Before Lab: Simulate SBL-1 Frequency Mixer using the LTspice template shown in class and illustrated in the SBL-1 LTspice screen shot on the web page. Download the SBL-1 data sheet to determine the pin connections, and note the more detailed connections described in class and in the LTspice simulations.

Lab 1 Task for the week of April 8-12 2013. Explore the use of the SBL-1 as a frequency mixer-multiplier with two high frequency input signals and a low frequency output signal. Note the relationship between frequency and phase among all three signals.

In the Lab week 1
Connect the SBL-1 using BNC clip lead cables to two signal generators, with wires to the prototyping strip for the IF port circuitry as discussed in class. Design or select a simple Low-Pass filter as shown in the screen shot and in class. Observe the IF port waveform with and without the low-pass filter. Observe the variation in IF output signal while varying the frequency and amplitude of the input signals connected to the RF port of the SBL-1. Note the complete symmetry inside the package: RF and LO inputs are interchangeable.

Capture a screen shot of the measured output waveform and an LTspice simulation using the same frequencies and amplitudes to compare simulation and measurements. Have the Lab TA check off the simulation and measurement by Wednesday April 17.

In the Lab week 2
With one signal generator, a T Connector, and a long cable, measure the phase detector sensitivity using the technique discussed in class. Compare results with LTspice simulations.

Lab Progress Report Due April 24:
Include Block Diagrams showing all of your lab setups, the schematic of the inside of the SBL-1 and your Low-Pass filter design, screen shots of your LTspice simulations of the SBL-1 as a frequency mixer and phase detector. This first lab report will be graded and commented, and you will need all of this information to proceed with the second lab.