PHY to MAC interface (RX)

PHY: DP83620; MAC: Artix 7

Diagram

Description automatically generated

Frequency: 125Mhz

Driver PHY DP83620 waveform:



Receiver FPGA Artix 7 waveform with 22 ohm:



I can clearly see the non-monotonicity in the waveform even after providing 22 ohms series termination.

As per datasheet MAC-PHY interface can be routed upto 6 inches but it is degrading in 3 inches itself.

* Test case 1: Without any transmission line and load.

A picture containing line chart

Description automatically generated

Driver waveforms:



Observation:

Overshoot and undershoot is more (290 mV approx.)

* Test case 2: With transmission line and cap load

Diagram

Description automatically generated

Waveforms:

At driver side:



Load cap waveforms:



Observation: By adding termination line, non-monotonicity has been observed in the signal.

* Test case 3: With TL, cap load and series termination

A picture containing different

Description automatically generated

Driver waveforms:



Load cap waveforms:



Observation: After adding series termination still facing the same issue of non-monotonicity.

* Test case 4: With TL and 50 ohms resistive load.

A picture containing different

Description automatically generated



Load res waveform:



Observation: Voltage level reduced to 1.2V. It is supposed to be 3.3V

PHY to MAC interface (RX)

PHY: DP83620; MAC: Artix 7

Diagram, schematic

Description automatically generated

Freq: 25Mhz

Receiver FPGA Artix 7 waveform with 22 ohm:



Receiver FPGA Artix 7 waveform with 33 ohm:



Observation: With Artix 7 FPGA as load we can clearly see the non-monotonicity at both edges which will lead to increase in rise and fall time.