

Microsemi SmartFusion[®]2 SoC FPGA and IGLOO[®]2 FPGA



Infrared Camera

Head-up Display

Medical Imaging

Digital Signage

Drone Camera

Human Machine Interface

Machine Vision

Driver Assistance System

Imaging and Video Solution with Microsemi FPGAs and SoCs

Microsemi provides a complete, easy-to-use development environment for designing low-power and secure video processing applications. The solution comprises of an IP suite with modular IP, a field programmable gate array (FPGA) mezzanine card (FMC) for the SmartFusion2 Advanced Development Kit, and a software GUI.

Key Features

- Modular IP suite
- Support for parallel, MIPI CSI-2, and HiSPi sensor interfaces
- Display interface for 7:1 LVDS
- Audio-processing
- Low-power, security, and reliability
- Easy-to-use software GUI for real-time audio and video configuration

Solution Overview

Hardware

- Imaging and video FMC daughter card with camera module options
- SmartFusion2 Advanced Development Kit¹



Imaging and video FMC and SmartFusion2 Advanced Development Kit

IP Suite

- Imaging and video processing IP cores in Libero[®] SoC²:
 - Sensor interface – Parallel, MIPI CSI-2, and HiSPi
 - Bayer conversion
 - Color-space conversion
 - Image-edge detection
 - Video scaler
 - Alpha blending and overlay
 - Image sharpening filter
 - Image de-noising filter
 - Display pattern generation
 - Display enhancements
 - Display control (LVDS and Parallel RGB-HDMI)
- Obfuscated IPs and reference design (provided for free)
- Source code in Verilog (licensing fee required)

Name	Version
▶ Peripherals	
▶ Processors	
▶ SC/Tamper	
▶ Solutions-MotorControl	
▲ Solutions-Video	
▶ Alpha Blending	1.0.0
▶ Bayer Interpolation	1.0.0
▶ Display Controller	1.0.0
▶ Image Edge Detection	1.0.0
▶ Image Enhancement	1.0.0
▶ Image Sharpen	1.0.0
▶ LVDS 7:1 Receiver	1.0.0
▶ LVDS 7:1 Transmitter	1.0.0
▶ RGB To YCbCr	1.0.0
▶ SF2 DDR Memory Arbiter	1.0.0
▶ Scaler	1.0.0
▶ Test Pattern Generator	1.0.0
▶ YCbCr to RGB	1.0.0
▶ Tamper	

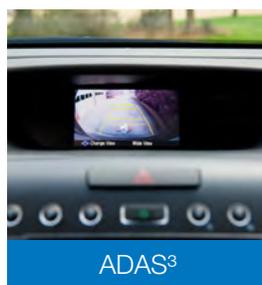
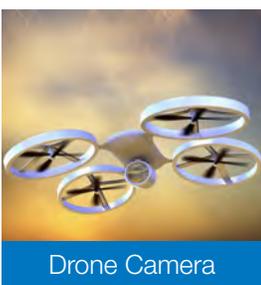
Imaging and Video IP Cores in Libero SoC Catalog

Software GUI

- Enables video and audio configurations
- GUI communicates with IP blocks through SmartFusion2 ARM[®] Cortex[®]-M3 processor
- Supports the following demos:
 - Camera sensor to display
 - Image edge detection



Software GUI for Imaging and Video Kit



¹ Advanced development kit must be purchased separately; it comes with one-year free platinum license for the Libero System on Chip (SoC) software

