# Connector Reliability and Signal Degradation

## Outline

Connectors are mandatory in electronics and have become more important in business and everyday life. A connector provides a separable connections between elements inside an electronic system. This demo will demonstrate the reliability of different connectors in respect to how they affect the degradation of the signal passing though the connectors. One main point to focus on in this experiment is how ranging frequencies cannot be handled by common connectors and how they specifically change the signal.

Objective

To have a compact board that can either use an internal clock or an injected signal through connectors to witness the effects of common connectors and how they can degrade the signal when passing through them.

Success Criteria

For this to be successful, the following needs to be achieved using upper division lab equipment that would be available to college students:

* Minimum of 3 connectors fully connected on board
* Headers both before and after the connectors used to display the effects of said connector on the signal
* Be able to run all components off USB power
* Use of a demultiplexer to choose which connector is under test
  + Used to confirm they won’t interfere with each other
* Demultiplexer must able to handle high frequency signals (<100Mhz)
* Written lab document to instruct how to use the board to see the effects
* May have an internal adjustable clock used as the test signal
* Must have independent header for injection of foreign signal to be chosen by the user

Equipment

To be able to use this board, you must have access to the following equipment:

* Signal generator, signal source, or use of internal clock
* Oscilloscope with a minimum of two input sources
* USB power via wall adapter or computer port

Procedure

To start you must select a source of the signal. You can either use the onboard clock or use the supplied jumpers to inject the signal from an outside source. Then using the dip switches you must select which on board connector you want to test. The signal will route through the demux and to the selected connector. The lines on the board have been matched to the corresponding impendence of the connectors so no additional tuning is needed. Once the signal is setup, you will hookup an oscilloscope to the jumper before the connector and after the connector. Here you will be able to see the changes the connectors have on the signal. If using an external source, adjust the frequency and see how the signal breaks down the further you increase the frequency. Once one connector is tested, move to the next connector type and notice the changes it has at the same frequency. The connectors have been arranged on the board from lowest to highest max frequency. Once all connectors have been tested, try to figure out what the max frequency is for each. What effect would this have in a real world application.