Serializer Design With MUX 4:1 And LVDS Driver

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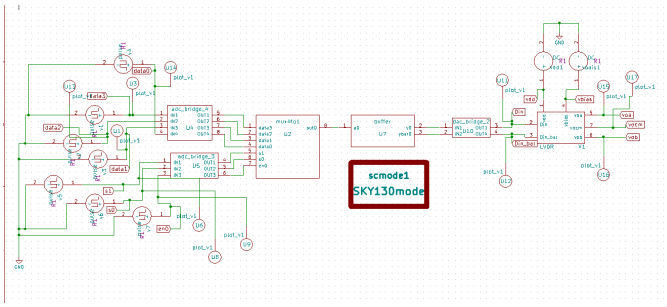
***Abstract*—This paper proposes the implementation of a Serializer with Low Voltage Differential Signaling (LVDS) based driver design using CMOS technology with 130 nm Technology. Serializer is a mixed block which uses a Multiplexer(MUX 4:1) Digital Block and LVDS Driver as Analog Block. Serializers are basic building blocks of High speed data transfer communication link. It also helps to reduce the no. of ports in multiport operations that can be multiplexed, serialized with the help of a Multiplexer and transmitted over a cable with LVDS Driver. This circuit will be designed with Skywater 130nm pdk and simulated using the eSim EDA tool developed by FOSSEE IIT Bombay.**

I. Circuit Details

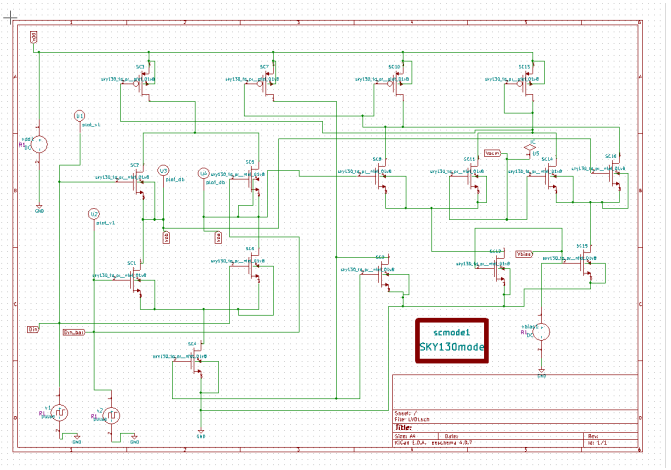
The Serializer Block diagram is shown in section II. It consists of MUX(4:1) digital Block which will convert 4 line parallel data into serial output. This output is then connected to Buffer to stream D and ~D which are complementary data signals. These two are 180 degrees out of phase with each other. The output of Buffer is then given to the LVDS driver.

Reference LVDS Driver circuit diagram is shown in section III. Here transistors M1, M2, M3 and M4 provide constant current when switched with the help of data signals from buffer i.e. D and ~D. The LVDS Driver will provide differential output signals Voa and Vob which are then used to drive 100-ohm transmission lines. When D = 1, M1 and M4 will turn on while M2 and M3 remain off. This will result in Vob = High and Voa = Low. When D = 0 the reverse will occr.

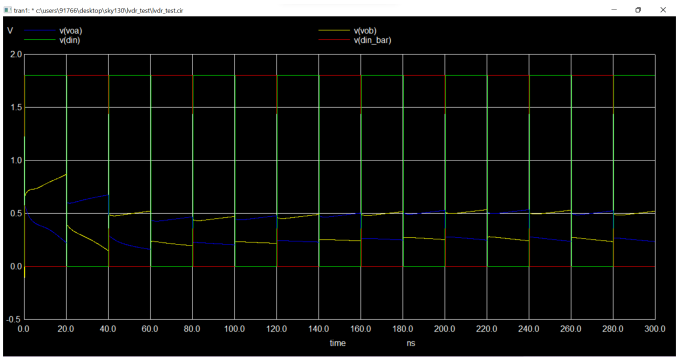
II. Serializer Block Diagram



II. Lvds Circuit Diagram



III. LVDS Driver Circuit Waveforms



Reference

[1] Hari Shanker Gupta, RM Parmar and R K Dave, "High-Speed LVDS Driver for SERDES ," *IEEE Conference Proc.*, July 2009.
[2] G. A. Graceffa, U. Gatti, C. Calligaro, "A 400 Mbps Radiation Hardened By Design LVDS Compliant Driver and Receiver," *IEEE Conference Proc.*, July 2016.
[3] Madhuri Kadam, Git-hub Repo,"https://github.com/MadhuriKadam9/Design-of-Serializer-with-LVDS-Driver