Xylon d.o.o.

Fallerovo setaliste 22
10000 Zagreb, Croatia
Phone: +385 1 368 00 26
Fax: +385 1 365 51 67
E-mail: support@logicbricks.com
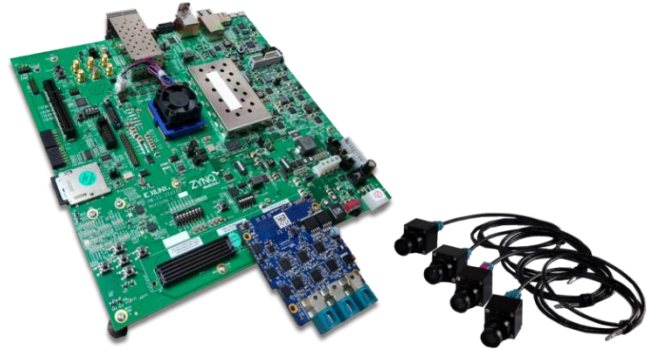URL: www.logicbricks.com

Figure 1: logiVID-ZU-GMSL2 MPSoC Vision Development Kit

Features

- Complete and flexible design platforms for embedded multi-camera vision applications
- Based on Xilinx Zynq® UltraScale+™ MPSoC
- Available kit versions with support for the most popular automotive high-speed serial interfaces:
  - logiVID-ZU-GMSL2 kit supports GMSL2 from Maxim Integrated™, and
  - logiVID-ZU-FPD3 kit supports the FPD-Link III from Texas Instruments
- Includes licensed reference MPSoC designs:
  - logiADAK-VDF-ZU 4-Ch Video Design Framework (FPD-Link III and GMSL2)
  - logiREF-DFX-IDF Dynamic Function eXchange Design Framework with Isolation Design Flow (GMSL2 Only)
- Both included reference designs come with the video processing block example:
  - four camera video inputs to display output
  - Sobel filter implementation using Xilinx Vitis™ accelerated[1] libraries
- logiVID-ZU Evaluation kit includes licensed Xylon logicBRICKS IP Cores[2]
- Designs are fully prepared for Xilinx Vivado® Design Suite 2021.1 and Vitis 2021.1 Unified Software Platform

- Enables vision developers to quickly add their own algorithms to the provided infrastructure
- Provided demos run on Linux OS and include logicBRICKS software drivers and applications developed with the Xilinx Vitis platform
- HDMI® display output with the Xilinx HDMI 1.4/2.0 Transmitter Subsystem[3] controlled via Xylon's DRM kernel driver
- Resolutions: IN 1928x1208 and OUT 1920x1080
- Compatible with Xilinx PetaLinux tools
- The complete hardware platform includes:
  - 1x Xilinx ZCU102 Evaluation Kit
  - 1x Xylon video input FMC board (FPD3 or GMSL2)
  - 4x Xylon 2.3MP automotive video cameras
  - 4x Rosenberger® FAKRA cables (5 m)
  - 2x Rosenberger® HFM® to 4x FAKRA cable assembly
  - Power Supply
- Documentation and Tech support (e-mail)

---

[1] Additional Green filter included with the logiREF-DFX-IDF.
[2] Included 1-year Xylon Low-Volume IP Program (LVIP) seat licenses for used Xylon logicBRICKS IP cores.

[3] Licensed Xilinx IP core. Digital code vouchers provided by Xylon to buyers of the logiVID-ZU Evaluation Kit.

Applications

- AD/ADAS, guided robotics, drones, machine vision, AR/VR and other vision application

General Description

The logiVID-ZU Vision Development Kit provides system designers with everything they need to efficiently develop multi-camera vision applications on Xilinx's Zynq UltraScale+ MPSoC devices. The complete hardware platform includes four Xylon's 2.3MP automotive video cameras and supports HDMI video output. Xylon offers two kit versions; the logiVID-ZU-GMSL2 kit that supports the next generation GMSL2 serial interface from Maxim Integrated, and the logiVID-ZU-FPD3 kit that supports the FPD Link-III serial interface from Texas Instruments.

Kit deliverables include the complete and licensed logiADAK-VDF-ZU Video Design Framework, as well as the logiREF-DFX-IDF Dynamic Function eXchange Design Framework with Isolation Design Flow. Both design frameworks include pre-verified reference designs implemented by Xylon's logicBRICKS IP cores. All IP cores are supplied with Linux software drivers. The video capture and display demo applications run in Linux OS.

logiADAK-VDF-ZU design implements four parallel video inputs from Xylon AR0231 cameras (either GMSL2 or FPD-Link III), and the display output with an RGB overlay. All video inputs are stored in the video memory, and by mean of the on-board push buttons, the design user can select each of them for the single camera or all cameras full screen display output. The Sobel filter algorithm is implemented on the first camera, using Vitis accelerated libraries, and it can be turned on or off with a push of a button.

The logiREF-DFX-IDF Design Framework showcases Xilinx's Dynamic Function eXchange that enables features swapping by reconfiguring parts of a continually operating programmable FPGA/SoC Chip. Designed through the Isolation Design Flow (IDF), included fault-tolerant chip design also showcases Xilinx's functional safety design methodologies for safety-critical applications.