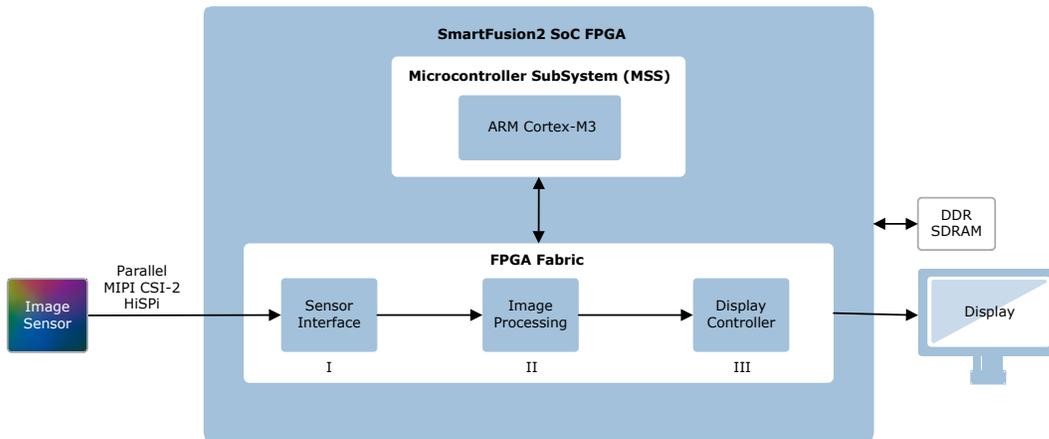
² Microsemi Libero SoC is a comprehensive software toolset for designing with Microsemi FPGAs and SoC FPGAs

³ Advanced Driver Assistance Systems

Imaging and Video Solution with Microsemi FPGAs and SoCs

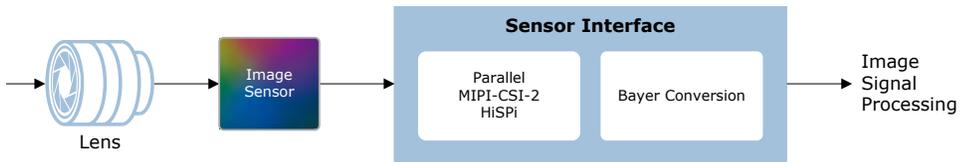
Camera/Display Signal Chain

Microsemi imaging and video solution provides IP cores and designs which are optimized for SmartFusion2 SoC FPGAs and IGLOO2 FPGAs. These IP cores and designs are production ready, and are used to implement the blocks which are essential to the Camera/Display Signal Chain architecture.



I. Sensor Interface Block

- Supports multiple sensor interface types
- On-chip programmability of image sensor



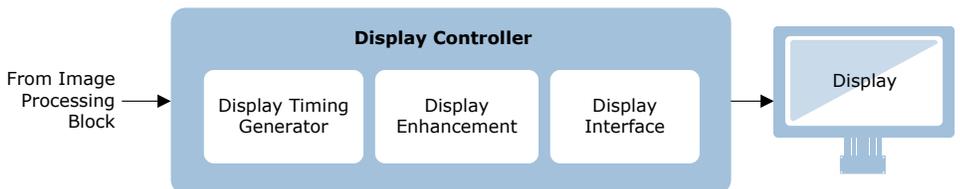
II. Image Processing Block

- Per-pixel alpha blending (overlay) and global alpha
- 8, 10, 12, and 16 bits-per-color component input and output
- Supports 3 x 3 2D median filtering
- Programmable gain for edge directions



