## ISI Add On Experiment

# Goal

* To demonstrate the difficulties encountered when designing a PCB specifically looking at signal degradation due to crosstalk and ISI. User will be able to see the effects of ISI and crosstalk on the outputs of multiple lines at high frequency.

# Detailed requirements:

* Powered by USB 2.0
* Include 1-8 MHz clock
* Have pseudo random pattern generator via LFSR
* Capable of injecting other signals external function generator.
  + External clock can be used
  + LSFR can be disconnected and other patterns used
* Have 1 victim trace with 2 aggressors at each side.
* Include test points near input and output
* Include variable discrete components (R,C,L) to affect transmission line properties
* User must be able to perform experiment using USB powered board and oscilloscope

# Equipment:

* Power source with USB 2.0 cable
* Oscilloscope

# Description

Before completing this experiment is recommended that the student completes and understands the crosstalk and the Intersymbol interference (ISI) experiment in the E3VB. ISI distortion is a result of previous symbols interfering with the current symbol. Crosstalk is a form of signal distortion that happens when the nearby traces interfere with each other. Both factors may affect signals at the same time. The experiment demonstrates the effect of both ISI and crosstalk either independently or simultaneously.

The new 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.