Technical Details

MIPI Deserializer Design Recommendations

THE IMAGINGSOURCE
TECHNOLOGY BASED ON STANDARDS

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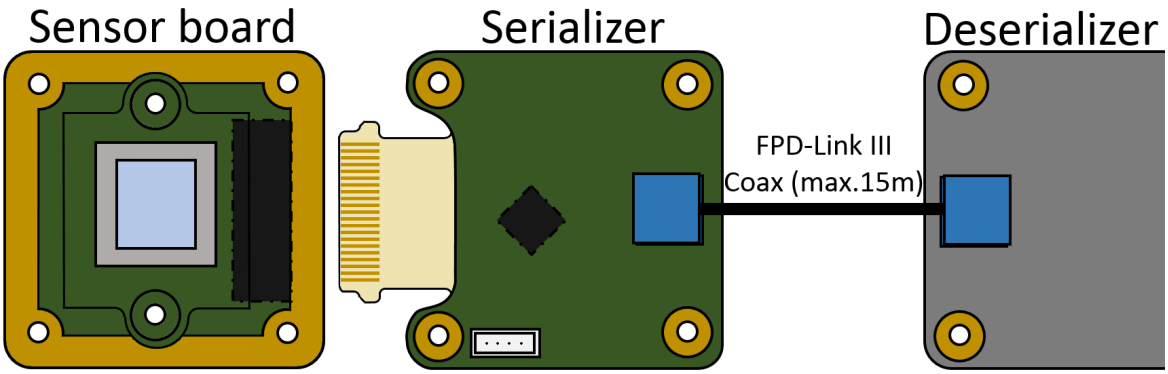
1 Introduction

For the FPD-Link III connection, a camera-side serializer board as well as platform-side deserializer board are necessary. The Imaging Source FPD-Link III board cameras already include a serializer board which serializes the sensor signal and transports it via a coaxial cable. This document contains important information needed for the creation of a custom deserializer design compatible with the DS90UB954-Q1 chip from Texas Instruments.



2 Deserializer Design Recommendations

The following chapters describe important points for maintaining compatibility with The Imaging Source software drivers.

2.1 Crystal Oscillator Selection

The DS90UB954-Q1 shall be clocked by a 25 MHz clock source.

2.2 GPIO Connections

The GPIO pins of the deseriazlier chip DS90UB954-Q1 can be freely configured, but the settings must be adjusted in the device tree and driver provided by The Imaging Source.

For example, the GPIOs can be configured as on the MDSER-FPD-1CH board:

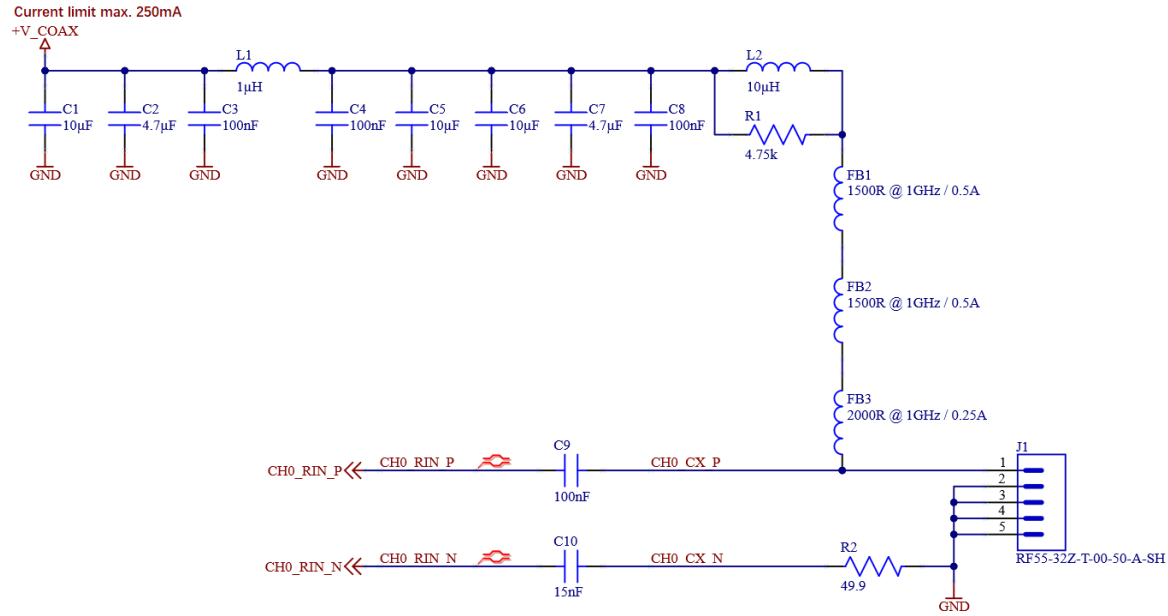
Pin	Name	Dir	Description
GPIO0	CAM_GPIO0	I/O	GPIO0 signal for the sensor booard
GPIO1	CAM_GPIO1	I/O	GPIO1 signal for the sensor booard
GPIO2	PWR_ON	O	Coax power for FPD-Link enable, active high
GPIO3	SW_TRIG_PWM	I	Software trigger from embedded system
GPIO4	HW_TRIGGER	I	Hardware trigger from deserializer or serializer (PicoBlade I/O connector) to sensor board
GPIO5	STROBE	O	CMOS sensor strobe signal from sensor board
GPIO6	TRIG_SER	O	Remote hardware trigger signal from serializer board

2.3 Device Functional Mode

The DS90UB954-Q1 must be configured for COAX / CSI-2 with synchronous back channel. This setting allows the sensors connected to the deserializer to run synchronously. In addition, this setting allows the serializer to recover the input clock from the link. This is done by applying a voltage of 0.995V to the MODE selection pin.

2.4 Power over Coax (PoC)

In order to reach the maximum cable length of 15 meters, the filter circuit should be as follows:



Suggested Parts:

Ref-No.	Part-No.	Manufacturer
L1	LBR2518T1R0M	Taiyo Yuden
L2	74404032100	Wurth Electronics
FB1, FB2	BLM18HE152SN1D	Murata
FB3	BLM15HD102SN1D	Murata

The recommended voltage of +V_COAX is displayed in the following table.

Parameter	Min	Max
+V_COAX	10V	27V

To keep the signal attenuation in the ferrite beads as low as possible, the value of +V_COAX should be set as high as possible. The provided power should be at least 2.5W.

Pay attention to capacitor C9: If a ceramic capacitor is used, its capacitance decreases with increasing voltage. The nominal value should be 33nF (at Vdc = 0V). At 27V, a 100nF capacitor can be used.

The current of PoC path must be limited at max. 250mA. A high-side switch, for example the ITS42k5D-LP-F could be used. At the same time the hotplug functionality is provided by such a current limiter.

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All weights and dimensions are approximate. Unless otherwise specified, the lenses shown in the context of cameras are not shipped with these cameras.

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