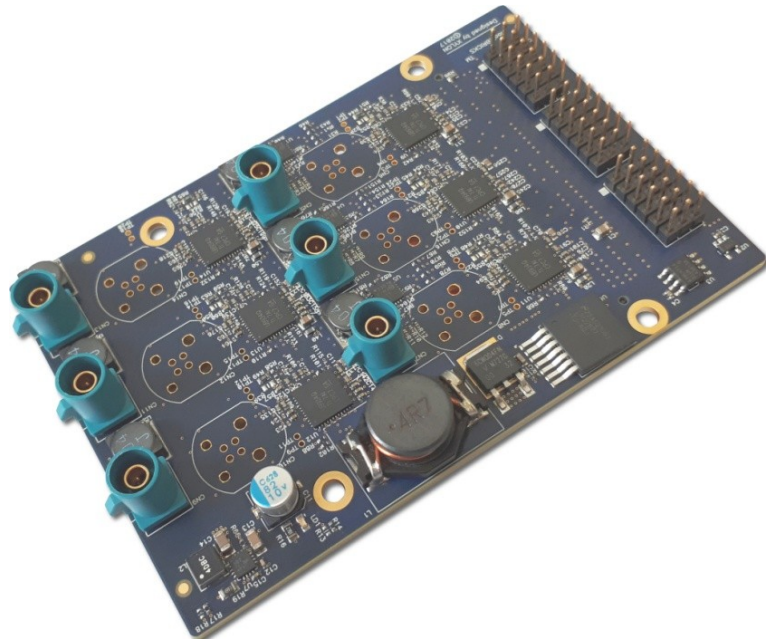## Xylon d.o.o.

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Figure 1: logiFMC-FPD3-934 6-Ch FPD-Link III FMC Daughter Card

(Assembled with the Rosenberger FAKRA Connectors)

Features

- FPGA Mezzanine Card (FMC) with support for six video camera connections
- Compatible with the Texas Instruments® FPD-Link™ III high-speed serial link
- Integrates TI's DS90UB934-Q1 FPD-Link III deserializers
- The deserializers are compatible with the TI's DS90UB933-Q1 and DS90UB913 serializers
- Supported resolutions include 1MP/60fps and 2MP/30fps
- Incorporates Low Pin Count (LPC) FMC connector (ASP-127797-01)
- Compatible with Xilinx® ZCU102, ZC706, and other evaluation kits
- Supported video pinout configurations setup by a simple on-board pin header:

    - 6-Ch 9-bit video data, HSYNC, VSYNC, and PIX_CLK
    - 6-Ch 10-bit video data, HSYNC, and PIX_CLK
    - 4-Ch 12-bit video data, HSYNC, VSYNC, and PIX_CLK

- On-board I2C GPIO expander enables easy programming
- Optional cable assemblies: Rosenberger® FAKRA or RosenbergerHSD® video connectors
- Capable of powering video cameras with different power requirements
- Info EEPROM contains card's identification and configuration data
- VITA 57.1 FMC standard compliant
- Board dimensions 103.5mm x 69mm

Applications

The logiFMC-FPD3-934 6-Ch FPD-Link III Video FMC Daughter Card can be used in a broad range of automotive multi-camera Advanced Driver Assistance (ADAS) and Autonomous Driving (AD) applications.

General Description

Xylon's logiFMC-FPD3-934 6-Channel FPD-Link III FMC daughter card supports one of the most popular automotive high-speed serial links for in-vehicle video, audio, and communication data streams transfers - the FPD-Link III serial link from Texas Instruments. The board 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 six automotive video cameras to evaluation kits based on the Xilinx FPGA and SoC video and vision processors.

The board integrates six DS90UB934-Q1 deserializers (1.87Gbps) that pair with the counterpart DS90UB913A and DS90UB933-Q1 serializers. All deserializer chips can be programmed independently through a single I2C bus. The logiFMC-FPD3-934 FMC board is compatible with the existing Xilinx Zynq® UltraScale+™ MPSoC ZCU102 Evaluation Kit and Zynq-7000 All Programmable SoC ZC706 Evaluation Kit, and can be also used with other Xilinx and third-party evaluation board with the FMC connector.

The Xylon's logiFMC-FPD3-934 FMC daughter card provides a single Low Pin Count (LPC) FMC connector, which is pin compatible with the Low Pin Count (LPC) connectors on standard Xilinx evaluation kits.

On request, the board can be assembled either with the Rosenberger FAKRA connectors for a coax cable, or with the RosenbergerHSD High-Speed Data connectors for shielded twisted pair (STP) cable.

