Imaging and Video Solutions

Microsemi PolarFire® and SmartFusion®2/IGLOO®2 FPGAs

- Infrared Camera
- Head-Up Display
- Medical Imaging
- Digital Signage
- Drone Camera
- Human Machine Interface
- Machine Vision
- Driver Assistance System
- Thermal Imaging
Microsemi provides a complete, easy-to-use development environment for designing low-power and secure video processing applications. The solution includes an IP suite with modular IP, and FPGA mezzanine card (FMC) for the SmartFusion2 advanced development kit, and a software GUI. The IP suite currently supports PolarFire, SmartFusion2 SoC, and IGLOO2 FPGA product families.

**Key Features**

- Modular IP suite
- Support for MIPI CSI-2 or parallel sensor interfaces
- Display interface for 7:1 LVDS or HDMI
- The most secure FPGA to protect your design IP
- 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
- PolarFire evaluation kit (Sold separately and includes a one-year Gold license of Libero® SoC PolarFire software)
- SmartFusion2 advanced development kit (Sold separately and includes a one-year Gold license of Libero SoC software)

**IP Suite**

The following imaging and video processing IP cores are included in Libero SoC PolarFire and Libero SoC, a comprehensive software toolset for designing with Microsemi FPGAs and SoC FPGAs.

- Sensor interface—Parallel, MIPI CSI-2 (RX and TX)
- Bayer conversion
- Color-space conversion
- Image-edge detection
- Video scaler
- Alpha blending and overlay
- Image sharpening filter
- Image de-noising filter (under development)
- Display control (LVDS and parallel RGB-HDMI)
- Source code in Verilog (requires licensing fee)

**Software GUI**

Enables video and audio configurations. The GUI supports the following demos:

- Camera sensor to display
- Image edge detection
Imaging and Video Solutions with Microsemi FPGAs and SoCs

Camera/Display Signal Chain

Microsemi imaging and video solutions provide IP cores and designs that are optimized for PolarFire, SmartFusion2 SoC FPGAs, and IGLOO2 FPGAs. These IP cores and designs are production-ready, and are used to implement the blocks that are essential to the camera/display signal chain architecture.

I. Sensor Interface Block
- Supports multiple sensor interface types
- On-chip image sensor programmability
- CSI-2 receiver decoder IP supports multiple lanes 1, 2, and 4

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 × 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 FMC Cards

- 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
- FMC connector compatible with PolarFire evaluation kit and SmartFusion2 advanced development kit

<table>
<thead>
<tr>
<th>Description</th>
<th>Ordering Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Imaging and video FMC with parallel sensor interface camera module</td>
<td>VIDEO-DC-PRL</td>
</tr>
<tr>
<td>Imaging and video FMC with MIPI CSI-2 sensor interface camera module</td>
<td>VIDEO-DC-MIPI</td>
</tr>
<tr>
<td>PolarFire evaluation kit</td>
<td>MPF300-EVAL-KIT-ES</td>
</tr>
<tr>
<td>SmartFusion2 advanced development kit</td>
<td>M2S150-ADV-DEV-KIT</td>
</tr>
<tr>
<td>Imaging and video IP suite, RTL source</td>
<td>VDSOLCores-RM (node-locked license)</td>
</tr>
<tr>
<td></td>
<td>VDSOLCores-RMFL (floating license)</td>
</tr>
</tbody>
</table>

Send your queries and comments to: Imaging@microsemi.com