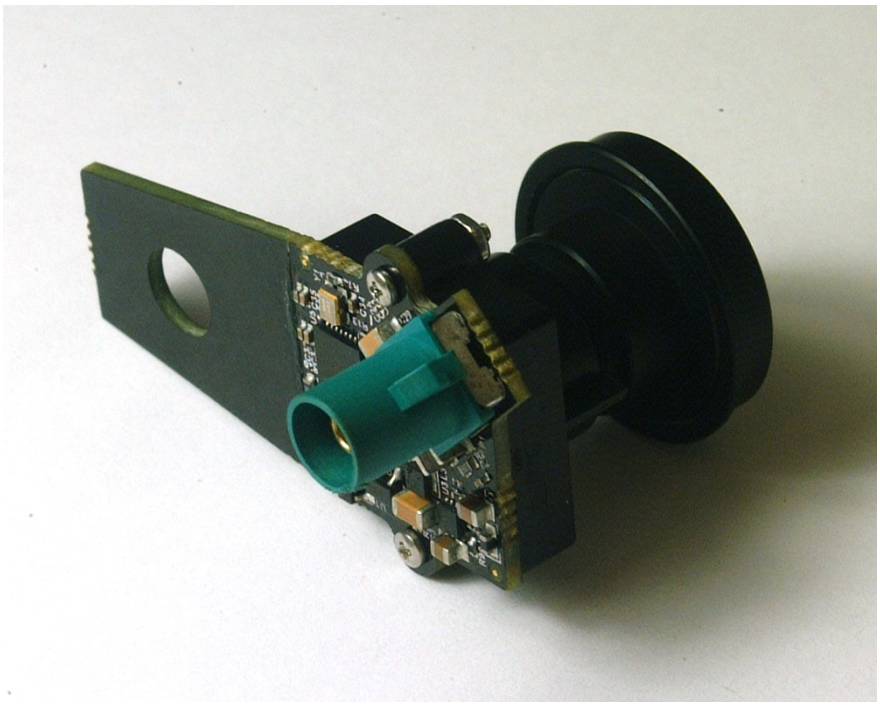
TI Designs – TIDA-00421

Automotive 1.3M Camera Module Design with OV10640, DS90UB913A and power over Coax

Test Data



1 Test Setup

The TIDA-00421 needs only one connection to a system with a compatible deserializer. For the following tests, the camera was connected to a four camera surround view system.

