

## 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](mailto:support@logicbricks.com)  
URL: [www.logicbricks.com](http://www.logicbricks.com)



**Figure 1: logiFMC-GMSL2 12-Ch GMSL2 FMC Daughter Card**

## Features

- FPGA Mezzanine Card (FMC) with support for twelve<sup>1</sup> (12) video camera connections
- Compatible with the Maxim Integrated™ Gigabit Multimedia Serial Link 2 (GMSL2)
- Integrates six (6) Maxim Integrated GMSL2 deserializers (3 – 6 Gbps)
- Backwards-compatible with the first generation of Maxim Integrated GMSL1 deserializers (1.5 – 3.12 Gbps)
- Operates up to 4.5 Gbps with the GMSL2 serializers operating in the GMSL1 mode
- Converts GMSL2 or GMSL1 serial links to MIPI® CSI-2 parallel camera interfaces
- Support for RAW8/10/12/14/16/20, RGB565/666/888 and YUV8/10-bit data types
- Supported resolutions include 2+MP/4MP @60fps and 8MP @30fps
- Incorporates High Pin Count (HPC) FMC connector (ASP-134488-01)
- Low Pin Count (LPC) pin section is compatible with standard Xilinx® evaluation kits
- Compatible with the Xilinx Zynq® UltraScale+™ MPSoC based ZCU102/ZCU104/ZCU106 evaluation kits, DRIVE-XA Automated Driving Development Platform and Versal™ AI Core Series VCK190 Evaluation Kit
- Supports up to 5 channels on the FMC connector's LPC section and up to 7 on the HPC section
- 12x 4-lane MIPI CSI-2 v1.3 ports
- D-PHY v1.2 at 80Mbps - 2.5Gbps/lane
- Twelve coax video cables connect through three Rosenberger® quad HFM® FAKRA-mini connectors (AMS22D-40MZ5-Z)
- On-board I2C GPIO expander enables easy programming and power supply controls
- Programmable power supply supports cameras with different power requirements
- Info EEPROM contains card's identification and configuration data
- VITA 57.1 FMC standard compliant
- Board dimensions 76.7mm x 69mm

<sup>1</sup> Due to different FPGA/SoC to FMC connection schemes applied on different hardware platforms, the number of supported GMSL2/GMSL1 channels on a specific platform may be lower than 12. Board users are advised to check the number of usable channels for the specific hardware setup.

## Applications

The logiFMC-GMSL2 12-Ch GMSL2 Video FMC Daughter Card can be used in a broad range of automotive multi-camera Advanced Driver Assistance (ADAS) and Automated Driving (AD) applications.

## General Description

Xylon's logiFMC-GMSL2 12-Channel GMSL2 FMC video daughter card supports the second generation Maxim Integrated's Gigabit Multimedia Serial Link 2 (GMSL2), which is one of the most popular automotive high-speed serial links for in-vehicle video, audio, and communication data streams transfers. The card is primarily designed to enable quick prototyping and evaluation of automotive multi-camera Advanced Driver Assistance (ADAS) and Autonomous Driving (AD) applications. It enables easy interfacing of up to twelve (12) automotive video cameras to hardware boards based on the Xilinx FPGA, SoC, MPSoC and ACAP video and vision processors.

The FMC daughter card integrates six (6) Maxim Integrated deserializer chips (max. 6 Gbps) that pair with the counterpart GMSL2 and GMSL1 serializer chips from Maxim Integrated. Each deserializer can be initialized through a single common I2C bus, supports two GMSL2 differential inputs and converts them to four-lanes MIPI Camera Serial Interface 2 (MIPI CSI-2) outputs.

The logiFMC-GMSL2 FMC daughter card is compatible with the existing Xilinx Zynq UltraScale+™ MPSoC based ZCU102/ZCU104/ZCU106 Evaluation Kits and the DRIVE-XA Automated Driving Development Platform. It can be also used with other FMC compatible Xilinx and third-party evaluation boards based on Xilinx devices with the MIPI compatible pins. While the logiFMC-GMSL2 FMC daughter card supports all twelve video channels available through six deserializer chips, the exact number of supported video channels in specific hardware configurations depends on the carrier's board capabilities; mainly on a number of available pins for the MIPI CSI-2 connections through the FMC connector.

The logiFMC-GMSL2 FMC daughter card uses a single High Pin Count (HPC) FMC connector that is pin compatible with the Low Pin Count (LPC) connectors on standard Xilinx evaluation kits. The HPC related pins, which are not utilized by standard carrier boards, are reserved for user-defined expansion functions used on custom-made carrier boards. The High Pin Count (HPC) section of the logiFMC\_GMSL2 daughter card's FMC connector supports seven (7) MIPI CSI-2 busses, and the LPC section supports up to five (5) MIPI CSI-2 buses.

The logiFMC-GMSL2 is assembled with the Rosenberger® quad HFM® High-Speed FAKRA-mini connectors that saves installation space and enables four coax cable video connections per a single connector.

