Experiment: Inter-symbol interference (ISI)

Summary:

The ISI experiment consists of expanding and improving both the ISI and the crosstalk experiment on the E3VB. The clock and the pseudo random function generator are included on board to allow the experiment to be run anywhere. If the user wants to make different observations the user can inject a new clock or digital patterns by disabling the built-in components and using provided jumpers.

Equipment:

Oscilloscope

3 Oscilloscope probes

USB A to mini USB B cable or a 5V power supply

Function generator optional.

Setup:

1. Plug in the USB to a computer that can supply 200 mA. The other end to the mini USB connector on the board. Alternatively you can use a power supply to provide power by plugging in to JP7 next to the USB connector.
2. Ensure the board is powered and the clock is working by probing the clock on JP6.
3. Use a jumper to select a clock frequency to run the experiments. Alternatively if you want to use a different frequency you can instead use a function generator with the desired frequency using a 5V amplitude.
4. Next, select the line you want to toggle and insert a jumper for the line or lines you want to use any of the headers described below:
   1. INV if you want to see the trace in the center only
   2. INA1 or INA2 to see the traces immediately next to the victim
   3. INA3 or INA4 to toggle the traces on the outside
5. You can probe the signals on the transmission line at near and far end by probing the headers labeled NE(XX) or FE(XX) where XX corresponds to the last two letters of the trace on the previous step.
6. If using the victim line (IN\_V) you can change the variable capacitor (C-TRIMM) and inductor then observe how the signal changes.
7. After we observe how the signal changes on the transmission line.  We can observe the signal thru one more buffer to see if the output signal is the same as the input signal or if anything was lost due to any changes made to the transmission line.

Changes/Updates Achieved:

Added pull up resistor and capacitor to enable the output of the XNOR.

Recommend Direction for Future:

Fix clock header (currently 8Mhz is before 4Mhz)

And add a switch to pull down and reset LFSR (sometimes get stuck)

Add label to variable inductor.