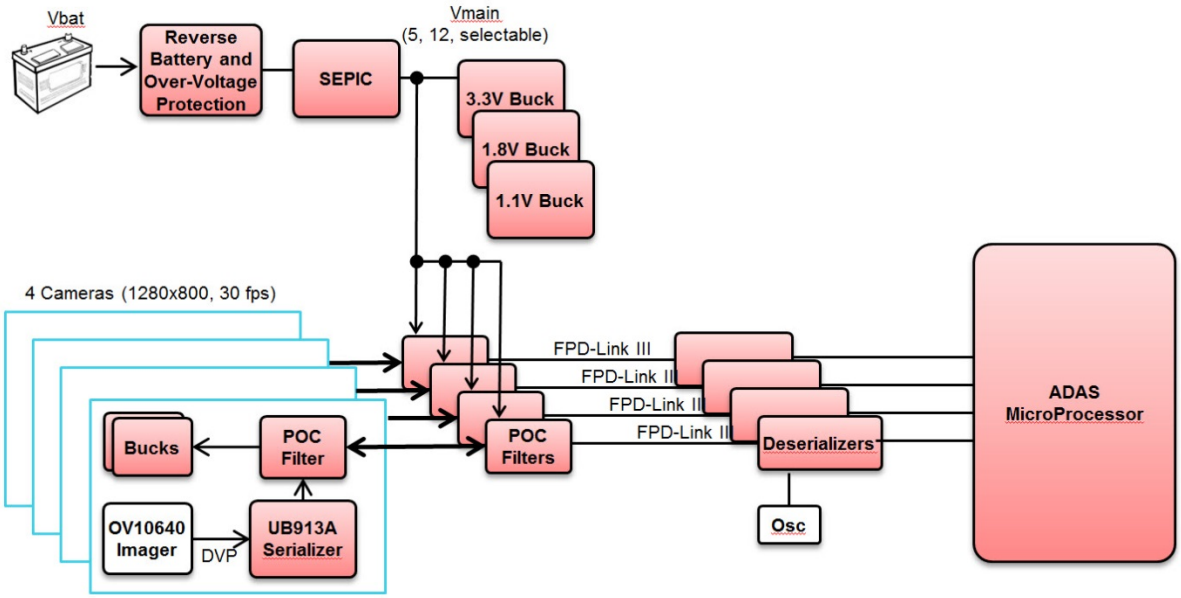


Figure 1: Simplified Surround View Block Diagram

1.1 Setup for Verifying Power Supply Startup - Vin, 3.3V, 1.8V and 1.5V Rails

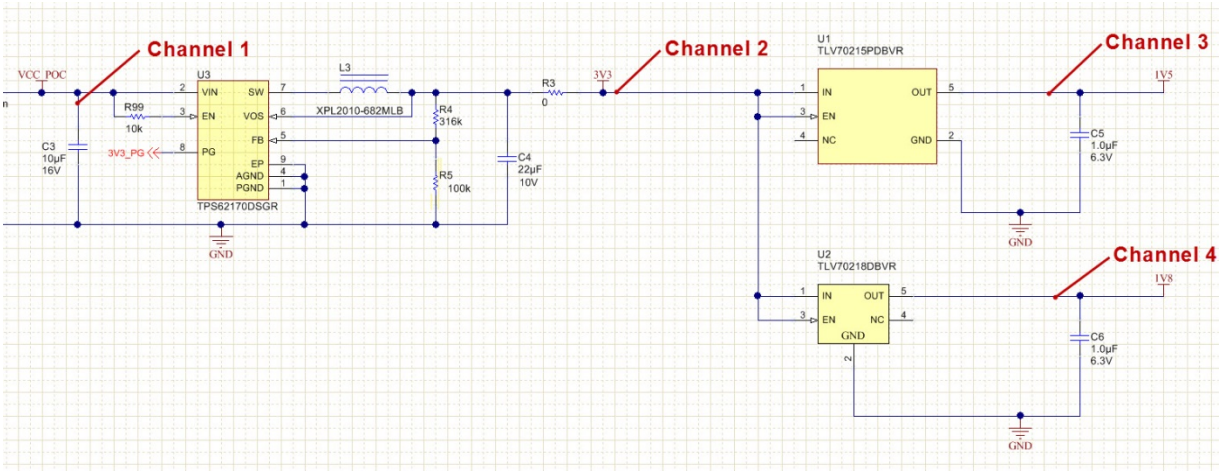


Figure 2: Setup for measuring all power rails

1.2 Setup for Verifying I2C Communications

For this test, a logic analyzer with I2C decode is used to monitor the I2C traffic on the buses. The two busses of interest are:

1. I2C connection from serializer to imager (shown as I2C_camera)
2. I2C connection from microprocessor to deserializer (shown as I2C_uC)

Connections must be made to both the clock and data lines of each bus.

