

**TI Designs: TIDA-00140**

# **XGA digital video SerDes 18bit to 24bit Upscaler Solution for Automotive TFT LCD Displays**



## **System Description**

The design is a high speed serial video interface to connect a remote automotive XGA TFT LCD display with 24 bit Parallel RGB Interface to a video processing system. Image enhancement features - dithering and white balance - optimize display performance. It uses TI's FPD-Link II SerDes technology to transmit uncompressed video data over shielded twisted pair cable

## **Featured Applications**

- Rear Seat Entertainment Systems
- Automotive Clusters
- HUD
- Navigation Systems

## **Design Resources**

[DS90UR905Q-Q1](#)

Product Folder

[EVM User's Guide](#)

Document

[DS90UR916Q-Q1](#)

Product Folder

[EVM User's Guide](#)

Document

## **Design Features**

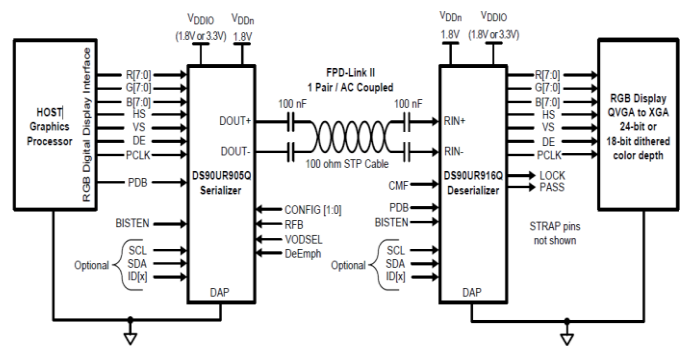
- Support XGA x 60 data rates
- Hardware dithering offers 24-bit image quality on 18-bit displays
- White balance adjustment
- Adaptive Equalizer auto calibrates for cable length, ageing and over temperature
- Built In Self-Test (BIST) ASIL B Applications

## **Design Photo**



**DS90UR916Q**

## **Block Diagram**



### **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>                  |
|-------------------------------|-----------------------------------------------------------------------|----------------------------------|
| <a href="#">DS90UR905Q-Q1</a> | 5-65MHz 24-bit Color FPD-Link II Serializer                           | <a href="#">EVM User's Guide</a> |
| <a href="#">DS90UR916Q-Q1</a> | 5-65 MHz 24-bit Color FPD-Link II Deserializer with Image Enhancement | <a href="#">EVM User's Guide</a> |

## **Design Considerations:**

The capability to drive multiple meters of cable in some cases with fewer wires between the physical interface of the host and the display, FPD-Link II technology is an ideal, cost optimized solution for high speed, low power and low EMI (spread spectrum generation and low voltage differential signal). The serial bus scheme greatly eases system design by eliminating skew problems between clock and data. Adjustable input equalization of the serial input stream provides compensation for transmission medium losses of the cable and reduces the medium-induced deterministic jitter. The DS90UR916Q provides features like white balance LUTs and adaptive Hi-FRC dithering to enhance image quality at the display (especially when displaying 24 bit images on an 18 bit display).

## **Quick Start Guide**

- 1) The following applies to the DS90UR905Q-Q1 serializer.
  1. The serializer typically would be the DS90UR905Q.
  2. Connect 24 bits of 1.8V or 3.3V RGB data with the clock input to J1
  3. Apply power to the serializer. Make certain PDB = *HIGH*
- 2) The following applies to the DS90UR916Q deserializer:
  1. Connect GND to J5
  2. Connect **1.8V** core power on J4.
  3. Connect GND to JP1 pin2.
  4. Connect 3.3V VDDIO power on pin 1 of JP1.
  5. Apply power to the deserializer.
- 3) Look for the green LED2 to light up on the DS90UR916Q EVK. If the green LED is lit and stable, then the DS90UR916Q is **LOCKED** to the FPD-LinkII serial stream. To be absolutely sure the DS90UR916Q is locked, use a scope to monitor off JP9 (pin 1 = LOCK, pin 2 = VSS)



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