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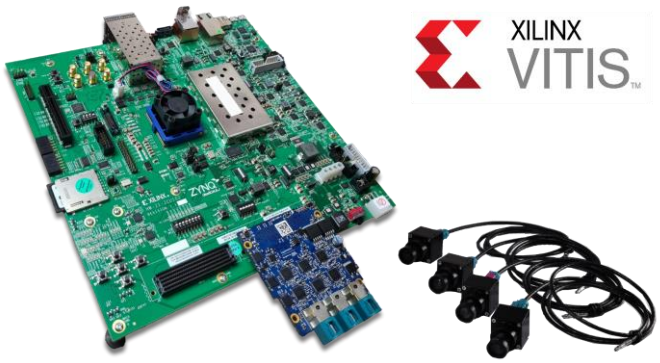

Figure 1: The Framework is Fully Compatible with Xylon logiVID-ZU Vision Development Kits

Features

- The complete video design framework for embedded multi-camera vision applications
- Enables vision developers to quickly add their own algorithms in the provided infrastructure
- Jump-starts the development and saves valuable design time
- Includes complete reference designs with an integrated video processing block example:
  - Four camera video inputs to display output
  - Sobel filter implementation using Vitis accelerated libraries
- Design is fully compatible with the Xylon logiVID-ZU Vision Development Kit based on the Xilinx® Zynq® UltraScale+™ MPSoC
- logiVID-ZU Evaluation kit includes licensed Xylon logicBRICKS IP Cores[1]
- Design is prepared for following environment:
  - Xilinx Vivado® Design Suite 2021.1
  - Vitis Unified Software Platform
- Runs on Linux OS and includes logicBRICKS software drivers and demo applications developed on and for the Xilinx Vitis Unified Software Platform
- HDMI™ display output with the Xilinx HDMI 1.4/2.0 Transmitter Subsystem controlled via Xylon's DRM kernel driver[2]
- Use minimal resources (Table 1) and leave room for very complex vision functions
- Resolutions: IN 1928x1208 and OUT 1920x1080
- Full evaluation version available online
- Documentation and Tech support (e-mail)

Table 1: Reference Designs Implementation Statistics

	Available in XCZU9EG	FOUR-CAM
Look-Up Tables (LUTs)	274,080	~ 14%
Look-Up Tables as Memory (LUTRAM)	144000	~ 3%
Flip Flops (FFs)	548,160	~ 9%
Block RAM (18/36 kB BRAM)	912	~ 6%
DSP slices (MULT/DSP)	2,520	~ 5%

1 *Included 1-year Xylon Low-Volume IP Program (LVIP) seat licenses for used Xylon logicBRICKS IP cores.*

2 *Licensed Xilinx IP core. Digital code vouchers provided by Xylon to buyers of the reference design or the logiVID-ZU kit.*

Applications

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

General Description

The logiADAK-VDF-ZU Video Design Framework enables Xylon logiVID-ZU Vision Development Kit users to quickly utilize the provided hardware platform for development of the Xilinx All Programmable Zynq UltraScale+ MPSoC based embedded multi-camera vision systems.

The framework includes pre-verified logicBRICKS reference designs for video capture from Xylon AR0231 video cameras, and the display output under the Linux operating system. Video capture can be either from:

- Xylon video cameras with the Maxim Integrated **GMSL2** high-speed digital video interface (Figure 2):

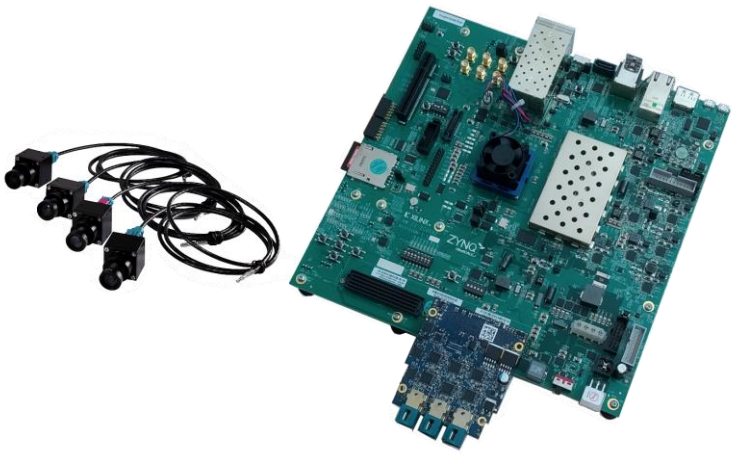

Figure 2: Xylon logiVID-ZU-GMSL2 Vision Development Kit

- Xylon video cameras with the TI® **FPD-Link III** high-speed digital video interface (Figure 3):