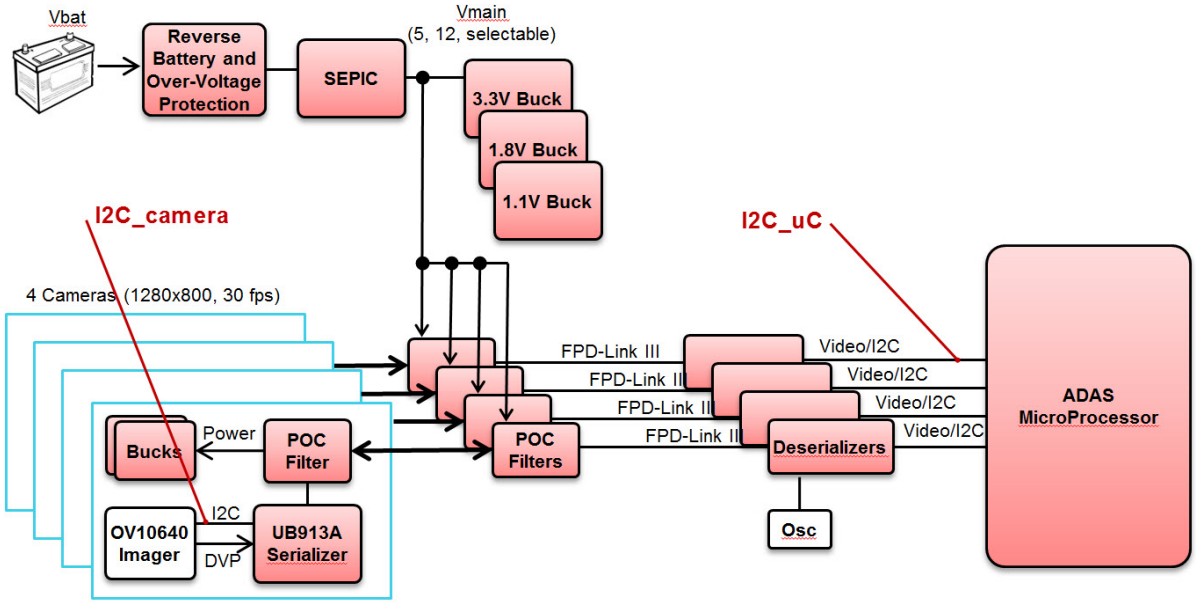


Figure 3: Setup for monitoring I2C transactions

2 Test Data

The following sections show the test data from verifying the functionality of the camera design.

2.1 Power Supply Startup - Vin, 3.3V, 1.8V and 1.5V Rails

The power supply startup waveforms are shown below.

- Channel 1 (yellow) 12V, Power Over Coax in
- Channel 2 (blue) 3.3V Switching Converter Output
- Channel 3 (pink) 1.5V LDO Output
- Channel 4 (green) 1.8V LDO Output

Figure 4: Power Supply Startup

2.2 I2C Communications

With the supplies up and running, we can now check the FPD-Link connection, the I2C aliasing and the state of the OV10640 imager in one step. The image below shows the initial communication between the microprocessor and the imager. This occurs after the microprocessor configures the deserializer on the other end of the link. Since this communication starts on the ECU board and is acknowledged by the camera(imager), this shows that the communication through the FPD-Link III is working. See figure 5.

