

## TI Designs: TIDA-00133

# Uncompressed digital video SerDes over Coax for Automotive Mega Pixel CMOS Camera Systems



### System Description

The design is a high speed serial video interface to connect a remote automotive camera module to a display or machine vision processing system. It uses TI's FPD-Link III SerDes technology to transmit uncompressed MegaPixel video data, bidirectional control signals and power either over shielded twisted pair or coax cable.

### Featured Applications

- Back-up Camera
- Rear View Camera
- Surround View System
- Around View Monitor
- Camera Based Park Assist Systems
- Mirror Replacement

### Design Resources

[DS90UB913A-Q1](#)

Product Folder

[DS90UB914A-Q1](#)

Product Folder

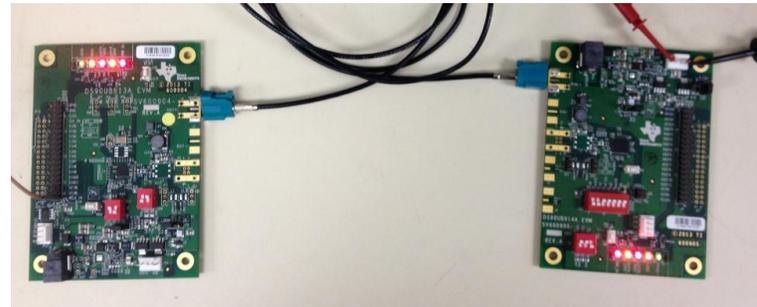
[EVM User's Guide](#)

Document

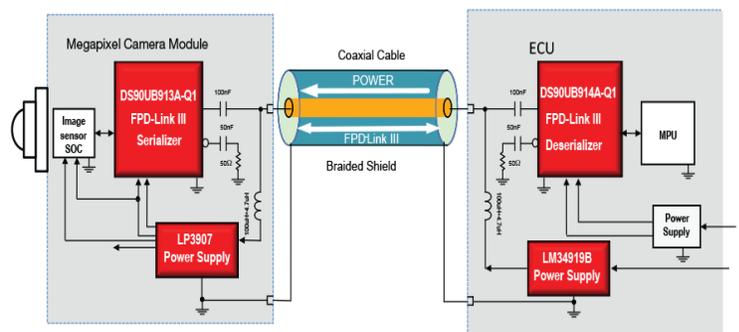
### Design Features

- Supports 1 Megapixel image sensors
- 2:1 Input MUX on DS90UB914A allows 2 cameras to use only one video interface
- Supports RAW RGB or YUV data streams
- Adaptive Equalizer Auto Calibrates for cable length, aging, and over temperature
- Diagnostic Built In Self-Test (BIST) and Pattern Generation

### Design Photo



### Block Diagram



Common low impedance GND for all components (no GND shifts)



### Jump start system design and speed time to market

Comprehensive designs include schematics or block diagrams, BOMs, design files and test reports by experts with deep system and product knowledge. Designs span TI's portfolio of analog, embedded processor and connectivity products and supports a board range of applications including industrial, automotive, medical, consumer, and more. To explore the designs, go to <http://www.ti.com/tidesigns>

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## **Associated Part Numbers**

<u>Part Number</u>	<u>Part Description</u>	<u>EVM Link</u>
DS90UB913A-Q1	25-100MHz 10/12-Bit FPD-Link III SERIALIZER	<a href="#">EVM User's Guide</a>
DS90UB914A-Q1	25-100MHz 10/12-Bit FPD-Link III Deserializer	<a href="#">EVM User's Guide</a>

## **Design Considerations:**

Connecting one or multiple remote MegaPixel cameras to a surround view ECU or an infotainment system requires a data line with sufficient bandwidth and capability to drive multiple meters of cable. To configure the remote camera or to return diagnostic information from the camera to the video processing ECU, an additional control channel is required. With TI's FPD-Link III SerDes family of products the video signal, a bidirectional I2C channel and the clock can all be transmitted on the same coaxial cable. Power transmission for the camera modules can be done over the coaxial cable instead of a separate power line which saves another wire in the wiring harness and one connector pin. This architecture reduces the required cable to a single standard coaxial cable, thus reducing weight, space and cost of the wiring harness. It also minimizes the connector size on the camera module and the video processing ECU. Adaptive input equalization of the serial input stream provides compensation for transmission medium losses and aging effects of the cable and reduces the medium-induced deterministic jitter.

## **Quick Start Guide**

What's Needed:

1. DS90UB913A-CXEVM Rev A and DS90UB914A-CXEVM Rev A
2. 50 ohm Coaxial Cable
3. 5V power supply

Before the system is powered up, please make sure all hardware is configured properly. Check that all jumpers and headers are connected appropriately. For a detailed description of configurations, see EVM user's guide.

1. Connect the DS90UB913AQ and DS90UB914AQ Evaluation boards using a coax cable.
2. Connect the 5V power supply to Deserializer board (recommended current limit is 300mA)
3. Look for the LED D2 to light up on the DS90UB914AQ board. If the LED is lit and stable, then the DS90UB914AQ is LOCKED to the FPD-Link III serial stream.



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