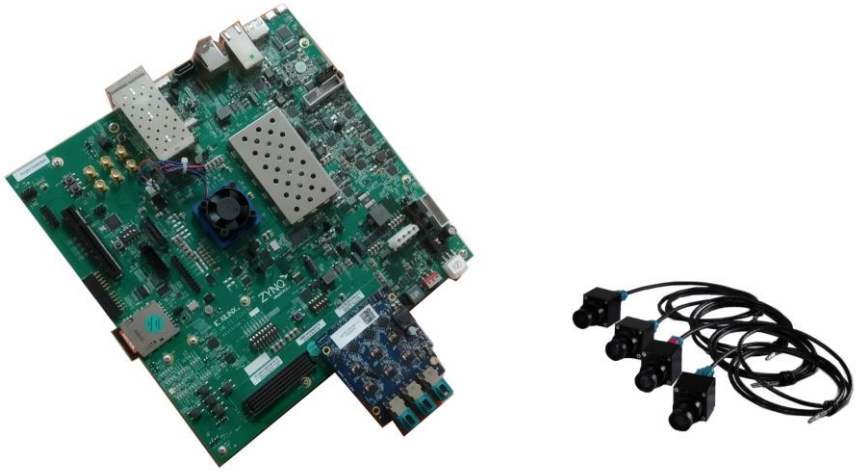

Figure 3: Xylon logiVID-ZU-FPD3 Vision Development Kit

Reference designs are prepared for Xilinx Vivado Design Suite.

Figure 4: Four-Camera Demo View

The complete camera-to-display MPSoC designs, which use just a fraction of available programmable logic (Table 1), significantly save the design time. Instead of starting from scratch and having to spend months designing and building a new design framework, the logiADAK-VDF-ZU design framework users can immediately focus on specific vision-based parts of their next MPSoC design. The logiADAK-VDF-ZU hardware platform can be installed on test vehicles (cars, robots…) and used in exhaustive tests, i.e. for testing and validation of the new AD/ADAS developments in the test vehicle and under different road conditions.

