ISL36411 Evaluation Board User Guide

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Introduction to the ISL36411DRZ-EVALZ Evaluation Kit

The ISL36411DRZ-EVALZ Evaluation Board is a versatile stand-alone printed circuit board developed to evaluate the performance of the Intersil ISL36411 11.1Gb/s Quad Lane Extender.

The evaluation kit includes:

- ISL36411DRZ-EVALZ evaluation board
- Power cable
- Four jumpers

The key features of the evaluation board are:

- ISL36411 IC
- Connection to external 3.3V power supply
- On-board voltage regulator that provides the 1.2V supply to the IC
- On-board boost selection using provided jumpers
- SMA connectors to access differential inputs and outputs

Operation of the ISL36411DRZ-EVALZ Evaluation Board

This section describes the setup of the ISL36411DRZ-EVALZ evaluation board: making sure proper power is applied, connecting to the high-speed RF inputs and outputs, and adjusting the levels of loss compensation (boost) applied by the ISL36411's four equalizing filters. The board is shown in Figure 1.

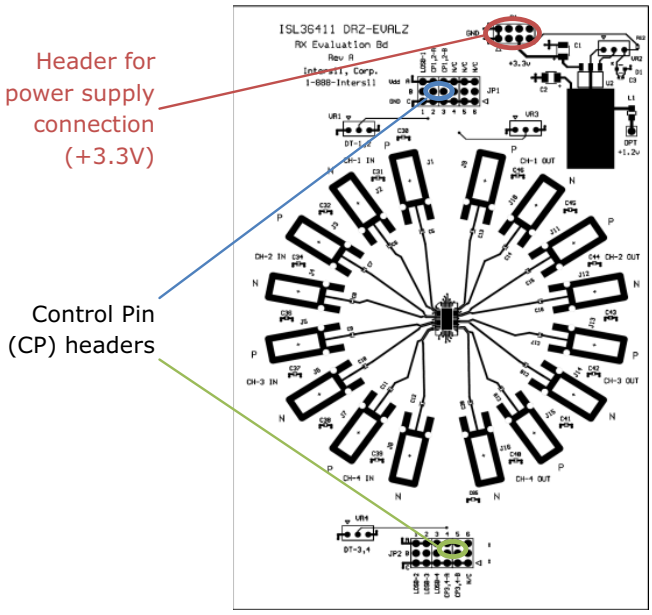

FIGURE 1. ISL36411DRZ-EVALZ EVALUATION BOARD

Power Supply

The board needs to be powered by an external +3.3V power supply via the power header located at the top of the board using the power cable provided. The red lead of the power cable should be connected to the +3.3V output of the external power supply while the black lead should be connected to the ground (-) terminal.

Typical current consumption of the board is 290mA when no input signal is applied and 310mA when a signal is applied to any one of the four high-speed inputs. Total board current will be approximately 370mA if all four channels are active simultaneously.

High-Speed Data I/O Interface Connectors

The Intersil ISL36411 Quad Lane Extender is intended to be used at the receive end of lossy differential copper channels. The four channels of the ISL36411 make it well-suited for high-density applications with parallel channels subject to frequency-dependent attenuation. The differential input(s) of the ISL36411 should be connected to the output side of the differential channel(s) under test (board traces or twin-axial cables). This connection should be made using the input SMA connectors labeled on the board. We recommend using phase (time-delay)-matched cables for each differential input to preserve the fidelity of the differential signal. The output SMA connectors provide access to the output differential signal(s) of the ISL36411 and can be connected to a scope or error tester for characterization. Make sure proper torque (5 in-lbs) is applied to the SMA connectors for reliable measurements and to prevent damage to the connectors.

The ISL36411DRZ-EVALZ evaluation board is designed to minimize parasitic board effects for transparent evaluation of the ISL36411's high-speed performance. Due to the extremely low-loss nature of the evaluation board's high-speed traces, all unused channels on the board should be terminated at the input and output SMA connections with 50 loads to minimize reflections, which can corrupt the performance of neighboring channels.