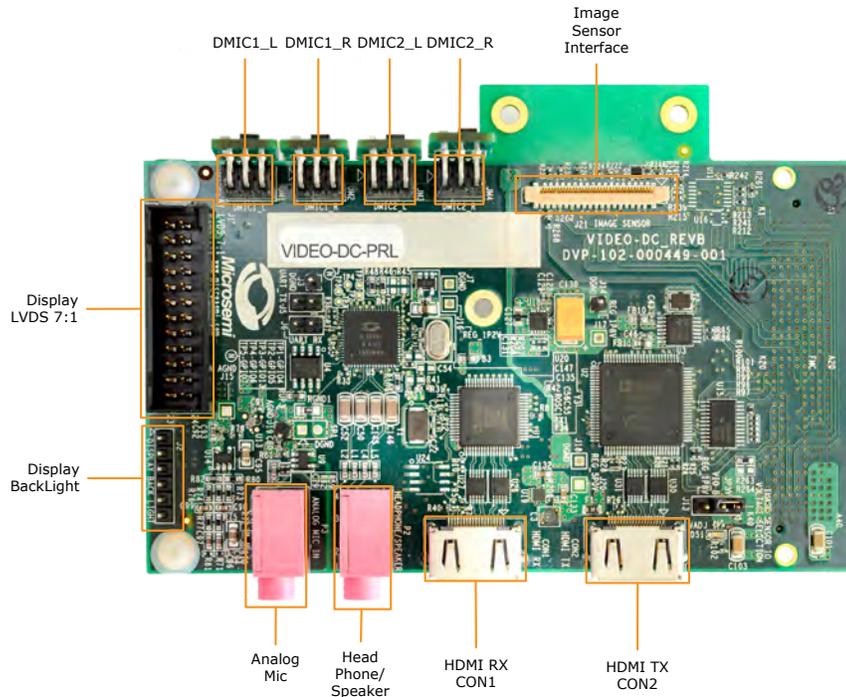
III. Display Interface Block

- Supports LVDS 7:1
- LVDS transmit clock automatically aligned to data
- User-configurable display enhancement IP block
- Embedded and separate sync signals
- Supports RGB parallel and YUV (444 and 442 formats)



Imaging and Video Solution with Microsemi FPGAs and SoCs

Imaging and Video FMC Card



- Flexible image-sensor interface supporting multiple camera-sensor options to connect to the kit
- On-board LVDS 7:1 connector and HDMI interface for display connectivity
- 100 pin FMC connector for compatibility with upcoming Microsemi FMC-based product kits

Imaging and Video Solution	Ordering Code
Imaging and video card with parallel sensor module	VIDEO-DC-PRL
Imaging and video card with MIPI CSI-2 sensor module	VIDEO-DC-MIPI
Imaging and video card with HiSPi sensor module	VIDEO-DC-HISPI
SmartFusion2 Advanced Development Kit	M2SADV150-ADV-DEV-KIT
Imaging and video IP Suite RTL source	VDSOLCores-RM and VDSOLCores-RMFL

For more information on imaging and video solutions visit: <http://www.microsemi.com/products/fpga-soc/imaging>
 Send your queries and comments to: imaging@microsemi.com



Microsemi Corporate Headquarters
 One Enterprise, Aliso Viejo, CA 92656 USA
 Within the USA: +1 (800) 713-4113
 Outside the USA: +1 (949) 380-6100
 Sales: +1 (949) 380-6136
 Fax: +1 (949) 215-4996
 email: sales.support@microsemi.com
www.microsemi.com

©2016 Microsemi Corporation. All rights reserved.
 Microsemi and the Microsemi logo are registered trademarks of Microsemi Corporation. All other trademarks and service marks are the property of their respective owners.

Microsemi Corporation (Nasdaq: MSCC) offers a comprehensive portfolio of semiconductor and system solutions for aerospace & defense, communications, data center and industrial markets. Products include high-performance and radiation-hardened analog mixed-signal integrated circuits, FPGAs, SoCs and ASICs; power management products; timing and synchronization devices and precise time solutions, setting the world's standard for time; voice processing devices; RF solutions; discrete components; enterprise storage and communication solutions, security technologies and scalable anti-tamper products; Ethernet solutions; Power-over-Ethernet ICs and midspans; as well as custom design capabilities and services. Microsemi is headquartered in Aliso Viejo, Calif., and has approximately 4,800 employees globally. Learn more at www.microsemi.com.

Microsemi makes no warranty, representation, or guarantee regarding the information contained herein or the suitability of its products and services for any particular purpose, nor does Microsemi assume any liability whatsoever arising out of the application or use of any product or circuit. The products sold hereunder and any other products sold by Microsemi have been subject to limited testing and should not be used in conjunction with mission-critical equipment or applications. Any performance specifications are believed to be reliable but are not verified, and Buyer must conduct and complete all performance and other testing of the products, alone and together with, or installed in, any end-products. Buyer shall not rely on any data and performance specifications or parameters provided by Microsemi. It is the Buyer's responsibility to independently determine suitability of any products and to test and verify the same. The information provided by Microsemi hereunder is provided "as is, where is" and with all faults, and the entire risk associated with such information is entirely with the Buyer. Microsemi does not grant, explicitly or implicitly, to any party any patent rights, licenses, or any other IP rights, whether with regard to such information itself or anything described by such information. Information provided in this document is proprietary to Microsemi, and Microsemi reserves the right to make any changes to the information in this document or to any products and services at any time without notice.