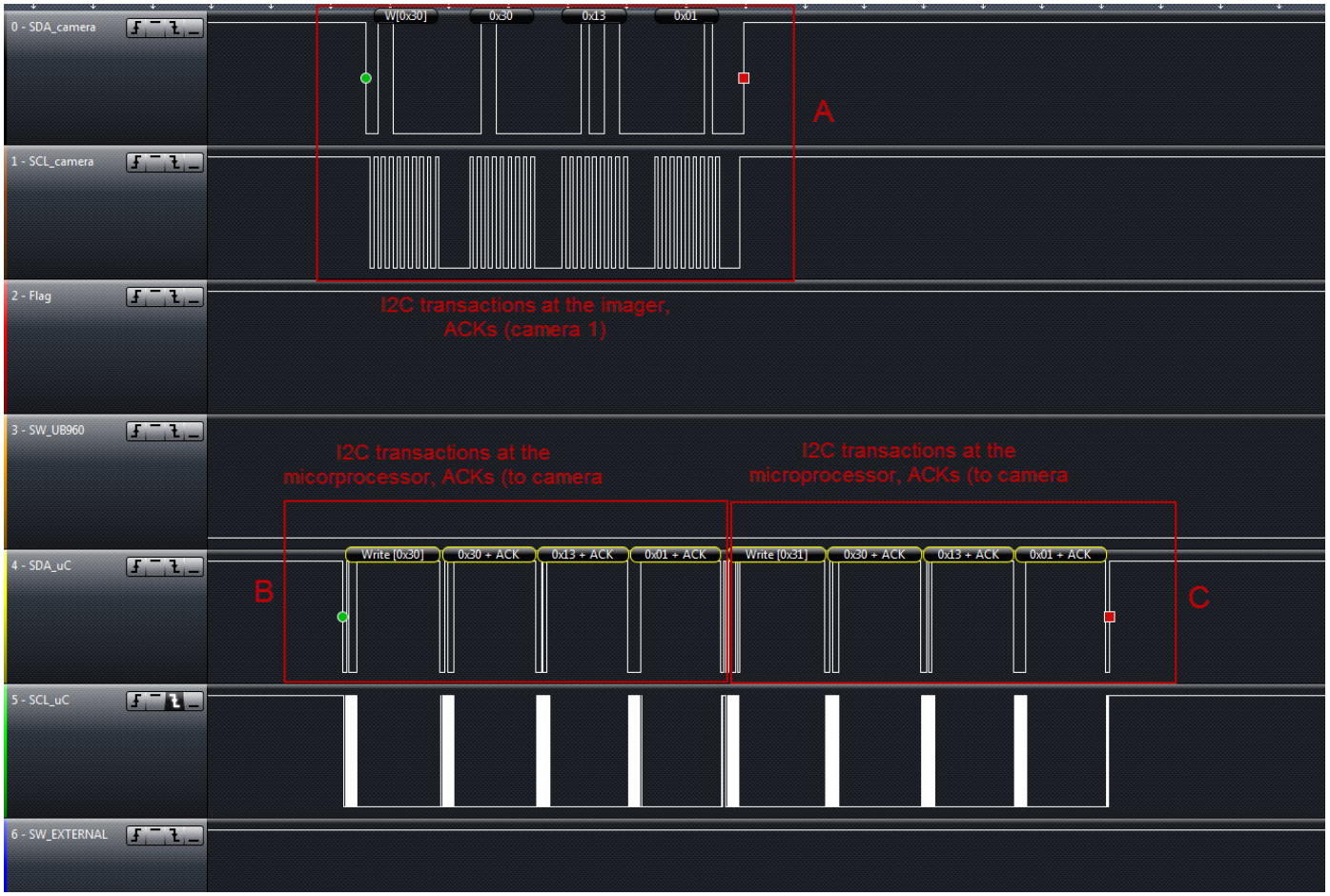


Figure 5: I2C Transactions

The box labeled B contains the first write from the microprocessor. It is addressed to address 0x30, the register address is 0x3013 and the data to be written is 0x1. Since the address is 0x30, the on the deserializer passes this transaction to the first camera in the system. It is routed to the imager, and the address is aliased to 0x30.

In box A, you can see the same communication, slightly delayed. This is the communication present on the camera 1 I2C bus, measured a the imager.
The write to address 0x31 in box C is for camera 2. (see figure 20) The deserializer on the ECU board passes this transaction to camera 2 and the address is aliased to 0x30. As you can see, this transaction is not present on the camera 1 I2C bus, because it is not intended for this camera.

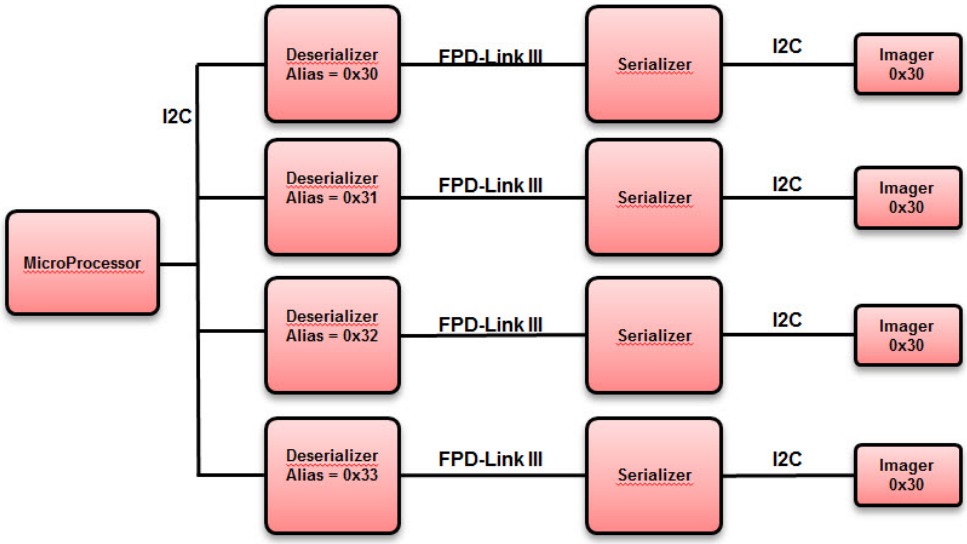


Figure 6: I2C Address Aliasing

By acknowledging the I2C write, the imager has confirmed that it is present and alive. Reading the status registers can confirm the status of the imager as well as verify that the correct imager was installed during assembly.

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