIC and FPGA
- Input/output I/F conforms to AMBA ※1
- Maximum image size: 4K x 2K pixels
- Supports RGB, YCbCr formats（No sensor correction）
- Equipped with the following functions
  - ●Sensor correction　　　：Black level correction, Demosaic, Color correction
  - ●Automatic correction　　：AWB(Auto White Balance)、AE(Auto Exposure)※2
  - ●Image correction　　　　：Tone curve correction、Gamma correction、Color space conversion
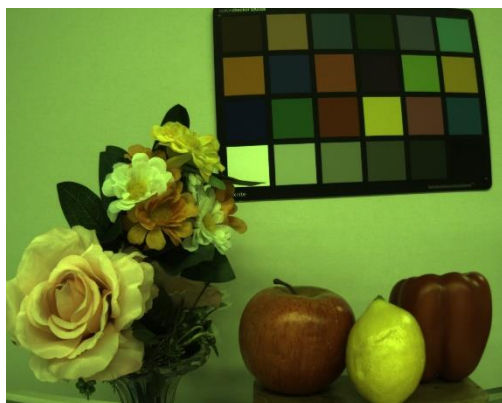
■Image processed by SHSA-01001 ※3

Figure1. Raw Image ※4
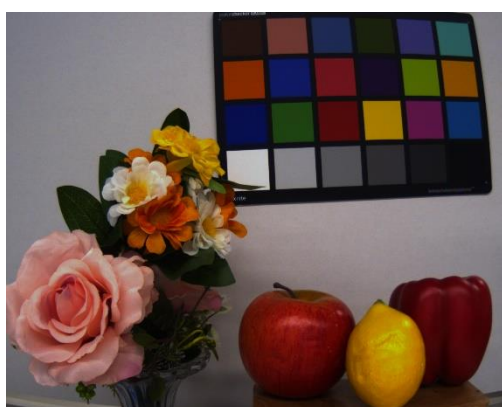

Figure2. After Sensor correction

Figure3. After Automatic Correction ※5

Figure4. After Image Correction ※5

※1 AMBA(Advanced Microcontroller Bus Architecture) : ARM's on-chip bus standard.
※2 This IP only performs photometry, and requires separate control of the image sensor, etc.
※3 These are images output by implementing SHSA-01001 in FPGA.
※4 For comparison with color images, only demosaic processing is performed.
※5 Each correction includes all previous processing.

SHSA-01001 Specification

	FPGA (Cyclone® V ※1)	ASIC (@28nm)
Gate Count	7,500 (ALMs) ※2	210 (KGate) ※2
RAMs	73 (M10Ks) ※2	550 (Kbit) ※2
DSPs	27	−
Frame rate	40 fps ※3	
Pixel rate	1 Pixel/CLK	
Image bit depth	12 bit ※4	
Interfaces	CPU I/F : AMBA3 APB Image I/F : AMBA4 AXI4-Stream	
Input color format	RAW(Bayer)、RGB、YCbCr 4:4:4 ※5	
Output color format	RGB、YCbCr 4:4:4 ※5	

※1 Intel, the Intel logo, and other Intel names and logos are trademarks of Intel Corporation or its subsidiaries.
※2 The value is for the maximum image size of 4096x2160.
※3 It is the value when the image size is 1920x1080 and the clock frequency is 100MHz.
　　(100MHz : 4K 10fps , VGA 300fps)
　　Frame rate(fps) = Clock frequency (Hz) ／ Image pixel count (pixel)
※4 If it is 12bit or less, it will be possible to input.
※5 If other sub-sampling is required, customization by peripheral circuit design is required.

Applications

■ Security camera　　■ Monitoring camera　　■ Appearance inspection camera　　etc.

　　In addition, it is also possible to support to the image input system.

Customization

IP core customization according to customer needs is available.
- ■ Processing capacity　　■ IP core peripheral circuit design
- ■ Gate amount reduction

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