Boost Setting Control

Each of the four equalizing filters in the ISL36411 provide nine different levels (0 to 8) of adjustable loss compensation (or boost). The boost levels of Channels 1 and 2 are controlled simultaneously by the control pin (CP) headers located at JP1 on the north-side of the board and highlighted in blue in Figure 1. The boost levels of Channels 3 and 4 are controlled simultaneously by the control pin (CP) headers located at JP2 on the south-side of the board and highlighted in green in Figure 1. Boost levels are set by positioning jumpers on the appropriate header as illustrated in Figure 2. For both sets of headers, CP-A and CP-B can each be set to one of three values (Vdd, GND, or Floating). Table 1 gives the jumper positions required to achieve various boost levels. As an example, Figure 2 depicts the jumper positions that set the filter compensation level to boost 7 (CP-A = Vdd and CP-B = GND).

TABLE 1. JUMPER POSITIONS FOR BOOST SETTINGS

CP-A	CP-B	BOOST LEVEL
No jumper	No jumper	0
No jumper	Jumper to GND	1
Jumper to GND	Jumper to Vdd	2
No jumper	Jumper to Vdd	3
Jumper to Vdd	No jumper	4
Jumper to GND	No jumper	5
Jumper to GND	Jumper to GND	6
Jumper to Vdd	Jumper to GND	7
Jumper to Vdd	Jumper to Vdd	8

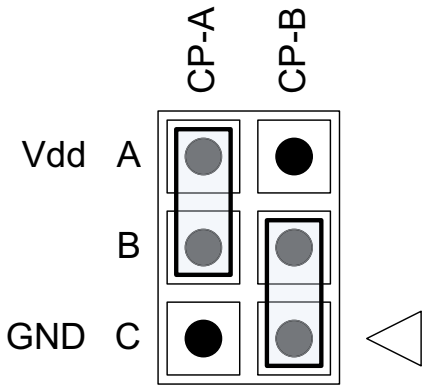

FIGURE 2. JUMPER CONFIGURATION TO ACHIEVE BOOST 7

LOSB Indicators

The ISL36411 provides an inverted Loss-Of-Signal (LOSB) output for each channel. The LOSB output for Channel 1 is located on header JP1 as labeled on the ISL36411DRZ-EVALZ evaluation board. The LOSB indicator pins for the remaining three channels are located on header JP2. When the high-speed input signal to a given channel on the ISL36411 is turned off or disabled, the output driver for that channel on the ISL36411 is disabled (muted). The differential output signal does not exceed 20mV$_{P-P}$ during this condition, and the voltage on the channel's LOSB indicator pin is pulled low (<250mV). During normal operation, when a high-speed signal is input to a channel on the ISL36411, the corresponding output driver on the IC is enabled, and the voltage on the channel's LOSB indicator pin is pulled high (>1V).

Baseline Performance

Figure 3 shows the signal quality improvement provided by the ISL36411DRZ-EVALZ evaluation board at 10.3125Gb/s. After transmission through a 10m 28AWG twin-axial cable, the eye diagram is closed (Figure 3A), and the digital information in the data stream is indiscernible. The ISL36411 compensates for the degradation occurring on the cable and recovers the transmitted signal (Figure 3B).

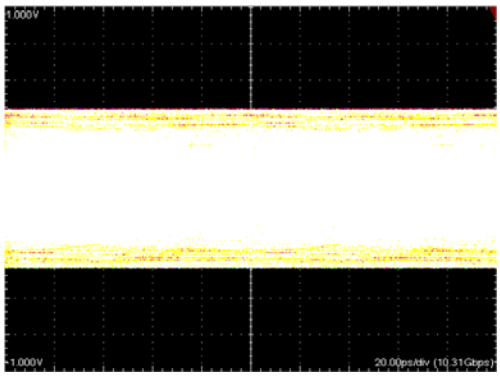

FIGURE 3A. 10.3125 Gb/s EYE DIAGRAM AFTER 10 METERS OF 28AWG TWIN-AXIAL CABLE (INPUT TO ISL36411DRZ-EVALZ EVALUATION BOARD)