## Functional Description

The Figure 2 presents the FMC card's internal structure. The main functional blocks are:

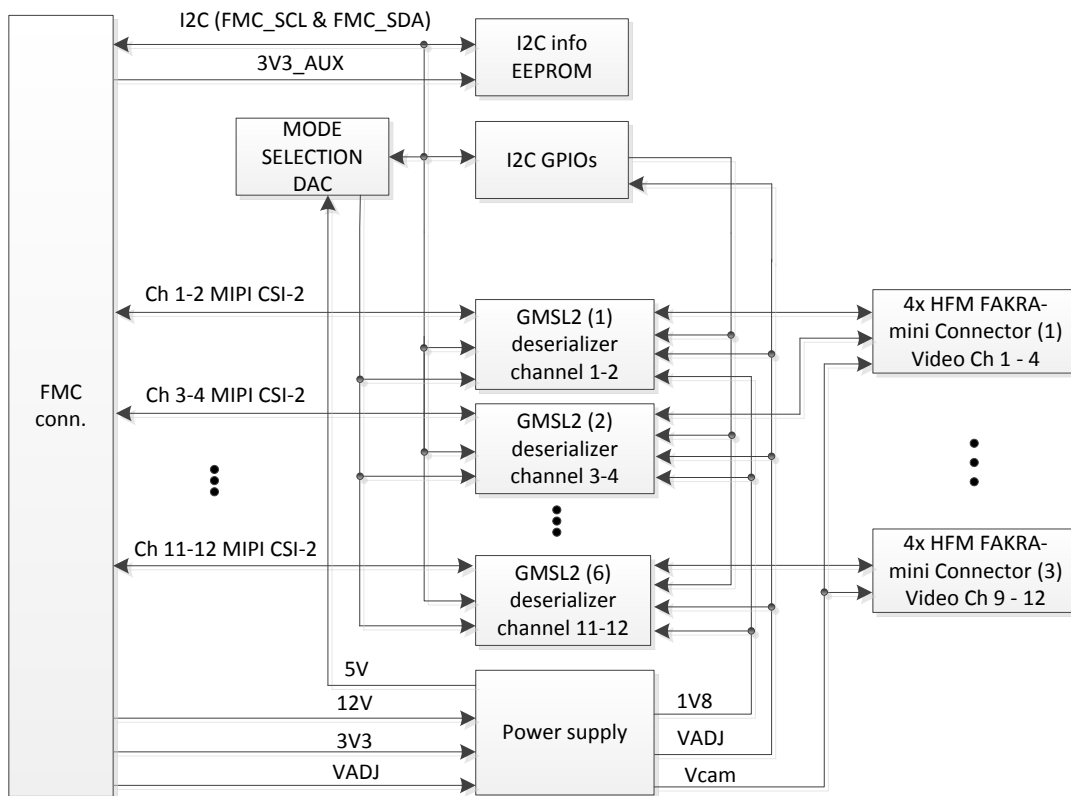
- Maxim Integrated GMSL2 deserializers
- I2C GPIOs
- Info EEPROM
- Mode selection DAC
- FMC connector
- Video connectors
- Power supply

### GMSL2 Deserializers

The logiFMC-GMSL2 integrates six GMSL2 deserializer chips from Maxim Integrated. Prior to use, the deserializers need to be programmed as it is explained in the User's Manual.

### I2C GPIOs

I2C General Purpose IOs enable easy programming of the GMSL2 deserializer chips, mode selection DAC and the power supply controls.



**Figure 2: logiFMC-GMSL2 Block Diagram**

### Info EEPROM

Programmed by card's identification and configuration data in accordance to the IPMI format, the on-board non-volatile EEPROM memory assures full compliance with the VITA 57.1 standard.

### Mode Selection DAC

On-board Digital-to-Analog Converter (DAC) can be programmed to define different GMSL2 deserializers' operation modes.

### FMC Connector

The High Pin Count (HPC) on-board FMC connector is pin compatible with the LPC connectors on many standard Xilinx evaluation kits, assures the extended connectivity and enables user-defined expansion functions.

### Video Connectors

The assembled Rosenberger quad HFM High-Speed FAKRA-mini connectors save installation space and enables four coax cable video connections per a single connector.

### Power Supply

Provides all voltages necessary for a proper FMC card's operation. Integrated regulated power supply enables software controller powering of different camera types.



**Figure 3: Xylon FMC Card with the Rosenberger Quad HFM High-Speed FAKRA-mini Connectors**

## Available Support Products

Xylon provides the complete multi-camera hardware kits based on the Xilinx UltraScale+ MPSoC evaluation carrier boards expanded by Xylon FMC cards and Xylon video cameras. Besides the complete hardware platforms, Xylon also provides free downloadable camera-to-display reference MPSoC designs and Linux demo applications. Such complete frameworks, which can be fully controlled through the Xilinx SDSoC Development Environment, enables system designers to jumpstart their next embedded vision design on the Xilinx Zynq UltraScale+ MPSoC and to focus on vision application's specific parts. To find out how to quickly utilize the logiFMC-GMSL2 FMC card, please contact Xylon or visit the web:

Email: [sales@logicbricks.com](mailto:sales@logicbricks.com)

URL: <https://www.logicbricks.com/Products/Hardware-Platforms.aspx>

(Hardware Kits)

<https://www.logicbricks.com/logicBRICKS/Reference-logicBRICKS-Design.aspx>

(Reference Designs)

## Ordering Information

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

Email: [sales@logicbricks.com](mailto:sales@logicbricks.com)

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

This publication has been carefully checked for accuracy. However, Xylon does not assume any responsibility for the contents or use of any product described herein. Xylon reserves the right to make any changes to product without further notice. Our customers should ensure that they take appropriate action so that their use of our products does not infringe upon any patents. Xylon products are not intended for use in the life support applications. Use of the Xylon products in such appliances is prohibited without written Xylon approval.

## 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](http://www.xilinx.com)

### Maxim Integrated

For information on Maxim Integrated video high-speed serial links:

Maxim Integrated  
160 Rio Robles  
San Jose, CA 95134  
URL: [www.maximintegrated.com](http://www.maximintegrated.com)

## Revision History

Version	Date	Note
1.0	01.08.2019.	Initial internal release.
	17.03.2020.	Initial public release.