Functional Description

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

- TI's FPD-Link III deserializers
- I2C GPIOs
- Info EEPROM
- Configuration header connectors
- FMC connector
- Video connectors
- Power supply
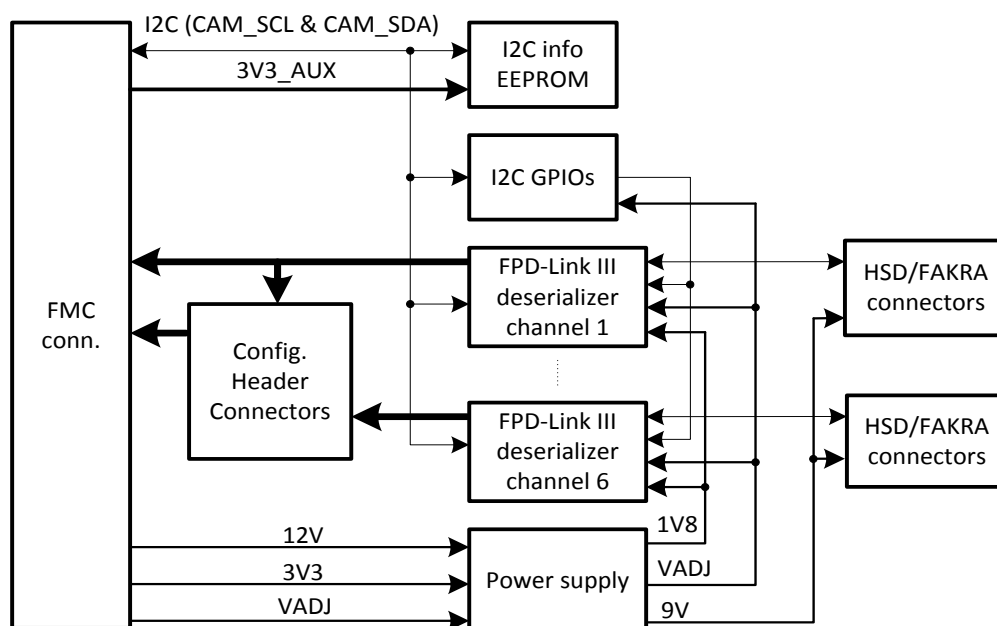
Figure 2: logiFMC-FPD3-934 Block Diagram

FPD-Link III Deserializers

The logiFMC-FPD3-034 integrates six DS90UB934-Q1 deserializers from Texas Instruments. Prior to use, the deserializers need to be configured as it is explained in the User's Manual.

I2C GPIOs

General Purpose IOs (32x) enable easy configuration of the FPD-Link III deserializer chips.

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.

Configuration Header Connectors

Enables FMC card's configurations to support more channels with the reduced video data width, or less channels with the full video data width.

FMC Connector

On-board LPC FMC connector is pin compatible with the LPC connectors on standard Xilinx evaluation kits.

Video Connectors

On request Xylon delivers FMC cards assembled either with the Rosenberger FAKRA connectors for a coax cable, or with the RosenbergerHSD connectors for the STP cable. The HSD connectors can be freely oriented.

Figure 3: logiFMC-FPD3-934 Assembled with the RosenbergerHSD Connectors

Power Supply

Provides all voltages necessary for a proper FMC card's operation. Voltage output of an integrated power supply can be adjusted by soldering to properly power different camera types.

Application Example – Xilinx ZCU102 Evaluation Board

Xilinx ZCU102 Evaluation Board is a general purpose evaluation board for rapid-prototyping based on the Zynq UltraScale+ XCZU9EG-2FFVB1156E MPSoC (multiprocessor system-on-chip). This board features two FMC connectors:

- FMC HPC0 Connector J5, and
- FMC HPC1 Connector J4

The FMC HPC0 connector J5 provides 8 single-ended user-defined pins more than the HPC1 FMC connector, and enables full support for all Xylon's logiFMC-FPD3-934 6-Channel FPD-Link III FMC daughter card operation modes, including the 6-Ch operation modes.

Due to less available pins, the FMC HPC1 connector J4 enables five video channels with the logiFMC-FPD3-934 FMC daughter card configured for the 6-Ch operation modes. The 4-Ch mode is naturally supported.

The logiFMC-FPD3-934 plugged into the J5 connector, and configured for the 6-Ch operation mode, can be used in a parallel with the Avnet HDMI Input/Output FMC card plugged in the HPC1 FMC Connector J4. This hardware configuration supports only the HDMI display output. An example of such hardware configuration is Xylon's logiVID-ZU applications that require an additional HDMI output, like the Xylon's logiVID-ZU MPSoC Multi-Camera Vision Kit:

https://www.logicbricks.com/Solutions/Xylon-MPSoC-Vision-Development-Kit.aspx

Available Support Products

To learn more about the Xylon hardware boards and development platforms, contact Xylon or visit the web:

Email: sales@logicbricks.com
URL: https://www.logicbricks.com/Products/Hardware-Platforms.aspx

The logiFMC-FPD3-934 can be used in advanced multi-camera ADAS applications like the Surround View ADAS with an integrated virtual flying camera that provides a 3D hemispheric view of the vehicle's surrounding. Such systems enable the driver to dynamically adjust the perspective view and safely park the vehicle with no blind spots around it. To learn more about the Xylon Surround View IP Suite, contact Xylon or visit the web:

Email: sales@logicbricks.com
URL: https://www.logicbricks.com/Solutions/Xylon-MPSoC-Vision-Development-Kit/Xylon-Surround-View-ADAS.aspx

Ordering Information

This product is available directly from Xylon under the terms of the Xylon's IP License. Please visit our web shop or contact Xylon for pricing and additional information:

Email: sales@logicbricks.com
URL: https://www.logicbricks.com/Products/logiFMC-FPD3-934.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

Texas Instruments

For information on Texas Instruments video high-speed serial links:

Texas Instruments
12 500 TI Boulevard
Dallas, TX 75243
URL: www.ti.com

Revision History

Version	Date	Note
1.0	28.02.2018.	Initial public release.