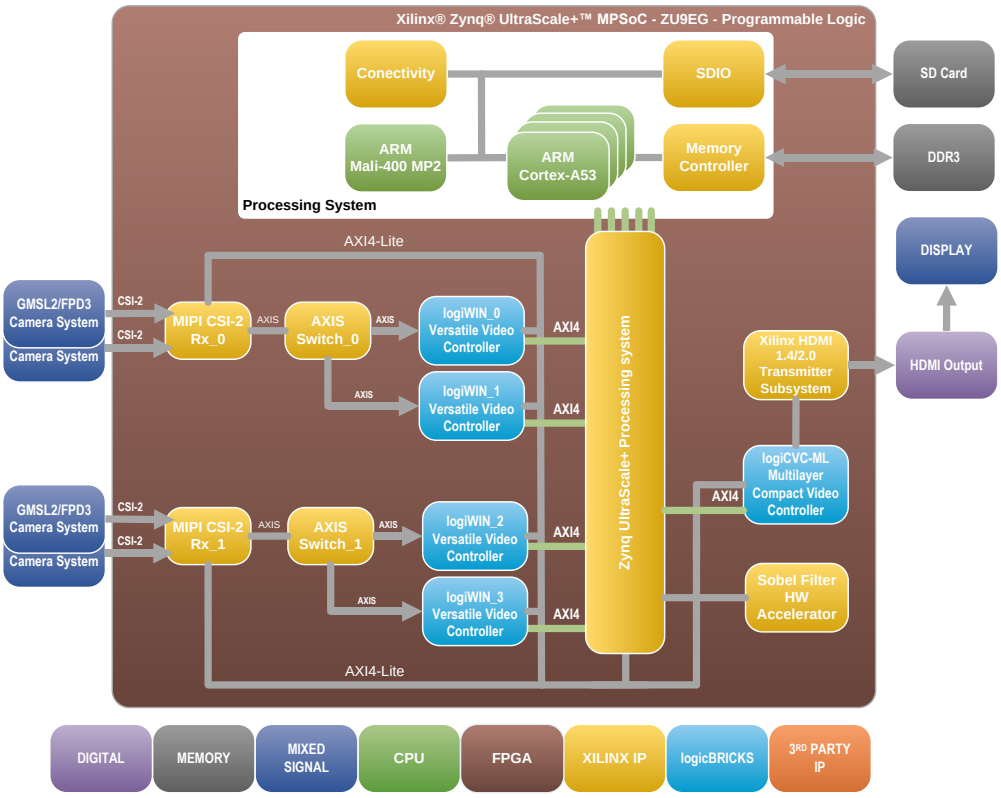

Figure 5: Four-Camera Design – Block Diagram

FOUR-CAM Reference Design

This design implements four parallel video inputs from or Xylon AR0231 cameras (either GMSL2 or FPD-Link III), and the display output with the 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. On first camera, using Vitis accelerated libraries, Sobel filter algorithm is implemented which can be turned on or off on a push of a button.

logiADAK-VDF-ZU reference designs include Xylon logicBRICKS IP cores and design files prepared for the Xilinx Vivado Design Suite.

All IP cores are supplied with appropriate Linux software drivers. The provided video capture and display demo applications run in Linux operating system.

To download the evaluation version of the logiADAK-VDF-ZU Video Design Framework and to purchase it, please visit our online catalog: http://www.logicbricks.com/Products/logiADAK-VDF-ZU.aspx.

Framework Content

logiADAK-VDF-ZU Reference Designs for the Xilinx Vivado Design Suite:

Vitis platform

- Reference design prepared for Vitis Unified Software Platform
- Supports Linux applications
- Includes Linux kernel drivers for included logicBRICKS IP cores
- Vivado reference design that allows for instant design check-up and Vitis workspace for quick software changes
- Xylon evaluation logicBRICKS IP cores:
    - logiCVC-ML Compact Multilayer Video Controller
    - logiWIN Versatile Video Input
- Non-licensable add-on Xylon IP cores that complete the design:
    - TUser-Trimmer

Software

- logiVIOF VideoIn-VideoOut library
- Demo application sources
- Includes Linux kernel drivers for included logicBRICKS IP cores

Binaries

- Precompiled SD card image for the fastest demo startup:
    - boot.bin
        - First Stage Boot Loader
        - Universal Boot Loader
        - FPGA
        - Platform Management Unit Firmware
    - image.ub
        - kernel image
        - device tree blob
        - minimal Root File System
    - Four Camera demo (either GMSL2 or FPD-Link III)
    - Sobel filter binary (xclbin)

Recommended Design Experience

The users, who want to make changes on the provided designs, should have experience in the following areas:

- Xilinx design tools
- C programming
- Embedded hardware and software design

All logicBRICKS IP cores provided with the design framework are fully compatible with Xilinx implementation tools and their use does not require any particular skills beyond general Xilinx tools knowledge.

Related Xylon Products

The logiVID-ZU Vision Development Kit provides system designers with everything they need to efficiently develop multi-camera vision applications on the Xilinx Zynq UltraScale+ MPSoC devices. The kit includes the complete hardware platform to support a single HDMI video input, and depending on the kit version, up to four inputs from Xylon GMSL2 or FPD-Link III video cameras, as well as the fully licensed logiADAK-VDF-ZU Video Design Framework (only with Xylon AR0231 cameras). To learn more about this product, please contact Xylon or visit our website:

Email: support@logicbricks.com
URL: http://www.logicbricks.com/Products/logiVID-ZU.aspx

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

Ordering Information

Product is available directly from Xylon. Please visit our web shop or contact Xylon for pricing and additional information:

Email: sales@logicbricks.com
URL: http://www.logicbricks.com/Products/logiADAK-VDF-ZU.aspx

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Related Information

Xilinx Programmable Logic

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

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Fax: +1 408-559-7114
URL: www.xilinx.com

Revision History

Version	Date	Note
2.00	01.09.2017.	Initial public release.
2.01	07.09.2018.	Xylon FPD-Link III FMC module.
2.02	30.10.2018	Update to Vivado Design Suite 2017.4.
2.03	19.07.2019.	Updated to support cameras with MIPI interface.
3.00	15.12.2019.	Update to Vivado Design Suite 2019.1. Unified GMSL2 and FPD-Link III documentation.
3.10	14.07.2021.	Updated to support the newest versions of GMSL2 and FPD-Link III FMCs and cameras.
4.0	25.10.2021	Updated to support Xilinx tools v2021.1 (Vivado, Vitis, Petalinux). Updated to support Vitis accelerated libraries (Sobel filter example). Added Xilinx HDMI IP Subsystem and removed support for Avnet HDMI IN/OUT FMC board.