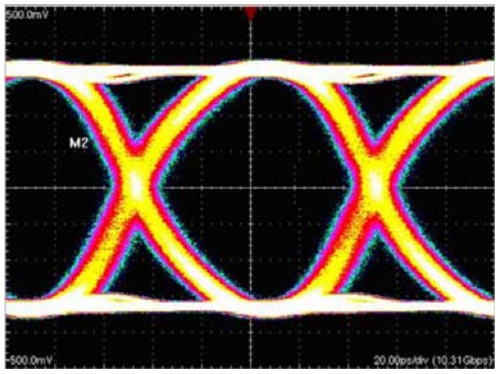

FIGURE 3B. 10.3125Gb/s EYE DIAGRAM AT ISL36411DRZ-EVALZ EVALUATION BOARD OUTPUT

FIGURE 3. ISL36411DRZ-EVALZ EXAMPLE PERFORMANCE

ISL36411DRZ-EVALZ Evaluation Board Schematic

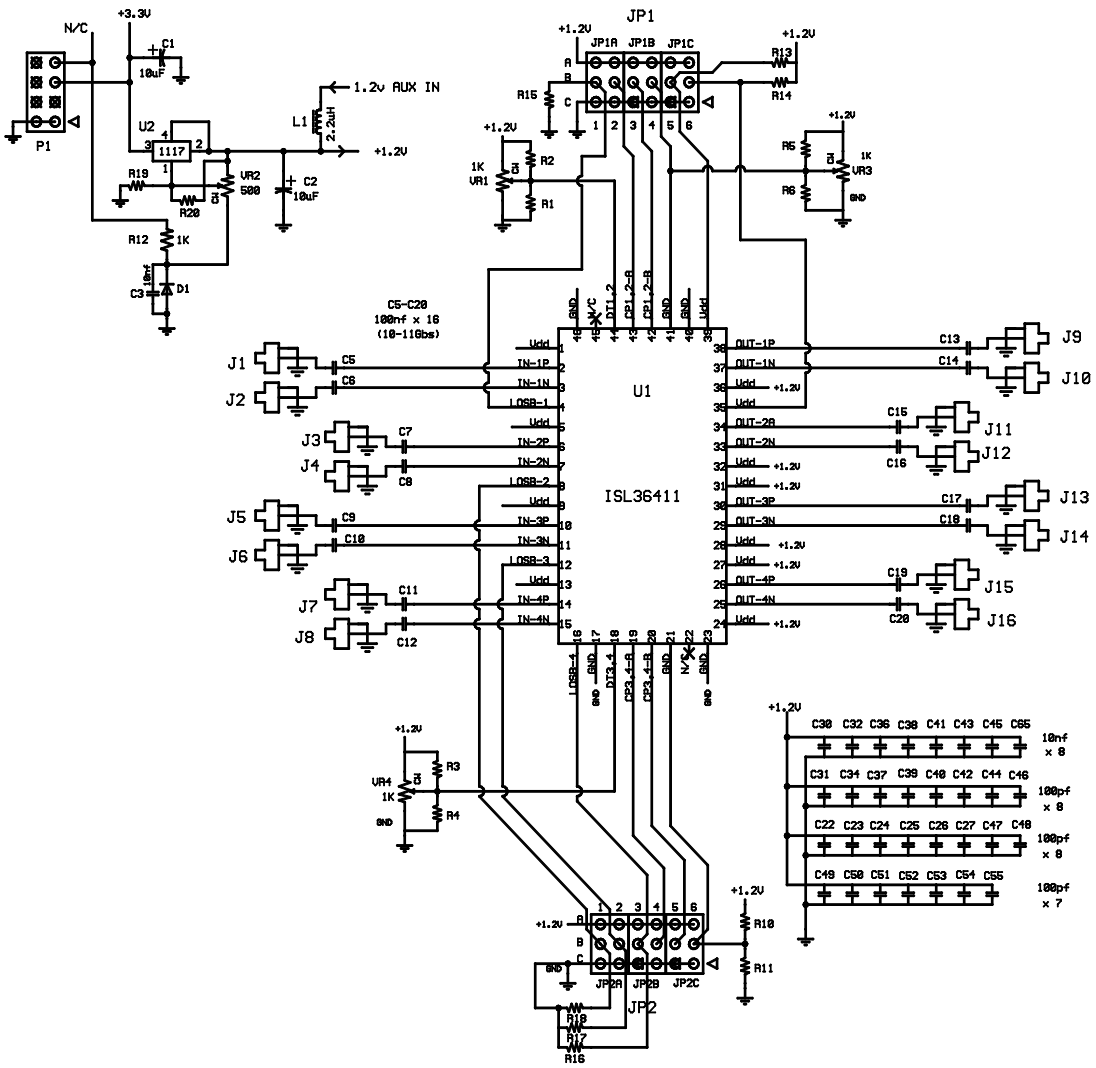

FIGURE 4. ISL36411DRZ-EVALZ SCHEMATIC