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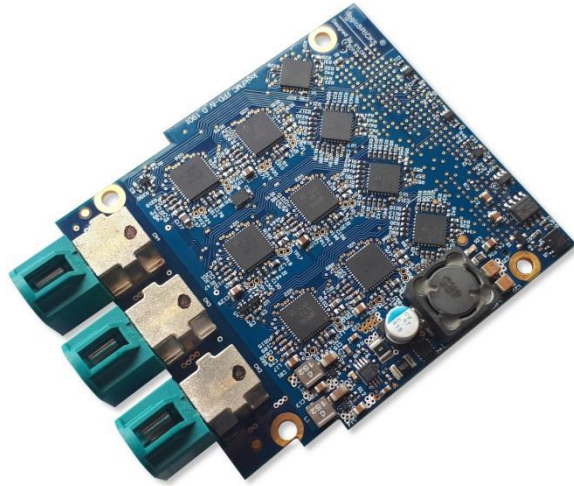


Figure 1: logiFMC-FPD3-954 12-Ch Video Input FMC Daughter Card

Features

- FPGA Mezzanine Card (FMC) with support for twelve¹ (12) video camera connections
- Compatible with the Texas Instruments Flat Panel Display Link III (FPD-Link III)
- Integrates the TI DS90UB954-Q1 FPD-Link III deserializers (4.16 Gbps max)
- Compatible with the TI DS90UB953-Q1, DS90UB935-Q1, DS90UB933-Q1 and DS90UB913A-Q1 serializers
- Converts FPD-Link III serial link to MIPI[®] CSI-2 parallel camera interfaces
- Each CSI-2 MIPI bus includes 4 data lanes and 1 clock lane
- Supported resolutions include 2MP@60fps and 4MP@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 Xilinx[®] ZCU102/104/106, DRIVE-XA and other evaluation kits
- Supported number of video channels:
 - 12 Channels MIPI (HPC carrier only)
 - 6 Channels MIPI (LPC compatible)
 - ZCU102 – usable max 4 ch.
 - ZCU104 – usable max 6 ch.
 - DRIVE-XA – usable max 12 ch.
- 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 76.62mm x 68.98mm

¹ Due to different FPGA/SoC to FMC connection schemes applied on different hardware platforms, the number of supported FPD-Link III 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-FPD3-954 12-Ch FPD-Link III 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-FPD3-954 12-Channel FPD-Link III FMC video daughter card supports the Texas Instruments Flat Panel Display Link (FPD-Link III), 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 and MPSoC video and vision processors.

The FMC daughter card integrates six (6) TI DS90UB954-Q1 deserializer chips (max. 4.16 Gbps for DS90UB954-Q1) that pair with the counterpart DS90UB953-Q1, DS90UB935-Q1, DS90UB933-Q1 and DS90UB913A-Q1 serializer chips from Texas Instruments. Each deserializer can be initialized through a single common I2C bus, supports two FPD-Link III differential inputs and converts them to four-lanes MIPI Camera Serial Interface 2 (MIPI CSI-2) outputs.

The logiFMC-FPD3-954 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-FPD3-954 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-FPD3-954 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-FPD3-954 daughter card's FMC connector supports three (3) MIPI CSI-2 busses, and the LPC section supports three (3) MIPI CSI-2 buses. Each MIPI CSI-2 bus supports 2 video channels.

The logiFMC-FPD3-954 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:

- TI FPD-Link III deserializers
- I2C GPIOs
- Info EEPROM
- Protection EEPROM
- FMC connector
- Video connectors
- Power supply

FPD-Link III Deserializers

The logiFMC-FPD3-954 integrates six DS90UB954-Q1 deserializer chips from Texas Instruments. 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 FPD-Link III deserializer chips and the power supply controls.

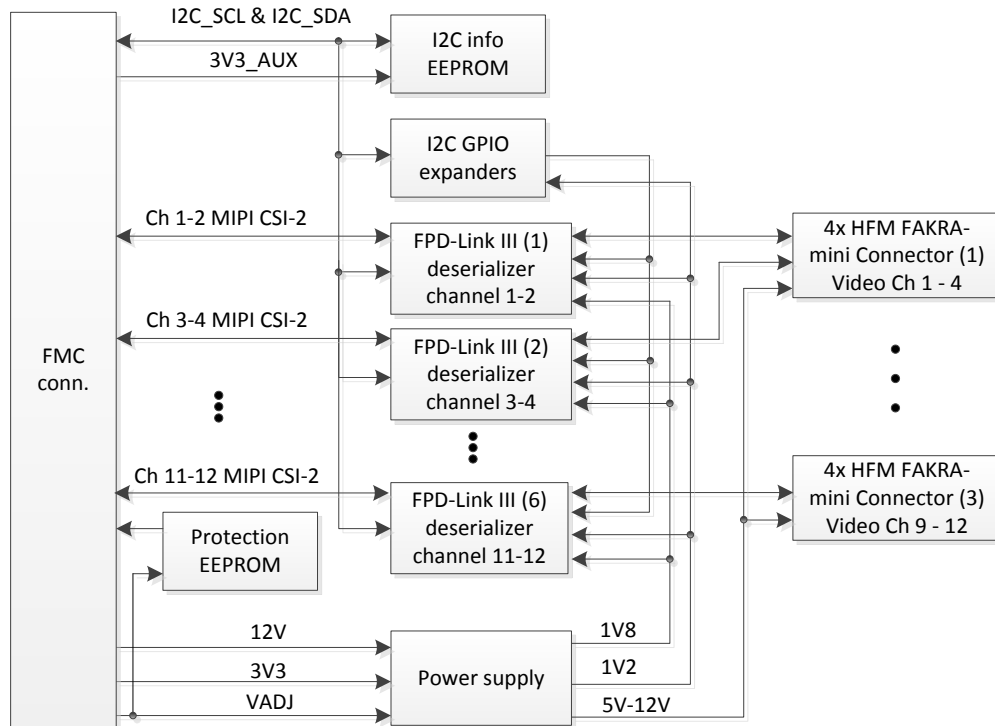


Figure 2: logiFMC-FPD3-954 Block Diagram

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.

Protection EEPROM

Integrated 1 Kb Protected 1-Wire EEPROM can be used for challenge-and-response authentication security implemented with the SHA-1 algorithm. For more information about this hardware feature, please contact Xylon at info@logicbricks.com.

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 more about availability of support products for the logiFMC-FPD3-954 FMC card, please contact Xylon or visit the web:

Email: 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

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

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 Incorporated
12500 TI Boulevard
Dallas, TX 75243 USA
URL: www.ti.com

Revision History

Version	Date	Note
1.0	05.11.2019.	Internal document
1.1	17.03.2020.	Initial public release.