Figure 2: The Frameworks Provide Complete Multi-Camera-to-Display MPSoC Designs

logiVID-ZU reference designs include Xylon's logicBRICKS IP cores and design files prepared for Xilinx's Vivado Design Suite. These complete camera-to-display SoC designs use just a fraction of available programmable logic and significantly save design time. Instead of starting from scratch and having to spend months designing and building a new design framework, logiVID-ZU users can immediately focus on specific vision-based parts of their next SoC design. To request the quote, please visit: https://www.logicbricks.com/Products/logiVID-ZU.aspx

logiADAK-VDF-ZU Video Design Framework

The logiADAK-VDF-ZU framework includes the reference design for use with both logiVID-ZU Vision Developer Kit versions. To get more information about the framework, please read the datasheet: http://www.logicbricks.com/Documentation/Datasheets/IP/logiADAK-VDF-ZU_hds.pdf.

The fully functional evaluation version of the logiADAK-VDF-ZU Video Design Framework is available for download: https://www.logicbricks.com/logicBRICKS/Reference-logicBRICKS-Design/MPSoC-Multi-Camera-Vision-Demo.aspx

Xylon's logicBRICKS IP core used in the logiADAK-VDF-ZU reference designs is licensed through Xylon's Low- Volume IP Program: http://www.logicbricks.com/logicBRICKS/Low-Volume-IP-Program.aspx.

logiREF-DFX-IDF Dynamic Function eXchange Design Framework with Isolation Design Flow

The logiREF-DFX-IDF design framework includes the reference design for the GMSL2 version of the logiVID-ZU Vision Developer Kit. To get more information about the framework, please read the datasheet: http://www.logicbricks.com/Documentation/Datasheets/IP/logiREF-DFX-IDF_hds.pdf.

The fully functional evaluation version of the logiREF-DFX-IDF Design Framework is available for download:

https://www.logicbricks.com/logicBRICKS/Reference-logicBRICKS-Design/Dynamic-Function-eXchange-Design-Framework.aspx

> **i**   The logiREF-DFX-IDF Design Framework is compatible only with the logiVID-ZU-GMSL2 kit.

Xylon's logicBRICKS IP core used in the logiREF-DFX-IDF reference design is licensed through Xylon's Low- Volume IP Program: http://www.logicbricks.com/logicBRICKS/Low-Volume-IP-Program.aspx.

Figure 3: Tiled, Full Screen and Error Injection Modes of the logiREF-DFX-IDF Design Framework

Xylon's Automotive Video Camera

Packed in a compact, only a cubic inch big waterproof aluminum housing, Xylon's new automotive video camera provides excellent performance. Based on the Semiconductor® AR0231AT CMOS image sensor, the camera provides 30 Frames per Second (fps) of color 2.3 MP (1928x1280) video processed by an internal FPGA video processor. The FPGA integrates Xylon's complete logicBRICKS High Dynamic Range (HDR) Image Signal Processing (ISP) pipeline. Depending on the camera's version, the supported communication interface includes either the GMSL2 or the FPD-Link III high-speed serial interface. Cameras supplied with the logiVID-ZU kit are equipped with the FIFO Optics 05525FM narrow-angle lens and short coax-cable leads with the Rosenberger FAKRA Z type connector.

Figure 4: Xylon logiCAM-GMSL2-AR0231 Video Camera

More info about the GMSL2 camera: https://www.logicbricks.com/Products/logiCAM-GMSL2-AR0231.aspx

More info about the FPD-Link III camera: https://www.logicbricks.com/Products/logiCAM-FPD3-AR0231.aspx

Xylon's Automotive Video FMC Cards

Depending on the selected version, the logiVID-ZU kit comes with either the logiFMC-GMSL2 or the logiFMC- FPD3-954 video input FMC card. These add-on cards are designed primarily to enable quick prototyping and evaluation of automotive multi-camera Advanced Driver Assistance (ADAS) and Autonomous Driving (AD) applications. Both cards enable easy interfacing of up to twelve (12) automotive video cameras to hardware boards based on Xilinx's FPGA, SoC, MPSoC and ACAP video and vision processors.

Figure 5: Xylon's logiFMC-GMSL2 FMC Card

https://www.logicbricks.com/Products/logiFMC-GMSL2.aspx

Figure 6: Xylon's logiFMC-FPD3-954 FMC Card

https://https://www.logicbricks.com/Products/logiFMC-FPD3-954.aspx

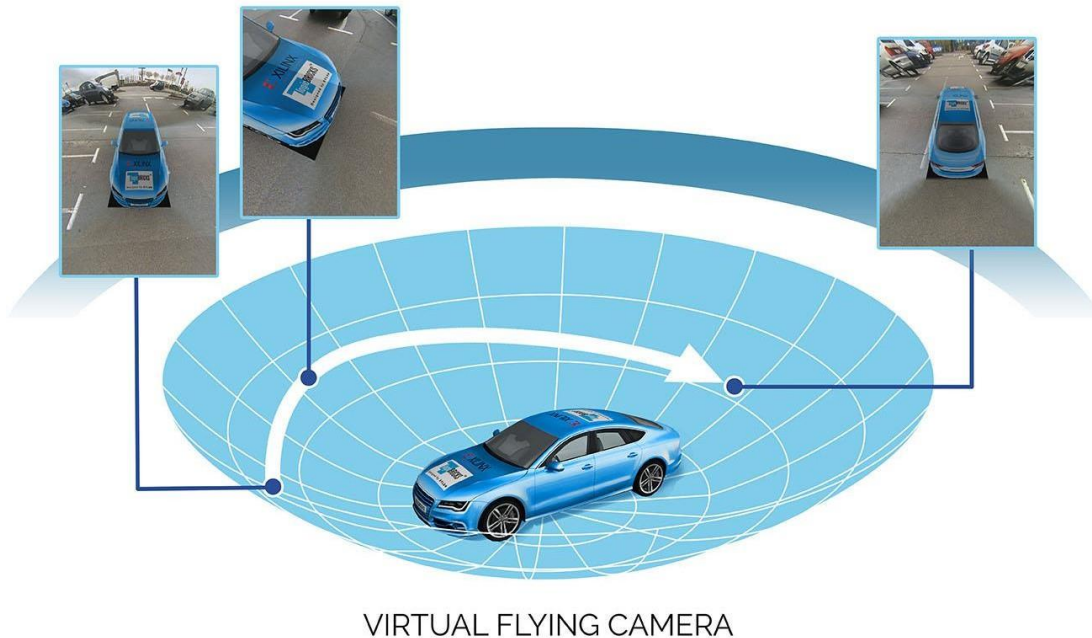## Application Example – Xylon's ViewMore™ Natural Surround View Parking Assistance

Figure 7: Xylon's Surround View Parking Assistance ADAS – Illustration

Xylon's logiADAK Programmable MPSoC Advanced Driver Assistance (ADAS) Development Kit uses the logiVID-GMSL2-ZU hardware platform to quickly bring new ADAS innovations to the market. It includes the demo of Xylon's latest generation ViewMore Natural Surround View IP suite and advanced software for quick setup on any vehicle; vehicle's multi-camera calibration software and PC software for system configuration. This complete ADAS solution enables drivers to dynamically adjust the position of the virtual flying camera and to see the vehicle's naturally looking surroundings in a three-dimensional hemispheric view displayed in fine-detail HD resolution.

> **i** Please note that Xylon's Surround View ADAS IP Suite is not part of the logiVID-ZU kit. For more information about the IP Suite, please contact Xylon at sales@logicbricks.com.

Related Design Services

Design services are available to customers interested in customization and enhancement developments based on the presented hardware and software products. For more information, please contact Xylon at info@logicbricks.com.

Related Xylon Products

The logiADAK Automotive Driver Assistance kit is a great programmable platform for upcoming automotive ADAS/AD applications. The kit comes with a full set of user-customizable demo applications, advanced software for quick setup on any vehicle, documentation and skilled Xylon technical support. The provided hardware platform is appropriate for quick test vehicle installations and rapid engagements in proof-of-concept or demonstration projects:

Email: support@logicbricks.com
URL: http://www.logicbricks.com/Products/logiADAK.aspx

Xylon's logiISP-UHD Image Signal Processing Pipeline IP core is a full high-definition ISP pipeline designed for digital processing and image quality enhancements of an input video stream in Smarter Vision embedded designs based on Xilinx's All Programmable devices. The logiISP-UHD ISP pipeline IP core can be supplemented with the logiHDR High Dynamic Range (HDR) Pipeline. To learn more, please visit our website:

URL: http://www.logicbricks.com/Products/logiISP.aspx
URL: http://www.logicbricks.com/Products/logiHDR.aspx

Related Information

Xilinx Programmable Logic

For information on Xilinx programmable logic or development system software, contact your local Xilinx sales office, or:

Xilinx, Inc.
2100 Logic Drive
San Jose, CA 95124
Phone: +1 408-559-7778
Fax: +1 408-559-7114
URL: www.xilinx.com

Revision History

Version	Date	Note
1.00	01.09.2017.	Initial release.
1.10	07.11.2017.	Added Surround View ADAS application example description.
2.00	31.03.2020.	New kit versions with new Xylon FMC cards and automotive cameras compatible with popular GMSL2 and FPD-Link III serial interfaces.
2.10	14.07.2021.	New kit version with updated Xylon FMC cards and automotive cameras.
3.00	30.11.2021.	Updated logiADAK VDF-ZU Vivado and Vitis version. Integrated HDMI IP subsystem enables direct connection of HDMI monitor. Avnet HDMI IN/OUT FMC board abandoned.
3.10	23.02.2022	Updated to include information about the new Xylon reference design - logiREF-DFX-IDF Dynamic Function eXchange with Isolation Design Flow that is also based on the logiVID-ZU kit. Added Figure 3: Tiled, Full Screen and Error Injection Modes of the logiREF-DFX-IDF Design Framewor.